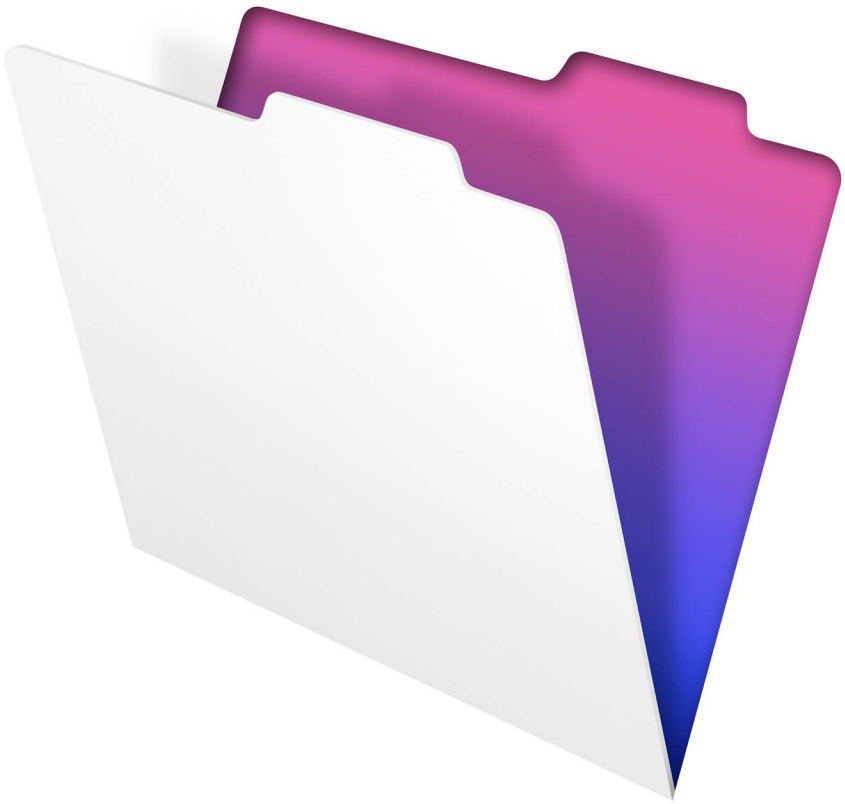
FileMaker® Pro 13

User's Guide



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For more information, visit our website at http://www.filemaker.com.

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Chapter 1
Introducing FileMaker Pro

FileMaker® Pro is the leading workgroup database software for quickly creating and sharing solutions adapted to your business needs. Powerful features, broad platform support, and an easy-to-use interface make FileMaker Pro indispensable for anyone in business, government, and education who needs to effortlessly manage all their information on iPad, iPhone, Windows, OS X, and the web.

About this guide

This *User's Guide* contains an introduction to FileMaker Pro features and provides step-by-step instructions on the most common FileMaker Pro tasks. You may need to refer to FileMaker Pro Help for detailed information on more advanced product features.

To send your feedback on this guide, see http://www.filemaker.com/company/documentation_feedback.html.

Using FileMaker Pro documentation

The FileMaker Pro documentation provides a learning path to productivity, installation instructions, online Help, and more.

The following manuals are included:

- *FileMaker Pro User's Guide* (this manual): contains key concepts and basic procedures
- *Installation and New Features Guide for FileMaker Pro and FileMaker Pro Advanced*: contains installation instructions and a list of the new features in the current version
- *FileMaker ODBC and JDBC Guide*: describes how you can use FileMaker software as an ODBC client application and as a data source for ODBC and JDBC applications
- *FileMaker SQL Reference*: describes the SQL statements, expressions, and functions supported by FileMaker
- *FileMaker WebDirect™ Guide:* describes how to make FileMaker Pro layouts hosted by FileMaker Server accessible to web browser users over an intranet or the Internet

Where to find PDF documentation

To access PDFs of FileMaker documentation:

- In FileMaker Pro, choose **Help** menu > **Product Documentation**.
- Visit http://www.filemaker.com/documentation for additional documentation.

FileMaker Pro Help

FileMaker Pro Help provides comprehensive step-by-step instructions on FileMaker Pro features. You can open Help from the Help menu in FileMaker Pro.

There are three ways to access Help:

- Browse the Help table of contents to locate topics by subject.

- Search for particular topics by entering keywords.
- Get information about the currently displayed dialog box by pressing F1 (Windows) or Command-? (OS X). Some dialog boxes display a  (Windows) or  (OS X) button or a **Learn More** link, which you can also use for getting information about the dialog box.

Getting Started tour

You can explore FileMaker Pro through the interactive Getting Started tour. Practice creating, modifying, and deleting records; and learn about searching for data values and sorting records, displaying data in charts and reports, and importing and exporting data between files. You'll also get to know the rich features FileMaker Pro provides for creating your own custom solutions.

To access the tour, choose **Help** menu > **Product Documentation** > **Getting Started Tour**. Or, use FileMaker Quick Start (see “Opening files” on page 16).

Starter Solutions

FileMaker Pro includes Starter Solutions (database template files) that you can use to quickly get started designing your FileMaker Pro database solutions. Starter Solutions take advantage of the best new FileMaker Pro features. Whenever you start creating databases, check the list of Starter Solutions to see if one is available that suits your needs.

You can access Starter Solutions when you open files (see “Opening files” on page 16).

You can find more information, tips, and database ideas on the FileMaker website at http://www.filemaker.com.

Suggested reading

Here are some suggestions for using the documentation to help you learn how to do specific tasks in FileMaker Pro.

Type of user	Suggested reading
Data entry person	Chapter 2, “Using databases,” in this guide
Small business owner or educator who creates a basic database to start, then improves it over time	Chapter 3, “Creating databases,” in this guide. As features are added to the database, refer to Help
Database administrator	▪ All chapters in this guide ▪ Help, for information on advanced topics ▪ *FileMaker ODBC and JDBC Guide* and *FileMaker SQL Reference*
New FileMaker Pro user	▪ *Installation and New Features Guide for FileMaker Pro and FileMaker Pro Advanced* ▪ All chapters in this guide
User upgrading from a previous version	▪ *Installation and New Features Guide for FileMaker Pro and FileMaker Pro Advanced* ▪ Chapter 7, “Converting databases from FileMaker Pro 11 and earlier,” in this guide

Note If your database was developed using FileMaker Pro Advanced, you may see customized menus or tooltips for layout objects. For an overview of these features, see Help.

FileMaker Pro overview

Here is an overview of the capabilities of FileMaker Pro.

Creating simple or complex database solutions

With FileMaker Pro you can create simple database solutions (database files) consisting of just one database table, such as for customer information, or you can create a complex database with relationships and multiple database tables. For example, you can create a complex database that relates two tables based on a single common value, such as a serial number or an ID number.

A database consisting of one table

A database consisting of multiple tables, with a portal to display records from a related table

You can organize your databases as a single table in a single file, as multiple tables in a single file, or as multiple tables in multiple files.

FileMaker Pro provides Starter Solutions designed for business, education, and personal purposes. The templates can be quickly customized to suit your needs.

For more information, see chapter 3, “Creating databases.”

Using layouts to display, enter, and print data

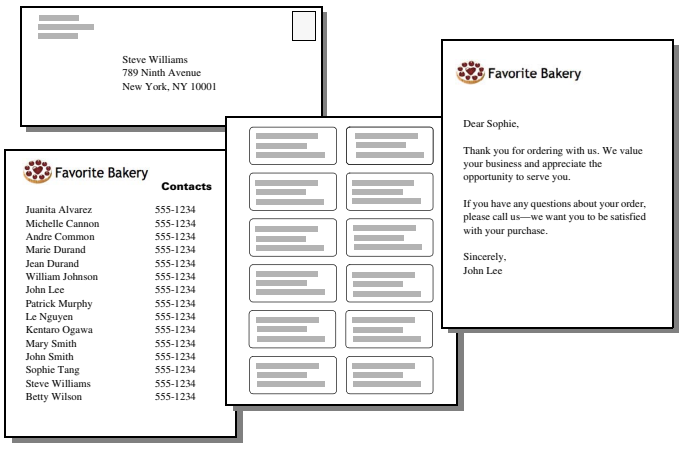
FileMaker Pro layouts determine how information is organized for viewing, printing, reporting, finding, and entering data. Layouts do not store your data—they just display it.

Database files can have many different layouts, which display data in a variety of ways. Within one database file you can design separate layouts for entering data, reporting summaries, printing mailing labels, displaying data graphically in charts, working with a database in a web browser or on a touch device, and so on. You can change a layout’s design without affecting the data or other layouts in the file. When you change the data in a field, the changes are reflected in the same field on all the layouts in the database.

In a layout, you choose, arrange, and modify fields and field labels, create reports, add buttons to initiate scripts, add graphics and text, and specify printing options.

Not all information needs to be stored in your FileMaker Pro database. For example, you can add a *web viewer* to display a web page on a layout. There are some restrictions for displaying web content in FileMaker Pro.

Choose different layout types in the New Layout/Report assistant. Use these different layout types for various purposes, like displaying a data entry screen on a computer or an iPad, or printing a totaled sales report or formatting data as mailing labels. You can customize each layout further by using the design tools that are available in Layout mode.



The same data can be arranged differently with multiple layouts

For more information, see “Creating layouts and reports” on page 73.

Finding, sorting, and replacing data

Features for finding, sorting, and replacing data allow you to manipulate your data in many ways.

You can find records that meet criteria you specify, such as records entered on a certain date or addresses in a particular city. You can open another window in order to perform different searches on the same data.

You can rearrange records in order to view or print them in a different sequence. For example, you can sort fields alphabetically, numerically, by date, or by a custom sort order.

You can search for and replace data across multiple fields, similar to the way you find and replace data in word processing applications. You can also save a found set of records as a snapshot link and send the link to another person.

For more information, see “Finding records” on page 31, “Sorting records” on page 43, and “Finding and replacing data” on page 42.

Protecting databases

You can restrict what users see and do in a database file by defining accounts and privilege sets. Accounts authenticate users who are attempting to open a protected file. Each account specifies an account name and (usually) a password. Any user that cannot specify valid account information won’t be able to open a protected file. A privilege set specifies a level of access to a database file. Each account is assigned a privilege set, which determines the level of access when someone opens a file using that account.

Extended privileges determine the data sharing options that are permitted by a privilege set, such as whether a privilege set permits users to open a shared file or view a database in a web browser.

You can further protect a file by authorizing other FileMaker Pro files to create references to the schema (tables, layouts, scripts, and value lists) in that file, and by preventing a file from being opened with a version of FileMaker Pro, FileMaker Go®, or FileMaker Server that's earlier than the specified version.

For more information about FileMaker Pro database security, see chapter 6, “Protecting databases.”

Creating scripts to automate tasks

Scripts can do simple tasks like setting print orientation, or complex tasks like preparing a customized mailing to customers.

For example, you could define a script that creates a thank you letter to customers in your database who have made a purchase in the last week. The script composes a letter customized to each customer. The script then switches to Preview mode and pauses so that you can see what the letter looks like before it prints. The whole task is started by clicking a button on a layout.

You can build scripts by selecting from a list of FileMaker Pro script steps, specifying options, and arranging the steps in the correct order to perform the task. FileMaker Pro makes it easy to manage and maintain scripts, even for complex databases. You can simultaneously view, edit, and manage scripts from different databases. For more information about scripts, see “Automating tasks with scripts” on page 49.

You can also set up script triggers to specify that scripts run when particular events occur. For more information, see Help.

Sharing and exchanging data

A benefit of storing data in FileMaker Pro is sharing your data with others. You can share your data with other FileMaker Pro or FileMaker Go users on a network, or import or export data from another file. In addition, you can use ODBC (Open Database Connectivity) and JDBC (Java Database Connectivity) to share FileMaker Pro files with ODBC- and JDBC-compliant applications, or you can access data from external data sources. If you have FileMaker Server, you can use FileMaker WebDirect to publish databases hosted by FileMaker Server to share data over the web, and you can upload files to FileMaker Server.

If your computer is connected to a network, you and other FileMaker Pro or FileMaker Go users can use the same FileMaker Pro database file simultaneously. FileMaker Pro Network sharing supports the sharing of files with up to 5 concurrent users.

Note To support more users and web publishing technologies such as XML, PHP, and FileMaker WebDirect, FileMaker recommends the use of FileMaker Server.

You can set up a FileMaker Pro file to automatically update data imported from another application such as Microsoft Excel. Recurring import occurs automatically the first time you view the layout containing the data from the external file. Later, you can run a script to update data. For more information about recurring import, see “Setting up recurring imports” on page 130.

For more information about sharing and exchanging data, see chapter 5, “Sharing and exchanging data.”

Saving and sending data in other formats

FileMaker Pro lets you save data in different file formats, such as Microsoft Excel worksheets and Adobe PDF files, so you can give the files to users who do not have FileMaker Pro. You can automatically email the files after saving them. For more information, see “Saving and sending data in other formats” on page 130.

Chapter 2
Using databases

This chapter explains the basics of how to:

- open, close, and save files
- create records in a database
- add and edit data in fields
- find records using different criteria
- omit records from the found set
- find and replace data
- sort data
- print data, scripts, table and field information, and the relationships graph
- use scripts

See Help for detailed, comprehensive information and step-by-step procedures about using FileMaker Pro.

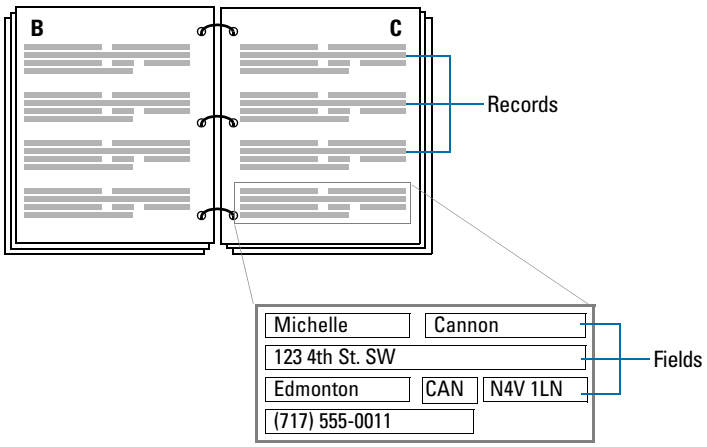
Note Some procedures refer to using a shortcut menu. To display a shortcut menu (context menu), right-click or Control-click an object or area to see a list of commands. You can use the Control Panel (Windows) or System Preferences (OS X) to configure your mouse, trackpad, or input device. For example, you can set up a secondary button on a mouse.

About database fields and records

A *database* is a collection of information, or data, that you can organize, update, sort, search through, and print as needed. Unlike an electronic *spreadsheet*, which is used to tabulate and calculate data stored in the cells of a rectangular table, a database is a collection of knowledge tied together by a schema that describes the organization of database tables, their fields, and the relationships between the fields and tables.

Certain tasks are better suited to each of these important business productivity tools. Spreadsheets are best used for tasks such as maintaining a business ledger, where data needs to be recorded and calculated, but not presented or analyzed in multiple formats. Databases are best for tasks such as inventory control, where you need to track consumption and losses and generate reports on inventory status over time. An inventory database can sort and report on inventory information in many ways, allowing you to analyze data by item type, by sales figures, by monthly consumption, and so on.

Your own address book or filing cabinet is an example of a simple database. With the address book and filing cabinet, you store similar pieces of information organized for easy retrieval. With a filing cabinet, you must choose a way to sort your data, for example, alphabetically by last name or by region. By storing contacts and addresses in FileMaker Pro, you can organize your information in many ways. You can sort your information by country, city, last name, or even sort by all three of these fields.



Your address book is like a database

An invoicing system is an example of a more complex database, with multiple related tables, multiple layouts, and calculated fields.

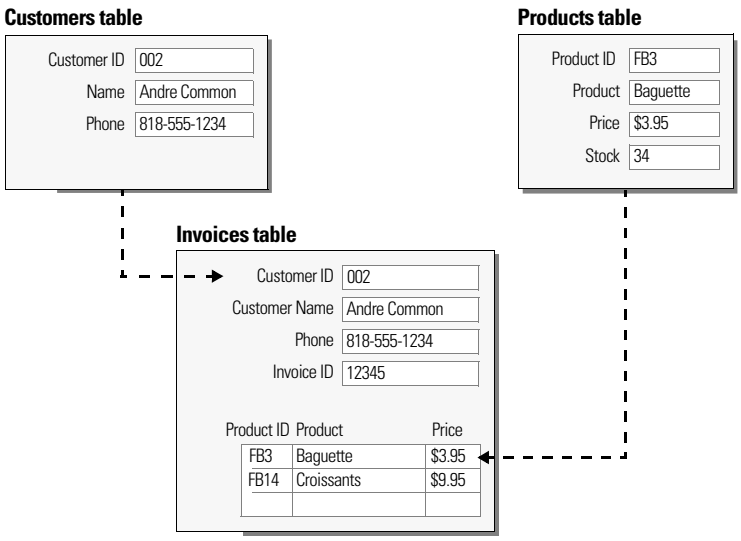
You can also view a subset of your data; for example, view only invoices for a particular month. A database doesn't just hold information—you use a database to organize and analyze information so that you understand its significance.

Fields are the basis of a database *table*. Fields are used to store, calculate, and display the data you enter into a *record*. Each piece of information in a record—like name, ID number, and telephone number—is stored in a field.

A database *table* contains one or more fields that hold similar information about one subject or activity. For example, the fields on a record in the Customers table contain address information for one customer. Tables also define the organization of records based on that table.

A database can consist of one file with one table, which might hold the names, addresses, and telephone and fax numbers of all your customers. A database can also consist of several files, each of which can contain one or more tables that, together, contain all the information about related topics (sometimes called a *database system*). Using the relational capabilities of FileMaker Pro, you can join information between files and tables to create a *relational database*.

For example, one table can show you which customers bought a particular item and a related table can show how much they paid.



To enter data in a database table, you make a new record and enter values into the fields that belong to that record. Values can be typed into a field, imported from another application, or entered in a number of other ways.

FileMaker Pro also allows you to access and view data that is stored in non-FileMaker Pro files. For example, if you have access to data stored in a SQL database, you can display information from the external database and work with that data in your FileMaker Pro file.

Opening files

To open a file if FileMaker Pro isn't running

Choose one of the following methods:

- Double-click the FileMaker Pro file.
- Drag the file onto the FileMaker Pro application icon.
- Double-click the FileMaker Pro application icon and choose the file you want to open. If you see the Quick Start Screen, see "To open a file using FileMaker Quick Start," below, for more information.

To open a file if FileMaker Pro is already running

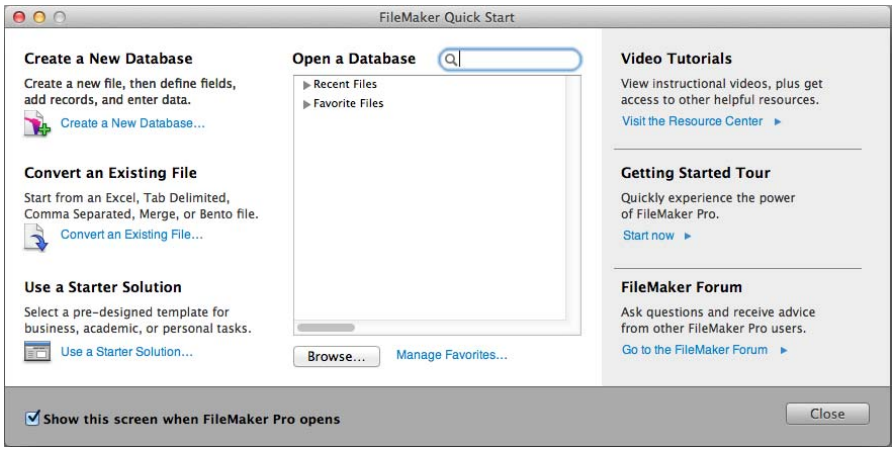
1. Choose **File** menu > **Open**.

   Tip You can also choose **File** menu > **Open Recent** or **File** menu > **Open Favorite**.

2. In the Open File dialog box, select the filename and click **Open**.
3. If you're asked for an account name and password, type them in the Password dialog box, then click **OK**.

To open a file using FileMaker Quick Start

1. To have the Quick Start Screen appear, do one of the following.
   - Start FileMaker Pro.
   - If FileMaker Pro is running or if you start FileMaker Pro and you don't see the FileMaker Quick Start Screen, choose **Help** menu > **Quick Start Screen**.



FileMaker Quick Start Screen (OS X)

2. When the FileMaker Quick Start Screen appears, do one of the following.

Do this	To
Click **Recent Files** in the box at the center of the Quick Start Screen	Display a list of FileMaker Pro files that you have recently opened. If no recent files are listed, choose **Edit** menu > **Preferences** (Windows) or **FileMaker Pro** menu > **Preferences** (OS X), select **Show recently opened files**, enter a value from 1 to 30 indicating the number of recent files you want to display in the list, then click **OK**. (To remove the list of recently opened files, choose **File** menu > **Open Recent** > **Clear Recent Files**.)
Click **Favorite Files** in the box at the center of the Quick Start Screen	Display a list of FileMaker Pro files that you have marked as favorite.
Click the host name or IP address of a remote computer	Display a list of FileMaker Pro files stored on a remote computer.
Click **Browse**	Locate the local or remote files that you want to open.

3. Double-click a file to open it.

The FileMaker Quick Start Screen provides a central place where you can do several tasks in a variety of ways. In addition to opening files, you can:

- Create and design a new empty FileMaker Pro file. See “Creating a FileMaker Pro file” on page 55.
- Convert a file of a different format (such as Microsoft Excel) that already contains data. See “Converting a data file to a new FileMaker Pro file” on page 134.
- Create files using empty predesigned Starter Solutions provided by FileMaker, Inc. See “Creating a FileMaker Pro file” on page 55.
- Work with the Getting Started tour. See “Getting Started tour” on page 9.

For more information about using FileMaker Quick Start, see Help.

To open a file that is being shared over a network

1. Choose **File** menu > **Open Remote**.
2. In the Open Remote File dialog box, select **View** for a list of hosts.

Choose	To display
Favorite Hosts	Hosts you previously added as favorites
Local Hosts	FileMaker Pro hosts on your TCP/IP subnet
Hosts Listed by LDAP	FileMaker Pro hosts available through the specified LDAP server

3. To see the available files from a host, select the host. In the **Available Files** list, select the file you want to open.

   Or, for **Network File Path**, type the network path (for example, `fmnet:/hostIPaddress/fileName`).

4. Click **Open**.

   Windows: Depending on how FileMaker Network sharing is configured on the host, you might be required to enter an account name, password, and domain name.

Keep the following points in mind:

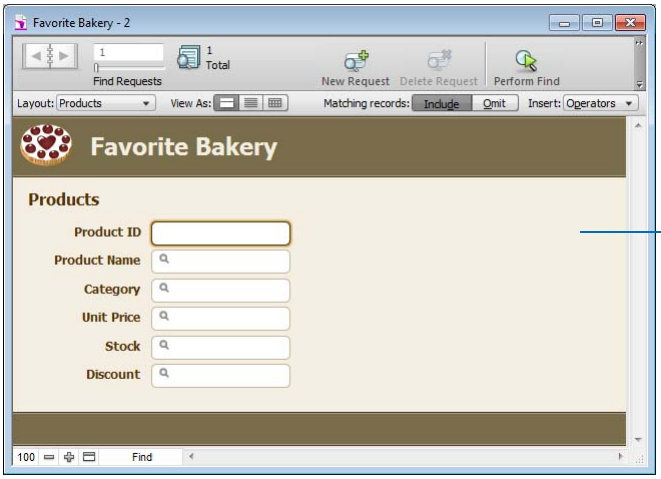
- If **Show recently opened files** is selected in the General preferences, files you have recently accessed appear in the list of recently opened files (by choosing **File** menu **Open Recent** or by clicking **Recent Files** in the FileMaker Quick Start Screen). See Help for information about adding local or remote files to the Favorite Files list in the FileMaker Quick Start Screen.
- To open and share a file, see “Enabling file sharing and hosting files” on page 125.
- You can open FileMaker Pro files created in Windows on a computer running OS X, and vice versa. If you intend to move files across platforms, it’s best to include the .fmp12 extension in the filename. If you add or remove filename extensions, you must redefine the FileMaker data sources for related files and for files with external scripts.
- You can set a default account name and password for a file in the Open tab of the File Options dialog box. When you do so, users automatically log in using a specific account and password (if specified) when they open a database. For more information, see Help.
- When a file you are opening is hosted, you may see an icon in the lower-left corner of the FileMaker Pro window. This icon indicates the security level of the connection to the host. A  icon means the connection is encrypted (SSL). A  icon means the connection is encrypted (SSL) and verified with a certificate. For more information, see your database administrator.

Opening multiple windows per file

You can open more than one window per file. This allows you to view the same layout in separate windows, or simultaneously view different layouts in the same file. You can perform find or sort operations independently in the different windows.

To open an additional window, choose **Window** menu > **New Window**. Another window appears. Initially, the window displays the same layout, sort order, and found set as the previously active window.

The original database window, in Browse mode, in which you can view the records



A second window, in Find mode, in which you can perform a different search on the same found set

To view a different layout in the new window, choose a layout from the Layout pop-up menu in the layout bar, or choose **View** menu > **Go to Layout**. For information on finding records, see “Finding records” on page 31. For information on sorting records, see “Sorting records” on page 43. For more information about opening multiple windows, see Help.

Closing windows and files

You can close FileMaker Pro windows and files as you would in most Windows and OS X applications.

To close a window, do one of the following:

- Windows: Double-click the document icon in the upper-left corner of the document window.
- Windows: Click the close box in the upper-right corner of the document window.
- OS X: Click the red close button in the upper-left corner of the document window.
- Choose **File** menu > **Close.**

To close a file, use the procedures above to close all the open windows for a file.

Note Even if you close a file, it may remain open as a hidden file if the window of any other file is displaying data from that file. (For example, another window may be displaying related data from the file you attempted to close.) FileMaker Pro will close the file when you close all the dependent windows.

Saving files

By default, FileMaker Pro automatically saves changes to your data as you work, so there is no Save command. If you want more control over when record data is saved, you can clear the **Save record changes automatically** option (in the Layout Setup dialog box) individually for each layout. For more information, see Help.

You can save a copy of your file as a backup or save a clone of your file with no data. To save a copy of your file in a non-FileMaker format, see “Saving and sending data in other formats” on page 130.

Important Always save a copy of a file before you make extensive changes. You can’t restore data after you delete a field from the Manage Database dialog box (or the Field Picker dialog box) or remove records using the **Delete Record** or **Delete All** commands.

To save a copy of your file:

1. Make the file you want to save the active file, and choose **File** menu > **Save a Copy As**.

2. Navigate to where you want to save the copy on your hard disk.

3. For **File name** (Windows) or **Save As** (OS X), type a filename.

4. Windows: For **Save as type**, choose **FileMaker Files**.

5. For **Save a** (Windows) or **Type** (OS X), choose one of the following options:

Choose	To
Copy of current file	Duplicate the entire file, including the tables, field definitions, layouts, scripts, page setup options, and data. Duplicating a file is useful before you make extensive changes to the file.
Compacted copy (smaller)	Compact the entire file into less disk space by reclaiming unused space in the file. Saving a compacted copy is useful if you edit many records frequently.
Clone (no records)	Save a file's tables, field definitions, layouts, scripts, and page setup options, without the data. Make a clone when you want a template of the file schemas.
Self-contained copy (single file)	Create a copy of the current file with all container data that is stored as a file reference or stored externally (by both open and secure storage) embedded in the file's container fields.

Note To have a copy of a file that includes container data that's stored externally, choose **self-contained copy**. The **copy of current file** and **compacted copy** options do not copy externally stored data. To use either of those options, you'll need to embed data in the container fields first. For more information, see Help.

6. Click **Save**.

What FileMaker Pro doesn't save

FileMaker Pro doesn't save changes to the state of a file, if they are the only changes you make while the file is open. For example, here are some changes that are not saved:

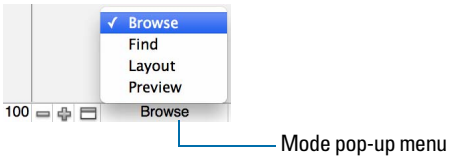
- Displaying a different record or layout
- Sorting records or modifying a sort order
- Performing find operations such as Find, Show All Records, Omit Record, or modifying a find request
- Changing the position and size of windows or opening a new window
- Showing or hiding the status toolbar
- Changing ruler display settings
- Changing the unit of measure

For example, if you open a file, sort records, and then close the file, FileMaker Pro does not save the sort order. However, if you open a file, add a new record, sort the records, and then close the file, FileMaker Pro saves the sort order as well as the new record.

For more information about saving files, see Help.

About modes

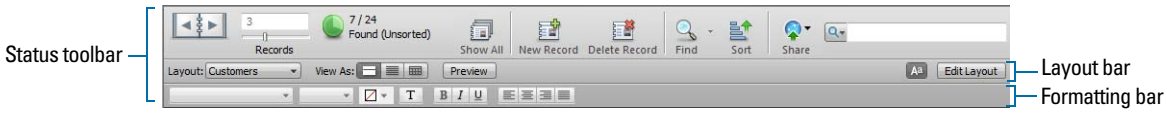
You work with data in FileMaker Pro in Browse, Find, Layout, or Preview mode. You can choose a mode from the View menu or from the mode pop-up menu at the bottom of the document window.



Use this mode	To
Browse mode	Work with the data in a file. You can add, view, change, sort, omit (hide), and delete records. Browse mode is where you'll do most of your work, such as data entry.
Find mode	Search for particular records that match a set of criteria. You can then work with this subset of your records, called the *found set*. After you find a group of records, FileMaker Pro returns to Browse mode so you can begin working with them.
Layout mode	Determine how information is presented on your screen or in printed reports, labels, and forms. Design layouts for specific tasks, like data entry or printing invoices or envelopes. Select and arrange fields and other objects to modify an existing layout or create new layouts.
Preview mode	See how data in forms or reports will look before you print. Preview mode is especially useful for viewing layouts with multiple columns (like mailing labels) and reports with summaries.

Using the status toolbar

The status toolbar provides quick access to many FileMaker Pro menu commands. In all modes, it includes navigation tools, customizable buttons, and a layout bar for working with layouts. In Layout mode, it includes layout tools. Move the pointer over a button to see its description. You can also switch modes by clicking buttons in the status toolbar. The buttons in the status toolbar vary depending on which mode you're in.



In Layout mode, you can also use the Inspector when you format and edit objects on a layout. For more information, see "Using the Inspector to format objects" on page 83.

For more information about using the status toolbar, see Help.

Viewing records

FileMaker Pro provides three views of each layout: form, list, and table. When you change views, you temporarily change the way records display or print.

To view records	Do this in Browse mode or Find mode
Individually	Choose **View** menu > **View as Form**, or click **Form View** in the layout bar.
In a list	Choose **View** menu > **View as List**, or click **List View** in the layout bar.
In a spreadsheet-like table	Choose **View** menu > **View as Table**, or click **Table View** in the layout bar. Each row displays a record, and each column displays a field. For information about working with data in a spreadsheet-like table, see "Working with data in Table View" on page 29.

The following illustration shows the same layout in three views.

Form View

List View

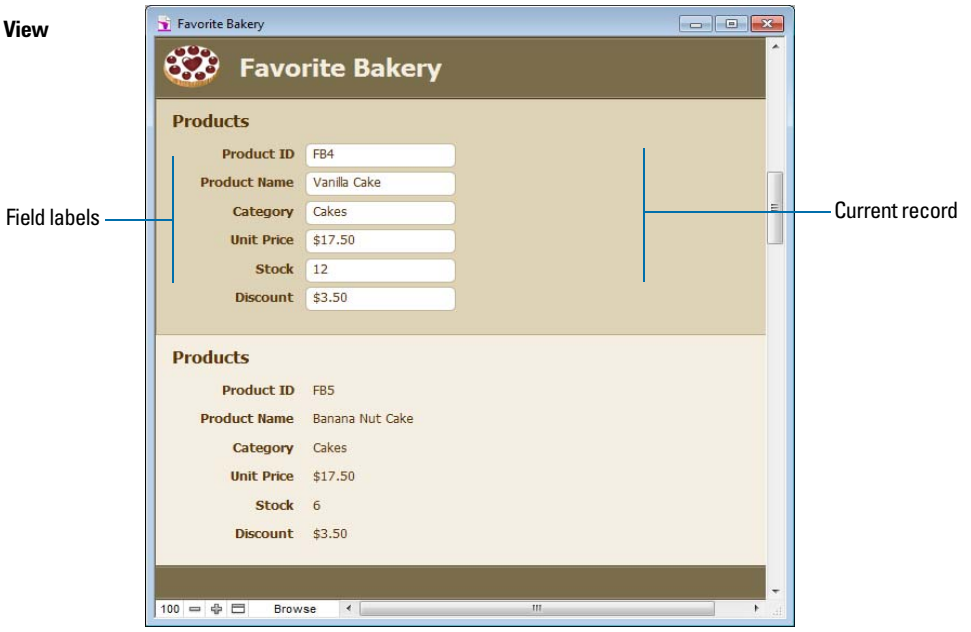
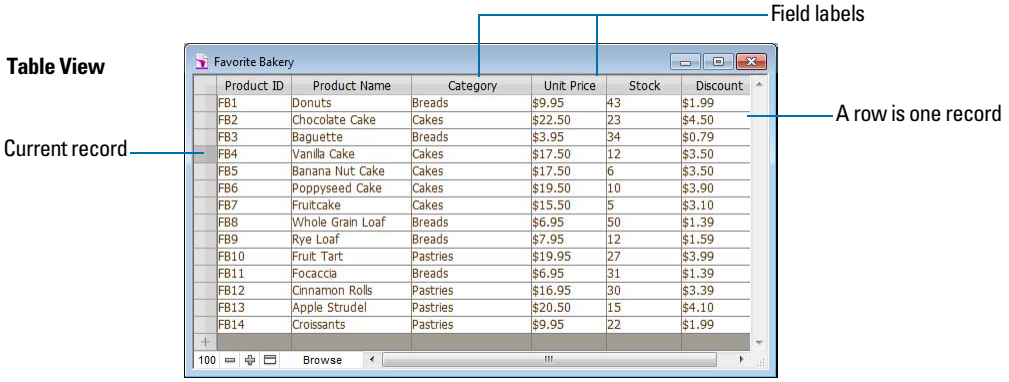


Table View

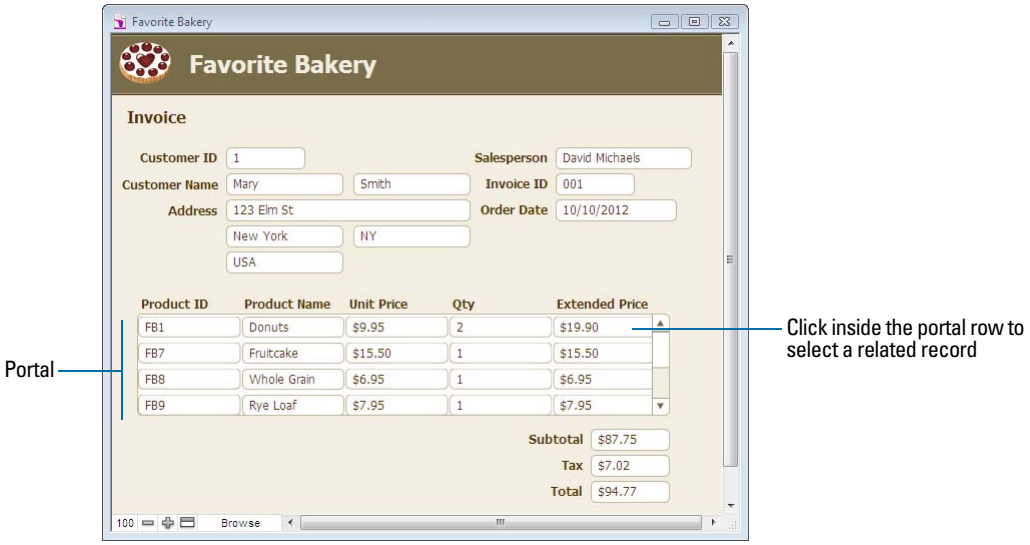


Selecting the current record

In Browse mode, a table has one current (active or selected) record at a time for each window. For more information about moving through records, see “Moving through records” on page 24.

In this view	The current record is
Form View	The record that you’re displaying. To select another record and make it the current record, move to the other record.
List View	The record that has a different fill from the other records. To select another record and make it the current record, click that record or use controls in the status toolbar. The current record can also be indicated by a solid vertical bar along the left side.
Table View	The record that’s highlighted in the record margin at the left of the record. To select another record and make it the current record, click that record or use controls in the status toolbar.

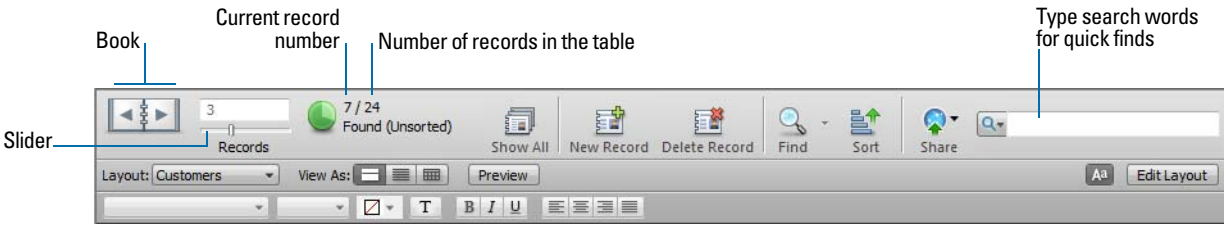
To select a related record in a portal, select the portal row (click inside the row but outside any fields in the row).



For information about related records and portals, see chapter 4, “Working with related tables and files.”

Moving through records

To move from one record to another, use the book in the status toolbar.



To move	Do this
To the next record in the current table	Click the right page of the book or choose **Records** menu > **Go to Record** > **Next**.
To the previous record in the current table	Click the left page of the book or choose **Records** menu > **Go to Record** > **Previous**.
Quickly to a specific record	▪ Click the current record number, type the record number you want, then press Enter (Windows) or Return (OS X). ▪ With the current record selected, press Esc, type the record number, then press Enter or Return. ▪ Choose **Records** menu > **Go to Record** > **Go To**, then type the number of the record.
Quickly through records	Drag the slider right or left to move forward or backward.
Through records in List View or Table View	Use the scroll bar on the right side of the window.
To a record with a unique value that you know	See “Finding records” on page 31.

You can also use a mouse scroll wheel to move through records. For more information about viewing records, see Help.

Adding and duplicating records

When you add or duplicate records, FileMaker Pro stores new records at the end of the current table. In Browse mode, you see the new record after the current record, or after the last record in the found set (the set of records made active by a find request).

- If records are sorted, by default the new record appears in the correct position in the sort order when you commit the record. For information about changing this setting, see Help.
- If records are unsorted, the new record appears after the last record in the found set. For more information, see “Sorting records” on page 43.

To	Do this in Browse mode
Add a new blank record	In Browse mode, click **New Record** in the status toolbar. You see a blank record with one field selected.
Quickly add a record with the same or similar data as an existing record	Select the record to duplicate. Then, choose **Records** menu > **Duplicate Record**.
Add or duplicate related records	See “Adding and duplicating related records” on page 26.

Note If a file is locked or write-protected, or if you don’t have access privileges to create records, FileMaker Pro will not add or duplicate records.

If the field is defined to automatically enter field values, you see those values entered in the new record. See “Defining automatic data entry” on page 68.

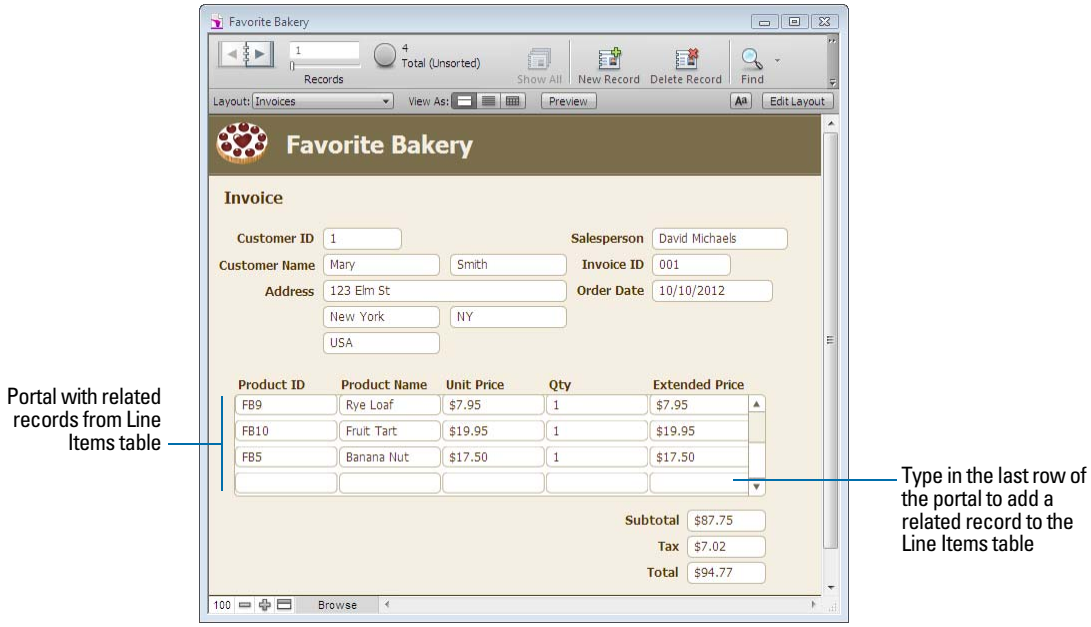
To enter or change values in the new record, see “Entering and changing data in fields” on page 28.

Adding and duplicating related records

If you're working with records in related tables, you can add records to a related table when you enter data in a record in the current table.

Note You can only add related records from the current table if the relationship is defined to allow the creation of related records. If a related table is in a write-protected file, or if you don't have access privileges to create records, FileMaker Pro will not add or duplicate records. For more information, see "Creating relationships" on page 118.

To	Do this in Browse mode
Create a record in the current table	Click **New Record** in the status toolbar.
Add a record to a related table	▪ If the related field is in a portal, type data into the field in the last (empty) row of the portal, then commit the record (for example, by clicking anywhere outside the record or selecting another record). ▪ If the related field isn't in a portal, type data into the field, then commit the record (for example, by clicking anywhere outside the record or selecting another record).
Duplicate a record that is displaying related data	Be sure no records in a portal are selected, then choose **Records** menu > **Duplicate Record**. Note Records in related tables are not duplicated.
Duplicate a related record in a portal	Select the record in the portal, then choose **Records** menu > **Duplicate Record**.



For more information about adding and duplicating records, see Help

Deleting records

When you delete a record, you *permanently* discard the data in all the fields in that record.

Important You can't retrieve deleted data, and you can't undo the action of deleting records. Before you delete records, consider making a backup copy of your file.

If you're working in a relational database and the option to delete related records is selected in the Edit Relationship dialog box, FileMaker Pro deletes related records when you delete a record.

To delete	Do this in Browse mode
One record	Select the record to delete. In the status toolbar, click **Delete Record**, then click **Delete**.
A related record	Select a portal row in the current table by clicking inside the row but outside any fields in the row. In the status toolbar, click **Delete Record**, then click **Delete**. Note To delete related records, **Allow deletion of portal records** must be selected in the Portal Setup dialog box.
A group of records	Make sure the found set contains only the records you want to delete. (See "Finding records" on page 31.) Choose **Records** menu > **Delete Found Records**, then click **Delete All.**
All records in a table	Click **Show All** in the status toolbar, or choose **Records** menu > **Show All Records**. Choose **Records** menu > **Delete All Records**, then click **Delete All**.
All records in a database	Create a clone of the database with no records. See "Saving files" on page 20.

Entering data

Note If a file is locked or write-protected, or if you don't have privileges to edit certain records or fields, you may not be able to modify data.

Selecting a field

To	Do this in Browse or Find mode
Select a field	Click in the field.
Select the contents of a field	Select the field, then choose **Edit** menu > **Select All**.
Move to the next field in the tab order	Press Tab. Note To set the Return or Enter key(s) to move to the next field, in Layout mode, select the fields. Click **Inspector** in the layout bar, then click **Data**. In the Behavior area, for **Go to next object using**, select the keys you want to use for exiting fields. Buttons, popover buttons, tab controls, and slide controls can be included in the tab order. Fields on tab panels or slide panels that are not on the front-most panel are skipped.
Move to the previous field in the tab order	Press Shift-Tab (or Shift-Return or Shift-Enter, if enabled).
Move to items in a value list	Press the arrow keys.

Entering and changing data in fields

You can enter or import data up to the character limit for the field type. You can view and print only the data that fits within the field boundaries.

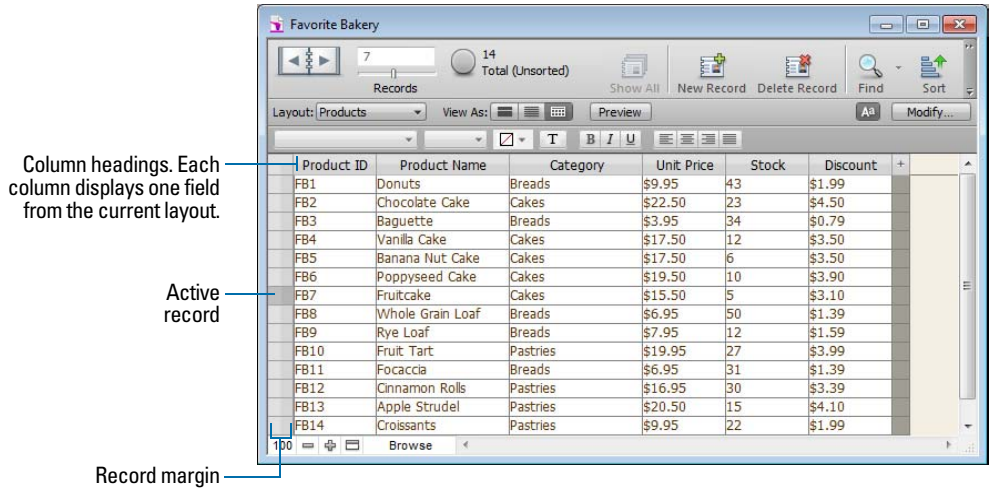
Note For information about how FileMaker Pro uses system formats to display and sort dates, times, and numbers, see Help.

To	Click in the field in Browse mode, then
Enter data in a text field	Type the text. Note In a field set up to auto-complete, you see suggestions based on what you type.
Enter data in a number field	Type the values (from 10^{400} to 10^{-400}).
Enter data in a date field	Type one date on one line in the field. Type the day, month, and year as numbers (for example, 3/3/2014), separated by a nonnumeric character like – (minus) or / (forward slash). Note You cannot use a : (colon) as a date separator. Important If you enter dates with two-digit years, FileMaker Pro converts them to four-digit year dates using a conversion method described in Help. To avoid misinterpretations during conversion, always enter dates with four-digit years.
Enter the current date in a date, number, or text field	Choose **Insert** menu > **Current Date**. Select the date using the drop-down calendar, if available.
Enter data in a time field	Type the time of day (or time duration) as: ▪ hours ▪ hours and minutes ▪ hours, minutes, and seconds ▪ hours, minutes, seconds, and fractional seconds Separate hours, minutes, and seconds by a nonnumeric character like : (colon). Separate fractional seconds by a . (period). Type the time of day in 24- or 12-hour format, with or without AM or PM. (AM is assumed for a time less than 12:00.)
Enter the current time in a time, number, or text field	Choose **Insert** menu > **Current Time**.
Enter data in a timestamp field	Type the date and time (for example, 10/10/2014 3:15:05 PM). Type the day, month, and four-digit year as numbers, separated by a nonnumeric character like – (minus) or / (forward slash). Note You cannot use a : (colon) as a date separator. Then type the time of day as: ▪ hours and minutes ▪ hours, minutes, and seconds ▪ hours, minutes, seconds, and fractional seconds ▪ Type AM or PM if the time is not in 24-hour format Separate hours, minutes, and seconds by a nonnumeric character like : (colon).
Enter the current date and time in a timestamp field	Choose **Insert** menu > **Current Time**. Select the date using the drop-down calendar, if available.
Insert a tab character in a field	Click where you want to insert the tab. Press Ctrl+Tab (Windows) or Option-Tab (OS X).
Delete data from a field	Select the data, then press Backspace or Delete.

To	Click in the field in Browse mode, then
Insert an audio, video, image, PDF, or other type of file in a container field	For information, see Help.
Add data to value lists (fields formatted as radio or option buttons, checkboxes, lists, or menus)	For information, see “Setting up checkbox sets and other controls on a layout” on page 91.
Edit, format, or check the spelling of text in a field or edit dictionaries	For information, see Help.

Working with data in Table View

You can work with data in Table View to quickly create and change field definitions; add, modify, and delete records; sort records; create dynamic reports; and create quick charts. FileMaker Pro displays each record in a separate row, and each field in a separate column.



To work with data in Table View, click **Table View** in the layout bar when you’re working in Browse mode.

Displaying data in Table View

You can change the display settings in Table View.

To	Do this
Reorder columns	Click a column heading and drag it to a new location.
Resize a column	Move the pointer to the edge of the column heading. When the pointer changes to a double arrow (↔), drag it to the desired size.
Set a precise column width	Select one or more columns, then right-click and choose **Table View** > **Set Column Width** from the shortcut menu. In the dialog box, type a width, choose units from the list, then click **OK**.
Change the color of the background	Right-click the left or right margin of a record, choose **Part Color** from the shortcut menu, then choose a color. The color of the row for adding new records and the column for adding new fields will be slightly darker than the main background color.

To	Do this
Display a different background color for alternating records	Right-click the left or right margin of a record, then choose a color from the **Alternate Color** shortcut menu.
Restore the default display settings	Right-click a column heading and choose **Table View** > **Reset** from the shortcut menu. Note Resetting Table View doesn't delete the fields and records.

Working with records in Table View

When you view records in a table, FileMaker Pro displays data in rows and columns. Each row displays a record, and each column displays a field.

Note You can set field options such as validation or indexing when you define a field, or at a later time. See "Setting options for fields" on page 67.

To	Do this in Browse mode
Add a new record	Click **+** in the left margin at the bottom of the table. A new row is added to the end of the table if the records have not been sorted or if **Keep records in sorted order** is cleared in the Sort Records dialog box.
Enter data in fields	Click in the field, and enter data in the field. See "Entering and changing data in fields" on page 28. Note FileMaker Pro saves changes to your data as you work. To see how your data looks in other views, click **Form View** or **List View** in the layout bar.
Duplicate a record	Right-click the left or right margin of the record that you want to duplicate, then choose **Duplicate Record** from the shortcut menu.
Delete a record	Right-click the left or right margin of the record that you want to delete, then choose **Delete Record** from the shortcut menu.
Copy the data in a record	Right-click the left or right margin of the record that you want to copy, then choose **Copy Record** from the shortcut menu. You can paste the copied, tab-separated data into a field or into Microsoft Excel.
Sort records by one or more fields	Select a column heading and optionally Shift-click additional headings. Right-click one of the selected column headings and choose **Sort Ascending** or **Sort Descending**. A sort icon appears on the column headings indicating the sort setting (ascending or descending). If you selected multiple columns, the order in which columns were selected determines the sort order. You can also choose **Sort By Value List** and then select a value list from the submenu. For more information, see "Sorting records" on page 43.
Create a dynamic report	For information, see Help. For example, you can create a quick report to group your data by a field, display subtotals for a field, or create subtotals for each group of data.
Create a quick chart	For information, see Help. For example, you can quickly create a chart from Table View based on the data in the current field.
Save data as a Microsoft Excel file or Adobe PDF file, or save the current found set of records as a snapshot link	Right-click the left or right margin, then choose an option from the **Save/Send Records As** shortcut menu.
Send email messages based on record data	Right-click the left or right margin of the record, then choose **Send Mail** from the shortcut menu.

For more information about working with data in Table View, see Help

Finding records

To find particular records in your database, you can:

- perform a quick find in Browse mode (see “Performing quick finds in Browse mode” on page 31)
- make a find request in Find mode (see “Making find requests in Find mode” on page 32)

Performing quick finds in Browse mode

If a layout is enabled for quick find in Browse mode, you can use the search box in Browse mode to search for data across multiple fields on the layout. Quick find is helpful if the data you are looking for might be in multiple fields or if you don’t know which field contains the data.

When a layout is enabled for quick find, all fields that are supported for quick find (including merge fields) are set to be included in the search. Quick find does not search summary, container, or global fields. (To enable a layout for quick find, see “To configure and enable quick find” on page 32.)

Note While quick finds are an easy way to search for data, they can work slowly depending on the type of data in the database. For example, unstored calculations or related or remote data can slow progress, compared with data that's local or stored.

To perform a quick find

1. In Browse mode, type one or more words in the search box in the upper-right corner of the status toolbar.
2. Press Enter (Windows) or Return (OS X).

   The search includes all the fields that are enabled for quick find on the layout. Your find request returns a found set of records. The light green area of the pie chart  in the status toolbar indicates the portion of the total records displayed.

Keep the following points in mind:

- The only find operator supported by quick find is the *match phrase* operator, double quotation marks (" ").
- If you type more than one word in the search box, FileMaker Pro searches for records that have all of the words you typed.

To view a list of recent quick finds

1. In Browse mode, click the down arrow in the search box.
2. Do one of the following:
   - Choose a search term from the search history list to perform a quick find for the term.
   - Choose **Clear Recent Searches** to remove the search history.

Note The list of recent quick finds is available only until you close the file.

To configure and enable quick find

If the selected layout doesn't show the quick find badges for supported fields in Layout mode, use the following steps.

1. In Layout mode, choose **View** menu > **Show** > **Quick Find**.

   A small badge next to each field shows if the field has been enabled for quick find. If there is no quick find badge next to a field, the field is not searchable, either because it is not supported for quick find or because it is not set to be included in the search. A gray badge indicates that the layout is disabled for quick find. A green badge indicates that the field is searchable. A yellow badge indicates that the field is searchable, but the search might take longer than fields with the green badge.

2. Select one or more fields.

3. Click **Inspector** in the layout bar, then click **Data**.

4. In the Behavior area, select **Include field for Quick Find**.

5. To enable quick find, click **Layout Setup** in the layout bar. In the Layout Setup dialog box, select **Enable Quick Find**, then click **OK**.

For more information about quick finds, see Help.

Making find requests in Find mode

When you perform a find in Find mode, you type *criteria* (the value or values to find) into fields in a *find request*, which looks like a blank record. FileMaker Pro searches through all the records in a table, comparing the criteria you specify with the data in the table.

Records with data matching the criteria become the *found set*, which is the subset of records being browsed. Records that don't match are omitted. You can constrain (narrow) or extend (broaden) the found set in Find mode.

You can work with just the records in the found set. For example, you can view, edit, calculate summaries for, sort, print, delete, export, or replace data in these records. You can also open a new window in order to perform different find requests on the same data.

You can save the found set of records and email it as a snapshot link. (For more information, see Help.)

You cannot perform a find in summary fields, container fields, or fields defined with the global storage option.

Note In Find mode, a badge indicates a searchable field.

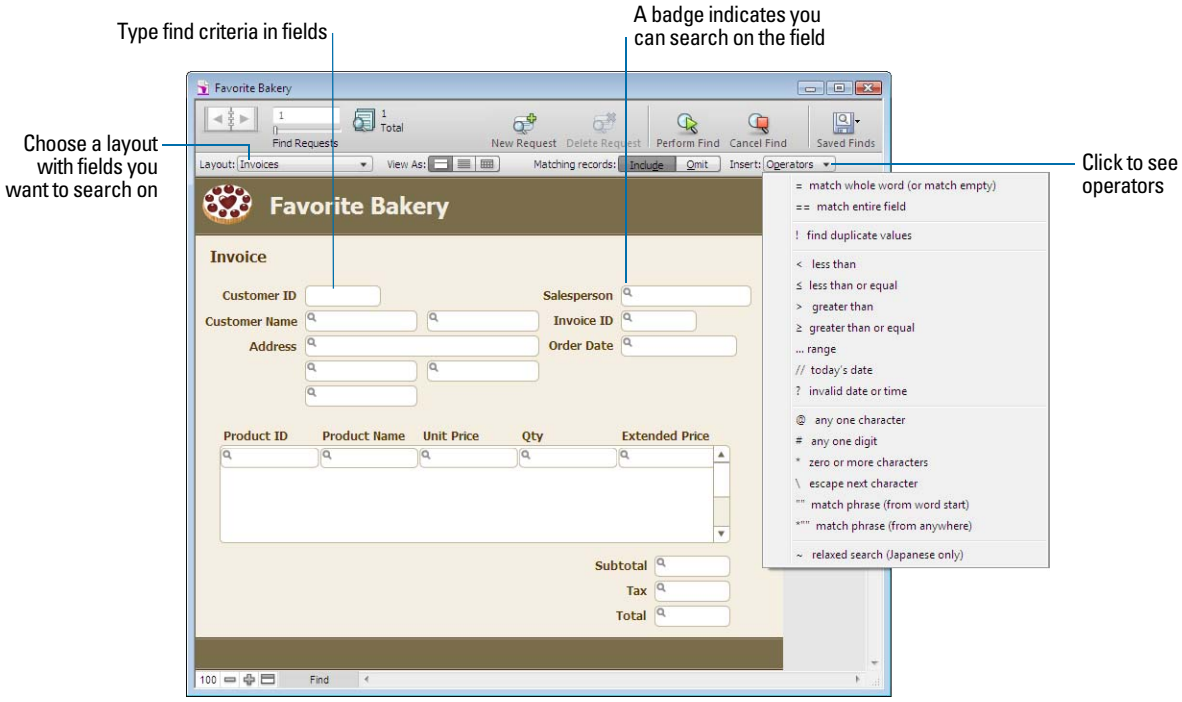
To make a find request

1. In Find mode, from the Layout pop-up menu, select a layout that includes the fields that contain the data you want to search.

   If necessary, you can change layouts and enter criteria on more than one layout.

2. In the find request, select a text, number, date, time, timestamp, or calculation field to use for finding, and then type a value in the field.

   You can use the **Insert Operators** list in the layout bar to help you enter criteria. You can click **Omit** to exclude records matching a specific set of criteria.



3. Click **Perform Find**.

   Your find request returns a found set of records. The light green area of the pie chart in the status toolbar indicates the portion of the total records displayed.

You can do one or more of the following during or after performing a find request:

To	Do this
Cancel a find operation before it is finished and leave the previous found set unchanged	Press Esc (Windows) or ⌘-period (OS X).
Change or refine criteria after performing a find request	See “Viewing, repeating, or changing the last find” on page 41.
Narrow an existing found set	See “Constraining (narrowing) a found set” on page 39.
Broaden an existing found set	See “Extending (broadening) a found set” on page 40.
Show all records again	In Browse mode, choose **Records** menu > **Show All Records**. In Find mode, choose **Requests** menu > **Show All Records**. You don’t need to choose **Show All Records** before performing finds. FileMaker Pro always searches all records in the tables you specify unless you have narrowed the existing found set.
Open another window in order to perform different find requests on the same data	Choose **Window** menu > **New Window**.

Finding text and characters

Search for text in text fields, or in calculation fields that return a text result.

Unless you search for phrases and exact matches, the field can contain other values in addition to the one(s) you specify, and the values can be in any order. For example, typing `hotel` in a field named Accommodation finds records for **Hotel**, **Discount Hotel**, and **Hotel, Luxury**.

To find	Type this in the field	Examples
Words that start with specific Roman characters (works with fields that use any language except Japanese)	The characters	`Chris Smith` finds **Chris Smith, Smith Chris, Chris Smithson**, and **Smith Christenson**
Words that start with Japanese Hiragana, Katakana, or Kanji characters	The characters between = and *	=小田* finds 小田, 小田山, and 小田川
A phrase or sequence of characters that match when they are the first characters in a word (match phrase from word start)	The literal text (characters), including spaces and punctuation, between double quotation marks (`"`)	`"Marten and Jones Interiors"` finds **Marten and Jones Interiors** but not **Jones and Marten Interiors** `", Ltd."` finds all companies with **", Ltd."** in the name, but not those without the comma `“Spring”` finds **Springville** but not **ColdSpring Harbor** or **HotSpring**
Words with one or more unknown or variable characters (any one character)	One wildcard character (@) for each unknown character	`Gr@y` finds **Gray** and **Grey** `@on` finds **Don** and **Ron** but not **Bron**
Invalid characters in a text field	?	Invalid characters display as blank characters Note To find the ? character, search for `"?"`
Digits in a text field (any one digit)	A # character for each digit	`#` finds **3** but not **30** `##` finds **30** but not **3** or **300** `#3` finds **53** and **43** but not **3**

To find	Type this in the field	Examples
Words with zero or more unknown or variable text characters in a row (zero or more characters)	* for all unknown characters	`Jo*n` finds **Jon** and **John** `J*r` finds **Jr.** and **Junior** `*phan*` finds **Phan** and **Stephanie**
Operators or other non-alphanumeric characters, such as punctuation or spaces	The literal text (characters), including spaces and punctuation, between double quotation marks (")	"@" finds @ (or an email address, for example) `","` finds records containing a comma `"  "` finds three spaces in a row
A character with special meaning, such as the find operators recognized by FileMaker Pro: @, *, #, ?, !, =, <, >, " (escape next character)	\ followed by the special character	`\"Joey\"` finds **"Joey"** `joey\@abc.net` finds the email address **joey@abc.net**
Words with accented characters	The literal text (characters), including spaces and punctuation, between double quotation marks (")	"`òpera`" finds **òpera** but not **opera** (`òpera` without quotation marks finds both **òpera** and **opera**)
Partial phrases, a sequence of words or characters (match phrase from anywhere)	Characters, punctuation, and spaces between double quotation marks ("); use * to find this text in the middle of a longer text string	`*"son & Phillips"` finds **Johnson & Phillips** and **Paulson & Phillips**
Exact matches of the text you specify (match entire field)	== (two equal signs) for a field content match	`==John` finds **John** but not **John Smith** `==John Smith` finds **John Smith** but not **Smith**, **John** or **John Smithers**
Exact matches of whole words you specify (match whole word)	=	`=Market` finds **Market**, **Market Services**, and **Ongoing Market Research** but not **Marketing** or **Supermarket** `=Chris =Smith` finds **Chris Smith** or **Smith Chris** but not **Chris** or **Christopher Smithson**
Words that contain Japanese Hiragana, Katakana, and Kanji characters (Japanese-indexed fields only)	The characters	京都 finds 京都 , 東京都 , and 京都府
Kana characters in a Japanese-indexed field without differentiating between Hiragana/Katakana, Voiced/Semi-Voiced/Unvoiced Kana, Small/Regular Kana, and Kana Voiced/Unvoiced Iteration Marks	~ (tilde) and the character, to do a relaxed search	~ は finds は , ば , ぱ , ハ , バ , and パ
Ranges of information	See “Finding ranges of information” on page 37.	
Case-sensitive text	Change the default language for indexing the field to Unicode. Note This procedure will change the order in which records sort. For more information, see Help.	`fred` finds **fred** but not **Fred**

Finding numbers, dates, times, and timestamps

When you enter criteria in a find request, numbers, dates, times, and timestamps should be entered in the corresponding field types (or calculation fields returning the corresponding field type) to ensure correct behavior when finding them. See “About choosing a field type” on page 58.

Important To avoid confusion when working with dates, always use four-digit years. For more information, see the Help topic “Conversion of dates with two-digit years.”

To find	Type this in the field	Examples
A number in a number field or in a calculation field that produces a numeric result	The number	`.50` finds **.5**, **.50**, and **$.50**
A Boolean number in a number field or in a calculation field that produces a Boolean result	`1` to find True values `0` to find False values	`1` finds **1** `0` finds **0**
A date in a date field or in a calculation field that produces a date result	The date as digits, separated by a valid date separator character (such as a slash or hyphen)	`3/3/2014` finds **3/3/2014**, **March 3, 2014**, and **3-3-2014**
Today’s date in a date field or in a calculation field that produces a date result	//	`//` finds **April 4, 2014** (when the current date is 4/4/2014)
A time in a time field or in a calculation field that produces a time result	The time as digits, separated by colons	`12:53:09` finds **12:53:09**
A timestamp in a timestamp field or in a calculation field that produces a timestamp result	The date as digits, separated by a valid date separator character, then the time as digits, separated by colons	`3/3/2014 12:53:09 PM` finds **3/3/2014 12:53:09 PM**
Invalid dates, times, timestamps, or calculated date or time results	`?`	`?` finds **Next Tuesday** or **2/33/2014** in a date field, or **midnight** in a time field
Invalid data (fields containing no numbers) in a number field or calculation field that produces a numeric result	`?`	`?` finds **twelve** but not **12** or **twelve30**
Dates on a day of the week in a date or timestamp field	The day of the week Note Full or short day names (for example, `Friday` or `Fri`) are acceptable in day of week searches.	`Tuesday` finds all dates that occur on a Tuesday `=Thu` finds all dates that occur on a Thursday
Any valid value for a date or time component in a date, time, or timestamp field	`*` or leave component unspecified, while specifying the other components you want to find	`3/3/*` finds the 3rd day of March in any year `*:15` finds times that are 15 minutes after any hour `1/1/* 7 PM` finds timestamps in the 7 o’clock hour on January 1st in any year Note When the year is unspecified, the current year is assumed. `3/3` finds the 3rd day of March in the current year
Ranges of information	See the next section, “Finding ranges of information.”	

Finding ranges of information

To find values that are	Use this operator	Examples
Less than a specified value	<	<40 <9/7/2014 <M
Less than or equal to a specified value	<= or ≤ (OS X)	<=95129 ≤05:00:00 <=M
Greater than a specified value	>	>95129 >9/7/2014 >M
Greater than or equal to a specified value	>= or ≥ (OS X)	>=100 >=9/7/2014 ≥8:00 ≥M
Within the range you specify. A range is different based on the data type: ▪ Numbers: least to greatest ▪ Dates and times: earliest to latest ▪ Text: first to last word, based on the index order of words (not the sort order)	.. or ... (two or three periods)	12:30...17:30 1/1/2014..6/6/2015 A...M

To find dates	Type this in the field
In June 2014	6/2014
From July 2014 through October 2015	7/2014...10/2015
That occur on a Friday	=Friday
From the 10th through the 16th of October or November 2014 (if the date format is MM/DD/YYYY)	{10..11}/{10..16}/2014
That occur on March 1st between 1868 and 1912 in the Japanese Emperor Year era of Meiji	m*/3/1
That occur on December 31st between 1930 and 1940 in the Japanese Emperor Year era of Showa	S{5..15}+12+31

To find times	Type this in the field
In the 3 o'clock hour, not including 4:00 PM	3 PM
Between 8:00 AM and 8:59:59 PM	8 AM..8 PM
In the morning	AM
Any of the times 4:30, 5:30, 6:30 PM	{4..6}:30 PM

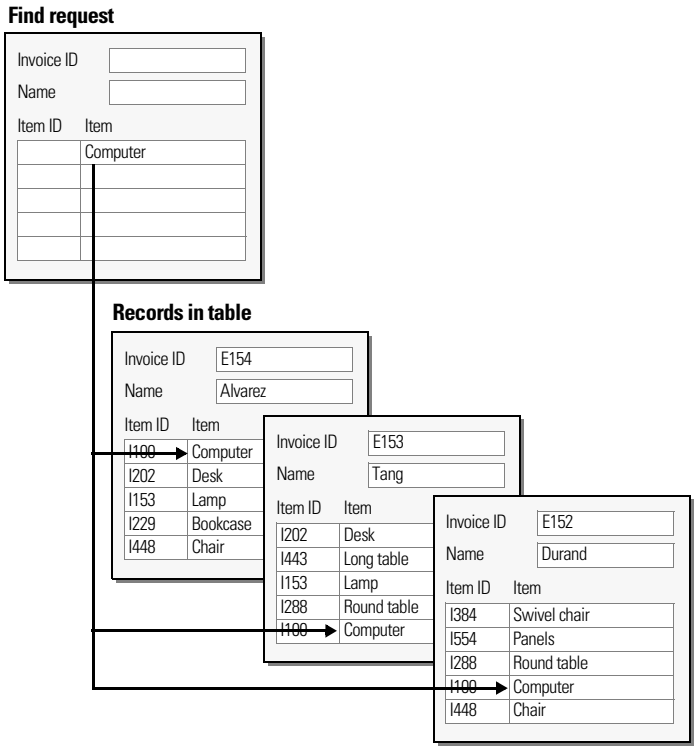
To find timestamps	Type this in the field
In the 3 o'clock hour today	// 3 PM
In the 7 o'clock hour in May 2014	5/2014 7 PM

To find timestamps	Type this in the field
That occur on a Monday in 2015	`=Mon 2015`
From the 10th through the 16th of November 2015 and from 3:00 PM to less than 6:00 PM (if the date format is MM/DD/YYYY)	`11/{10..16}/2015 {3..5} PM`

Finding data in related fields

You can enter find criteria in related fields that are displayed in a portal or directly on a layout.

When you perform a find in a related field, FileMaker Pro displays all the records that have a related record matching the criteria you enter. For example, suppose you have an invoice file that displays line items as related records in a portal. To find all invoices listing a computer, type `Computer` in the Item field in the portal. For information about related fields, see chapter 4, “Working with related tables and files.”



For information about omitting related records, see “Finding records except those matching criteria” on page 40.

Finding empty or non-empty fields

To find fields that are	Type this in the field
Not empty (fields that have data)	*
Empty	=

Finding duplicate values

You can find all records for which one or more fields contain duplicate values. For example, you might want to find all records that aren't unique, then examine them to decide which records to use or delete.

To find all duplicate records, in Find mode, type ! in the field.

Finding records that match multiple criteria

You can narrow or broaden your search by using more than one criterion.

Logical AND search

To narrow your search, enter criteria in as many fields as needed to make your request specific, then click **Perform Find**.

Constraining (narrowing) a found set

You can narrow find results incrementally, looking for more specific detail as you search your database.

For example, after searching for all of the employees who work in Sales, you can narrow the search to find all of the employees in Sales named Alvarez:

1. Perform a find to find all of the employees who work in Sales.

   FileMaker Pro displays the found set in Browse mode.

2. Click **Find** and type the criteria to narrow the search (type `Alvarez` in the **Last Name** field).

3. Choose **Requests** menu > **Constrain Found Set**.

   The found set now consists of employees in Sales named Alvarez.

Note To quickly constrain the found set in Browse mode, use the shortcut menu. Click in the field (or select a partial value in the field), then right-click, and choose **Constrain Found Set**.

Logical OR search

To widen your search, enter criteria in the first request. Click **New Request**. Enter the second (set of) criteria. Continue adding requests for each (set of) criteria, then click **Perform Find**.

You can navigate among multiple requests using **Go to Request** on the **Requests** menu or clicking the book in Find mode.

Examples:

- To include customers in New York and customers in Paris in the found set, type `New York` in the **City** field in the first request, then type `Paris` in the **City** field in the second request.
- To include companies with more than 100 employees and companies with more than $100 million in assets, type `>100` in **Number of Employees** in the first request, then type `>100,000,000` in **Capitalization** in the second request.
- To include 6th grade students who are in Algebra and 7th grade students who are in Geometry, type `6` in **Level** and `Algebra` in **Course** in the first request, then type `7` in **Level** and `Geometry` in **Course** in the second request.

Extending (broadening) a found set

You can broaden a found set to expand your search to include additional applicable records without starting over.

For example, after searching for customers in New York, you can broaden the search to also find customers in Hong Kong:

1. Perform a find to find customers in New York.

   FileMaker Pro displays the found set in Browse mode.

2. Click **Find** and type the criteria to broaden the search (type `Hong Kong` in the **City** field).

3. Choose **Requests** menu > **Extend Found Set**.

   The found set now consists of customers in New York and Hong Kong.

Note To quickly extend the found set in Browse mode, use the shortcut menu. Click in the field (or select a partial value in the field), then right-click, and choose **Extend Found Set**.

Records that match one set of criteria but not another

To narrow your search by excluding records that meet specified criteria (for example, to find vendors in New York state that are not in New York City), see "Finding some records while omitting others," below.

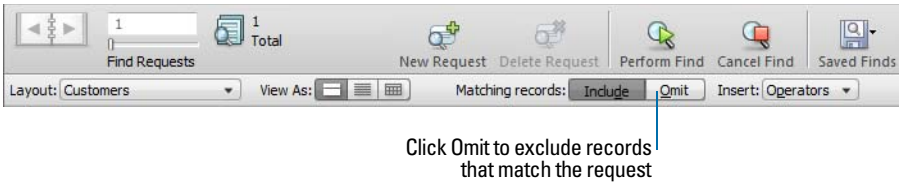
Finding records except those matching criteria

You can exclude (omit) records while performing a find. In other words, you can find information in your database that "does not equal" your specified criteria. For example, you can find all invoices except those created in the past 30 days.

Finding records that don't match criteria

1. In Find mode, type criteria for the records to omit.

2. Click **Omit** in the layout bar.



3. Click **Perform Find**.

Finding some records while omitting others

For example, to find vendors in the state of New York except those in New York City:

1. In Find mode, type the criteria for the records to find (type `New York` in the State field).

2. Click **New Request**.

3. Type criteria for the records to exclude (type `New York` in the City field).

4. Click **Omit**.

5. Click **Perform Find**.

Keep the following points in mind:

- You can have omit criteria in more than one request.
- FileMaker Pro works through the requests in the order you create them. For example, in a Customers database with customers in the US and France:
  - If the first request finds all customers in Paris and the second request omits all customers in the US, the found set contains all customers in Paris, France, but none in Paris, Texas, or anywhere else in the US.
  - If the order of the requests is reversed (the first request omits all customers in the US and the second request finds all customers in Paris), the found set includes all customers in France, and in Paris, Texas, but no records for customers elsewhere in the US.
- To omit a related record from a portal row (or set of related records), you must change the relationship or the value in at least one of the match fields so that the record is no longer related. For information about related fields, see chapter 4, “Working with related tables and files.”
- You can open another window in order to perform different find requests on the same data. See “Opening multiple windows per file” on page 19.
- To omit records from a found set after performing a find, see “Hiding records from a found set and viewing hidden records” on page 42.

Viewing, repeating, or changing the last find

To view the most recent find criteria, choose **Records** menu > **Modify Last Find**. Then, to return to the found set, switch to Browse mode. To repeat the find, click **Find**. Or you can modify the find criteria, then click **Perform Find**.

Saving find requests

When you have a complex find request that you want to use regularly, you can save the request and retrieve it when you need it later. You can save and retrieve find requests without having to go to Find mode. FileMaker Pro automatically saves the last five finds you have performed so you can access them again. Once a find is saved, the saved find is also available to any network clients that share the account. For more information about saving find requests, see Help.

Deleting and reverting requests

To delete a request, go to the request you want to delete, then click **Delete Request**.

To restore a request to the way it was when you last committed it, choose **Requests** menu > **Revert Request**. Requests are committed, for example, when you click out of all fields, go to a different layout or request, or perform a find.

Hiding records from a found set and viewing hidden records

All records that are not in the found set are omitted, or hidden. You can omit additional records from the found set without doing a new find.

Important Omitted records are temporarily excluded from the found set. They still exist in the database.

To	Do this
Omit a specific record	Display or select the record to omit, then choose **Records** menu > **Omit**.
Omit a series of records	Display or select the first record in a number of consecutive records to omit, then choose **Records** menu > **Omit Multiple**. In the Omit Multiple dialog box, type the number of records to omit, then click **Omit.**
View the omitted set	Choose **Records** menu > **Show Omitted Only**.
Bring back all the records in the file	Choose **Records** menu (Browse mode) or **Requests** menu (Find mode) > **Show All Records**.

Finding and replacing data

As in a word processing application, you can find and replace data across multiple fields (including related fields) in a record or in a find request, across a found set of records or find requests, or across text objects in a layout. You can search for data in any type of field except container fields and fields that are not modifiable.

1. In Browse, Find, or Layout mode, choose **Edit** menu > **Find/Replace** > **Find/Replace.**
2. In the **Find what** box, type the data you want to search for. In the **Replace with** box, type the replacement data.

   You can't replace data in fields that are formatted as pop-up menus, radio buttons, or checkboxes. These fields will be counted and reported as skipped at the end of a **Replace all** operation.
3. Set the search options you want to use.

Select	To
An option from the **Direction** list	Choose the search direction: **Forward**, **Backward**, or **All**.
Match case	Search for only those occurrences in which the capitalization matches the data you specified in the **Find what** box. Note In files that contain Japanese data, a find with the **Match case** option cleared does not simultaneously find both the half-width and full-width version of the same character. To comprehensively find and replace both characters, make sure you perform separate finds for both the half-width and full-width character.
Match whole words only	Search for only those occurrences that are whole words or are bounded by spaces and/or punctuation characters.
An option in **Search across**	In Browse mode, search across all records in the current layout or just in the current record. In Find mode, search across all find requests in the current layout or just in the current find request. Note In Layout mode, FileMaker Pro searches just in the current layout.
An option in **Search within**	In Browse and Find modes, search within all fields in the current layout or just in the current field.

4. Click one of the buttons to perform the type of find/replace operation you want.

Click	To
Find Next	Search for and select the next occurrence of the **Find what** data.
Replace & Find	If there is selected data that matches the **Find what** data: Replace the **Find what** data with the **Replace with** data, search for and select the next occurrence. If there is no selected data that matches the **Find what** data: Search for and select the first occurrence of the **Find what** data.
Replace	Replace the **Find what** data with the **Replace with** data.
Replace All	Replace all occurrences of the **Find what** data with the **Replace with** data. At the end of the **Replace All** operation, you see a summary of the number of occurrences found and replaced.

Keep the following points in mind:

- If you have added a tab control or slide control to a layout, when you find and replace data in Browse and Find modes, FileMaker Pro only finds and replaces data in fields on the front-most panel. In Layout mode, FileMaker Pro finds and replaces text on all panels.
- Performing a find and replace that includes fields on a popover opens the popover.

For more information about finding and replacing data, see Help.

Sorting records

FileMaker Pro stores records in the order they were added to the file. Sorting temporarily rearranges records, so you can view, update, or print them in a different sequence.

You choose the fields whose contents you want to sort by. The first sort field arranges the records based on the field's contents. The second sort field arranges records when two or more records have the same value in the first sort field, and so on. You can sort records in ascending order, descending order, or in a custom order.

By default, the records remain sorted until you perform a find or sort records by different criteria. When you add or change a record in a sorted found set, the record appears in the correct position in the sort order after you commit the record.

To sort the records in the current found set:

1. In Browse mode, click **Sort** in the status toolbar.

   Note To sort records in Table View in Browse mode, see "Working with records in Table View" on page 30.

2. In the Sort Records dialog box, choose fields for sorting, in the order you want them sorted by, and sort options.

   To choose a sort field visible on the current layout, no matter what table it is in, choose **Current Layout (LayoutName)** from the table list, then double-click a field in the list.

   To choose a sort field that is in the current layout's table, whether or not it is on the current layout, choose **Current Table (TableName)** from the table list, then double-click a field in the list.

   For information about sort options, see Help.

3. Click **Sort**.

To cancel before sorting is finished, press Esc (Windows) or ⌘-period (OS X).

Note You can sort records on one field without opening the Sort dialog box by using the field's shortcut menu.

For information about how FileMaker Pro uses system formats to sort and display dates, times, and numbers, see Help.

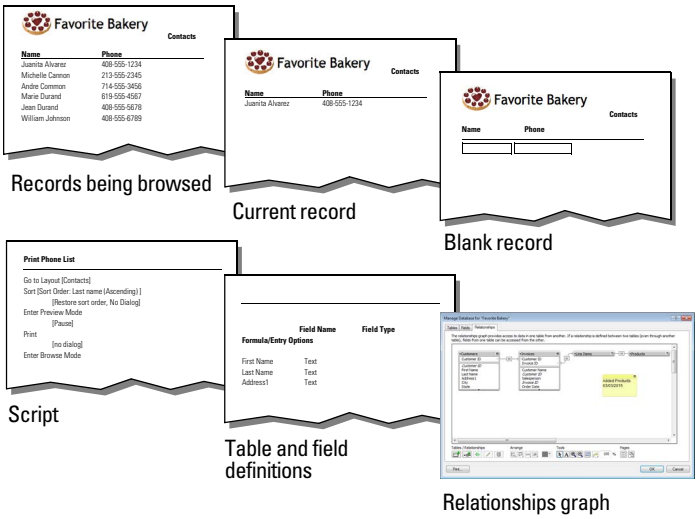
Previewing and printing databases

With FileMaker Pro, you can print:

- all the records in the database, a subset of the records, or only the current record
- a blank record to create a paper form
- definitions of scripts, fields, tables, and relationships to see the structure of your database
- data saved as a PDF file

FileMaker Pro prints records using the current layout. You can create layouts to print the same data in different ways. For example, you can print records one by one, in a columnar list, or in a complex sorted report with totals, headers, and footers. You can also create layouts for mailing labels or envelopes.

The New Layout/Report assistant (in Layout mode) makes it easy to create such layouts and reports. See "Creating layouts and reports" on page 73.



You can print data based on the current layout or print information about the structure of the database

You can control page margins, remove blank space, and keep specified objects from printing.

Previewing data on a layout

When you switch to Preview mode, you see the layout as it appears on the printed page. You can't enter or edit information in fields in Preview mode.

In Preview mode, you see:

- how many records fit on a printed page
- how the pagination settings you choose affect page breaks
- subsummary parts with calculated summary fields
- variable information supplied by FileMaker Pro, like page numbers, the current date, and so on
- the page margins you define
- how fields set with sliding options close up blank space
- records arranged in columns if the Layout Setup dialog box is defined to print in columns
- the front-most tab panel or slide panel if the page contains panel controls
- popover buttons, but not their associated popovers or the contents of popovers

To preview data on a layout, you follow the same preliminary steps that you perform when you print, including specifying a printer and printing options and verifying that the found set contains the records you want to preview (see steps 1 through 4 in the next section, "Printing records"). Then, switch to Preview mode.

Printing records

You can print information from your database, or you can print a blank record in order to print a blank "form."

To print records:

1. If you have more than one printer, specify which one you want to use.
2. Confirm printing options by choosing **File** menu > **Print Setup** (Windows) or **File** menu > **Page Setup** (OS X), then click **OK**.

   If you're in Preview mode, you can also click **Print Setup** (Windows) or **Page Setup** (OS X) in the status toolbar.

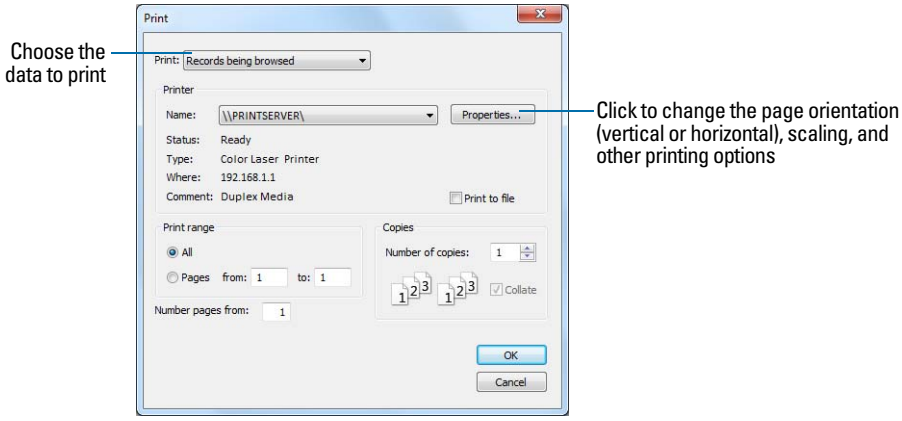
   For information about printer options, refer to your printer and system documentation.
3. Switch to the layout you want to use.
4. Make sure the found set is the way you want it by:
   - using Find mode and commands on the **Records** menu to change the found set
   - sorting the records
5. Switch to Preview mode to see exactly how your paper copy will look.

   If a record contains tab controls or slide controls, only the front-most panel is printed.
6. Choose **File** menu > **Print**.

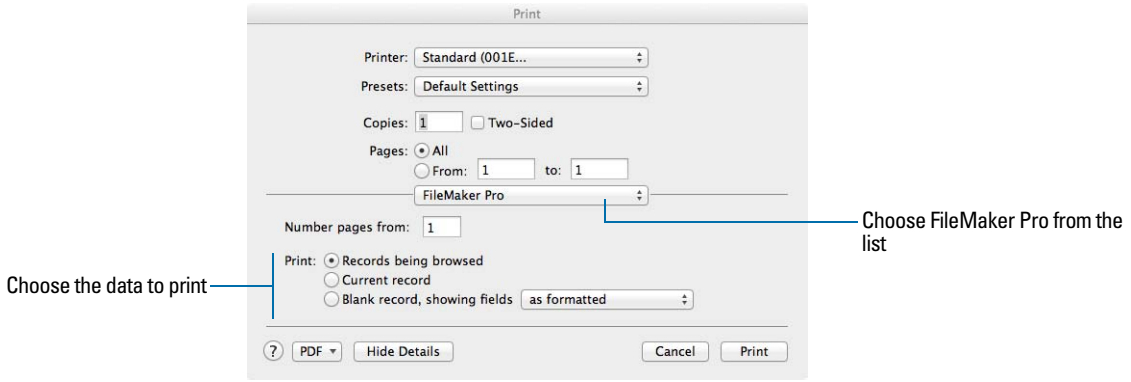
7. In the Print dialog box:

- Windows: For **Print**, choose an option for the data you want to print.
- OS X: Choose **FileMaker Pro** from the pop-up menu, then choose an option for the data you want to print. If you don't see the options, click **Show Details**.

To print	Choose
All records (or only records in the found set)	**Records being browsed**
Only the record currently selected in Browse mode	**Current record**
A blank record using the current layout (use this option to print a blank "form")	**Blank record, showing fields**, then choose a formatting option



Print dialog box (Windows)



Print dialog box (OS X)

8. Select the print range, number of copies and other printing settings, then click **OK** (Windows) or **Print** (OS X).

Printing labels and envelopes

You can create layouts for formatting and printing data onto mailing labels and envelopes. The process for printing envelopes is similar to that for printing labels.

You use the New Layout/Report assistant to create a Labels layout or a Vertical Labels layout that includes data from the fields you choose, arranged to print on many types of label stock (for example, Avery 4014). FileMaker Pro provides the dimensions of numerous standard label types and their codes. If the label type you want isn't available, you can specify custom label dimensions.

Labels layouts and Envelopes layouts use *merge* fields, which are placeholder fields for displaying and printing only; you can't enter data into merge fields. Merge fields expand and contract to fit the data in the field as needed, and close up space if the field is empty.

Creating a layout for labels, vertical labels, or envelopes

1. In Layout mode, click **New Layout/Report**.

   The New Layout/Report assistant appears. For onscreen help as you use the assistant, press F1 (Windows) or ⌘-? (OS X) in each panel.

2. For **Show records from**, choose the table that contains the records you want to use.

3. For **Layout Name**, type a name for the layout.

4. Choose **Printer**, then choose either **Labels** (for data that reads top to bottom horizontally) or **Vertical Labels** (for data that reads right to left vertically).

   For an Envelopes layout, choose **Envelopes** and click **Continue**. Then skip to "Choosing and formatting the merge fields."

5. Click **Continue**.

6. In the Specify Label Layout panel, specify the measurements of your mailing labels:
   - To choose a predefined measurement based on common label types, for the **Use label measurements for** list, choose the code that matches your labels. (You see this information on the package your labels came in.) FileMaker Pro creates a Labels layout that uses the exact dimensions of the label stock code you choose.
   - To specify a custom measurement, choose **Use custom measurements**, and enter values for **Labels across the page**, **Width**, and **Height**. Measure the unused margins on the label stock. Then select **Fixed page margins** and enter values for **Top**, **Bottom**, **Left**, and **Right**.

7. Click **Next**.

Choosing and formatting the merge fields

1. In the next panel, for the **Available fields** list, double-click the first field whose data you want on the labels or envelope.

   <<field name>> appears in the **Label contents** or the **Envelope contents** area. Angle brackets indicate that this is a merge field, and field data will display in and print on the labels or envelope.

   To include fields from related tables, choose the table from **Available fields**.

2. Continue selecting the fields you want on the labels or envelope.

3. Include all punctuation, blank spaces, and line breaks (to place a merge field on the next line) that you want printed.

4. Click **Finish**.

Printing labels

1. To print the labels, load the labels into your printer according to the instructions that came with your labels and your printer. To print the envelope, load the envelope into your printer according to the instructions that came with your printer.
2. Choose **File** menu > **Print**, choose the printer and any additional options, and click **Print**.

Keep the following points in mind:

- To choose options for how you want labels printed on the page, choose **Layouts** menu > **Layout Setup**, and click the **Printing** tab. Then choose the number of columns (labels) across and the direction in which you want the labels printed, and set custom page margins, if needed.
- You may need to adjust your printer settings to print the labels correctly. Choose **File** menu > **Print Setup** (Windows) or **Page Setup** (OS X).

For more information about creating a layout for labels or envelopes, choosing printing and layout setup options, and additional considerations when you create a Labels or Envelope layout, see Help.

Printing scripts

You can print a list of all script steps for one or more scripts in a file.

1. Choose **Scripts** menu > **Manage Scripts**, or choose **File** menu > **Manage** > **Scripts**.
2. In the Manage Scripts dialog box, select the script or scripts you want to print.

   To select more than one contiguous script in the list, Shift-click the scripts. To select more than one noncontiguous script, Ctrl-click (Windows) or ⌘-click (OS X) the scripts.
3. Click  at the bottom of the dialog box.
4. Click **OK** (Windows) or **Print** (OS X).

   The selected script steps and options are printed.

Printing table and field information

You can print table or field information.

1. Choose **File** menu > **Manage** > **Database**, then click the **Tables** or **Fields** tab.
2. Select the table(s) or field(s) you want to print.

   To select more than one contiguous table or field in the list, Shift-click the tables or fields. To select more than one noncontiguous table or field, Ctrl-click (Windows) or ⌘-click (OS X) the tables or fields.
3. Click **Print**.
4. Click **OK** (Windows) or **Print** (OS X).

   The field names, field types, and formulas or data entry options are printed for each selected table.

Printing the relationships graph

You can print a graphical representation of your database by printing the relationships graph.

1. Choose **File** menu > **Manage** > **Database**, then click the **Relationships** tab.
2. Click  to display page breaks in the relationships graph.
3. Click  to display the Print Setup (Windows) or Page Setup (OS X) dialog box.
4. Change or accept the settings, then click **OK**.
5. Click **Print**.
6. In the Printing Options dialog box, choose an option.
   - Choose **Print graph on multiple pages** to print the graph on more than one page.
   - Choose **Print graph on one page** to resize the graph to fit on one page.
7. Click **Continue**.
8. Click **OK** (Windows) or **Print** (OS X).

For more information about previewing and printing databases, see Help.

Automating tasks with scripts

Scripts can do simple tasks like setting print orientation or complex tasks like preparing a customized mailing to customers. Scripts can incorporate conditional decisions (if-else statements) and perform repetitive tasks (loop statements).

You can build scripts in the Edit Script dialog box by selecting from a list of FileMaker Pro script steps, specifying options, and arranging the steps in the correct order to perform the task.

Use scripts to combine and automate tasks like:

- switching to another layout or mode
- finding, sorting, and printing records
- importing data from the same source

FileMaker Pro makes it easy for you to manage scripts. You can display a default script to use as a template when writing your own scripts. You can open several scripts at once to compare them. You can copy and paste entire scripts between files. You can copy and paste script steps from one script to another script in the same file or to a script in a different file. You can assign scripts to groups to make it easy to find scripts of a specific type (for example, copy an entire group of scripts to another file or delete an entire group of scripts). And you can design scripts to run when a particular event occurs (such as when users enter a field, press a key, or add a new record to the database).

Procedures for creating and managing scripts and a reference to all FileMaker Pro script steps (organized alphabetically or by category) are available in Help.

In addition, you can set up script triggers to specify that scripts run when particular events occur. For more information, see Help.

Backing up database files

Routine backups are strongly recommended for any document stored on a computer. It is easier to restore a backed up database than it is to re-create it. How often you should back up depends on the amount of data you are adding to your databases, and how difficult it would be to re-create your files if they become corrupt.

For very important files, it's a good idea to routinely store backups at an offsite location.

For file backup recommendations, see "Backing up databases and other important files" on page 151. For an example of a backup script, see Help.

Setting preferences

You can customize the appearance and behavior of FileMaker Pro to suit the way you work by changing standard settings called *preferences*. Preferences affect the behavior of the application and are not specific to any file.

Settings in the File Options dialog box affect the current file's default layout, opening and closing scripts, login information, and spelling.

To set application preferences:

1. Windows: Choose **Edit** menu **> Preferences**.

   OS X: Choose **FileMaker Pro** menu **> Preferences**.

2. In the Preferences dialog box, click a tab, then set the options you want to use.

To set file preferences:

1. Choose **File** menu **> File Options**.

2. In the File Options dialog box, click a tab, then set the options you want to use.

For more information about setting application and file preferences, see Help.

Chapter 3
Creating databases

This chapter explains the basics of how to:

- plan a database
- define and modify fields
- define tables
- create layouts
- work with fields, objects, and parts on a layout

Note See Help for detailed, comprehensive information and step-by-step procedures about using FileMaker Pro.

Planning a database

A well-designed database promotes consistent data entry and retrieval, and reduces the existence of duplicate data among the database tables. Relational database tables work together to ensure that the correct data is available when you need it. It's a good idea to plan a database on paper first.

Follow these general steps to plan a database:

1. Determine the purpose for your database, or the problem you want to solve. For example, "to keep a list of my customers," "to manage my inventory," or "to grade my students."

   If other people will use the database, be sure to talk with them about the data they will need.

2. Consider the information you will store in your database. Typically, information falls into broad categories. Accurately identifying these categories is critical to designing an efficient database, because you will store different types and amounts of data in each category. For example, a database intended to track sales has categories such as "customers," "products," and "invoices." A database that records student grades has categories such as "students," "classes," and "assignments."

3. After you've determined the broad categories, consider how these categories are related. This can be done by writing simple sentences that describe how the categories interact, such as, "customers order products" and "invoices record customers' orders." Each of these pairs suggests a relationship between the data in one category and the data in the other category.

4. After you've identified your categories of information, you are ready to organize your database.

   In database terminology, these categories of information are referred to as *tables*. Tables are used to group data containing a common element or purpose. For example, you might use one table to store names and addresses, while you use another table to store transaction details, such as date of sale, item number, unit price, and so on.

   Typically, databases are organized in one of three ways:

   - A single table in a single file. Use a single table if you need to track data in one category only, such as names and addresses.
   - Multiple tables in a single file. Use multiple tables if your data is more complex, such as students, classes, and grades.
   - Multiple tables in multiple files. Use multiple files if you need to share the same data among several different database solutions. For example, you can store your tax rates or shipping information in a separate file if you plan to use that information in more than one solution.

   Note Use relationships to share data between tables in the same file or with tables in external files. Other database elements, such as scripts and access privileges, are stored at the file level; therefore, some complex solutions will benefit from using multiple files.

5. Determine the database tables and the data they will include, and, in turn, which fields you will need.

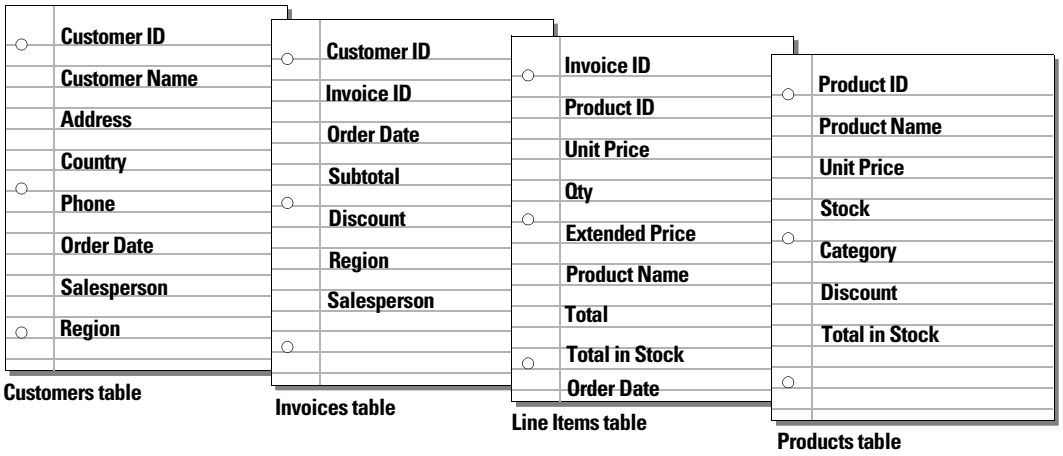
   Tip To make it easy to search and sort records, create separate fields for first and last name, titles, (like Mr. or Dr.), and items in addresses (city, state or province, country, and postal code). Separating your data into multiple fields at the time of data entry can make it easier to generate future reports. For example, using separate fields to capture transaction details such as the date, item number, quantity, and unit price of each transaction makes it easier to compile summary and subsummary reports at the end of a week, month, or year.

6. Decide which fields will contain common data among the tables.

   For example, a database for a bakery business might include these tables: a Customers table, which stores customer information; a Products table, which stores product information; and an Invoices table, which stores order information.

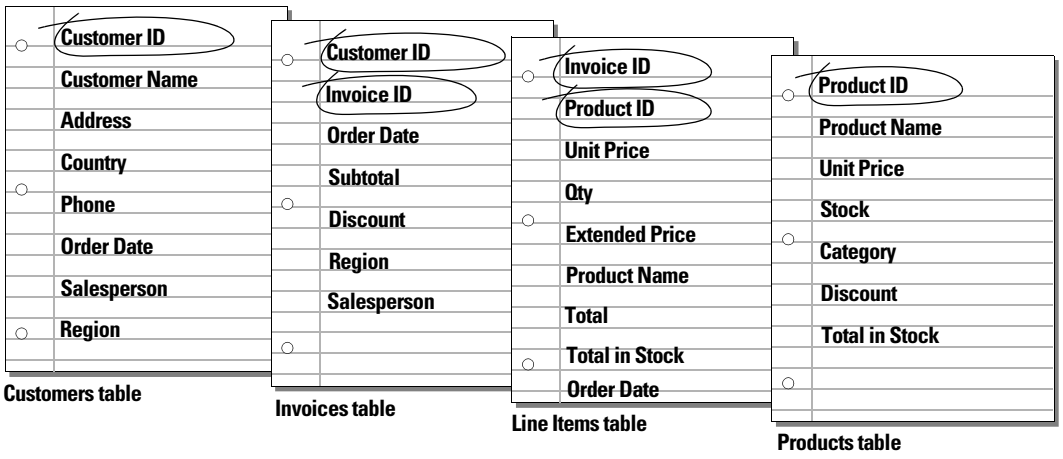
   Each table has only one subject, and all fields in a table describe only that subject. For example, the fields in one record of the Customers table together store all the information about one customer. For the same reason, you might assign each customer a unique, identifying number. You wouldn't enter a customer identification number into the table unless you had a new customer to add, so the existence of a customer number determines the existence of a record. A Customers table might also have fields for the customer's name, address and phone number.

A Products table might have fields for a product identification number, the unit price for each product, and the quantity in stock. A Line Items table might have fields for product and invoice identification numbers, the name, unit price, quantity, and total price of each product sold. An Invoices table might have fields for an invoice identification number, order date, and salesperson.



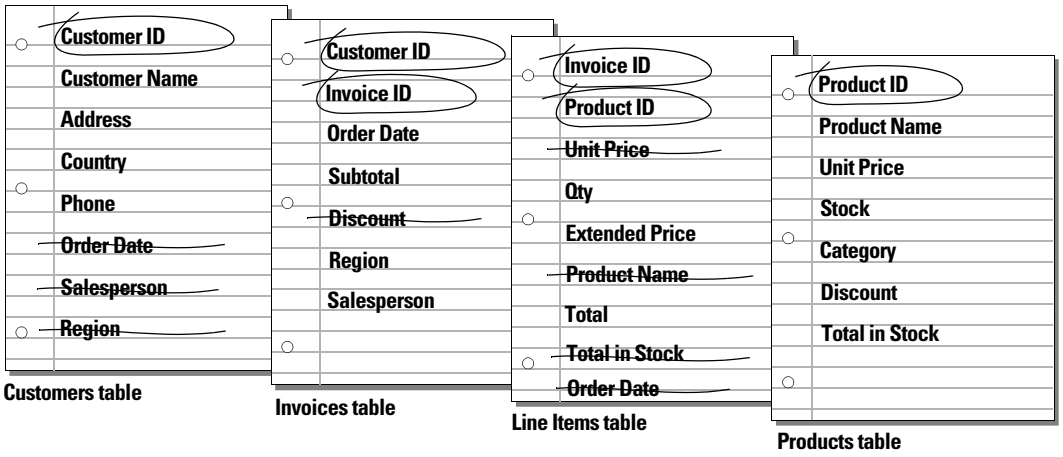
7. Determine the match fields for each table, and circle each one in your plan.

For more information, see “About match fields for relationships” on page 112.



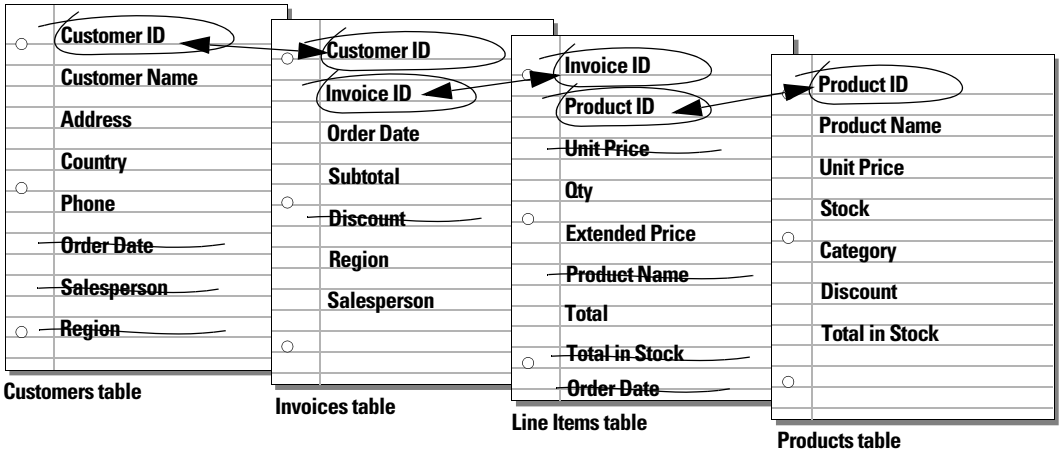
8. For each table, decide which fields will store data, and which ones will be used from other (related) tables.

Based on a table's subject, you can see where it makes sense to store the data and where to use data from a related table. Other than match fields, all fields should appear only once in your database. Cross out occurrences of fields that don't pertain to the table's subject.



9. Determine the relationships between the tables. In your plan, draw a line from each match field in a table to the corresponding match field in the related table.

What establishes a relationship between tables is that their match fields contain matching data.



Relationships also make it possible to group your data to resolve complex queries. For example, relationships can be used to determine current inventory levels, sales projections, and other tasks where it is necessary to query data across multiple tables. For more information about relationships, see chapter 4, "Working with related tables and files."

10. Determine whether you need to share your database with other users, and how they will access the file.

For more information about sharing databases, see "Sharing databases on a network" on page 124.

11. If you're designing the database for other people to use, show them your paper plan and ask them to review it and suggest any changes.

12. Consider who will use the database and whether you want to restrict access to it. When you create the database, assign access privileges as needed.

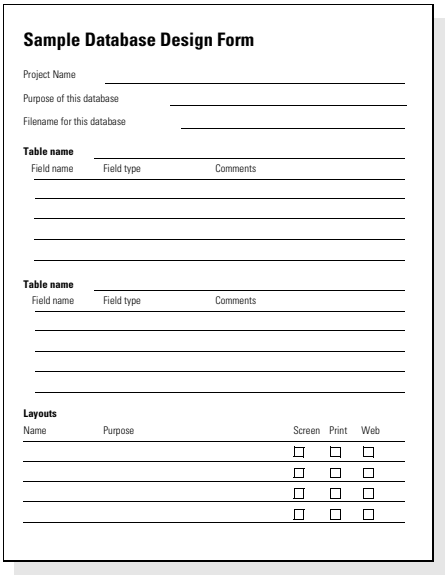
For more information about accounts and privilege sets, see chapter 6, “Protecting databases.”

13. Decide what layouts you need, and plan a separate layout for each task.

For example, create separate layouts for printing labels or envelopes.

For more information about creating layouts, see “Creating layouts and reports” on page 73.

14. Create a form such as the one shown below to list the files and tables you need and the fields for each table. Also list the forms and reports you will generate from each table.



Sample Database Design Form

Project Name _____

Purpose of this database _____

Filename for this database _____

Table name _____

Field name | Field type | Comments

Table name _____

Field name | Field type | Comments

Layouts

Name | Purpose | Screen | Print | Web

15. Create your database.

16. If you’ve designed the database for others to use, ask a few people to test it. Then, fix any problems they found before you make the database available for everyone to use.

Creating a FileMaker Pro file

You can create a file from a FileMaker Pro Starter Solution (template)—a predefined database file that you can modify to suit your needs. Or, you can create a file without using a template.

You can also create a file by making a copy of an existing FileMaker Pro file. See “Saving files” on page 20.

Creating a file using a Starter Solution

1. Choose **File** menu > **New From Starter Solution**.

You can also use the FileMaker Quick Start Screen to create files. Choose **Help** menu > **Quick Start Screen**, then click **Use a Starter Solution**.

2. Select **All Solutions** to view a list of all available solution files, or choose a solution category to narrow the list of choices.

If the FileMaker Quick Start Screen appears but there are no FileMaker Pro Starter Solutions displayed in it, the Starter Solutions weren’t installed. For more information, see Help.

3. Select a solution from the list (Windows) or the group of thumbnails (OS X), then click **Choose**.
4. Type a name for the file (choose a different folder, if needed), then click **Save**.

   Windows: For **Save as type**, select **FileMaker Files**.

   FileMaker Pro creates the file on your disk and opens the file. You can modify fields and layouts in Starter Solutions. For more information, see the remaining sections in this chapter.

Creating a new file

1. Choose **File** menu > **New Database**.

   You can use the FileMaker Quick Start Screen to create new files. Choose **Help** menu > **Quick Start Screen**, click **Create a New Database**, and continue with step 2.
2. Type a name for the file (choose a different folder, if needed), then click **Save**.

   Windows: For **Save as type**, select **FileMaker Files**. If you don't type a file extension, FileMaker Pro adds .fmp12 to the filename. (For information about viewing file extensions in Windows, see Windows Help and Support.)

   FileMaker Pro creates the file, displays a blank, empty file in Layout mode, and displays the Field Picker dialog box, which you use to define fields for the database and add them to the layout.

   To have fields automatically placed on the layout, select **Add newly defined fields to current layout** in the Layout tab of the Preferences dialog box before you define the fields.
3. Define the fields, drag them to the layout, then close the Field Picker dialog box.

   For details about defining fields using the Field Picker dialog box, see “Creating and changing fields in the Field Picker dialog box” on page 59.

   You can set field options such as validation or indexing when you define a field, or at a later time. For more information, see “Setting options for fields” on page 67.
4. Add objects and other embellishments to the layout.

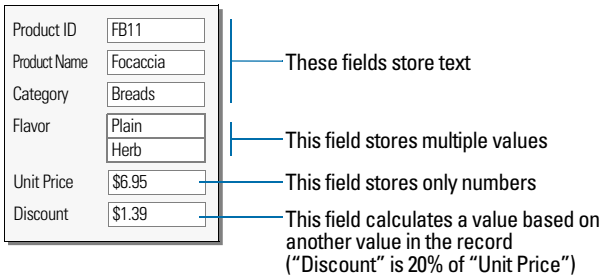
   For more information, see “Working with objects on a layout” on page 81.
5. Save the layout by pressing Ctrl+S (Windows) or ⌘-S (OS X), then exit the layout (click Exit Layout in the layout bar).

Keep the following points in mind:

- For information about entering data in fields in Browse mode, see “Adding and duplicating records” on page 25.
- By default, choosing **File** menu > **New Database** displays an empty database in Layout mode and the Field Picker dialog box. To display the Manage Database dialog box whenever you create a new database, choose **Edit** menu > **Preferences** (Windows) or **FileMaker Pro** menu > **Preferences** (OS X). In the Preferences dialog box, click the **General** tab, then select **Use Manage Database dialog to create files**.
- To change the layout theme, see “Working with layout themes” on page 78.
- You can change the width of a layout to accommodate more (or fewer) objects. Making a layout wider helps you see the edge of the layout without resizing the window. To change the width of a layout, drag the gray line on the right side of the layout.

Creating and changing fields

To define a new field in the database, you give it a name and select a field type. Then you select options that determine how the field interprets, enters, calculates, stores, and displays data. These characteristics make up the *field definition*.



See "Formatting field data on a layout" on page 93 for information about setting options for field formats, which control how data appears on a layout.

About naming fields

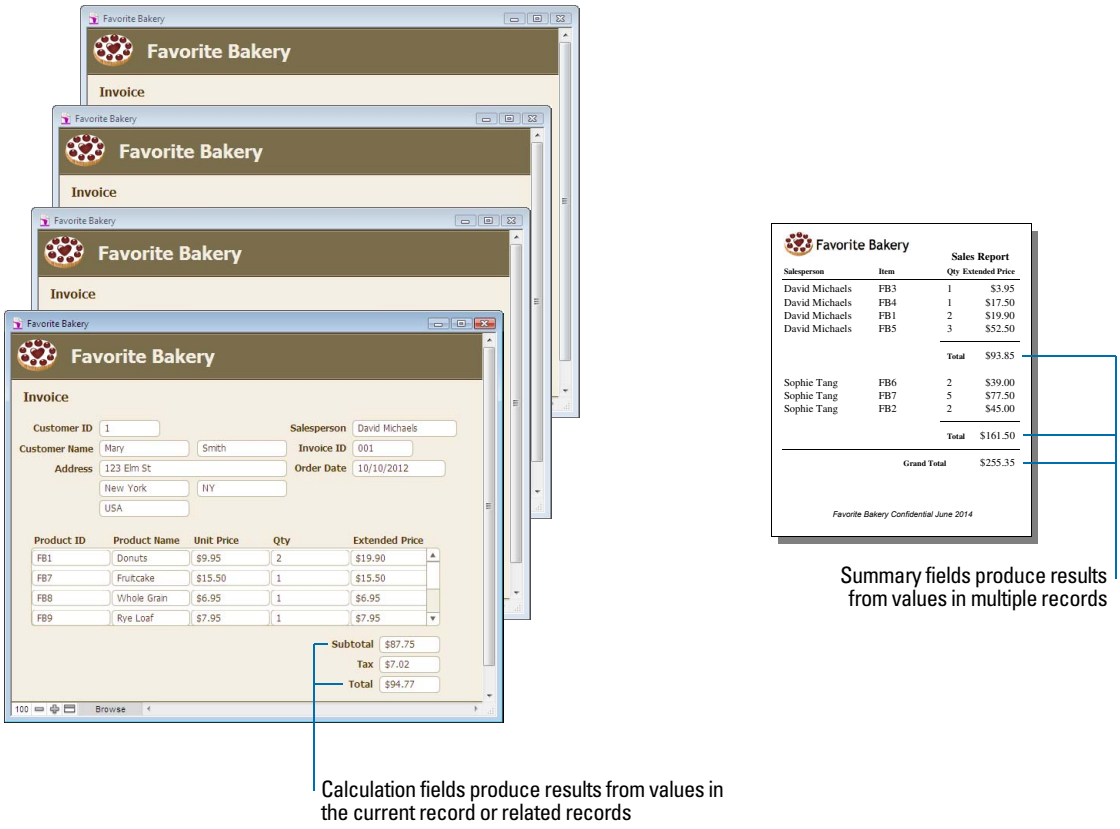
Follow these guidelines when naming fields:

- Field names must be unique. They can contain up to 100 characters.
- Use descriptive names that clearly identify the contents of the field. Avoid abbreviations, acronyms, or other terms that may cause confusion.
- Don't use any of the following symbols or words in the field name:
  - , (comma) + – * / ^ & = ≠ > < ≥ ≤ ( ) [ ] } " ; (semicolon) : (colon) :: (relational indicator) $ (variable indicator)
  - AND, OR, XOR, NOT, or the name of any FileMaker Pro function
- Don't begin a field name to be used in a calculation formula with a space, period (.), or number.
- Use _ (underscore) in place of a space to avoid restrictions in ODBC (Open Database Connectivity) or JDBC (Java Database Connectivity), exporting, web publishing, and other operations.
- If you're exchanging data with another application, check the field naming restrictions in the file formats supported by the other application.
- If you're using ODBC or JDBC to share FileMaker Pro data, avoid using SQL keywords in field names.

About choosing a field type

When you define a field, you select a field type based on the kind of information the field will contain. The field type determines what kind of data can be entered and what kinds of operations FileMaker Pro can perform with the data. FileMaker Pro uses the field type to interpret the data for tasks like sorting records and performing calculations.

Select this field type	If the field data will be
Text	Letters, symbols, and/or numbers used as text per field repetition, limited by available RAM and disk space. Indexes nominally based on the first 100 characters of each word or value. Text fields may contain carriage returns.
Number	Values up to 800 digits or other characters, and the negative values of the same range. Number fields can also contain Boolean values (0 or 1), to indicate, for example, true, false, yes, and no. Number fields can't contain carriage returns.
Date	Dates only. Uses the Gregorian calendar with a range of 1/1/0001...12/31/4000. Month, day, and year order is based on system settings when the file is created.
Time	Times only. A time field can contain the hours, minutes, and seconds portion of a time. A time field can contain a negative time duration, for example, -08:40:00.
Timestamp	Dates and times to reference a fixed point in calendar time. For example, 10/25/2014 2:39:46 AM
Container	A file of any type, such as a picture, a PDF, or a multimedia file. You can set up storage and display options for the field. You can reference container fields in calculations and summary fields. You can't find or sort records based on container fields, but you can define text fields to describe or identify them. Then, you can find or sort records based on the description or identifying number in the text field. Files in container fields can be embedded, stored as a reference, or stored externally.
Calculation	The result of a calculation formula that uses field values from the current record or related records. The formula can use values of all field types. The result can be one of these types of data: text, number, date, time, timestamp, or container.
Summary	A value that's produced by summarizing field values from more than one record in the same table.



Keep the following points in mind:

- Any field type except summary can store a global value. For more information, see “About indexing and storage options” on page 71.
- Be sure to use a date field (instead of a text or number field) to store dates. To avoid confusion when using dates, always use four-digit years.
- Use text fields instead of number fields to store postal codes, phone numbers, and other values with leading zeroes or characters like hyphens or parentheses.
- Although you can’t find or sort records based on a container field, you can define a text field to describe or identify the contents of the container. Then, you can find or sort records based on the data in that text field.

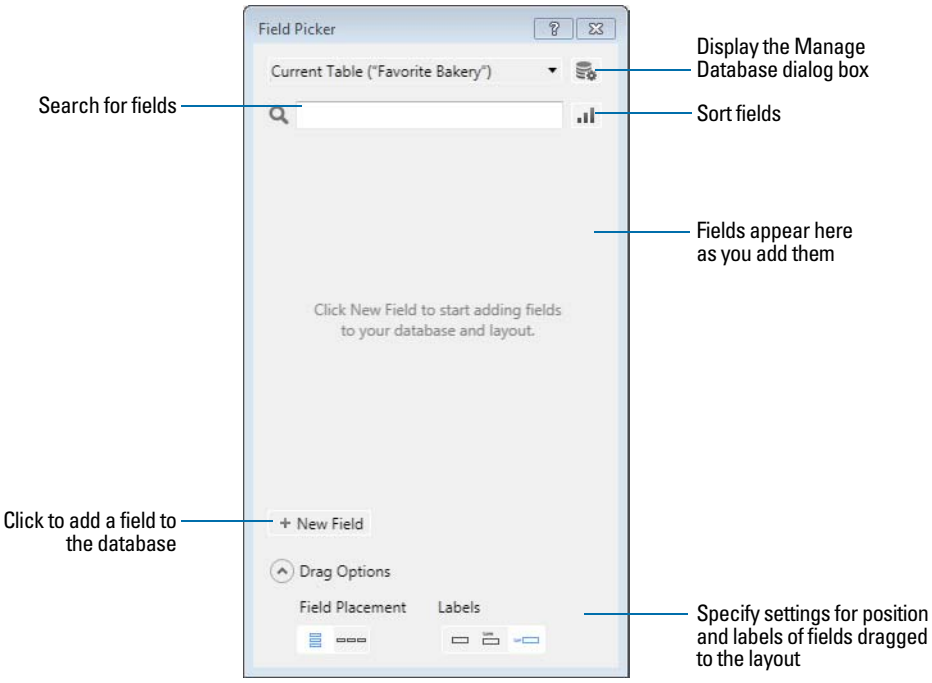
To change the way data is displayed in text, number, date, time, and timestamp fields, see “Formatting field data on a layout” on page 93.

Creating and changing fields in the Field Picker dialog box

When you create a new database, FileMaker Pro opens the file in Layout mode, and displays a blank layout and the Field Picker dialog box. Use the Field Picker dialog box to define fields for the database, and to add or change fields for an existing layout.

Note Fields are not automatically added to the layout when you define them in the Field Picker dialog box. To have fields placed on a layout when you define them, select **Add newly defined fields to current layout** in the Layout tab of the Preferences dialog box before you define the fields.

1. If the Field Picker dialog box is not open, in Layout mode, click Field Picker in the layout bar.



2. In the Field Picker dialog box, add, delete, or change fields.

To	Do this
Add a field	Click **New Field**. A placeholder ***Field*** is created in the fields list, with a field type assigned. With the field selected, type a new name for the field. See "About naming fields" on page 57.
Change the field type	Click the field type and choose a new field type from the list. See "About choosing a field type" on page 58. Important Changing the field type can permanently and irretrievably erase data.
Set options for the field	Right-click the field and choose **Field Options**. See "Setting options for fields" on page 67.
Delete a field	Right-click the field and choose **Delete Field**. To delete multiple fields at a time, select the fields, then right-click and choose **Delete Field**. Important Before you delete a field, confirm that you don't need any of the data it contains.
Change a field's name	Windows: Double-click the field, then type a new field name. OS X: Select the field, then click the field name and type a new field name.
Sort fields in the list	Click , then choose how you want to sort the fields.
Locate a field in a long list	Type the field name in the search box near the top of the Field Picker dialog box.

3. Repeat step 2 to continue defining fields.

4. When you drag fields to the layout, by default the fields are placed vertically on the layout, with field labels to the left of the fields. To change these settings, click **Drag Options** before you drag the fields to the layout.
   - To change the position (horizontal or vertical) in which fields are placed on the layout, for **Field Placement**, click a choice.
   - To specify the position of field labels, for **Labels**, click a choice.

   Subsequent fields that are added to the Field Picker dialog box use the current drag settings.

   Note Changes to the drag settings have no effect on fields that are already on the layout.

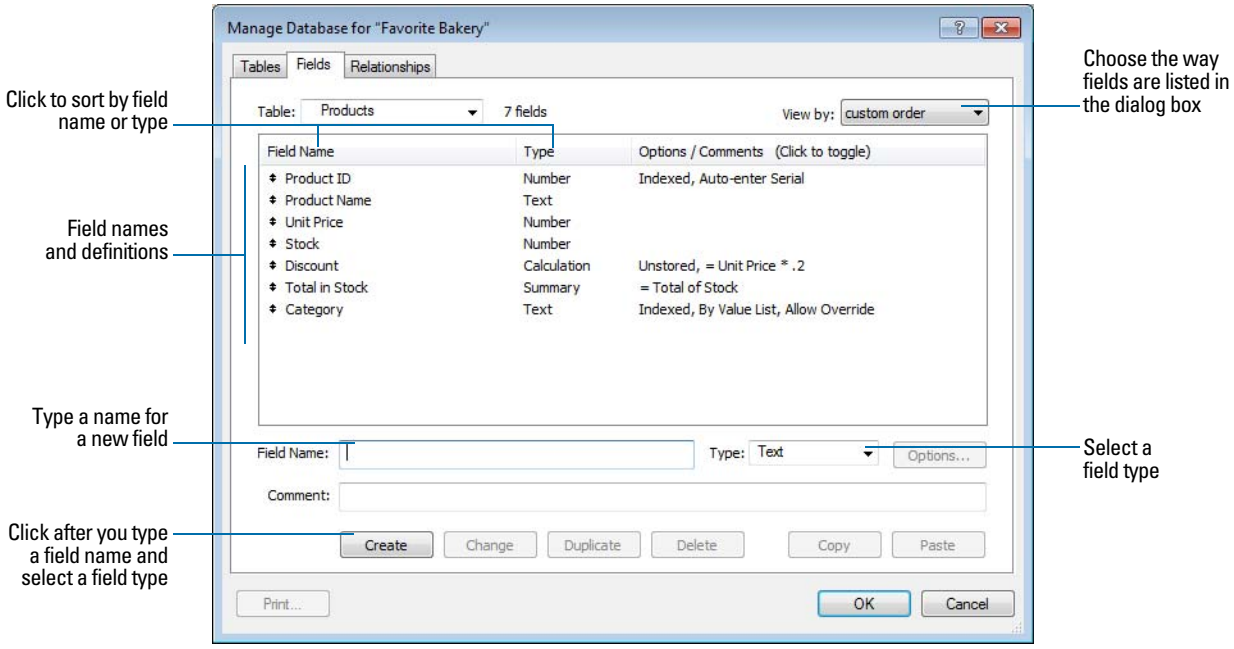
5. Select the fields you want to place on the layout, then drag them to the layout.

6. Close the Field Picker dialog box by clicking the close button or pressing Esc.

Creating and changing fields in the Manage Database dialog box

1. With the database open, choose **File** menu > **Manage** > **Database**.

2. In the Manage Database dialog box, click the **Fields** tab.



3. If your file contains more than one table, select the appropriate table from the **Table** list.

   You see tables from the current file and any related external files.

4. For **Field Name**, type a name for the field.

   Or, to change a field's name, select the field in the list, then type a new name in the **Field Name** box.

   See "About naming fields" on page 57.

5. For **Type**, select a field type.

   Important Changing the field type can permanently and irretrievably erase data.

   See “About choosing a field type” on page 58.

   You can enter a description of the field in the **Comment** box.

   For more information about creating calculation fields, see “Creating calculation fields” on page 63. For more information about creating summary fields, see “Creating summary fields” on page 65. For more information about creating container fields, see Help.

6. Click **Create** if you’re creating a new field. If you’re changing the field, click **Change**.

7. To delete a field, select one or more fields that you want to delete, click **Delete**, then click **Delete** again.

   Important Before you delete a field, confirm that you don’t need any of the data it contains.

8. To define options for the field, click **Options**, and specify the options you want in the Options for Field dialog box.

   For more information, see “Setting options for fields” on page 67.

To	Do this in the Options for Field dialog box
Automatically enter values into the field	Click the **Auto-Enter** tab, select the options, then click **OK**. For more information, see “Defining automatic data entry” on page 68.
Make sure data is entered into the field correctly	Click the **Validation** tab, select the options, then click **OK**. See “Defining field validation” on page 69. Important To avoid confusion when using dates in FileMaker Pro, set field validation options to make sure dates are always entered with four-digit years.
Make the field repeating	Click the **Storage** tab, then select **Maximum number of repetitions**. Type the number of repetitions, then click **OK**. For more information, see Help.
Select options for indexing the field	Click the **Storage** tab, select the options, then click **OK**.
Make the field use one value for all records in the file	Click the **Storage** tab, select **Use global storage**, then click **OK**.
Create a link between the “parent” data field and the Furigana “child” field, so that when you input Kanji characters into the “parent” field, the corresponding Kana reading appears in the Furigana “child” field	Click the **Furigana** tab, select **Use Furigana Field**, the Furigana field, and the Kana reading input format, then click **OK**. Note This option is available for text fields only, and if your operating system is configured to support Japanese text.

9. Continue to define or change fields, or click **OK** to close the Manage Database dialog box.

Creating and changing fields in Table View

1. With the database open, in Browse mode, click **Table View** in the layout bar.
2. Create new fields or change existing fields.

To	Do this in Table View
Create a field	To create the first field, click **Create Field** in the first column heading. To create additional fields, click **+** in the column heading, or click in the right margin.
Change a field name	Double-click the column heading for the field you want to rename, then type the new name. For more information, see “About naming fields” on page 57.
Choose a field type	Right-click the column heading, choose **Field** > **Field Type**, and choose a field type. For more information about field types, see “About choosing a field type” on page 58. Important Changing the field type can permanently and irretrievably erase data.
Set field options	Right-click the column heading, then choose **Field** > **Field Options**. For more information, see “Setting options for fields” on page 67.
Delete a field	Right-click the column heading, then choose **Field** > **Delete Field**. Important Before you delete a field, confirm that you don’t need any of the data it contains.
Display more fields or hide fields	Click **Modify** in the layout bar and use the options in the Modify Table View dialog box. Or, right-click a column heading, then choose **Field** > **Hide Field** to hide the selected field. To display a hidden field in Table View, right-click the **+** column heading, then choose a field from the list of existing fields.

For information on working with records in Table View (for example, adding, deleting, and sorting records), see “Working with records in Table View” on page 30. For information about displaying data in Table View (for example, reordering columns and setting column widths), see “Displaying data in Table View” on page 29.

Creating calculation fields

1. To create a calculation field, follow steps 1–5 in “Creating and changing fields in the Manage Database dialog box” on page 61.
2. Choose **Calculation** as the field’s type, then click **Create**.
3. In the Specify Calculation dialog box, if necessary, for **Evaluate this calculation from the context of**, choose a table from the list.

   Setting the context for a calculation is only necessary when you’re creating a calculation field in a *source table* that has two or more occurrences in the relationships graph. The source table is the table defined in the **Tables** tab of the Manage Database dialog box. The choice you make may affect the calculation results, particularly if your calculation will include fields in related tables.

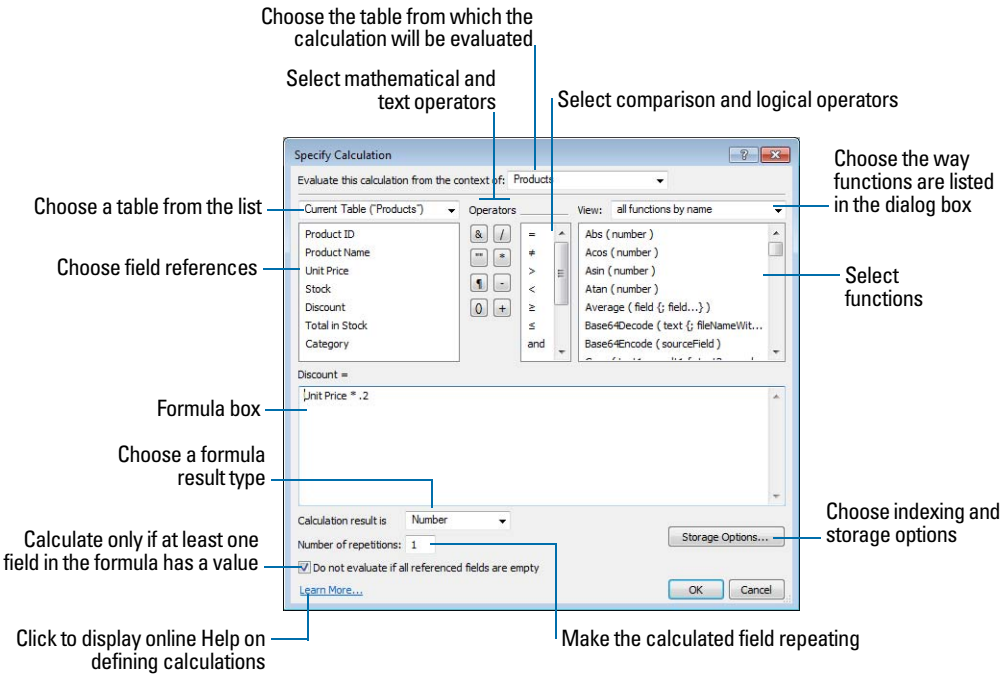
4. Build a formula for your calculation.

Click where you want the item to appear in the formula box, then do the following. You can also type the formula into the box.

To add a	Do this
Reference to a field	In the field list, double-click a field name. To display field names from another table, choose a table from the table list.
Mathematical or text operator	In the keypad in the dialog box, click an operator. (Quotation marks and parentheses are copied to the formula as a pair, with the insertion point blinking in the middle).
Comparison or logical operator, or an exponent	For **Operators**, choose an operator from the list.
Constant value	Type the value. A constant can be text, number, date, or time. Use date constants with the functions Date and GetAsDate, time constants with the functions Time and GetAsTime, and timestamp constants with the functions Timestamp and GetAsTimestamp. Text constants can be up to 29998 characters long.
Function	In the functions list, double-click a function (a predefined, named formula that performs a specific calculation and returns a single, specific value). In the formula box, replace the placeholder parameter with a value or expression.

Procedures for working with formulas and a reference to all FileMaker Pro functions (organized alphabetically or by category) are available in Help.

5. Select calculation options for the field.



To	Do this
Set the field type of the result	Choose a data type for **Calculation result is <value>**. Choose the correct type for the result you want. See “About choosing a field type” on page 58.
Make a calculated field repeating	Select **Number of repetitions**, then type the number of repetitions (up to 32,000).
Prevent calculation if all referenced fields are empty	Select **Do not evaluate if all referenced fields are empty**. When enabled, FileMaker Pro does not evaluate a calculation if all fields used by the calculation are empty.

6. To select indexing and global storage options for the field, click **Storage Options**, select options in the Storage Options dialog box, then click **OK**.
7. Click **OK** to close the Specify Calculation dialog box.
8. Continue to define fields, or click **OK**.

Note If your FileMaker Pro file accesses data from external ODBC data sources, you can add supplemental fields to specify calculations using external data. For more information, see “Using supplemental fields” on page 67.

For more information about creating or changing calculation fields or the use of context in calculations, see Help.

Creating summary fields

Use summary fields to calculate values such as subtotals, averages, and grand totals across multiple records. For example, a summary field can display in a report the grand total of all sales in the month of May.

Use the New Layout/Report assistant to create a report with grouped data (data in a summary field). See “Creating layouts and reports” on page 73.

Tip You can use Table View in Browse mode to quickly create a dynamic report that groups your data by a field, displays subtotals for a field, or creates subtotals for each group of data. For more information, see Help.

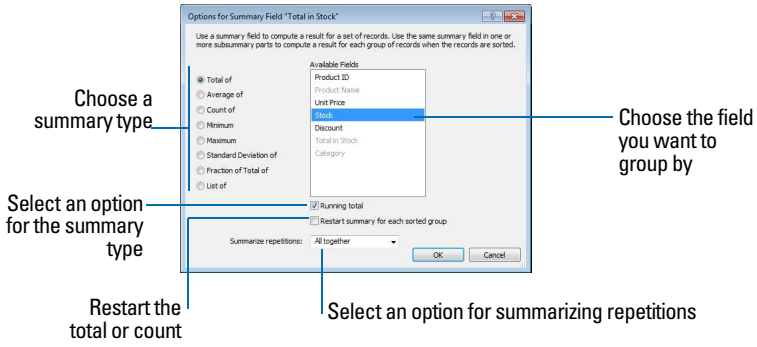
The value in a summary field can change depending on where you place the field on a layout, how many records are in the found set, whether the records are sorted, and which mode you’re using.

If you’re modifying a layout that contains a summary field, you must know about layout parts to get the results you want (see “Working with layout parts” on page 99).

1. To create a summary field, follow steps 1–5 in “Creating and changing fields in the Manage Database dialog box” on page 61.
2. Choose **Summary** as the field’s type, then click **Create**.

3. In the Options for Summary Field dialog box, select a summary type, then select the name of the field you want to group by.

Select this type of summary	To summarize values in a field in the found set of records by
Total of	Calculating the total of values in the field.
Average of	Calculating the average of values in the field.
Count of	Counting the number of records that contain a value for the field. For example, if a field contains 100 values (one value for each record), the result of the count is 100.
Minimum	Finding the lowest number, or the earliest date, time, or timestamp for a field.
Maximum	Finding the highest number, or the latest date, time, or timestamp for a field.
Standard Deviation of	Finding how widely the values in a field differ from each other. This option calculates the standard deviation from the mean of the values in a field. (The formula is *n*-1 weighted, following the normal standard deviation.)
Fraction of Total of	Calculating the ratio of the value in the field to the total of all the values in that field. For example, find what fraction of total sales can be attributed to each salesperson.
List of	Creating a return-delimited list of non-blank values in a field.



4. Select an option, if applicable, for the summary type.

   Options change according to the summary type you select in the previous step.

For this summary type	Select	To
Total of	**Running total**	Show the cumulative total for the current and all previous records. To restart the running total for each sorted group, also select **Restart summary for each sorted group**. Then, from the fields list, select the field that the sort will be restarted from.
Average of	**Weighted average**. In the list of fields that appears, select the field that contains the weight factor	Determine the average in one field based on a value in another field that's used as a weight factor.
Count of	**Running count**	Show the cumulative count of the current and all previous records. To restart the running count for each sorted group, also select **Restart summary for each sorted group.** Then, from the fields list, select the field that the sort will be restarted from.

For this summary type	Select	To
Standard Deviation of	**by population**	Calculate population standard deviation, where the formula is *n*-weighted.
Fraction of Total of	**Subtotaled**. In the list of fields that appears, select a field to group by. (When you return to Browse mode, sort by this field to calculate the value correctly.)	Calculate a fraction of the total based only on a group of records.

5. Select an option, if applicable, for summarizing a repeating field.

Select	To
All together	Calculate a single summary value for all repetitions in the field.
Individually	Calculate a summary value for each repetition.

6. Click **OK**.

7. Continue to define fields, or click **OK**.

Keep the following points in mind:

- When you create a report in the New Layout/Report assistant, fields that are in summary parts display the part-specific style, not the default theme style.
- If you have used the Field tool to add a field to a summary part and the text is difficult to see, use the Inspector or the Format Painter to copy the style you want from another field.
- If your FileMaker Pro file accesses data from external ODBC data sources, you can add supplemental fields to specify summary fields for external data. For more information, see the next section.

Using supplemental fields

If your FileMaker Pro file accesses data from external ODBC data sources, you can use *supplemental fields* to display unstored calculation and summary results using ODBC data. Because you can't use FileMaker Pro to change the schema of an external ODBC database, supplemental fields are the only fields you can add to external tables.

For information about how to access and work with SQL data interactively, see "Working with external data sources" on page 136. For more information about using supplemental fields, see Help.

Setting options for fields

You can set field options when you define a field, or at a later time. You can set options for:

- entering default data into a field
- checking data against validation requirements
- making a repeating field
- creating an index
- storing container data externally
- storing a global value
- Furigana fields (Japanese language fields only)

Some field options help ensure the accuracy and consistency of your data. For example, if you type **Frnc** instead of **France** into the Country field, you won't find that record when you later search for all customers from France. To be sure that all country names are entered correctly, you can define a value list containing the names, then select the **Member of value list** validation option for the Country field. When you enter data into the field, the data must match a value in the list.

You can set field options while you're working in Table View, Form View, or List View.

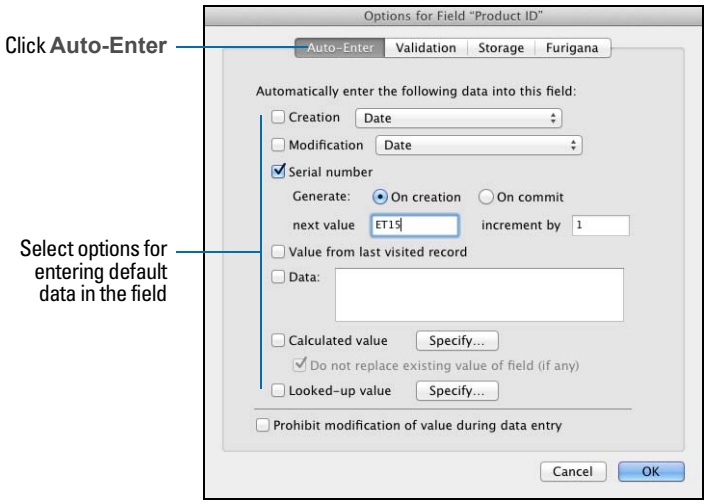
For more information on value lists, see "Setting up checkbox sets and other controls on a layout" on page 91. To set options for summary fields, see "Creating summary fields" on page 65. To set storage options for container fields, see Help.

Defining automatic data entry

To automatically enter a default value into a field for each record:

1. With the database open, do one of these:
   - If you're working in Table View, right-click the field name, then choose **Field** > **Field Options**. Then skip to step 5.
   - Choose **File** menu > **Manage** > **Database**.
2. In the Manage Database dialog box, click the **Fields** tab.
3. If your file contains more than one table, select the appropriate table from the **Table** list.
4. In the fields list, double-click a field that you want to define.
5. In the Options for Field dialog box, click the **Auto-Enter** tab and select options. (The available options depend on the field type.)

To	Do this
Enter a date, time, timestamp, user name, or account name when the record is created or modified	Select **Creation** or **Modification**, then choose an option from the list.
Assign a sequential number to the field in each record	Select **Serial number**. Select **On creation** to assign the number when a record is created. Select **On commit** to assign the number when the record is committed. For **next value**, type a starting value (for example, 1001), then type the number to increment by.
Enter the value from the previously accessed record	Select **Value from last visited record.**
Enter data you specify	Select **Data**, then type up to 255 characters.
Enter the result of a calculation in the field	Select **Calculated value,** define the formula in the Specify Calculation dialog box, then click **OK**. For more information about the Specify Calculation dialog box, see "Creating calculation fields" on page 63. Select **Do not replace existing value of field (if any)** to prevent overwriting data already present.
Enter a value that's copied from a field in the same or a different table or file	Select **Looked-up value**, define the lookup, then click **OK**. See "Creating lookups" on page 121.
Prevent users from changing an automatically entered value	Select **Prohibit modification of value during data entry.**
Turn off automatically entered data	Clear all selected checkboxes.



6. Click **OK** to close the Options for Field dialog box, or click another tab to set additional field options.

Defining field validation

You can select field validation options to ensure that data is entered into the field correctly. FileMaker Pro displays a message if you enter data incorrectly.

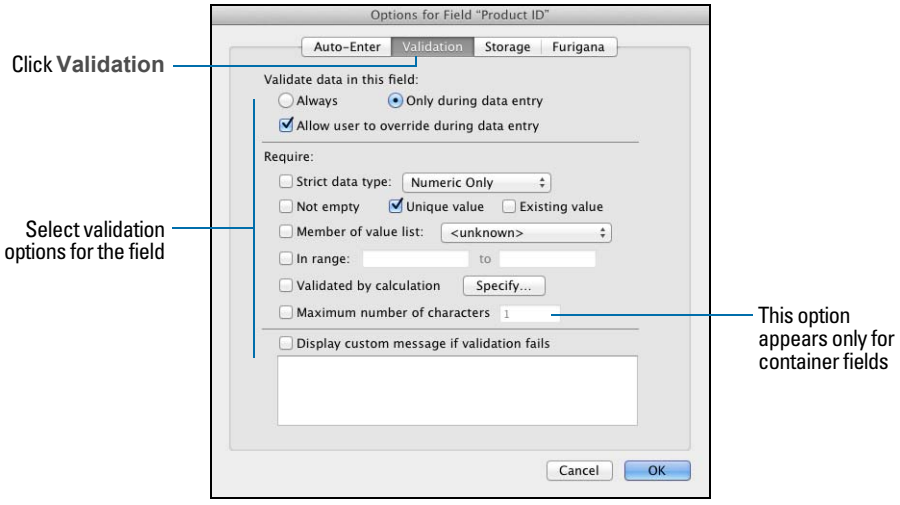
Important To avoid confusion when using dates in FileMaker Pro, set date field validation options to make sure dates are always entered with four-digit years.

1. With the database open, do one of these:
   - If you're working in Table View, right-click the field name, then choose **Field Options**. Then skip to step 5.
   - Choose **File** menu > **Manage** > **Database**.
2. In the Manage Database dialog box, click the **Fields** tab.
3. If your file contains more than one table, select the appropriate table from the **Table** list.
4. In the fields list, double-click a field you want to define.
5. In the Options for Field dialog box, click the **Validation** tab.
6. Specify how FileMaker Pro handles an invalid entry.

   For **Validation options for this field**, select **Always** for ongoing field validation, or **Only during data entry** to limit validation to instances when data is being entered. Deselect **Allow user to override during data entry** if you want to prevent users from entering invalid data.
7. Select validation options for the field.

To require that the entered value	Select
Contains only numbers	**Strict data type**, then choose **Numeric Only** from the list
Is a date containing numeric values for the month and day, and four digits for the year (for example, 5/12/2014)	**Strict data type**, then choose **4-Digit Year Date** from the list

To require that the entered value	Select
Is a time containing numeric values for hours and minutes between 00:00 and 23:59 (seconds are optional)	**Strict data type**, then choose **Time of Day** from the list
Is not blank	**Not empty**
Does not duplicate a value found in this field in other records	**Unique value**
Matches another value in the same field in any other record	**Existing value**
Matches a value in a specified value list	**Member of value list**, then choose an existing value list or define a new one
Is within a specific range of letters, numbers, dates, or times	**In range**, then type the beginning and ending values
Matches the result of a calculation	**Validated by calculation**, then enter a calculation in the Specify Calculation dialog box. Select or clear **Validate only if field has been modified**. Then click **OK**. The result must be Boolean—true or false. The result is true when the result is any number except zero; any other result (zero, no data, or non-numeric data) is false. For more information about the Specify Calculation dialog box, see “Creating calculation fields” on page 63.
Does not exceed the specified number of characters	**Maximum number of characters**, then type the maximum number of characters allowed
Does not exceed a specified file size (for container field)	**Maximum number of kilobytes**, then enter the number of kilobytes. This setting limits the size of a file that’s embedded in a container field or stored externally. This setting has no effect on files that are stored by reference in a container field.



8. To display a custom message when the data doesn’t meet the validation requirements, select **Display custom message if validation fails**, then type up to 255 characters.

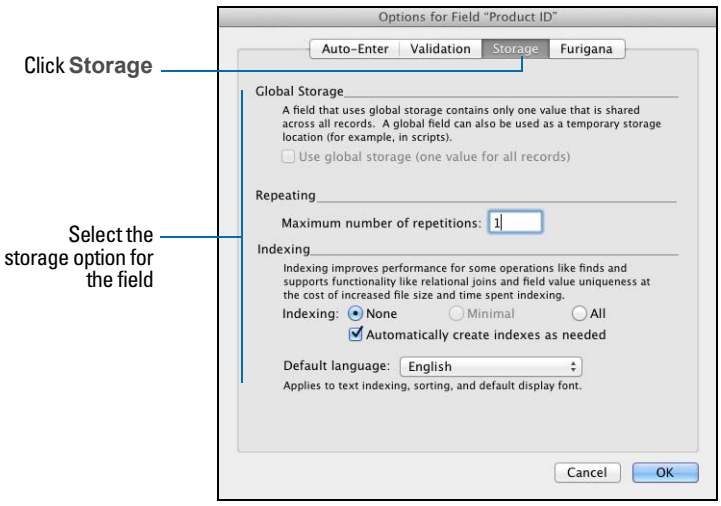
9. Click **OK** to close the Options for Field dialog box, or click another tab to set additional field options.

For more information, see Help.

About indexing and storage options

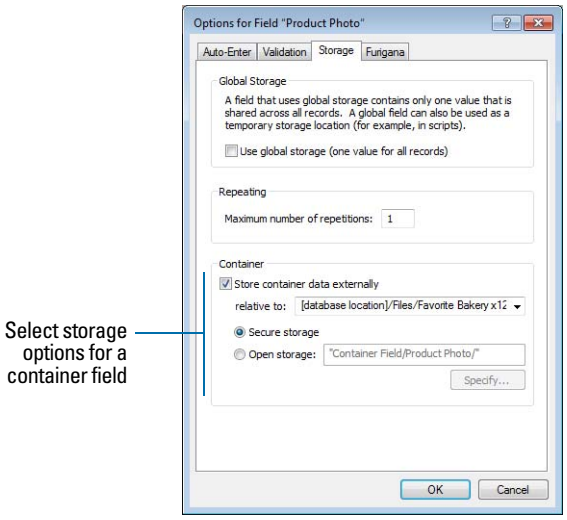
FileMaker Pro provides options for indexing fields and for storing the results of calculations. You can:

- Create an *index*, which is a list of the values stored in a field. An index greatly speeds searches, but takes up space on your disk. You can index text, number, date, time, and timestamp fields. You can also index calculation fields if the results are text, numbers, dates, times, or timestamps.
- Store the result of a calculation field in your database, or you can tell FileMaker Pro to perform the calculation only when needed (*unstored*). Storing the result is faster but takes up more space on the disk. You can specify storage options for text, number, date, time, timestamp, and calculation fields.
- Set any field (except summary fields) to share one value across all records in a file if you select **Use global storage** in the **Storage** tab of the Options for Field dialog box. Fields defined with global storage are also referred to as *global fields*.
- Store data for a container field in a location that's external to the file, such as in a different folder or directory on the local or a host computer.



Storage options for all field types except container fields

The options in the Storage tab change for a container field.



Storage options for container fields

For more information about setting field options, see Help.

Creating database tables

Use database tables to organize and group your data by a common characteristic or principle. Your database can contain as many tables as you need to organize your data.

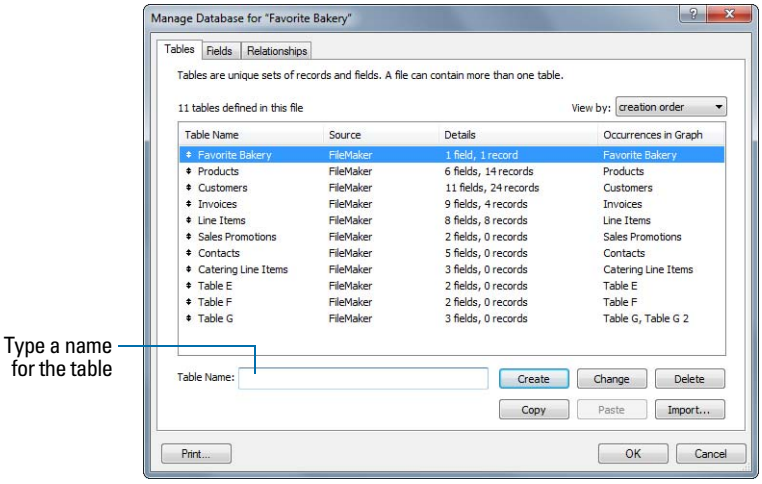
In addition to storing data, FileMaker Pro uses tables to describe relationships in the relationships graph, and establish the *context* for layouts and some calculations. In FileMaker Pro, context is the starting point from which calculations and scripts are begun and from which a relationship is evaluated in the relationships graph.

When you create a new file, FileMaker Pro automatically creates the first table and the first layout. The table and the layout are given the same name as the file.

You create additional tables in the Manage Database dialog box.

1. With the database open, choose **File** menu > **Manage** > **Database**.

2. In the Manage Database dialog box, click the **Tables** tab.



3. In the **Table Name** box, type a name for the table, then click **Create**.

   The table can be renamed or deleted. Tables you add to a file are automatically displayed in the relationships graph.

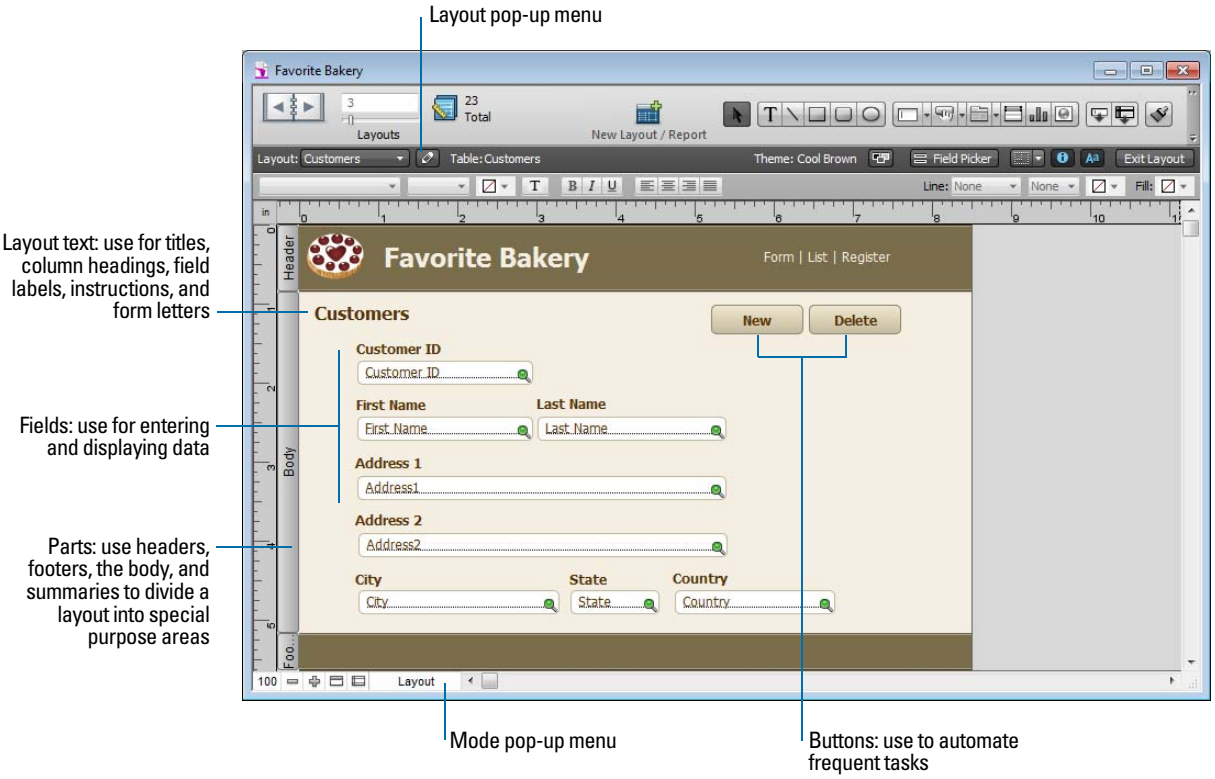
4. Continue to define tables, or click the **Fields** tab to define fields.

For information about relationships, tables, and the relationships graph, see chapter 4, “Working with related tables and files.”

Creating layouts and reports

FileMaker Pro layouts determine how information is organized for viewing, printing, reporting, finding, and entering data. Layouts don’t store your data—they just display it. Layouts are sometimes called reports, especially when printed.

You can create as many layouts as you need for a file (for example, layouts for entering data, reporting summaries, or printing mailing labels). You can change a layout’s design without affecting the data or other layouts for the file. Layouts can include certain fields and exclude others. When you change the data in a field (in Browse mode), the changes are reflected in the same field for the same record on all the layouts in the file.



When you create a database file (without using one of the Starter Solution template files included with FileMaker Pro), FileMaker Pro automatically creates a layout for the initial table in the file, and for each newly added table that contains fields.

You create additional layouts by switching to Layout mode and using the New Layout/Report assistant, which guides you through creating a layout according to options you choose. Use the different layout types for various purposes, like displaying a data entry screen or printing a totaled sales report or mailing labels. You can customize each layout by using the design tools that are available in Layout mode.

Important FileMaker Pro considers the selected printer, and print or page setup information when it calculates margins and other measurements on the layout. Printer and print settings depend on the printer and system software you're using. Refer to your printer and system documentation for more information.

Keep the following points in mind:

- If you intend to print the new layout in landscape orientation or on a special paper size, in Browse or Layout mode, choose **File** menu > **Print Setup** (Windows) or **File** menu > **Page Setup** (OS X), confirm the orientation and paper settings, then click **OK.** Modified Print Setup and Page Setup settings affect all other layouts in the current file, so you may need to change these settings later to print other layouts properly.
- You can easily manage the layouts and layout folders in your database using the Manage Layouts dialog box. For example, add, delete, and duplicate layouts and folders, open multiple layouts, and change the order in which layouts and folders appear in the Layout pop-up menu. For more information, see Help.

To create a layout:

1. In Layout mode, click **New Layout/Report** in the status toolbar.

   Or, in Browse mode, choose **File** menu > **Manage** > **Layouts**, and click **New**.

   You see the New Layout/Report assistant, which helps you create the type of layout you want. As you make your choices, additional options are presented to you. For some types of layouts, such as labels, envelopes, and reports, you see additional panels.

2. If the file has multiple tables, for **Show records from**, choose the table from which you want records displayed in this layout.

3. For **Layout Name**, give the layout a name.

4. Choose the type of layout you want to create.

   For a description of each layout type, see "About layout types," below.

5. Depending on the layout type you choose, additional options may become available.

To	Do this
See an onscreen Help topic that explains the choices in the current panel	Windows: Press F1 (Windows) or Command-? OS X). If the layout you're creating has additional panels (such as for labels, envelopes, or reports), you can also click  (Windows) or  (OS X) to get information about those panels.
Accept the settings in the panel and continue to the next panel (available for labels, envelopes, and reports layouts)	Click **Continue** or **Next**.

To	Do this
Accept the settings in the panel but go back to the previous panel (available for labels, envelopes, and reports layouts)	Click **Back**.
Close the assistant without saving any of your choices	Click **Cancel**.

6. When you have finished making your choices, click **Finish** to create the layout.
7. For layouts designed for computers or touch devices, add fields to the layout.

   See “Creating and changing fields” on page 57.

Keep the following points in mind:

- You can use the tools and commands in Layout mode to further customize the layout. See “Working with objects on a layout” on page 81 and “Working with fields on a layout” on page 89.
- If you click **Finish** in the first panel of the New Layout/Report assistant without choosing a layout type, FileMaker Pro creates a blank layout. A blank layout contains no fields; you add the fields you want in Layout mode. A blank layout is a good starting point for complex layouts (for example, a data entry screen or form letter).
- Each layout that you create is assigned a layout theme. If the new layout is the same type (Computer, Touch Device, or Printer) as the current layout, the same theme is assigned to the new layout; if the new layout is a different type, the appropriate default theme is assigned.

About layout types

You can use the New Layout/Report assistant to create several types of layouts, which are described below.

For more information about creating layouts and reports, see Help.

Computer

Computer layouts are designed to display within the dimensions of most laptop and desktop computer screens. After you choose **Computer**, you choose the view in which you want to display the layout (Form View, List View, or Table View), or you can create a report (see “Report,” below). After you finish the assistant, you add the fields and any layout objects and embellishments you want to the layout.

The default theme for Computer layouts is Enlightened.

Touch Device

Touch Device layouts are designed to display on touch-compatible input devices, including the iPad, iPad mini, iPhone 3.5-inch, iPhone 4-inch, or a device with dimensions that you customize after you finish the assistant. After you choose **Touch Device**, you choose the view in which you want to display the layout. You can also choose the orientation—portrait or landscape—for the layout. After you finish the assistant, you add the fields and any layout objects and embellishments you want to the layout.

The default theme for Touch Device layouts is Enlightened Touch.

Printer

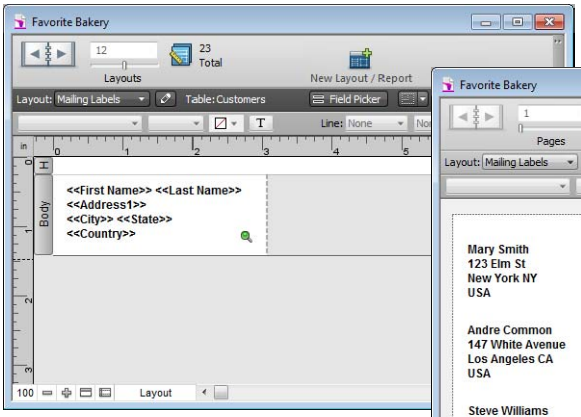
Printer layouts are designed for printing data on labels (horizontal or vertical), envelopes, and in reports. The Printer layout choices are described below.

The default theme for Printer layouts is Enlightened Print.

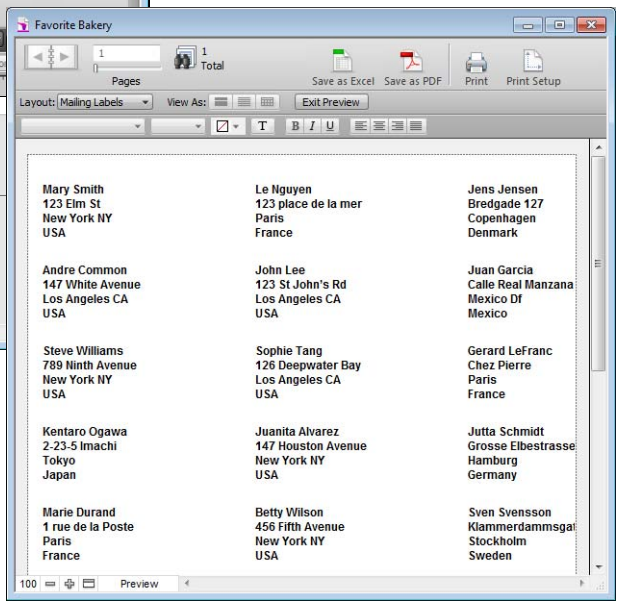
Labels

Use a Labels layout to arrange fields you select to print on one of the predefined standard label sizes. (FileMaker Pro includes the dimensions of a large number of standard label types.) If the label type you want isn't available, you can specify custom label dimensions.

You can only print (or preview) data; you cannot add information. (Use another layout type for data entry or finding data.)



Labels in Layout mode



Labels in Preview mode

For more information about creating a Labels layout and printing labels, see “Printing labels and envelopes” on page 46.

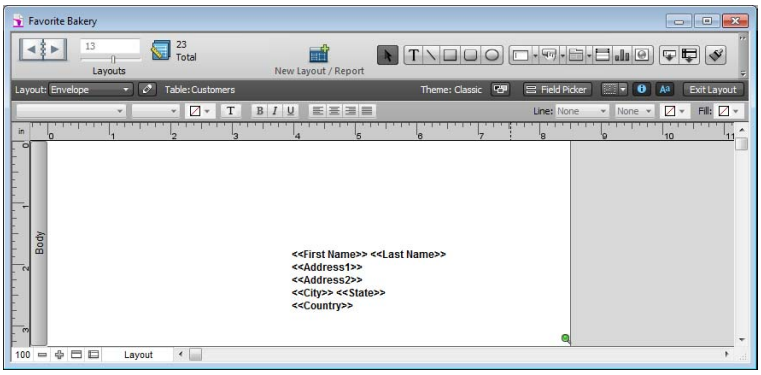
Vertical Labels

With the Vertical Labels layout, Asian and full-width characters are rotated so that labels can be used vertically.

For more information about vertical writing, see “Formatting fields and text for vertical writing” on page 98.

Envelopes

Use an Envelopes layout to print the fields you select, arranged to print on a standard “Number 10” business envelope. You can only print (or preview) data; you can't add information. (Use another layout type for data entry or finding data.)



For more information about creating an Envelopes layout and printing on envelopes, see “Printing labels and envelopes” on page 46.

Report

The New Layout/Report assistant lets you define varied report formats. You can create a Report layout with simple rows and columns of data (formerly a predefined layout type known as the List view layout), or a complex report with data grouped by specified values and including subtotals and grand totals.

You can also group records by sorting data by selected fields. You can then subtotal, or subsummarize, data in these groups (for example, group sales data by region, then subtotal sales for each region).

When you create a Report layout in the assistant, you can then choose to:

- include subtotals and grand totals in the report.
- add header and footer parts with static text (like your company's name), dynamic text (like the page number or current date), or a graphic (like your company logo).
- group records by sorting; you can then subtotal or subsummarize data in the groups (for example, group sales data by region, then subtotal sales for each region).
- save information in a script to rerun the report (for example, switch to the report layout and sort the data).

You can modify any of these options after you finish the assistant.

Working with layout themes

Use FileMaker Pro themes to enhance the appearance of a layout or report and to give all your layouts a consistent look. A theme affects characteristics of the layout, including the background color, field borders and fill, and text attributes in and outside of fields. A theme does not control the placement or behavior of fields or objects. You can change the theme of an existing layout in Layout mode.

To change the theme of a layout:

1. Display the layout you want to change.
2. In Layout mode, choose **Layouts** menu > **Change Theme**, or click  in the layout bar.
3. Select themes in the **Layout themes** list to display a preview of each theme.
   - To apply a theme from this file, select a theme in the **Layout themes** list to display a preview of each theme.
   - To apply a theme from another FileMaker Pro file, click **Import Themes**, choose the file containing the theme(s) you want to import, and click **Open**. Select one or more themes in the Import Themes dialog box, and click **OK**. Then select a theme in the **Layout themes** list.
4. Click **OK** to apply the selected theme to the current layout.

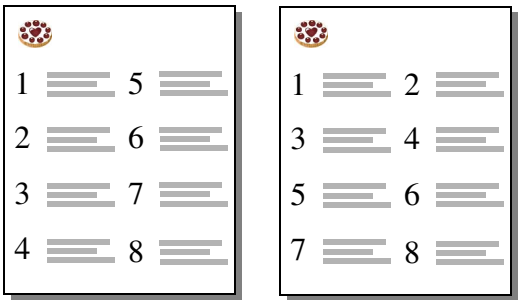
Keep the following points in mind:

- When you change a layout's theme, FileMaker Pro applies the attributes of the new theme to all objects on the layout except the following:
  - The font and font size remain from the original layout or theme.
  - Buttons created using versions of FileMaker Pro earlier than version 12 retain their original formatting.
  - Objects on the layout background that are filled with an image, or a layout background that is filled with an image, retain the image.
- You might need to resize layout parts and layout objects after a theme is applied for the layout to display properly.
- If you want the layout to look similar to layouts created with versions earlier than FileMaker Pro 12, under **Basic**, choose the **Classic** theme.
- If you're creating a layout to be used with FileMaker Go, choose one of the Touch themes.
- If you're creating a layout to be printed, choose one of the Print themes.
- The styles of layout objects, layout parts, and the layout background are controlled by the layout's theme. If the predesigned themes do not display the styles you want, you can create and apply a custom theme. See "Working with layout object, part, and background styles" on page 101.

Setting up a layout to print records in columns

You can set up a layout to print (or preview) records in columns, for example, for a directory of names and addresses. When you set up records to print in columns, all the field values (and labels, if specified) for one record are printed together in a block (much like on a label), then all the values for the next record are printed together, and so on. You only see multiple columns in Layout and Preview modes and when you print (not in Browse mode or Find mode).

You can choose to arrange columns across the page or down the page.



Down first Across first

Setting up columns in a layout

1. Choose a printer, and print or page setup options.

   FileMaker Pro considers the selected printer, and print or page setup information when it calculates margins and other measurements on the layout.

2. In Layout mode, create a layout or choose a layout from the Layout pop-up menu.

   It's easiest to start with a Blank layout or a layout with no objects in the body part.

3. Choose **Layouts** menu > **Layout Setup**.

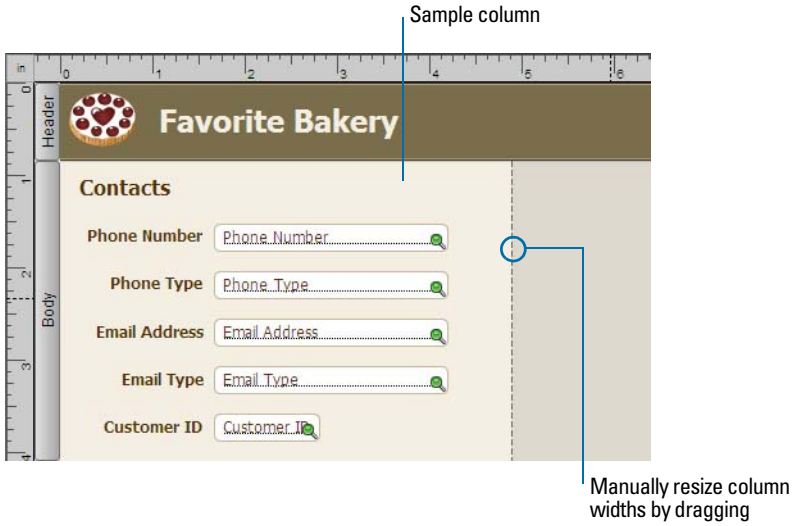
4. In the Layout Setup dialog box, click the **Printing** tab, select **Print in <value> columns**, select options for the columns, then click **OK**.

To	Do this
Specify the number of columns	For **Print in <*value*> columns**, type a number between 1 and 99.
Arrange records to flow across the page first (left to right, a row at a time)	Select **Across first.**  Use this option for reports like labels, to use the fewest number of rows and preserve label stock.
Arrange records to flow down the page first (top to bottom, a column at a time)	Select **Down first.**  Use this option for reports like directories, where you read from top to bottom, column by column.

5. On the layout, you see vertical lines indicating columns.

6. Place or arrange fields and other layout objects so they are contained within the sample column on the left.

   Use merge fields or fields or objects with sliding enabled to fit more data into the width of a column. With either of these two features, fields can extend into the gray area of the second column, and blank space in fields is eliminated when you view or print data.



Changing the width of columns

The initial width of each column is calculated based on the paper size, orientation, and any margins you have set. To change the width of columns, do one of the following:

To	Do this
Interactively adjust the width of the columns	Drag the right column boundary (the vertical dashed line at the right edge of the sample column). If you widen the column, you see a medium-gray area that indicates a “gutter” area that won’t print.
Precisely measure and adjust the width of the columns	Click **Inspector** in the layout bar. Click **Position**. Position the pointer over the right column boundary, hold down the mouse button (be careful not to drag the column width), and read the column **Width** value in the Size area.

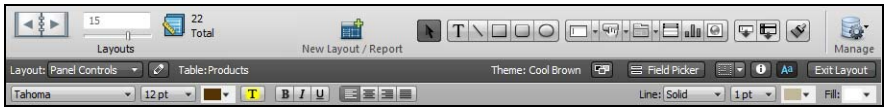
If you change the number of columns, FileMaker Pro adjusts the width of the columns to fit within the width of the paper size you have defined, not including fixed margins. You may need to readjust fields to fit within the sample column.

For more information about setting up a layout to print records, see Help.

Working with objects on a layout

An *object* is a discrete element—a field, text, a graphic object (such as an oval or imported picture), a button, a portal (for displaying rows of related records), a tab control or slide control, a popover button and its popover, a chart, or a web viewer—that you can select, move, resize, delete, copy, format, or otherwise change. Place objects on a layout to enhance its design.

For each type of object you work with, you use specific tools from the status toolbar.



Status toolbar in Layout mode (Windows)

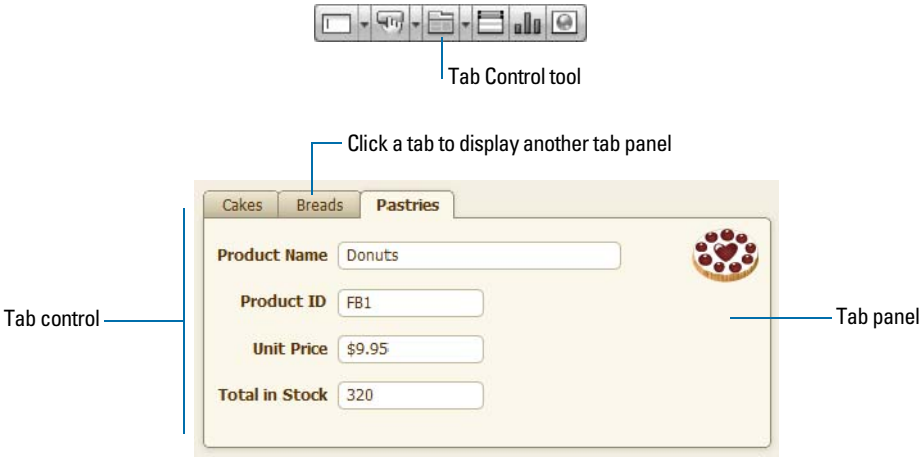
Status toolbar in Layout mode (OS X)

Note If you don't see the status toolbar at the top of the document window, the status toolbar might be hidden. Make sure you're in Layout mode, then click the status toolbar control button at the bottom-left corner of the document window (or choose **View** menu > **Status Toolbar**).

Organizing data with panel controls and popovers

Tab controls, slide controls, and popovers are useful ways of organizing data. For example, you could create tab panels for various categories of products.

- To create a tab control, in Layout mode, choose **Insert** menu > **Tab Control** or click the **Tab Control tool**.

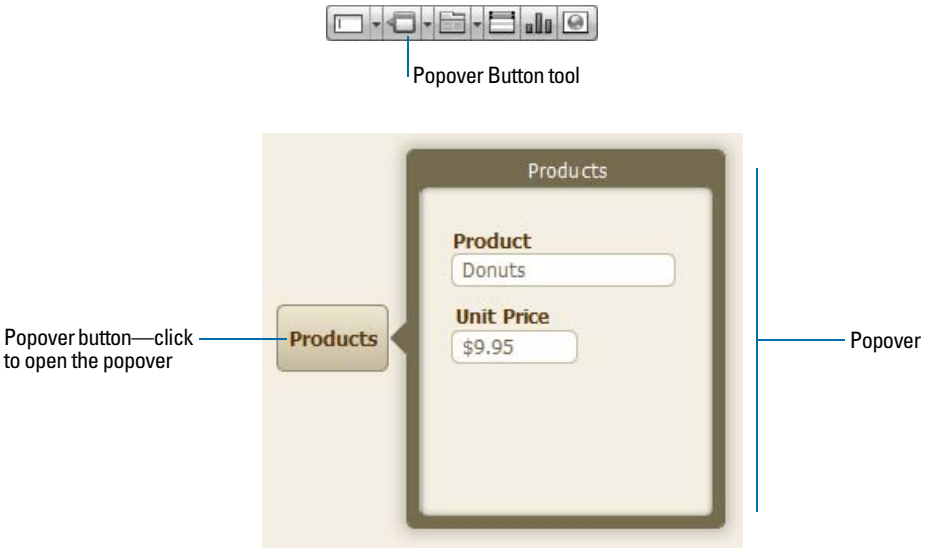


Tab control in Browse mode

- To create a slide control, in Layout mode, choose **Insert** menu > **Slide Control** or click the **Slide Control tool**.

Slide control in Browse mode

- To create a popover, in Layout mode, choose **Insert** menu > **Popover Button** or click the **Popover Button tool**.



Popover button and popover in Browse mode

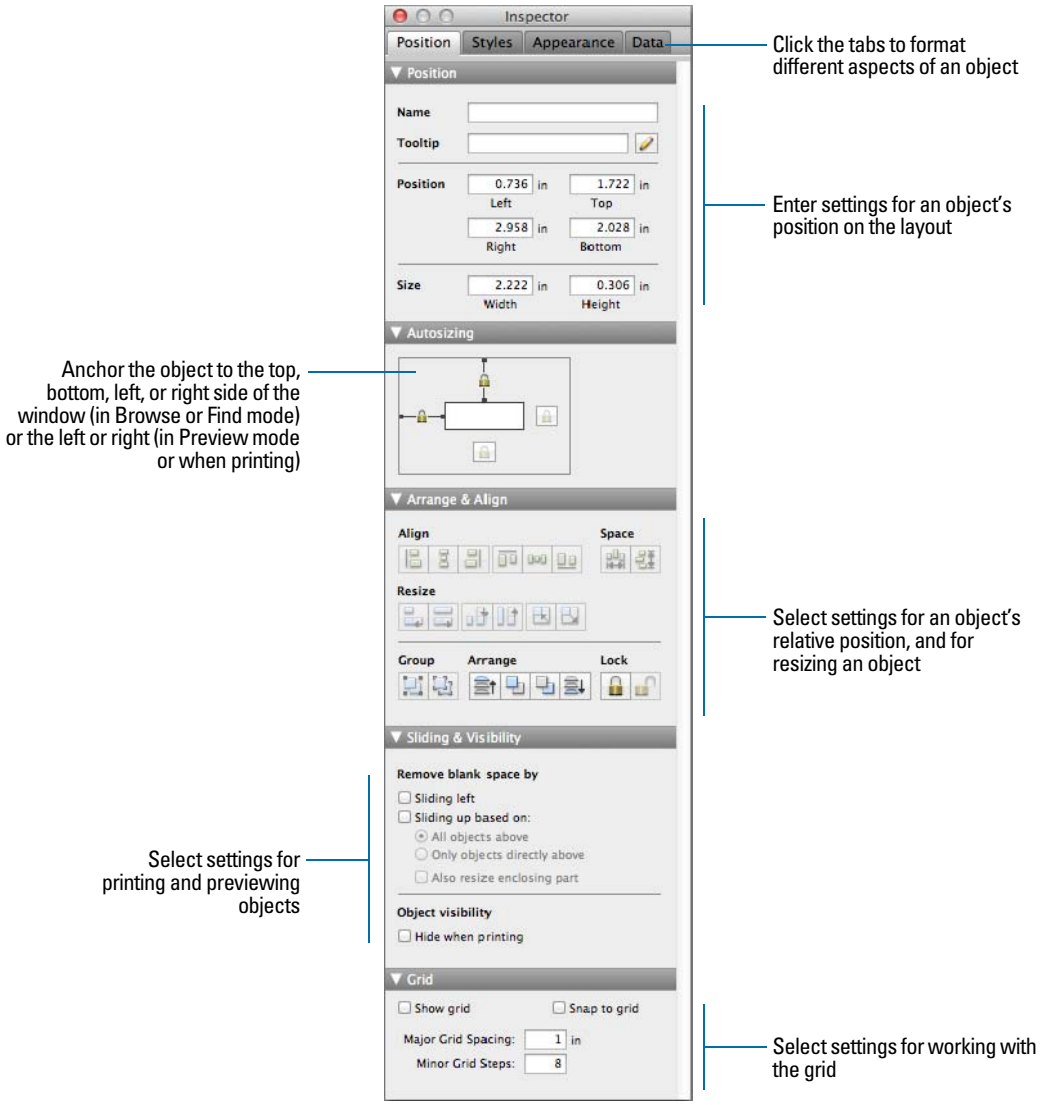
For more information about creating tab controls, slide controls, and popovers, see Help.

Using the Inspector to format objects

In Layout mode, you can use the Inspector to view and modify the settings for objects. Each tab focuses on a different aspect of formatting. Hold your pointer over options in each tab to see a description of what they do.

To open the Inspector:

- Click **Inspector** in the layout bar.
- Choose **View** menu > **Inspector**.



You can open multiple Inspector windows to make it easier to work on a layout. For example, display the Data tab of an Inspector window and the Appearance tab of another Inspector window to have access to the options on each tab. To open another Inspector window, choose **View** menu > **New Inspector**.

For more information about using the Inspector, see Help.

Using the Inspector to position objects

Use the Inspector to precisely position or size objects on a layout. Or you can set objects to automatically resize or move horizontally or vertically when the FileMaker Pro window is resized. Horizontal settings also apply to Preview mode and printing when the page size is wider than the size of the layout being viewed or printed.

When layout objects are set to resize, they maintain a constant distance from the object to which they are anchored. This allows objects to move, expand, or contract when the FileMaker Pro window is resized.

Anchor points are either the layout margin or the container margin in which an object resides. By default, objects are anchored on both the top and left side of the layout or page.

Precisely positioning or sizing objects

1. In Layout mode, select one or more objects.

   For more information, see “Selecting objects” on page 88.

2. Click **Inspector** in the layout bar, then click **Position**.

3. In the Position area, type a new value into one of the fields.

4. Type a new value in one of the following fields.

Field	Indicates
Name	The name of the selected object (optional). You can assign names to objects and grouped objects. Some script steps and functions use these names to specify which object to act upon. For more information, see Help.
Left	The distance from the left edge of the selection to the left edge of the layout.
Top	The distance from the top of the selection to the top of the layout.
Right	The distance from the right edge of the selection to the left edge of the layout.
Bottom	The distance from the bottom of the selection to the top of the layout.
Width	The object's width.
Height	The object's height.

   If you can't type a value, that field doesn't make sense for the selected object (for example, a horizontal line doesn't have a height), or the selection is locked.

5. Press Enter or Tab, or click outside the Inspector to apply the changes.

Note To change the unit of measure, do one of the following:

- Right-click a ruler and choose a unit of measure from the shortcut menu.
- Click the upper-left corner of the document where the horizontal and vertical rulers meet.
- In the Inspector, click the unit of measure, which appears next to many options.

Allowing objects to resize or move on the layout

When layout objects are set to resize, they maintain a constant distance from the object to which they are anchored. This allows objects to move, expand, or contract when the FileMaker Pro window is resized.

Anchor points are either the layout margin or the container margin in which an object resides. By default, objects are anchored on both the top and left sides of the layout or page.

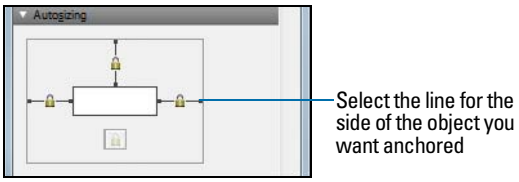
To allow objects to resize or move when the FileMaker Pro window is resized:

1. In Layout mode, select one or more objects on the layout.

   For more information, see “Selecting objects” on page 88.

2. Click **Inspector** in the layout bar, then click **Position**.

3. In the Autosizing area, select the line that indicates the side of the object that you want anchored to the layout or container.



Note Objects located in panel containers, popovers, or portals on layouts (such as fields located on a tab panel) do not inherit resize settings from the panel container, popover, or portal they are in.

Important Multiple objects positioned side-by-side or stacked vertically *and* anchored to both left and right margins or both top and bottom margins move or resize relative to the window or container margin, not each other. Therefore, adjacent objects will not maintain a relative distance from one another and may overlap when the window is resized.

For more information about setting objects to resize, see Help.

Using tools to precisely position objects

FileMaker Pro provides several tools to help you precisely create, size, reshape, move, and position objects in Layout mode.

Note To show or hide page breaks in Layout mode, choose **View** menu > **Page Breaks**.

Rulers

Showing the rulers displays a horizontal and vertical ruler along the edge of a layout. Guide lines on each ruler track the position of the pointer as you move the pointer on the layout.

- To show the rulers, in Layout mode, choose **View** menu > **Rulers**.
- To hide the rulers, choose **View** menu > **Rulers** again.

Grid

Showing the grid displays a series of nonprinting intersecting horizontal and vertical lines. The grid aligns objects you create, resize, move, or position. Objects “snap to” the grid to help you create and edit objects more precisely. Gridlines adjust when you change the unit of measure.

To show or hide the grid, do one of these:

- In the Inspector, click the **Position** tab. In the Grid area, select or deselect **Show grid**.
- Choose **View** menu > **Grid** > **Show Grid**. To hide the grid, choose **Show Grid** again.

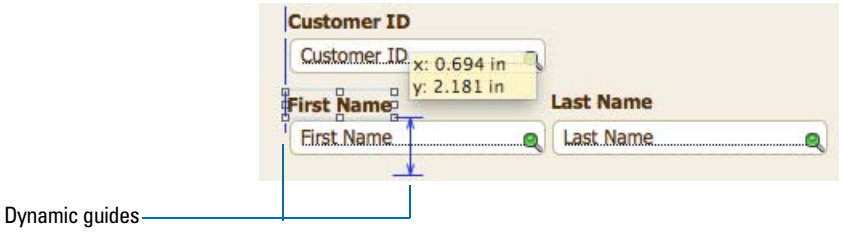
Guides

Guides help you align objects within the same layout and across multiple layouts.

To	Do this
Create a vertical guide	Drag out from the vertical ruler. (If the ruler isn’t displayed, select **View** menu > **Rulers**.)
Create a horizontal guide	Drag down from the horizontal ruler. (If the ruler isn’t displayed, select **View** menu > **Rulers**.)
Move a guide	Drag the guide to the new position. If a guide is locked, you must unlock it before you can move it.
Use guides in other layouts you create or edit	Right-click the guide, then choose **Share Guide with All Layouts**. A guide shared with other layouts is a different color from one that’s used only for the current layout. To use a shared guide only with the current layout, right-click the guide, then choose **Share Guide with All Layouts** again.
Lock a guide	Right-click the guide, then choose **Lock Guide**. A locked guide is a different color from an unlocked guide. To unlock a guide, choose **Lock Guide** again.
Remove a guide	Drag a horizontal guide back to the horizontal ruler, or a vertical guide back to the vertical ruler. Or, right-click the guide, then choose **Remove Guide**.
Show or hide the guides	To show guides, choose **View** menu > **Guides** > **Show Guides**. To hide guides, choose **Show Guides** again.
Turn the “snap-to” effect on or off	Choose **View** menu > **Guides** > **Snap to Guides**. To turn it off, choose **Snap to Guides** again. Objects snap to guides even when the guides are hidden.

Dynamic guides

When you drag objects to move, resize, or position them on a layout, dynamic guides appear near or on the objects to help you create and edit them more precisely. Dynamic guides also “snap-to” the upper and lower boundaries and the centers of objects as you move, resize, or position them.



Dynamic guides also appear when you use the keyboard to move objects, but they do not “snap-to” objects when you move them this way.

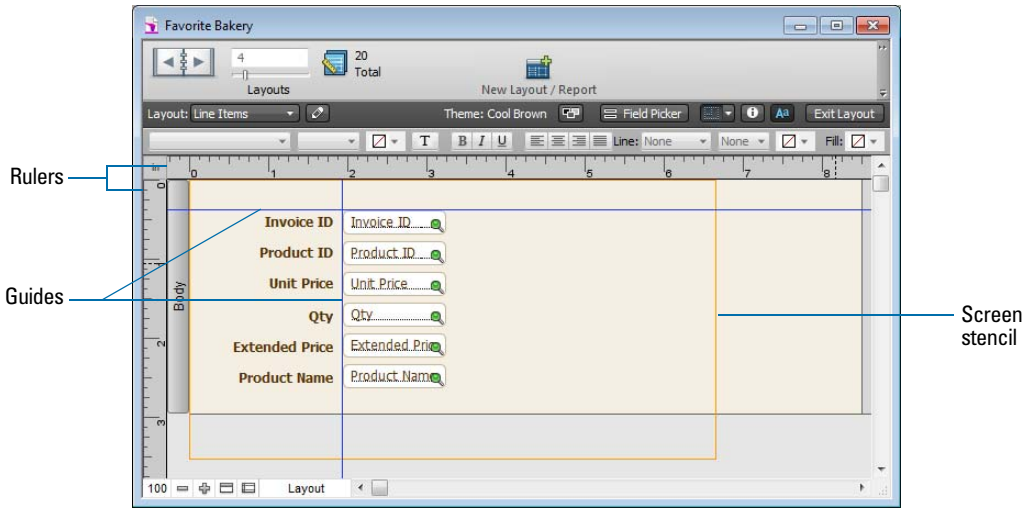
To use dynamic guides:

- To turn on dynamic guides, in Layout mode, choose **View** menu > **Dynamic Guides**.
- To turn off dynamic guides, choose **View** menu > **Dynamic Guides** again.

Screen stencils

You can display guides that help you design layouts optimally for iPad, iPhone, and common desktop resolutions. You can also create screen stencils with custom dimensions.

To display a screen stencil, click the arrow on **Screen Stencil** in the layout bar, then choose a size from the list. You can display more than one screen stencil at a time on the same layout. To create a screen stencil, choose **Custom Size** from the menu.



Selecting objects

To work with an object on a layout, select it in Layout mode. You see small squares, or *handles,* surrounding the selected object.

Note If an object's selection handles display as ✖ , the object is locked.

To select an object, click the selection tool in the status toolbar. The pointer becomes an arrow pointer. Then do one of the following.

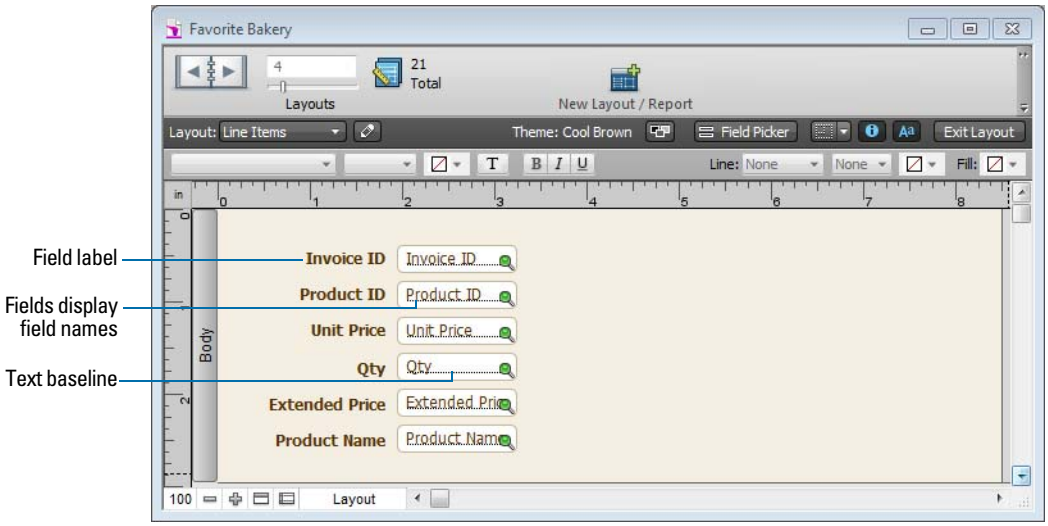
To	In Layout mode, do this
Select one object	With the arrow pointer, click the object. (If the object is transparent, click its border.)
Select several objects at once	Drag the arrow pointer to make a selection box that includes the objects. The selection box does not have to completely surround the objects. To avoid including partially selected objects, press Ctrl (Windows) or ⌘ (OS X) as you drag. Or, press Shift as you click each object individually.
Select all objects on the layout	Choose **Edit** menu > **Select All**.
Select all objects of the same type (for example, all text objects or all rectangles)	Click the tool for the type of object to select, then choose **Edit** menu > **Select All**. This method does not select buttons. Or, with the arrow pointer, click a field, press Shift (Windows) or Option (OS X), and choose **Edit** menu > **Select All** (Windows) or **Select Same** (OS X).
Select all fields	With the arrow pointer, click a field, press Shift (Windows) or Option (OS X), and choose **Edit** menu > **Select All** (Windows) or **Select Same** (OS X).
Select a portal	With the arrow pointer, click the border of the portal, or any other area within the portal that doesn't contain a field or object.
Select tab controls or slide controls, tab panels or slide panels, and objects on tab panels or slide panels	See Help for information on creating and working with tab controls and slide controls.
Select popover buttons, popovers, and objects on popovers	See Help for information on creating and working with popover buttons and popovers.
Deselect selected objects	Click a blank area of the layout or any tool in the status toolbar. Or, press Shift and click selected objects.

For more information about working with objects on a layout, see Help.

Working with fields on a layout

After you've added fields to a database, you can place the fields on a layout, remove fields you don't want displayed, determine control settings for data entered in fields, and determine the format in which you want data displayed.

Fields on a layout are objects, which you can select, move, resize, and reshape. In Layout mode, each field displays its field name, formatted with its attributes for font, size, style, alignment, line spacing, and color. All fields except container fields display text baselines to indicate where the data appears in Browse mode and to help you align fields with each other.



Note As long as you haven't deleted a field from the database, even if the field doesn't appear on a layout, it still exists in the database and its data can be used in calculations and summaries.

Placing and removing fields on a layout

You can place a field anywhere on any layout, as many times as you want. (You can place only fields that you've defined. See "Creating and changing fields" on page 57.)

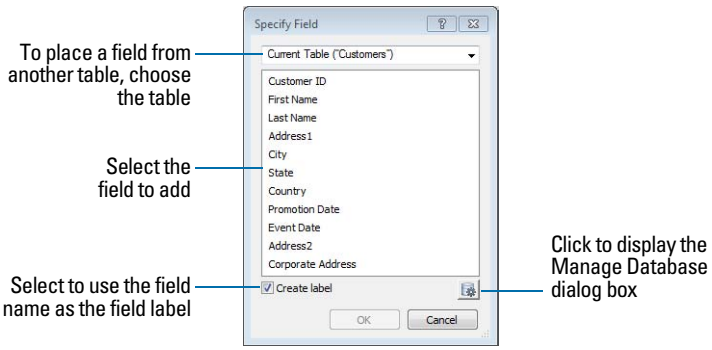
You get different results by placing the same field in different locations on the layout. For example:

- Add the same summary field to a subsummary part to calculate totals for each group of sorted records, and to a grand summary part to get totals for all the records in a table.
- Add a field to the header or footer part to repeat data from the first record or the last record on the page as a header or footer. (For example, add a Last Name field to the header in a directory.)
- Add the same related field directly on a layout to see the field's value in the first related record, or inside a *portal* to see values from more than one related record. (A portal is a layout object that displays records from related tables.)

Placing a field on a layout

1. In Layout mode, choose the layout you want to work with from the Layout pop-up menu.
2. Do one of the following:
   - Drag a field from the **Field tool** in the status toolbar to the position you want it on the layout. As you drag the field onto the layout, you see a border and text baselines to help you align the field with other objects on the layout. Release the mouse button when the field is where you want it.
   - To add and resize a field, click the **Field/Control tool** in the status toolbar. Drag the crosshair to draw the field.
   - To display field data in a drop-down list, pop-up menu, checkbox set, radio button set, or drop-down calendar, click the arrow next to the **Field/Control tool** (Windows) or click and hold the **Field/Control tool** (OS X), then select the type of field or control to add to the layout. Drag the crosshair to draw the field. To format and choose a value list for the field, see “Setting up checkbox sets and other controls on a layout” on page 91.

   Note If you're placing a related field in a portal, position it in the first row of the portal. Make sure each field in the portal is from the same related table from which the portal is set up to display records. For more information, see Help.
3. In the Specify Field dialog box, select the field to place.



   To choose a field in another table, choose the table from the table list above the list of fields. Then select a field from the fields list. Or choose **Manage Database** in the table list, or click to create a relationship or table (see “Creating relationships” on page 118).
4. To include the field name as text on the layout, select **Create label**.
5. Click **OK**.

   You see the field name in the field on the layout unless you have chosen to display sample data from the current record (by choosing **View** menu > **Show** > **Sample Data**). Fields from related tables appear as **::Field Name** (preceded by two colons).

Replacing a field with another field

In Layout mode, double-click the field, then select another field name in the Specify Field dialog box and click **OK**.

Removing a field from a layout

In Layout mode, click the field to select it, then press Backspace or Delete, or choose **Edit** menu > **Clear**. Removing a field from a layout does not delete the field or its data from your database.

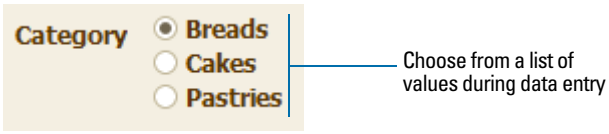
Setting up checkbox sets and other controls on a layout

You can format fields to display as drop-down lists, pop-up menus, checkboxes, radio buttons, and drop-down calendars. You can also format fields to auto-complete by suggesting possible matches as the user types data in the field. All of these options aid in data entry.

To set up a field to display a pop-up menu, checkbox set, or other control:

1. In Layout mode, select the field.
   - If the field isn't already on the layout, see "Placing and removing fields on a layout" on page 89.
   - If the field hasn't been defined yet, choose **File** menu > **Manage** > **Database** to define a new field.
2. Click **Inspector** in the layout bar, then click **Data**.
3. In the Field area, choose the **Control Style** you want:
   - Edit box
   - Drop-down list
   - Pop-up menu
   - Checkbox set
   - Radio button set
   - Drop-down calendar

   For example, use a radio button set to display a *value list* of frequently used text, number, date, or time values. During data entry, users can choose from the defined values rather than type the values.



Value list attached to Category field

   When you choose different control styles, you see different options in the Inspector.
4. Choose the value list you want from the **Values from** list.

   To create a value list, click next to the **Values from** list.

5. Choose options for the value list, if desired.

   If you selected **Drop-down list** for the **Control Style**, you can select **Include arrow to show and hide list** if you want to format the field as a combo box. An arrow control appears in the edit box. Users click the arrow or press Esc to show or hide the drop-down list.

   To allow users to enter values other than those defined by the value list, select **Allow editing of value list or Allow entry of other values.**

   To set up fields to suggest possible matches as the user types data in the field, select **Auto-complete using existing values** or **Auto-complete using value list**.

6. To display data from a different field, click next to **Display data from**.

   In the Specify Field dialog box, select the field to display data from. To include the field name as text on the layout, select **Create label**. Click **OK.**

7. Save the layout.

For more information on creating value lists and setting control style options, see Help.

Deciding where to place related fields

You can place related fields directly on layouts or in portals.

- **Directly on layouts:** Place related fields directly on a layout to display data from the first related record, even when there are more than one related records that matches the criteria of the relationship. (The first related record that's displayed is determined by whether the relationship specifies a sort order. For more information, see "Creating relationships" on page 118.)
- **In portals:** Place related fields within a portal on a layout to display data from all related records that match the criteria of the relationship. For examples of when to place related fields in portals, see Help.

Note Before placing related fields on a layout, you should understand the concepts presented in chapter 4, "Working with related tables and files."

About merge fields

Use merge fields to combine field data and text in documents like form letters, labels, envelopes, or contracts. You create merge fields in text blocks, which allows you to use static text and field data together.

Merge fields shrink or expand to fit the amount of text in the field for each record. For example:

- When the merge field <<First Name>> is between the text Dear and a colon, (as in **Dear <<First Name>>:**), FileMaker Pro displays **Dear Charles:** in Browse mode or Preview mode if the First Name field contains `Charles`.
- When a merge field is on a line by itself (such as an empty Address Line 2 field in a mailing label), FileMaker Pro removes the blank line from the text block.

FileMaker Pro uses merge fields to create Labels and Envelope layouts.

Note You can also use a merge variable to display data. For more information, see Help.

Formatting field data on a layout

Use FileMaker Pro field formats to control how data appears on a layout. The formats you specify don't change the data as it's stored in the database, and you can specify different formats each time you place a field on a layout (whether it's on the same layout or a different layout). For example, if you enter `-5123` into a number field, you can format it in one place to display as **–$5,123.00** and in another place as **<5123>**.

Note If you don't specify formats, FileMaker Pro displays numbers, dates, and times based on the system formats set in the Clock, Language, and Region control panel (Windows) or the Language & Text pane in System Preferences (OS X) when the file was created.

Specifying text formats for fields

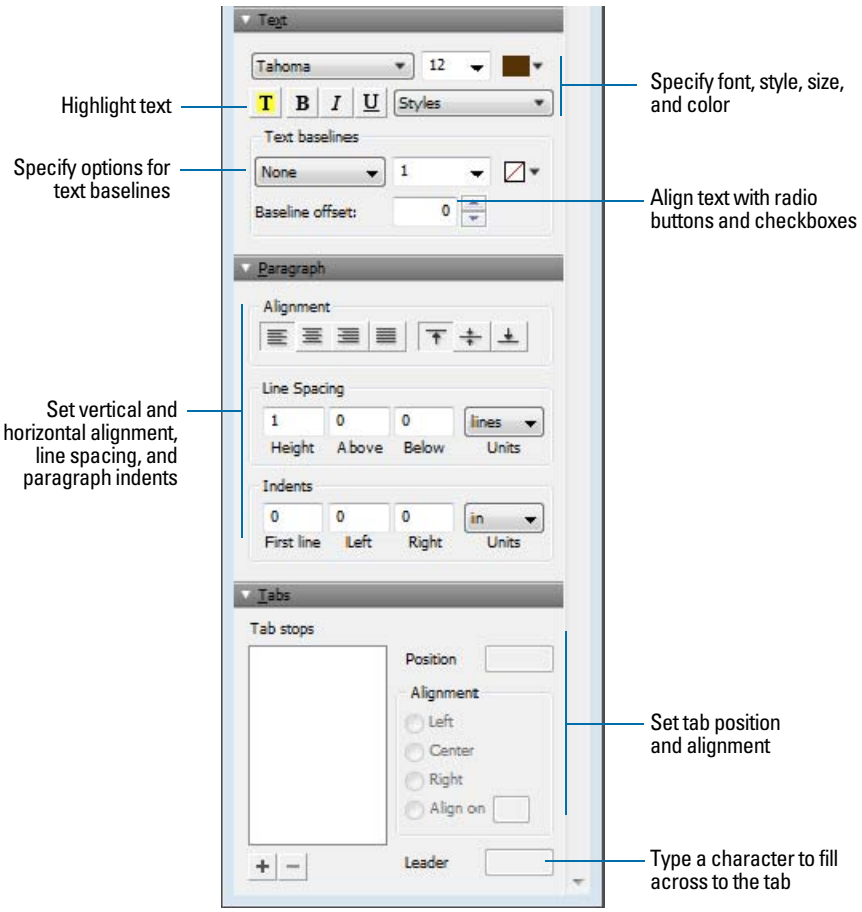
In Layout mode, you can specify a set of text character attributes for each field. All the characters in that instance of the field (including all repetitions of repeating fields) share the same font, size, style, color, line spacing, tab, and paragraph settings.

Note You can also format characters in text fields in Browse mode (for example, italicize or underline a word for emphasis). Unlike text formatting specified in Layout mode, this formatting is stored with the data, and you see it in any layout that displays that field.

1. In Layout mode, select one or more fields.
2. Click **Inspector**  in the layout bar, then click **Appearance**.

3. Select the formats you want to use.

Use the Text area to format the style, size, font, or color of the text or make text highlighted, bold, italic, or underlined. Use the Paragraph area to set paragraph alignment, indenting, and line spacing for fields. Use the Tabs section to position and align tab stops, and create a leader character to fill the width of the tab indention.



4. Press Enter or Tab, or click outside the Inspector to apply the changes.

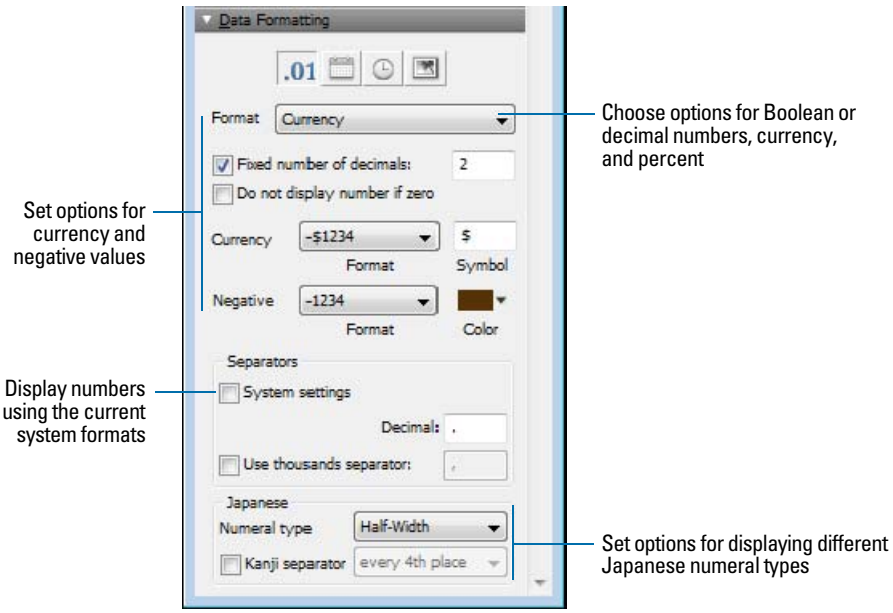
For more information about specifying text formats for fields, see Help.

Specifying formats for fields containing numbers

You can control how FileMaker Pro displays the values in number fields, calculation fields with numeric results, and summary fields.

1. In Layout mode, select one or more fields that display numeric values.
2. Click **Inspector** in the layout bar, then click **Data**.
3. In the Data Formatting area, click **Number** .01.
4. Select the number format you want to use from the **Format** list, then select additional formats for the number field.

   The options that appear depend on the format you choose.



5. Press Enter or Tab, or click outside the Inspector to apply the changes.

For more information about specifying formats for fields containing numbers, see Help.

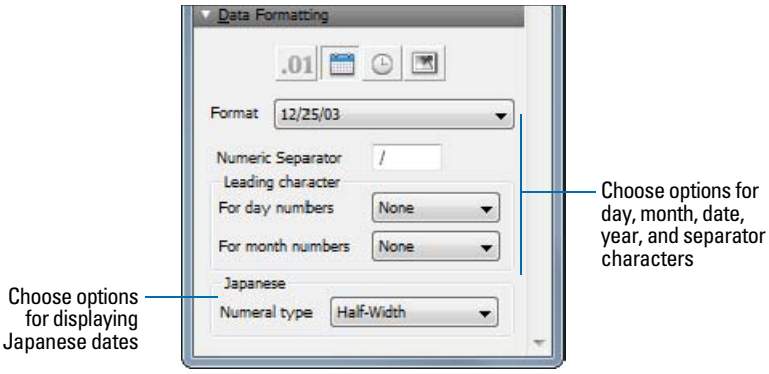
Specifying formats for date fields

You can control how FileMaker Pro displays the values in date fields, and calculation fields with date results.

Important No matter how you format a date field in Layout mode, whenever you click or tab into the field in Browse mode, FileMaker Pro displays the date with a four-digit year. FileMaker recommends that you always enter dates with four-digit years. If you enter dates with two-digit years, they are converted to four-digit year dates. For more information, see “Conversion of dates with two-digit years” in Help.

1. In Layout mode, select one or more date fields or calculation fields with a date result.
2. Click **Inspector** in the layout bar, then click **Data**.
3. In the Data Formatting area, click **Date** .

4. Select the date format you want to use from the **Format** list, then select additional formats for the date field.



Note To format dates using the current system format for dates, for **Format**, choose **Short system date** or **Long system date**.

5. Press Enter or Tab, or click outside the Inspector to apply the changes.

For more information about specifying formats for date fields, see Help.

Specifying formats for time fields

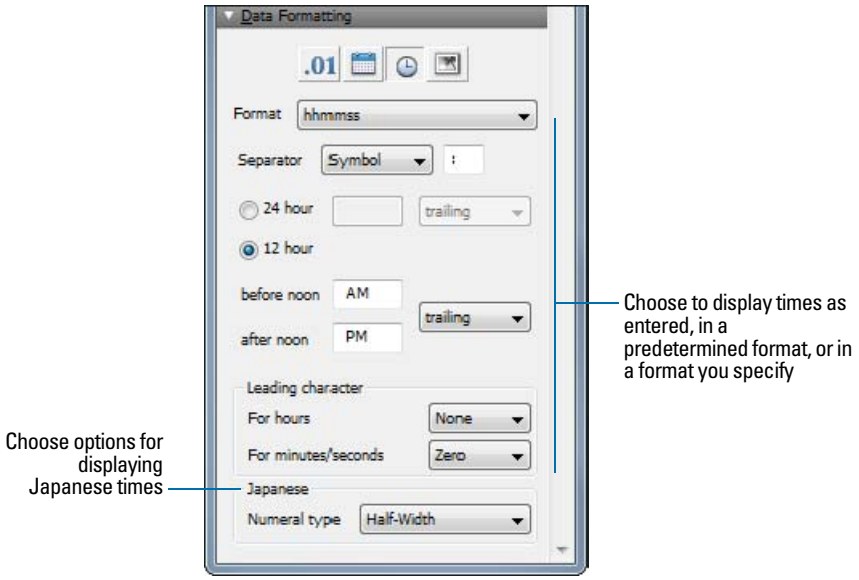
You can control how FileMaker Pro displays time values in fields.

1. In Layout mode, select one or more time fields, or calculation fields with a time result.
2. Click **Inspector** in the layout bar, then click **Data**.
3. In the Data Formatting area, click **Time**.
4. Select the time format you want to use from the **Format** list, then select additional formats for the time field.

   If you want to format the seconds component to display fractional seconds, continue with the next step. If you don't want to format the seconds component, skip to step 6.

5. Click **Number** .01 in the Data Formatting area, then select the formatting options you want.

   Only two options affect the display of the seconds component: **Fixed number of decimal digits** and **Decimal** (to the right of **Separators**). The remaining options have no effect.



   Note To format times using the current system format for times, for **Format**, choose **Short system time** or **Long system time**.

6. Press Enter or Tab, or click outside the Inspector to apply the changes.

For more information about specifying formats for time fields, see Help.

Specifying formats for timestamp fields

You can control how FileMaker Pro displays timestamp values in fields. You format a timestamp field by separately formatting its three components: date, time (excluding the seconds portion), and seconds (including fractional seconds).

1. In Layout mode, select one or more timestamp fields, or calculation fields with a timestamp result.
2. Click **Inspector** in the layout bar, then click **Data**.
3. To format the date component, in the Data Formatting area, click **Date**, then select the formatting options you want.
4. To format the time component (except the seconds portion), in the Data Formatting area, click **Time**, then select the formatting options you want.

5. To format the seconds and fractional seconds component, in the Data Formatting area, click **Number** .01, then select the formatting options you want.

   Only two options affect the display of the seconds component: **Fixed number of decimal digits** and **Decimal** (to the right of **Separators**). The remaining options have no effect.

6. Press Enter or Tab, or click outside the Inspector to apply the changes.

Note You must specify formats for both date and time components before any formatting will be applied. If you select **As entered** for either **Date** or **Time**, then the data in the timestamp field appears the way it is entered.

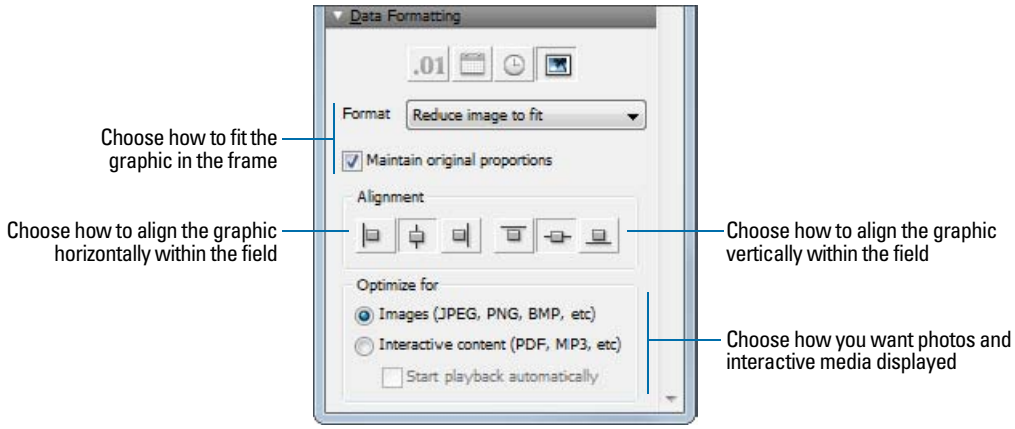
For more information about specifying formats for timestamp fields, see Help.

Specifying formats for container fields

You can control how FileMaker Pro displays images and file icons in container fields.

Note The following instructions also apply to formatting graphic objects that you insert onto a layout.

1. In Layout mode, select one or more container fields or inserted graphics.
2. Click **Inspector** in the layout bar, then click **Data**.
3. In the Data Formatting area, click **Graphic**, then select the formats you want to use.



For more information about specifying formats for container fields, see Help.

Formatting fields and text for vertical writing

If your operating system is configured to support Japanese text entry, you can format field objects and text objects that display Japanese text in vertical writing format. In vertical writing, characters are displayed and read from top to bottom, with successive columns displayed vertically from right to left. This is useful when printing addresses on labels.

When you select one or more fields, then choose **Format** menu > **Orientation** > **Sideways (Asian text only)**, the characters are rotated 90 degrees counter-clockwise within the field. The field itself is not rotated. To rotate the selected fields, choose **Arrange** menu > **Rotate**.

Depending on how you want the text to print, you may want to change the page orientation of the layout. To do so, choose **File** menu > **Print Setup** (Windows) or **Page Setup** (OS X), and change the page orientation to landscape or portrait.

For more information about formatting fields and text for vertical writing, see Help.

Allowing or preventing entry into fields

You can allow or prevent entry into a field. For example, you can restrict entry into a field containing a *serialized number*, so the field can't be modified. You can set separate Browse mode and Find mode data entry options, which would allow you to permit finding serialized numbers even though they can't be entered.

If you allow entry into a field, you can also control whether the entire contents of the field is selected when you click or tab into the field in Browse mode or Find mode. Otherwise, FileMaker Pro places the insertion point after the last character in the field.

1. In Layout mode, select one or more fields.
2. Click **Inspector** in the layout bar, then click **Data**.
3. In the Behavior area, for **Field entry**, select the following options:

To	Do this
Prevent entry into a field in Browse mode	Clear **Browse mode**.
Prevent entry into a field in Find mode	Clear **Find mode**.
Select the entire field's contents when the field is entered	Choose **Select entire contents on entry**.

For more information about working with fields on a layout, see Help.

Working with layout parts

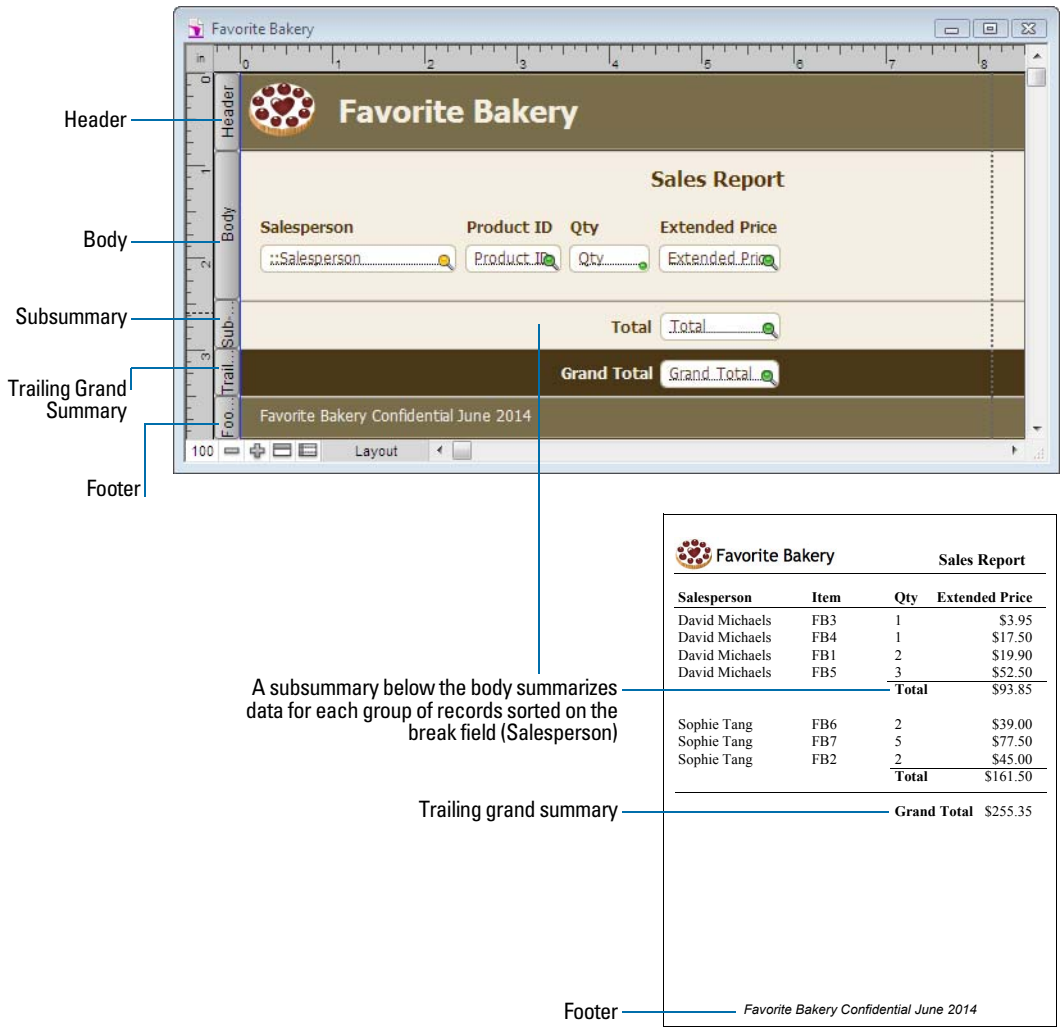
FileMaker Pro layouts are divided into *layout parts*, sections of the layout that determine how data in a field is treated and displayed. By using parts, you can control how FileMaker Pro prints data, for example:

- once for each record
- only at the top of each page
- only before or after groups of sorted records (for example, to include a subtotal for each group of records)

Each layout must have at least one part. Layout parts can contain fields, portals, buttons, text, charts, and other objects. In Layout mode, gray horizontal lines mark the division between layout parts (part boundaries), and the part labels appear in the left margin of the layout or directly in the part above the part boundary.

Parts are assigned styles that are defined by the theme of the layout. You can use the Inspector to customize part styles.

The New Layout/Report assistant automatically creates the appropriate layout parts depending on the choices you make. You can add, change, or delete layout parts after you finish the assistant as needed. (See “Creating layouts and reports” on page 73.)



About layout part types

The following table describes layout part types.

Layout part	Description
Title header	Appears only once at the top of the first screen or page and replaces the normal header (if one is specified). In reports, can be used to print a separate title page. You can have only one title header in a layout.
Header	Appears at the top of every screen or page (unless you add a title header, which supersedes the header on the first page). Use for titles or column headings (in columnar reports). You can have only one header in a layout.
Body	Each object you put in the body, including fields, text objects, and graphics, appears once for each record in the found set. You can have only one body in a layout.
Footer	Appears at the bottom of every screen or page (unless you add a title footer). You can have only one footer in a layout.
Title footer	Appears only once at the bottom of the first screen or page and replaces the normal footer (if one is specified). You can have only one title footer in a layout.

To include summary data on a layout (for example, subtotals, grand totals, averages, counts, and so on), you place summary fields in summary layout parts (see “Creating summary fields” on page 65). Summary parts include grand summary and subsummary parts.

- A *grand summary part* usually contains one or more summary fields that display summary information (like totals) about all records being browsed.
- A *subsummary part* usually contains one or more summary fields that display “subsummary” information (like subtotals) for a subset of records. The records are grouped (sorted) by values in another field, the *break field*. Whenever the value of the break field changes, the report “breaks” and FileMaker Pro inserts the subsummary part. Subsummary parts appear in Table View and List View when sorted by break fields, and update dynamically whenever data in the file is changed.

For more information about working with fields on a layout, see Help.

Working with layout object, part, and background styles

Each layout theme includes default styles for the objects and layout parts that you create while using that theme. Styles give objects and parts on a layout a consistent appearance. They also save you the time of reassigning formatting attributes each time you create a new object or part. A theme also includes a default style for the layout background.

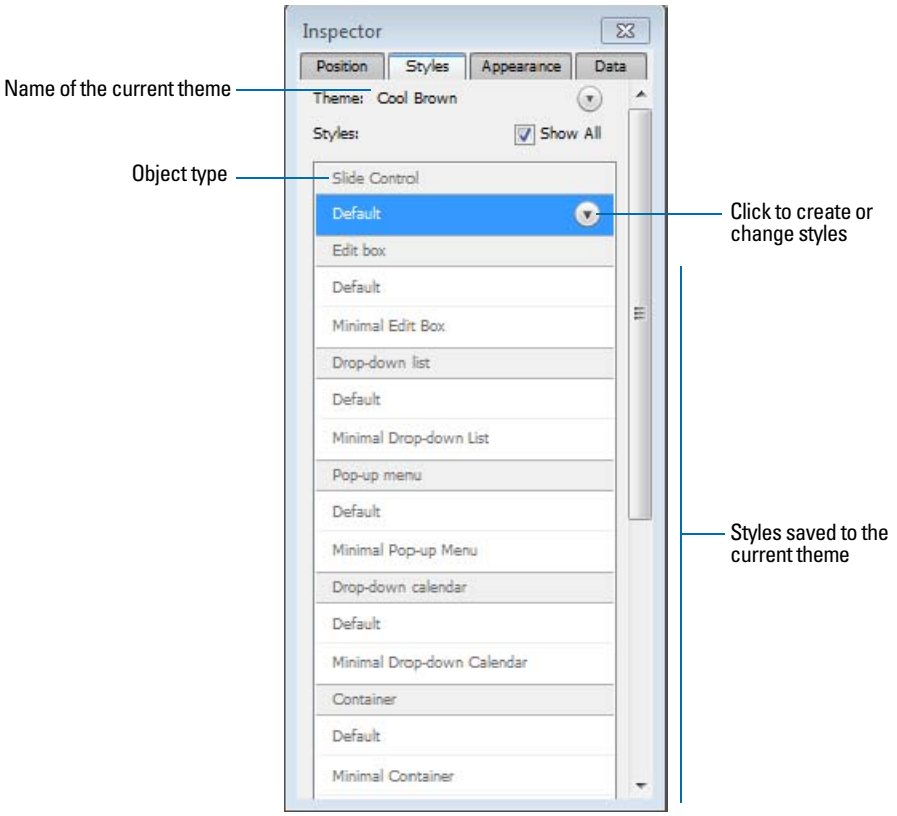
Some themes include additional default styles for some objects. For objects that have multiple components, each component has a separate style. For example, portals have a Portal style, which formats the entire object, and a Portal: Rows style, which formats only the rows of the portal.

You can modify default styles or design new styles and save them for use on the current layout. When you edit and save formatting attributes for styles that are applied to multiple objects or layout parts, your changes are applied to all objects and parts that use those styles on the current layout.

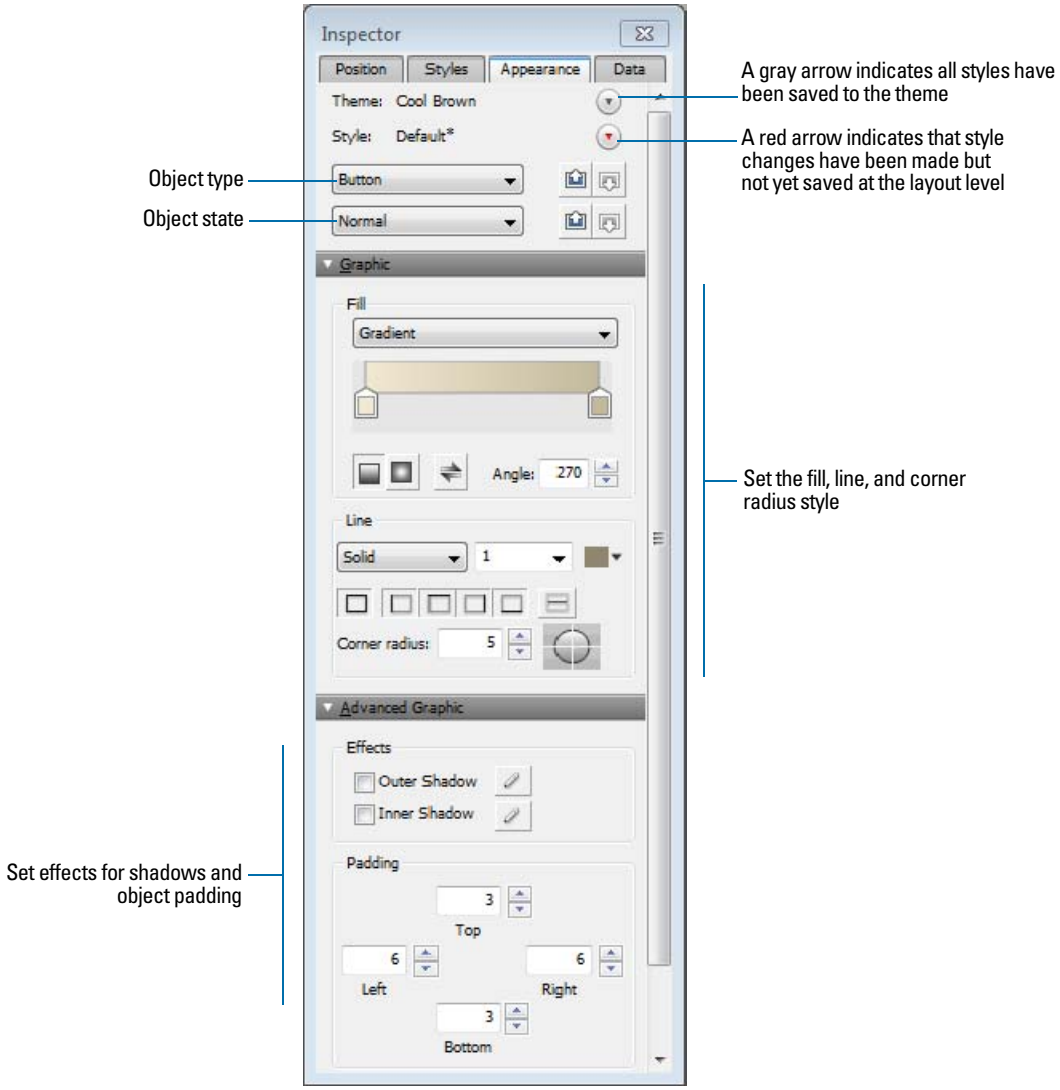
You can also create new styles with custom names, which you can then apply to objects, layout parts, or the layout background on the current layout. Any styles you modify and save, or any custom styles that you create, apply only to the current layout.

To use your custom styles on other layouts, save your styles to a theme. You can save custom styles to FileMaker Pro themes or you can create new custom themes.

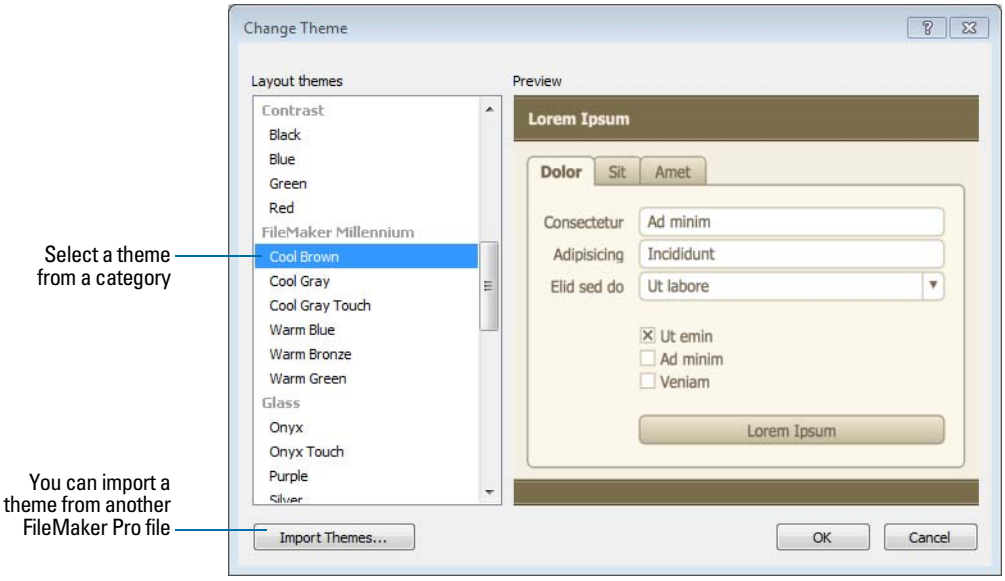
- Use the Styles tab in the Inspector to view and apply defined styles.



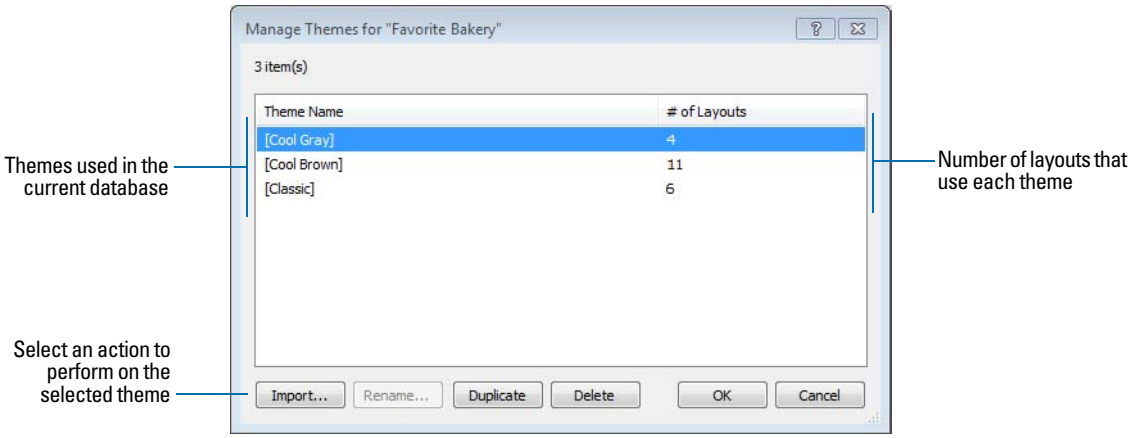
- Use the Appearance tab in the Inspector to create and modify styles and themes.



- Use the Change Theme dialog box to apply default and custom themes to layouts in a file.



- Use the Manage Themes dialog box to see which themes are in use in a file, and to import themes from other files.



For details about working with styles for layout objects, layout parts, and the layout background, and about saving styles to themes, see Help.

Creating and editing charts

You can create various types of charts in FileMaker Pro to compare data graphically. Before you create a chart, think about the data comparison that you want to emphasize, then choose the FileMaker Pro chart type that will show the comparison clearly.

Use	To
Column chart (vertical) or bar chart (horizontal) 	Compare increases to decreases, highest with lowest, how many, or how often. For example, show monthly sales for several products.
Stacked column chart (vertical) or stacked bar chart (horizontal) 	Compare parts to the whole. For example, compare annual sales figures over several years.
Positive/negative column chart 	Compare positive and negative values. For example, compare earnings to losses.
Pie chart 	Compare percentages of individual parts within the whole. For example, show the percentage of each product sold within total sales.
Line chart 	Show data that changes continuously over time, such as historical financial data.
Area chart 	Compare data that trends over time while emphasizing highs, lows, and movement between data points. For example, show sales totals or averages.
Scatter chart 	Plot x and y coordinates as individual values to reveal correlation patterns. For example, compare target wait time to actual wait time at a call center.
Bubble chart 	Compare individual data points in terms of size. For example, compare market share by charting the number of products sold, sales figures per product, and percentage of total sales in each data point.

Creating a chart

The following steps describe how to create a *quick chart*, which FileMaker Pro sets up for you based on the field(s) you've selected in Browse mode. When you create a quick chart, FileMaker Pro sets up the chart based on the selected fields, field type, the contents of the active field, and the sort order you specified.

Note You can also create charts in Layout mode. For more information about creating charts in Layout mode, see Help.

The following example describes how to create a chart that counts and compares the number of customers in each company that has an account with your business.

1. Open the file in which you want to add the chart, then switch to Table View.

2. Sort the column containing data that you want to emphasize.

   For example, to emphasize your customers' companies, right-click the **Company** column and choose **Sort Ascending**.

3. Choose the column containing the data that you want to compare.

   For example, to compare the number of customers in each company, right-click the **Last Name** column and choose **Chart** > **Chart Last Name by Company**.

   The Chart Setup dialog box appears with a preview of a column chart that shows the number of customers in each company.

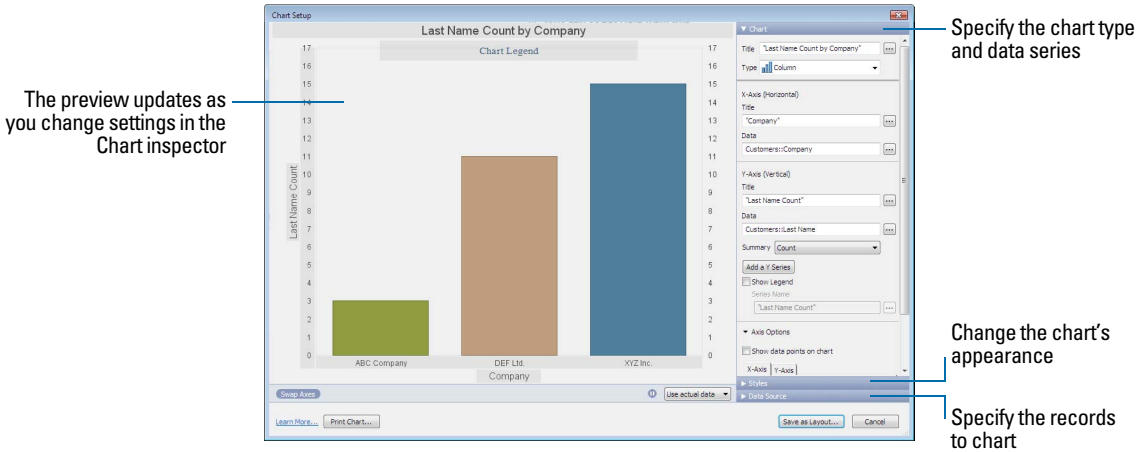


Chart preview

4. You can choose settings in the Chart inspector on the right to modify the chart, and preview the result of your changes in the Chart Setup dialog box.

To	Do this
Add a title to the chart	With the **Chart** options displayed, for **Title**, type or change the chart title, or click ... to specify a title. For example, "Accounts by Company."
Choose a chart type and specify the data series	For **Type**, choose a chart type. For example, choose **Pie**.
Change data labels, show or hide tick marks and set tick mark scale (if applicable), and format data	Select additional chart options. For example, select **Show Legend**, **Show values on chart**, and **Percentages**.
Change the color scheme, legend, or fonts in the chart	Click **Styles**, then make your changes. For example, choose **Shaded-3D** for the chart style, **Earth** for the color scheme, and Arial boldface black for the font settings.
Specify the type of data the chart uses (records in the found set, delimited records, or related records)	Click **Data Source**, then choose a data source. For example, choose **Current Found Set**.

For more information about these and other options for charts, see Help.

5. Click **Save as Layout**, then **Exit Layout**.

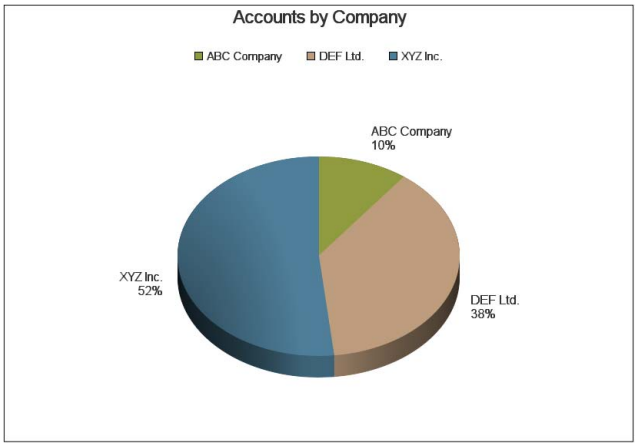


Chart in a layout in Browse mode

Editing a chart

1. Choose the layout containing the chart from the Layout pop-up menu.
2. Switch to Layout mode and double-click the chart.
3. In the Chart Setup dialog box, change settings in the Chart inspector.
4. Click **Done** to close the Chart Setup dialog box.
5. Click **Save Layout**, then **Exit Layout**.

For more information about creating and editing charts, see Help.

Chapter 4
Working with related tables and files

This chapter explains the basics of how to:

- plan a relational database
- create and edit relationships
- create and edit lookups

FileMaker Pro uses related tables as the basis for *relational databases* and *lookups*. Relational databases allow you to work with data from other tables dynamically, so that when you change data in one place, your changes are reflected in all places where the related data appears. Lookups let you copy and paste data from one table to another; once looked-up data has been inserted, it does not change unless you edit it or tell FileMaker Pro to look it up again.

Use relational databases to:

- See and work with data from another (or the current) table in its most up-to-date state. For example, display data in related fields when you need current data from a related table, such as the current price of an item. As data changes in the related records, you see those changes in the current table.
- Set up and manage data efficiently and with flexibility. Instead of creating many database tables or files with duplicate values, you store single occurrences of values and use relationships to make those values available. You can then make changes to data in only one place, which eliminates data duplication and promotes data accuracy.
- Save disk space, because data is stored in only one place.

Use lookups to copy data from a related table and keep it as copied, even when the related data changes. For example, use a lookup to copy the price of an item at the time of purchase into an Invoices table. Even if the price in the related table changes, the price in the Invoices table stays the same.

FileMaker Pro can also access data stored in other FileMaker Pro files and external ODBC data sources, which allows you to combine data stored in your FileMaker Pro file with data from these external sources. You can work with data in SQL databases that share information through ODBC. You can also use supplemental fields in FileMaker Pro to perform calculation and summary operations on data stored in ODBC data sources. For more information about using FileMaker Pro with external data sources, see “Working with external data sources” on page 136.

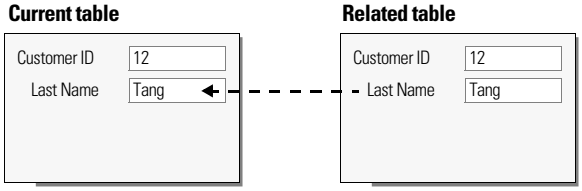
Note See Help for detailed, comprehensive information and step-by-step procedures about using FileMaker Pro.

About relationships

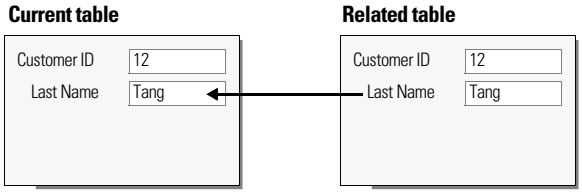
A relationship is a powerful method for organizing your data. Using a relationship, you can join data in one or more tables based on common field values, different field values, or a comparison of values in two or more fields.

After you create a relationship, you can do either of the following to display the data from the related table:

- Design a relational database, which is one or more tables that, when used together, contain all the data you need for your work. Each occurrence of data is stored in only one table at a time, but can be accessed and displayed from any related table. You can change any occurrence of your related data, and the changes appear in all places where that related data is used.
- Define a lookup to copy data from a related table into a field in the target table. The copied data is now stored in two places, just as if it were copied and pasted into a target field. Looked up data is current at the time it is copied, but once copied it remains static unless it is re-looked up or the lookup is triggered again.

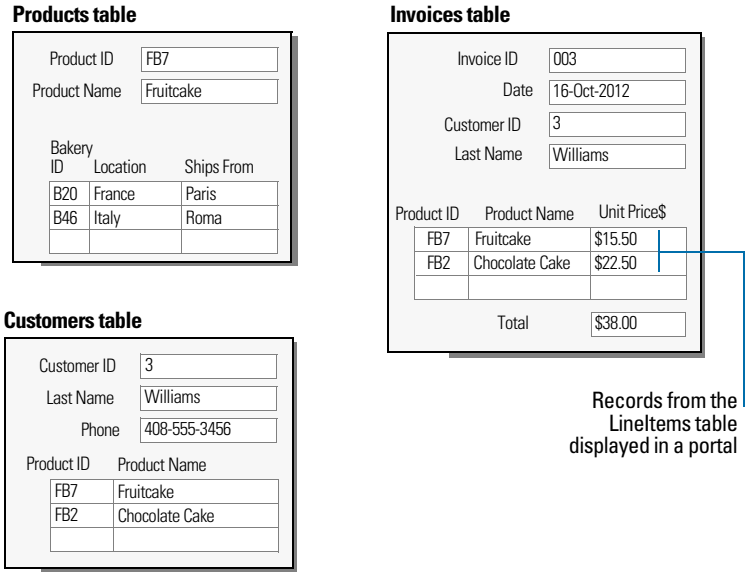


In relational databases, data from the related table is only displayed in the current table, *not* copied



Lookups copy data from the related table into the current table

For example, a database for a bakery might have these tables: a Products table, which stores information about bakery products and their current prices; a Customers table, which stores customer information such as customer names and contact information; an Invoices table, which keeps a record of each order; and a LineItems table, which stores sales data for each line of the invoice, including the item being sold and the price at which it is sold. Because invoices are a mix of dynamic and static data, you use both relational databases and lookups to display your data. Records from the LineItems table are displayed dynamically, in a portal on the Invoices layout, but the actual sales price of each line item is entered using a lookup, so the invoice totals remain historically accurate, even if prices change at some future date.



You create a relational database by defining a relationship between two fields, called *match fields*. These fields can be in different tables or they can be in the same table (a self-join). You are able to access related data when the value in the match field(s) on one side of the relationship compares successfully with a value in the match field(s) on the other side of the relationship, according to the criteria you establish in the relationship.

After you have created a relationship, you can use fields from the related table just as you would use any fields in the current table: to display data on a layout, as part of a calculation formula, in a script, as a match field for another relationship, and so on. You can work with the data in the related fields in all modes (if you have access privileges) when you work with records in the current table.

When you display related data in a portal, values from all related records are displayed. When the related field isn't in a portal, the value from the first related record is displayed.

For more information about relationships, see Help.

Relational database terminology

Before you begin working with relational databases and lookups, you should understand the following terms. These terms are explained in the sections that follow.

Term	Description
Current table	For relational databases, the table that you are currently working in. For lookups, the table that the data is copied to.
External table	A table outside of the current file, in another file.
Lookup target field (for lookups only)	The field in a table that you want data copied to during a lookup.
Lookup source field (for lookups only)	The field in the related table that contains the data you want copied during a lookup.
Match field	A field in the current table and a field in a related table that each contains values used to access matching records. (A match field is sometimes called a *key field*.) For each relationship, you select one or more match fields in each table. For relational databases, values in match fields must match each other in some way for a relationship to be established between the files. See “About match fields for relationships” on page 112. For lookups, values in match fields do not have to be equal to match.
Portal	A layout object that displays records from related tables. Portals display data from related fields in rows, one record in each row.
Related field	A field in one table that is related to a field in another table (or to a different field within the same table). If a relationship has been created between two tables (even through another table), data in fields in one table can be accessed from the other table.
Related record	A record in the related table whose match field (according to the relationship used) contains a value that matches the value in the match field of another table.
Related table	For relational databases, the table that contains the data you want to access and work with in the current table. For lookups, the table that contains the data to copy. A table can be related to itself. This is called a *self-join*.
Relational operators	In the relationships graph, the symbols that define the match criteria between one or more pairs of fields in two tables. These include: equal (=), not equal (≠), greater than (>), greater than or equal to (≥), less than (<), less than or equal to (≤), and all rows, or cartesian product (X).
Relationship	Relationships provide access to data from one table to another. Relationships can join one record in one table to one record in another table, one record to many other records, or all records in one table to all records in another table, depending on the criteria you specify when you create the relationship in the relationships graph. (A relationship is sometimes called a *link* or a *join expression*.)
Relationships graph	In the Relationships tab of the Manage Database dialog box, you can see the occurrences of tables both in the current file and from any external, related database files. In this relationships graph, you join tables and change relationships between fields in different tables. When you create a new table, a visual representation, or occurrence, of the table appears in the relationships graph. You can specify multiple occurrences (with unique names) of the same table in order to work with complex relationships in the graph.
Source file	The file from which you add a table to the relationships graph.
Source table	The table upon which one or more tables in the relationships graph are based. The source table is the table defined in the Tables tab of the Manage Database dialog box.

About the relationships graph

When you work with tables in the relationships graph, you organize your view of your data. Tables shown in the relationships graph can be located in the current FileMaker Pro file, in an external FileMaker Pro file, or in an external ODBC data source.

Each table occurrence in the relationships graph represents a separate view into your data. When you join two tables, you are leveraging the two existing views to create a third view. As you add tables to your relationships, each successive table represents an additional set of criteria that must be met before related data can be accessed in that relationship.

You can create a relationship between any two tables in the relationships graph, but the relationship must not create a cycle, or closed loop between tables. That is, each series of relationships must have a starting table and an ending table, and those tables must be different tables.

Because each relationship represents an additional set of criteria, you must be aware of your *context* within the relationships graph. Context is the point in the graph from which a relationship is evaluated. Because the graph is never a cycle, each point along the graph offers a different perspective into your data.

Because FileMaker Pro does not permit you to create cycles within the relationships graph, any attempt to create a cycle causes FileMaker Pro to generate a new, uniquely named table occurrence. A new occurrence functions like any other occurrence in the graph and allows you to continue with your new relationship.

For more information about the relationships graph, see Help.

About match fields for relationships

When you create a relationship between tables, you choose one or more fields in each table as *match fields*. Match fields usually have common values. In a typical relationship, a record in one table will be related to records in another table that share a common match field value.

For example, a Customers table and an Invoices table can each use the field Customer ID to uniquely identify each customer and purchase. If the two tables are related using Customer ID as the match field, a record in the Customers table can display a portal showing each invoice with a matching Customer ID, and in the Invoices table, each invoice with the same Customer ID can display consistent customer data.

The match fields used in a relationship can have different names. Match fields can be any field type except container or summary.

Types of relationships

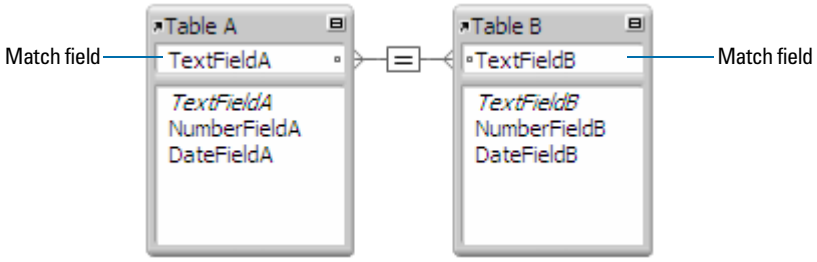
When you join two tables using a relationship, you establish criteria that FileMaker Pro uses to display or access related records.

Your criteria can be simple, such as matching a field in Table A with a field in Table B, or more complex. A more complex relationship definition will usually return a narrower set of related records. Examples of complex relationships include using multiple match fields on one or both sides of the relationship, comparing match fields using non-equal relational operators, or using calculated match fields.

Single-criteria relationships

In a single-criteria relationship, data in one field is matched to data in another field.

For example, a record in either table is related to any record in the other table when the values TextFieldA and TextFieldB are the same.

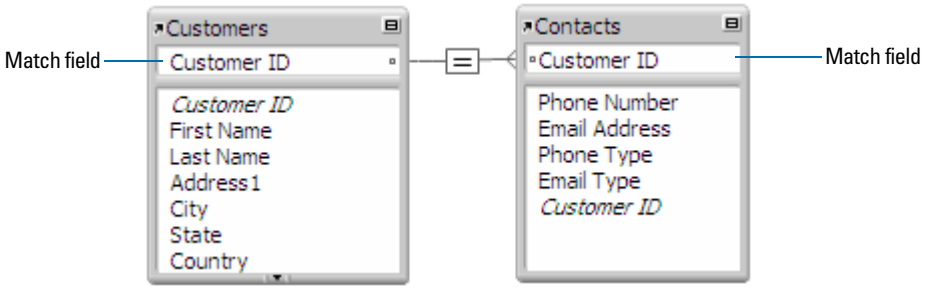


Use a single-criteria relationship when you want to relate two tables based on a single common value, such as a serial number or an ID number. For example, a database has two tables: Customers, which stores names and addresses, and Contacts, which stores phone numbers, types of phone numbers (such as work, home, fax, and so on), and email addresses. The data is split between two tables because a single customer can have multiple phone numbers and email addresses.

The tables have the following fields:

Table	Field name	Comment
Customers	Customer ID	Number field, auto-enter serial number; this will be the match field in the Customers table
	First Name	Text field
	Last Name	Text field
	Address1	Text field
	City	Text field
	State	Text field
	Country	Text field
Contacts	Phone Number	Text field
	Phone Type	Text field
	Email Address	Text field
	Email Type	Text field
	Customer ID	Number field; this will be the match field in the Contacts table

The Customer ID field is the match field in the relationship between the two tables. In the Customers table, the Customer ID field is set to auto-enter a serial number, giving each record in the Customers table a unique ID number. In the Contacts table, the Customer ID is a simple number field.

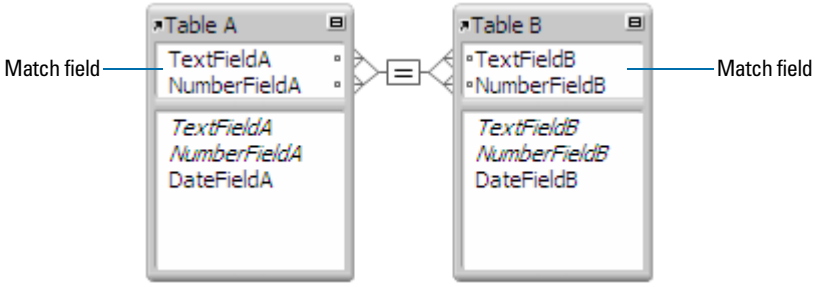


Because the relationship is defined to allow the creation of related records in the Contacts table, the Customer ID number from a Customers record will be automatically inserted in the Customer ID field in the Contacts table in each new related record. This allows many records in the Contacts table to be related to a single record in the Customers table.

You can then add a portal to the Contacts table on the Customer layout. When you enter a phone number or an email address in an empty portal row in the Customers table, FileMaker Pro creates a related record for that phone number or email address in the Contacts table.

Multi-criteria relationships

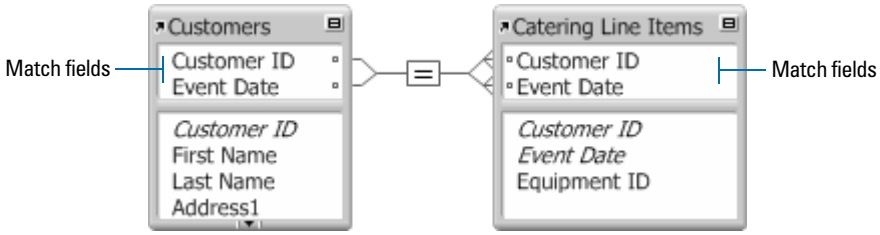
In a multi-criteria relationship, you increase the number of match fields, which increases the criteria that FileMaker Pro evaluates before successfully joining related records. In a multi-criteria relationship, FileMaker Pro compares the values from each match field on each side of the relationship in the order in which the fields appear. This is called an AND comparison; to match successfully, every match field must find a corresponding value in the other table.



In this relationship, both TextFieldA and NumberFieldA are match fields to TableB. A record in TableA with a TextFieldA value of Blue and a NumberFieldA value of 123 will only match those records in TableB where both TextFieldB and NumberFieldB have values of Blue and 123, respectively. If TextFieldA and TextFieldB have matching values, but NumberFieldA and NumberFieldB do not, no related records are returned by the relationship.

Use a multi-criteria relationship when you want to relate two tables based on more than one common value, such as a customer ID and a date.

For example, a catering equipment rental database has three tables: Equipment, a static table that stores equipment rental inventory; Customers, which stores customer names and addresses; and Catering Line Items, which stores a record of each equipment rental, including the equipment ID, the customer ID, and the event date. The purpose of this database is to track equipment rentals and display all rentals by a selected customer on a selected date.

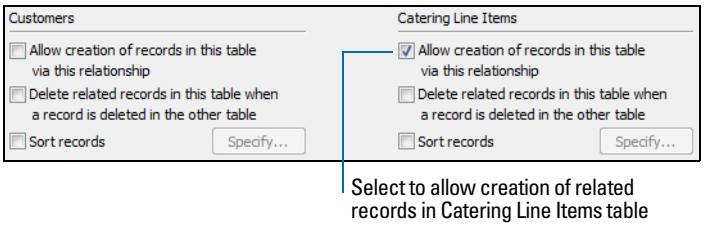


In this relationship, both Customer ID and Event Date are match fields to the Catering Line Items table. A record in the Customers table with a Customer ID value of 1000 and a Event Date value of 10/10/2014 will only match those records in the Catering Line Items table where both fields Customer ID and Event Date have values of 1000 and 10/10/2014, respectively. If Customer ID fields in both tables have matching values, but Event Date fields in both tables do not, no related records are returned by the relationship.

Although the database uses three tables, the multi-criteria relationship is between the Customers and Catering Line Items tables. These tables have the following fields:

Table	Field name	Comment
Customers	Customer ID	Number field, auto-enter serial number; one of the match fields to the Catering Line Items table
	Event Date	Date field; the other match field to the Catering Line Items table
Catering Line Items	Customer ID	Number field; one of the match fields to the Customers table
	Event Date	Date field; the other match field to the Customers table
	Equipment ID	Number field

Because the relationship is defined to allow the creation of related records in the Catering Line Items table, you will be able to enter catering information in an empty portal row, and FileMaker Pro will automatically create a related record for that catered event.

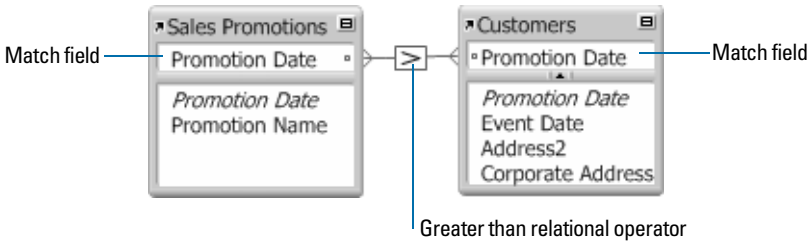


Relationships using comparative operators

In a comparative relationship, you use one or more of the following operators to compare match field values in the two related tables. The relationship returns related records when the comparison evaluates successfully, according to the criteria you establish.

Relational operator	Matches these records
=	Values in match fields are equal
≠	Values in match fields are unequal
<	Values in the left match field are less than values in the right match field
≤	Values in the left match field are less than or equal to values in the right match field
>	Values in the left match field are greater than values in the right match field

Relational operator	Matches these records
≥	Values in the left match field are greater than or equal to values in the right match field
x	All records in the left table are matched to all records in the right table, regardless of the values in the match fields

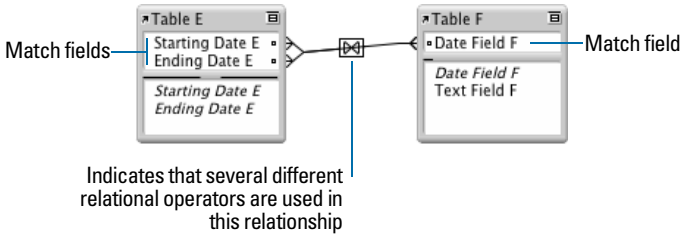


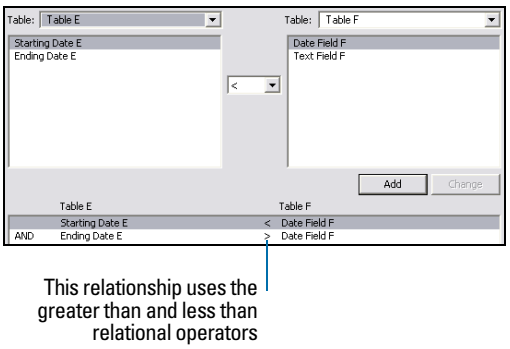
In this example, the Promotion Date fields in the Sales Promotions table and the Customers table are match fields. If a record in the Sales Promotions table has a Promotion Date value of 12/11/2014, all the records in the Customers table with a Promotion Date value of 12/10/2014 or earlier are related to it. In the Customers table, if a record has a Promotion Date value of 12/11/2014, all records in the Sales Promotions table with Promotion Date values of 12/12/2014 or later are related to it.

Relationships that return a range of records

A relationship that returns a range of records is similar to a multi-criteria relationship, except that you use comparative operators to find records that are greater than one of your criteria and less than your other criteria. This type of relationship is commonly used to return records that fall between a range of dates or serial numbers.

For example, from within Table E you want to view all the records in Table F that have Date Field F values that are greater than Starting Date E values and less than Ending Date E.





This relationship returns those records from Table F that have a Date Field F value that is later than Starting Date E and earlier than Ending Date E.

For example:

If fields	Contain values	These related records are returned from Table F
Starting Date E	11/01/2014	11/14/2014 11/27/2014
Ending Date E	12/01/2014	

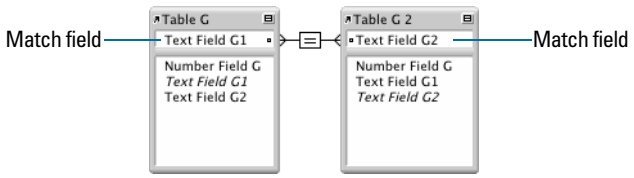
Another example:

If fields	Contain values	These related records are returned from Table F
Starting Date E	12/01/2014	12/02/2014 12/15/2014 12/17/2014 12/26/2014
Ending Date E	01/01/2015	

Self-joining relationships

A self-join is a relationship in which both match fields are defined in the same table. Define a self-join to create relationships between records in the same table. Use a self-join in a portal on a layout of the current table to display a subset of data that is in the current table, such as all the employees of each manager.

When you define a self-joining relationship in the relationships graph, FileMaker Pro generates a second occurrence of the table upon which you are basing the self-join. FileMaker Pro does this to prevent the relationships graph from forming a cycle, which would make it impossible to evaluate the relationship.



Self-joining relationship

This relationship returns related records in Table G when the value in Text Field G1 is the same as the value in Text Field G2.

For more information about the types of relationships, see Help.

Planning a relational database

For information about planning a relational database, see “Planning a database” on page 51.

Working with the relationships graph

Use the relationships graph to create, change, and view the relationships in your database file. The relationships graph lets you duplicate tables and relationships, resize and align tables, and add text notes. You can highlight tables that are connected to the selected table via a 1-away relationship, and you can highlight tables that have the same source table as the currently selected table. For more information, see Help.

By default, the relationships graph displays all of the tables in your current database file. You can add tables from other FileMaker Pro files or external ODBC data sources, add more than one occurrence of the same table to the graph, or remove tables from the graph using the buttons at the bottom of the graph.

Note When the table is from an external ODBC data source, the name of the table is typeset in italics in the relationships graph. To display information about the external data source, move the pointer over the arrow to the left of the table name.

Creating relationships

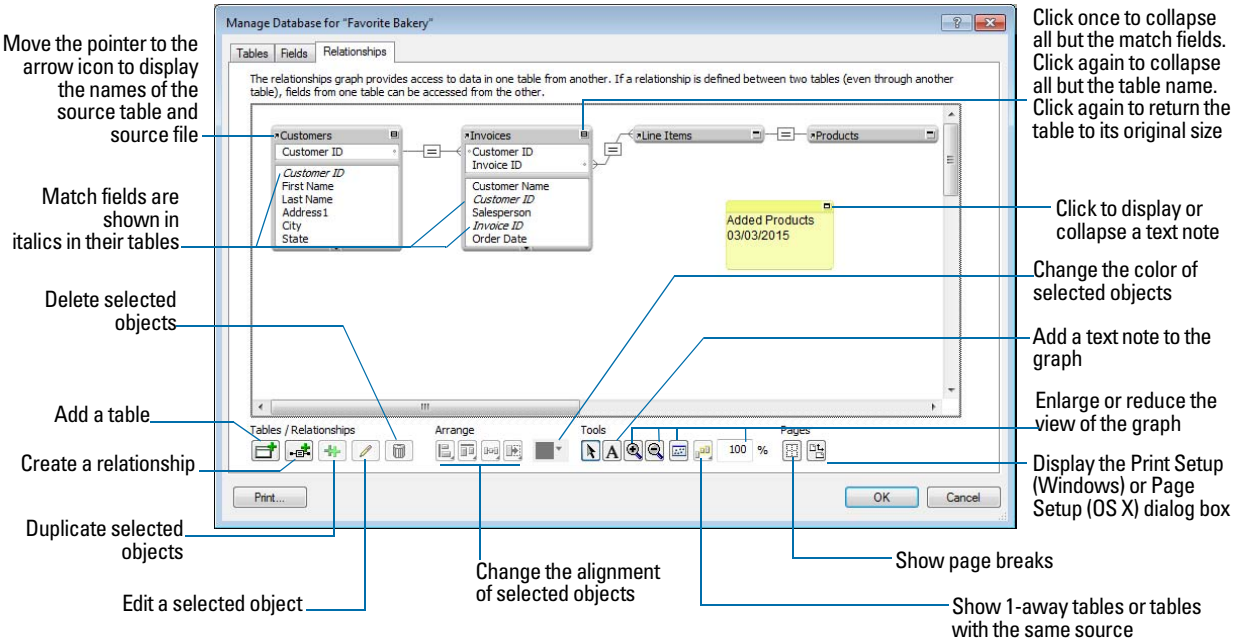
To create a relationship:

1. With the database open, choose **File** menu > **Manage** > **Database**.
2. In the Manage Database dialog box, click the **Relationships** tab.
3. In the relationships graph, locate the two tables you will be using for this relationship.

   They can appear anywhere on the graph but they must be present on the graph in order to create the relationship. For self-joining relationships, locate the single table; FileMaker Pro will create the second table occurrence for you.
4. Click a field in one of the tables and drag to the corresponding match field in the other table.

   Or, you can click  to open the Edit Relationship dialog box and create a relationship.
5. Repeat step 4 for each match field you intend to use in this relationship.

   For more information about match fields, see “About match fields for relationships” on page 112.
6. Click **OK** to save your changes and close the relationships graph.



The relationships graph

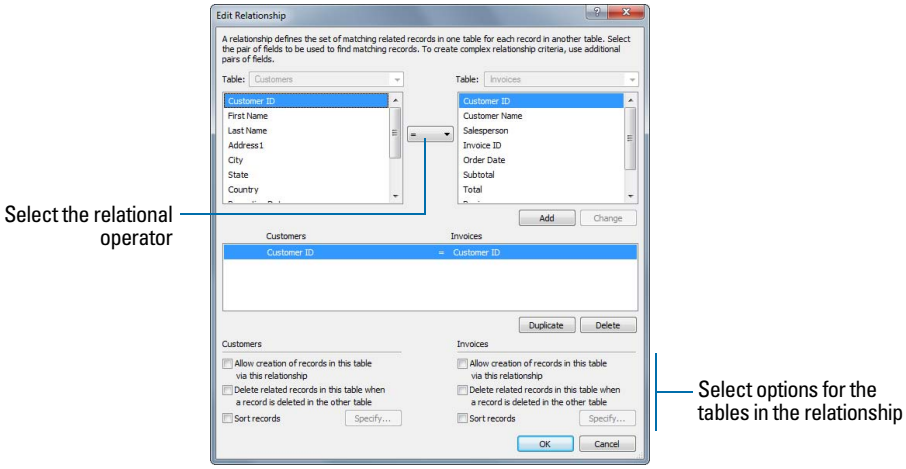
Changing relationships

After you have created a relationship, you can add or change match fields, change relational operators, and set options for creating, deleting, and sorting related records.

To change a relationship:

1. With the database open, choose **File** menu > **Manage** > **Database**.
2. In the Manage Database dialog box, click the **Relationships** tab.
3. In the relationships graph, locate the relationship to edit, and double-click the indicator line between the related tables to open the Edit Relationship dialog box.

   Or, you can select the relationship in the graph and click  to open the Edit Relationship dialog box.



4. Edit tables and match fields for the relationship.

To	Do this
Change a match field	Select the new match field and click **Change.**
Add a match field	Select the new match field and click **Add.**
Change the relational operator	Select a new relational operator from the list and click **Change.** See “Relationships using comparative operators” on page 115.
Duplicate a pair of relationship criteria	Select the paired criteria from the list in the middle part of the dialog box and click **Duplicate.**
Delete a pair of relationship criteria	Select the paired criteria from the list in the middle part of the dialog box and click **Delete**.

5. Select options for the relationship.

To	Select
Add a related record (to the related table) whenever you enter data into a related field in a record of the current table. (See "Adding and duplicating records" on page 25.)	**Allow creation of related records in this table via this relationship.** When this option is selected, entering data in a related field that has no corresponding related record creates a related record based on the match field in the current table.
Delete matching records (in the related table) whenever you delete a matching record in the current table. (See "Deleting records" on page 27.)	**Delete related records in this table when a record is deleted in the other table.** This option deletes related records even when you're browsing a layout that doesn't display the related records.
Sort related records.	**Sort records.** Then, in the left list in the Sort Records dialog box, double-click the fields to sort. To change the order in which fields are sorted, drag fields in the right list into the order you want. Select other options, then click **OK**. Selecting this option does not affect the sort order in the related file.

6. Click **OK.**

For more information about creating and editing relationships, see Help.

Summarizing data in portals

You can summarize data that's in a related field displayed in a portal. The portal can contain records from a related table or from the same table (a self-join).

To summarize data in portals:

1. Create a calculation field in the table in which you want the total to be displayed.
2. For the calculation field, define a formula that includes an aggregate function for the type of summary calculation you want to perform.

   For example, if you are in the Invoices table and want to define a calculation to total the related values in the Price field of the LineItems table, use the formula `Sum(LineItems::Price)`.
3. Place the calculation field on a layout of the table in which it is defined.

   See "Placing and removing fields on a layout" on page 89.

Filtering records in portals

By filtering portal records, you can display different sets of records in a portal.

1. Double-click the portal.
2. In the Portal Setup dialog box, select **Filter portal records**.

3. In the Specify Calculation dialog box, define a calculation that determines which portal records will be displayed.

   For example, if you are working in an Invoices layout, in a portal that shows product records from a LineItems table, and want to display just the products with quantities greater than 1, use the formula `If(LineItems::Quantity < 1; 0; 1)`.

4. Click **OK**.

Important The results of summary fields, calculations, and find requests are based on the full set of related records, not just the records in a portal that are filtered. For example, if a portal is displaying a filtered subset of records, and a **Total of** summary field outside the portal summarizes these records, the summary field will total all related records, not just the displayed records.

For more information about filtering records in portals, see Help.

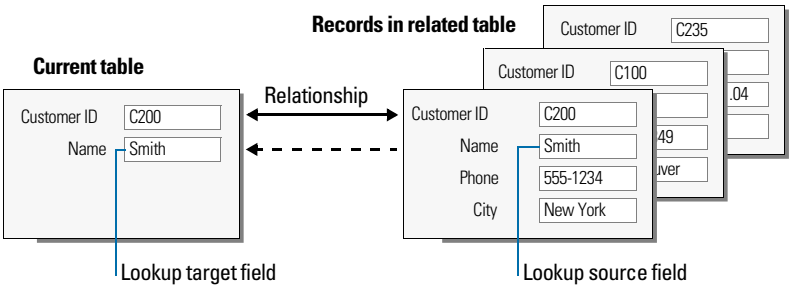
About lookups

A lookup copies data from another table into a field in the current table. After data is copied, it becomes part of the current table (and remains in the table from which it was copied). Data copied to the current table does not change automatically when the data in the other table changes, unless the data in the match field of the current table changes.

To establish a connection between tables for a lookup, you create a relationship. Then you define a lookup to copy data from a field in the related table into a field in the current table.

When you type a value in the match field of the current table, FileMaker Pro uses the relationship to access the first record in the related table whose match field contains a matching value. Next, it copies the value from the lookup source field into the lookup target field, where the value is stored.

After a value is copied into the lookup target field, you can edit, replace, or delete it like any other value (because the lookup value belongs to the current table). You can also update data in the current table to match data that changes in the related table.



Creating lookups

To create a lookup:

1. Create a relationship for the lookup between the match field of the current table and the match field of the related table. See “Creating relationships” on page 118.

2. With the database open, choose **File** menu > **Manage** > **Database**.

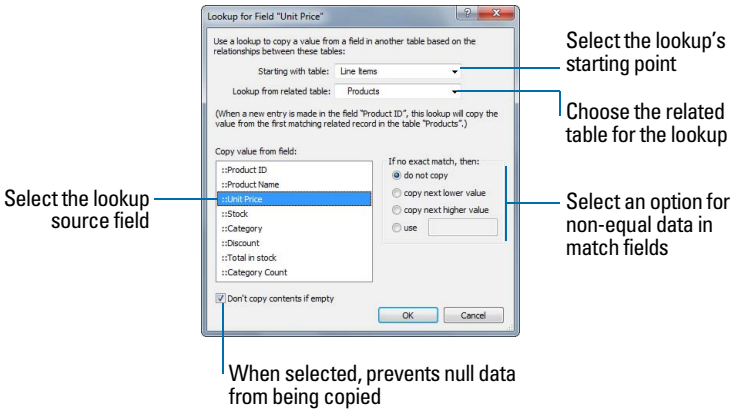
3. In the Manage Database dialog box, click the **Fields** tab.

4. If your database contains more than one table, select the appropriate table from the **Table** list.
5. Select a text, number, date, time, timestamp, or container field from the list of existing fields, or define a new one.
6. Click **Options** (or double-click the field name).
7. In the Options for Field dialog box, click the **Auto-Enter** tab, then select **Looked-up value**.
8. In the Lookup for Field dialog box, choose the table the lookup will start with, and the table from which the value will be copied.

Select	To specify
Starting with table	The table the lookup will use as its starting point in the relationships graph
Lookup from related table	The related table from which the related data will be looked up

9. Select the field from which the lookup value will be copied.
10. Select options for the lookup.

To	Do this
Specify an action when values in the match fields do not match exactly	For **If no exact match, then**, select an option to copy no value, copy the next lower or next higher value that's in the lookup source field, or enter a fixed value to be used instead
Prevent null (empty) data in the lookup source field from being copied to the lookup target field	Select **Don't copy contents if empty**. (Clear this option to allow empty data to be copied.)



11. Click **OK**.
12. Repeat steps 5–11 for each additional field for which you want to define a lookup.

Editing lookups

To edit a lookup:

1. With the database open, choose **File** menu > **Manage** > **Database**.
2. Click the **Fields** tab.
3. If your database contains more than one table, select the appropriate table from the **Table** list.
4. Double-click the lookup target field.
5. In the Options for Field dialog box, click the **Auto-Enter** tab.
6. Be sure **Looked-up value** is selected and click **Specify**.
   To stop or suspend using a lookup, clear **Looked-up value**.
7. Make your changes.
8. Click **OK.**

For more information about creating and editing lookups, see Help.

Chapter 5
Sharing and exchanging data

This chapter explains the basics of how you can share FileMaker Pro databases:

- **FileMaker Network sharing:** You can share FileMaker Pro databases on your network, which allows multiple FileMaker Pro and FileMaker Go users to access and use the same database file simultaneously.
- **Importing and exporting data:** You can exchange information between FileMaker Pro and other applications by importing and exporting data. For example, you can import data that is in another database or spreadsheet program, or export address data in order to create personalized form letters with a word processing program.
- **Recurring import:** You can set up a FileMaker Pro file to automatically update data imported from another application, such as Microsoft Excel.
- **Accessing data from external data sources:** You can access information stored in other FileMaker Pro files and external SQL databases that use ODBC technology to share data. This allows you to work with information stored in external databases and combine external data with information stored in your file. When you access data from an ODBC database, you can use supplemental fields in your FileMaker Pro file to perform calculations and summary operations on the data without changing the schema of the external file.
- **Publishing FileMaker Pro layouts:** If you have FileMaker Server, you can use FileMaker WebDirect to quickly and easily publish layouts from your FileMaker Pro databases in a web browser.

Note See Help for detailed, comprehensive information and step-by-step procedures about using FileMaker Pro. See *FileMaker WebDirect Guide* for information about publishing databases on the web.

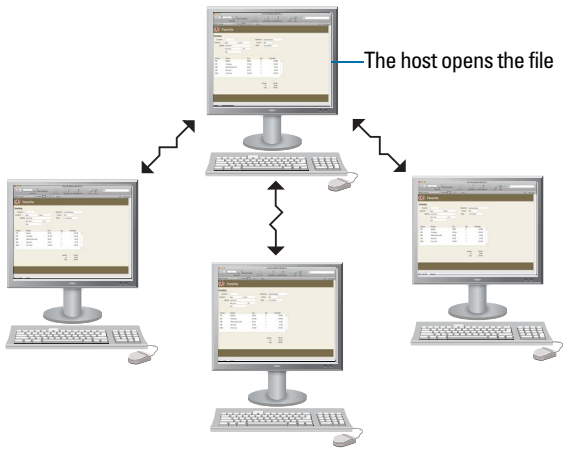
Sharing databases on a network

If your computer is connected to a network, you and other Windows and OS X FileMaker Pro and FileMaker Go users can use the same database file simultaneously.

FileMaker Pro Network sharing supports the sharing of files with up to 5 concurrent users (not including the host). FileMaker Go clients are included in the limit of 5 users. To support more users and web publishing technologies such as XML, PHP, and FileMaker WebDirect, use FileMaker Server.

Important Your FileMaker Pro licensing agreement requires that you pay for a license for each separate computer on which the FileMaker Pro application is installed or run. The software license may not be shared or used concurrently on different computers. Please read the software license for complete terms and conditions.

The first person to open a shared file is the *host*. Any user who opens a shared file after the host is a *client*.



Clients open connections to the shared file

Once a shared file is open, the host and clients have access to the same information, and all changes to the file appear in each user's window.

Modifications to the data made by any user are saved in the shared file. The shared file is saved on the disk where the file resides.

Sort orders, find requests, import and export field orders, and print setups are specific to each user.

Enabling file sharing and hosting files

Because many FileMaker Pro commands are processed on the host machine, you will see better performance if you host your shared files from the fastest available computer. The file you're hosting must be on the hard disk of your computer. Remotely hosting a file stored on another computer or server is not supported, as it might compromise data integrity and will result in poor performance.

To turn on network file sharing for all open files:

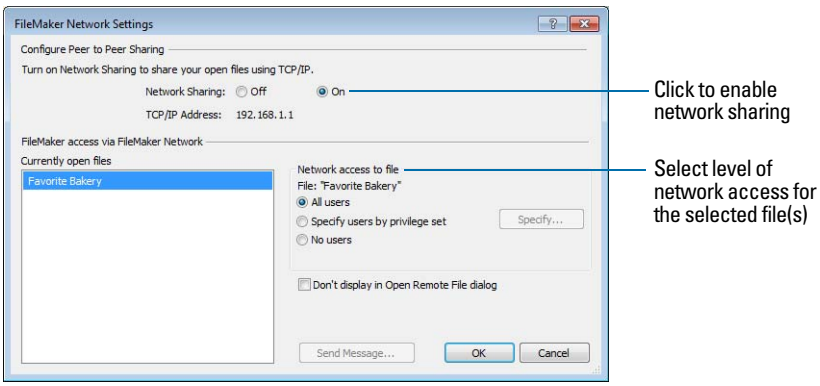
1. Open the FileMaker Pro file(s) you want to share.

   Note To enable or change a file's sharing status, you must open it with an account that has Manage Extended Privileges access privileges. For more information, see "Accounts, privilege sets, and extended privileges" on page 138.

2. Choose **File** menu > **Sharing** > **Share with FileMaker Clients**.

3. In the FileMaker Network Settings dialog box, for **Network Sharing**, click **On**.

   In the **TCP/IP Address** box, you see the TCP/IP address of your system.



4. Select the file(s) to be hosted from the list of **Currently open files.**

5. Set the level of network access for the file(s).

To	Select
Provide access to all FileMaker Pro and FileMaker Go users on your network	**All users**.
Limit network access to users based on their privilege set	**Specify users by privilege set**, then click **Specify**. In the “Specify users by privilege set” dialog box, select the privilege sets you want to have network access.
Prevent any access via FileMaker networking	**No users**.

6. Click **OK**.

   The open files are now hosted.

Important You must keep your shared file(s) open to make them available to clients.

Opening shared files as a client

FileMaker Pro databases shared via TCP/IP can be opened remotely using the list of local hosts, the IP address of the host machine, or the DNS name of the host machine (if one has been defined).

To open a shared file as a client:

1. Choose **File** menu > **Open Remote**.
2. In the Open Remote File dialog box, select **View** for a list of hosts.

Choose	To display
Favorite Hosts	Hosts you previously added as favorites
Local Hosts	FileMaker Pro hosts on your TCP/IP subnet
Hosts Listed by LDAP	FileMaker Pro hosts available through the specified LDAP server

3. To see the available files from a host, select the host. In the **Available Files** list, select the file you want to open.

   Tip To narrow the list of available files, type a few characters in the **Filter** text box. Only filenames containing the characters you type are displayed in the list.

   Or, for **Network File Path**, type the network path; for example:

   For IPv4: `fmnet:/<host IP address>/<filename>`

   For IPv6: `fmnet:/[<host IPv6 address>]/<filename>`

4. Click **Open.**

   You might be required to enter an account name, password, and domain name (Windows only), depending on how file sharing is configured on the host.

   If the network is very busy, the file might not be listed. To check the network for a longer period of time, hold down the Ctrl key (Windows) or Option key (OS X) as you click an item.

For information about marking remote files as favorites and accessing favorite files, see Help.

Note When a file you are opening is hosted, you may see an icon in the lower-left corner of the FileMaker Pro window. This icon indicates the security level of the connection to the host. A  icon means the connection is encrypted (SSL). A icon means the connection is encrypted (SSL) and verified with a certificate. For more information, see your database administrator.

Limitations on changes to shared files

Although it is possible for multiple users to make changes in the same shared file at the same time, there are limits to the types of simultaneous changes that are permitted. The following table describes the types of changes you can and cannot make to shared files.

Database change	Limitation
Data in layouts and records	Two people can't edit the same record at the same time.
Data in records from external ODBC data sources	Two people can edit the same record at the same time. If two users edit the same record simultaneously, FileMaker Pro posts an alert when either user attempts to commit changes. The alert provides a user with a choice, allowing changes to be committed (overwriting any changes the other user might have made), returning to the record without committing changes, or reverting the record to the state it was when the editing session began.
Layouts and layout elements	Two people can't modify the same layout at the same time.
Value lists	Two people can't modify or define the same value list at the same time. One person can edit a value list while another person is using it in Browse mode or Find mode.
Scripts	Two people can't modify or define the same script at the same time. One person can edit a script while another person is using it.
Tables, fields, relationships (database schema)	Two people can't modify any of these elements at one time.
Data sources	Two people can't modify or define the same data source at the same time. One person can edit a data source reference while another person is using the external file.
Accounts and privileges	Two people can't modify or define accounts and privileges at the same time. One person can create or modify an account and privileges while another person is using it.

Opening shared databases remotely using a URL

The FileMaker Pro installer registers FMP as an internet protocol. This enables you to open a shared database using a URL. You can also run a script in the shared file using a URL.

Clients can use a browser to access shared databases by entering the URL of the shared file on the host machine in a browser's address area.

To identify the URL for the shared database on the host machine and send it to a client user:

1. In the shared file on the host machine, choose **File** menu > **Send** > **Link to Database**.

   FileMaker Pro opens an email message in your default email application that contains the URL for the current database, plus client connection requirements.

2. Address the email message to the client user, then send the message.

To open a shared database on a client machine using a URL:

1. Launch a web browser on the intended client machine.

2. Enter the URL of the host machine into the browser's address area using the format:

   `fmp://[[account:password@]netaddress]/databasename`

   Optional parameters are indicated by square brackets ("`[ ]`").

3. Press Enter (Windows) or Return (OS X).

Examples

fmp://My%20Addresses

fmp://192.168.10.0/My%20Addresses.fmp12

fmp://[2001:0DB8:85A3:08D3:1319:8A2E:0370:7334]/My%20Addresses.fmp12

fmp://MyAccount:MyPassword@192.168.10.0/My%20Addresses.fmp12

Closing a hosted file

Before a shared file can be closed by a host, all clients must close the file. FileMaker Pro allows you to prompt networked clients to close the shared file when you do one of the following: close the file, change the sharing conditions for the file, exit FileMaker Pro, or perform a task that requires all clients to close the file. If a client does not respond to your request to close a shared file within 30 seconds, FileMaker Pro will attempt to close the shared file on the client's machine.

To close a hosted file:

1. On the computer hosting the file, choose **File** menu > **Close**.
2. If any clients have the shared file open, you see a dialog box listing those clients. Click **Ask** to send a message to these clients requesting that they close the file.
3. Clients see a dialog box requesting that they close the file.

If	FileMaker Pro
Clients click **Cancel**	Waits for those clients to close the file
Clients click **Close Now**	Closes the shared file on the client's computer
Clients do nothing	Attempts to close the file after 30 seconds, if it can be closed safely

For more information about sharing files over a network, see Help.

Sharing files with FileMaker Go clients

FileMaker Go lets you work with FileMaker Pro databases on an iPad, iPhone, or iPod touch. You work with data interactively: when you change data on an iOS device, the data is updated on the host computer, and vice versa.

Build databases using FileMaker Pro. Share them using FileMaker Pro or FileMaker Server. Then use FileMaker Go to work with the data on a device. To tailor databases for use with FileMaker Go, see *FileMaker Go Development Guide*, available at http://www.filemaker.com/documentation.

Uploading files to FileMaker Server

You can use FileMaker Pro to transfer database files to FileMaker Server. Before you can upload files, you must have the account name and password for the server administrator or for a group administrator that has the privilege to perform actions on databases. For more information about uploading files to FileMaker Server, see FileMaker Server Help.

Importing and exporting data

You can exchange information between FileMaker Pro and other applications by importing and exporting data. You can:

- import data into an existing FileMaker Pro file, either into a new table or into an existing table
- convert data from other applications to new FileMaker Pro files
- export data for use in other applications

Saving and sending data in other formats

You can save FileMaker Pro data as a Microsoft Excel worksheet or a PDF file, allowing you to give your record data to users who don't have FileMaker Pro.

FileMaker Pro lets you email the Excel worksheet or PDF file when you save it. You can also create scripts to save records as Excel or PDF.

In order to save files as Excel, you need the Allow Exporting Access privilege. To save files as PDF, you need the Allow Printing Access privilege.

Note The saved file will only include fields that are on the layout when you perform the save. If you want to include other fields (for example, fields on tab panels that are not in front), use the **Export Records** command instead of **Save/Send Records As**.

Sending email messages based on record data

You can use FileMaker Pro to send one message, or multiple messages, to one or more recipients. Generated email is sent using your default email application or directly through SMTP (Simple Mail Transfer Protocol, a set of criteria for sending and receiving email). You can enter values, or use values from fields or calculations. You can also create scripts to send email.

Supported import/export file formats

Every application stores its data files in its own file type or file format. Most applications can also exchange information in certain other formats.

FileMaker Pro can import and/or export files in these formats, followed by their filename extensions: Microsoft Excel (.xlsx), tab-separated text (.tab, .txt), comma-separated values (.csv, .txt), FileMaker Pro 12 (.fmp12), Merge (.mer), HTML table (.htm), and XML (.xml). You can also import Bento data into FileMaker Pro. If you're exchanging data with another program, check the documentation that came with that program to determine a common intermediary file format that both FileMaker Pro and the other program support.

Most file formats support data conversion only and do not import or export formatting such as font, size, style, and color.

For information about supported file formats for importing and exporting, see Help.

Setting up recurring imports

You can set up a FileMaker Pro file to automatically update data imported from another application, such as Microsoft Excel. A recurring import occurs automatically the first time you view the layout containing the data from the external file. Later, you can run a script to update data.

Keep the following points in mind:

- Data imported via recurring import is read-only in FileMaker Pro.

- When you set up recurring imports, FileMaker Pro creates a new table for the imported data and a new layout to display the data. You can customize the layout in Layout mode later, if you wish.
- To set up recurring imports, you must open a file with an account that is assigned the Full Access privilege set. For information about privilege sets, see “Creating accounts” on page 145.

To set up recurring imports:

1. Create a new file, or open the file in which you want to set up recurring imports. See “Creating a FileMaker Pro file” on page 55 or “Opening files” on page 16.
2. In Browse mode, choose **File** menu > **Import Records** > **File**.
3. For **Files of type** (Windows) or **Show** (OS X), select the type of file you want to import, then locate and select the file containing data to import.
4. Select **Set up as automatic recurring import**, then click **Open**.

   The path of the file you selected appears in the Recurring Import Setup dialog box.
5. To skip importing column headings, select **Don’t import first record (Contains field names)**.
6. Accept the default layout name or type a new name for the layout that FileMaker Pro will create to display the imported data.
7. Accept the default script name or type a new name for the script you can use for updating data manually.
8. Click **OK**.
9. If you are importing data from an Excel file, you can import data by worksheet or by named range.

To	Do this
Import data by worksheet	Select **Display worksheets**, select the worksheet you want to import, then click **Continue**.
Import data by named range, one worksheet or named range per layout	Select **Display named ranges**, select the named range you want to import, then click **Continue**.

10. The new layout appears in Browse mode in Table View. You can update data, add an empty record to the file, or add a new field to the layout.

To	Do this
Update data	Click the script button at the top of the new layout.
Add an empty record to the file (appears as a blank row at the bottom of the table)	Click **+** at the bottom of the table.
Add a new field to the layout (appears as a blank column on the right in the table)	Click **+** in the table heading.

For more information about setting up recurring imports, see Help.

ODBC and JDBC

You can exchange FileMaker Pro data with ODBC- and JDBC-compliant applications. For example, you can chart FileMaker Pro data in Microsoft Excel.

What do you want to do?	How do you do it?	See
Use FileMaker Pro as a data source/share FileMaker Pro data	1. ODBC and JDBC 2. SQL queries	*FileMaker ODBC and JDBC Guide* and *FileMaker SQL Reference*
Use FileMaker Pro as an ODBC client/access ODBC data	1. Interactively via the relationships graph 2. One-time, static via ODBC import (or **File** menu > **Open**), also Import Records script step, Execute SQL script step	"Working with external data sources" on page 136 and Help

Methods of importing data into an existing file

When you import data into an existing file, you can:

- add new records to an existing table
- create a new table from imported data
- update existing records in an existing table
- update matching records in an existing table

Important The import options that update existing records and update matching records both overwrite existing data during the import process and cannot be undone. To safeguard your data, choose **File** menu > **Save a Copy As** to make a backup of the file before you perform an import that updates records.

The file you import records from is the *source*. The file you import records to is the *target*.

About adding records

When you add records, you import all records from the source file to the target file or table. A new record is created in the target file for each importable record in the source file.

About updating existing records

With this option, you replace data in your file with data from the source file. For each field you import into, data from the first importable record (or row of data) in the source file overwrites fields in the first record in the target file. Data from the second importable record (or row of data) in the source file overwrites fields in the second record in the target file, and so on. When you replace data, FileMaker Pro doesn't examine or compare the data in the files.

You can choose whether to replace or not replace data on a field-by-field basis.

Records in the target file are replaced with the same number of records from the source file. If there are more importable records in the source file, data from the extra records in the source file will not be imported unless you also choose **Add remaining data as new records**. If there are more records in the target file, data in the extra records in the target file will not be replaced.

About updating matching records

You can update matching records and fields in your target file with data from another file. For example, you might have a copy of a database on your desktop computer and another copy on your laptop computer. You can update the file in your office with the changes you make on the road.

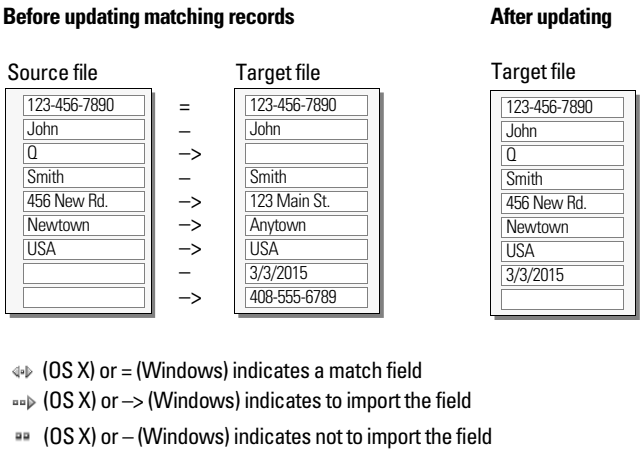
You determine which records in the source file update which records in the target file by choosing one or more match fields in each file. If data in the match field(s) of a record in the target file matches data in the match field(s) of a record in the source file, the record in the target file will be updated with data from the source file.

Match fields must uniquely identify each entity in your database. For example, in a database of people, you could use one match field such as **Employee Number**, or multiple match fields such as **Last Name**, **First Name**, and **Phone Number**. Using **Last Name** alone might identify more than one person, so it isn't a good match field to use by itself.

You also specify the fields you want to import. The contents of all fields you select to import, in all matching records, will overwrite data in the target file, even if the field in the source file is blank.

When the target file contains a found set, only the found records are updated. (If the source file is another FileMaker Pro file, you can also import only from a found set.)

The following example shows how a record in a target file appears before and after being updated by a matching record in a source file.



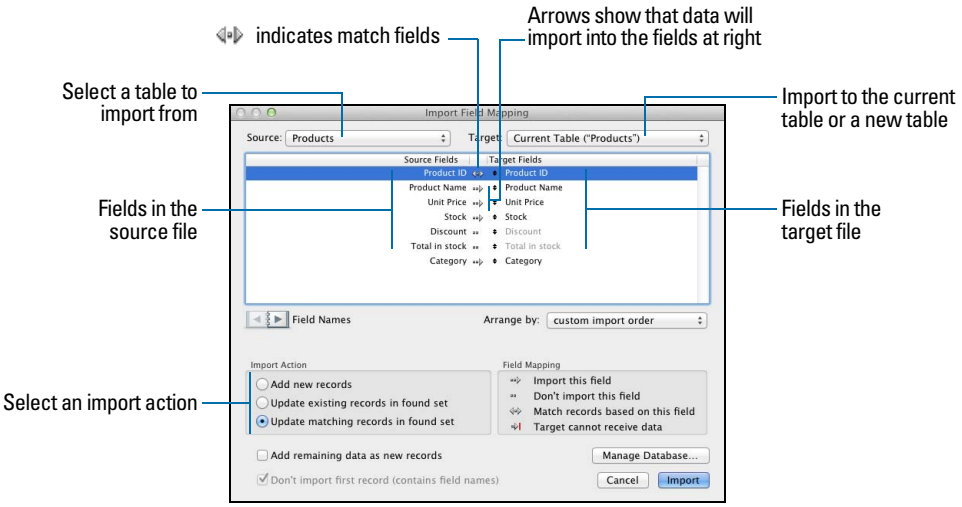
About the importing process

The basic steps for importing records are:

1. Make a backup copy of the target file you're importing into.
2. If the source file is a FileMaker Pro file, perform a find so that the found set in the current window contains only the records you want to import.
3. Open the target file, and if it has multiple tables, select a layout that shows records from the table you want to import data into.

   The layout doesn't have to display all the fields in the table. You will be able to specify the fields that you want to import to in the Import Field Mapping dialog box.
4. If you're updating existing or matching records, make sure the found set in the target file contains only the records you want to change or update.

5. Choose **File** menu > **Import Records** > **File**, and choose the name of the file that contains the data you want to import (the source file).
6. In the Import Field Mapping dialog box, if necessary, select a table from the **Source** list.
7. Accept the table shown in the **Target** list, or select **New Table** to create a table with the same schema as the source table.
8. Select the type of import to perform. See “Methods of importing data into an existing file” on page 132.
9. Map the fields in the source file to the fields in the target file.



Converting a data file to a new FileMaker Pro file

You can convert a data file from another application into a new FileMaker Pro file. The converted file will contain:

- The data from the file or source you convert
- Two layouts for displaying the data
- Converted field names if they are available in the file or source you convert. Otherwise, field names are generic: f1, f2, f3, and so on.
- Converted field types if they are available in the file or source you convert. Otherwise, all fields are text fields.

To import data into a new file:

1. In the source application, save the data you want to import in a file type that FileMaker Pro supports. See “Supported import/export file formats” on page 130.
2. Choose **File** menu > **Open**.
3. In the Open File dialog box, for **Files of type** (Windows) or **Show** (OS X), specify the type of file, choose the file to convert, then click **Open**.
4. If you see the First Row Option dialog box, choose whether the first row of data contains field names or the first record of data, then click **OK.**

5. If you're converting a Microsoft Excel spreadsheet and the Specify Excel Data dialog box appears, choose a worksheet or named range from the workbook file, then click **OK.**
6. In the Create a New File Named dialog box, type a name for the new file, choose a location, then click **Save.**

   FileMaker Pro converts the data to a FileMaker Pro file and displays the file.

For more information about importing data, see Help.

About the exporting process

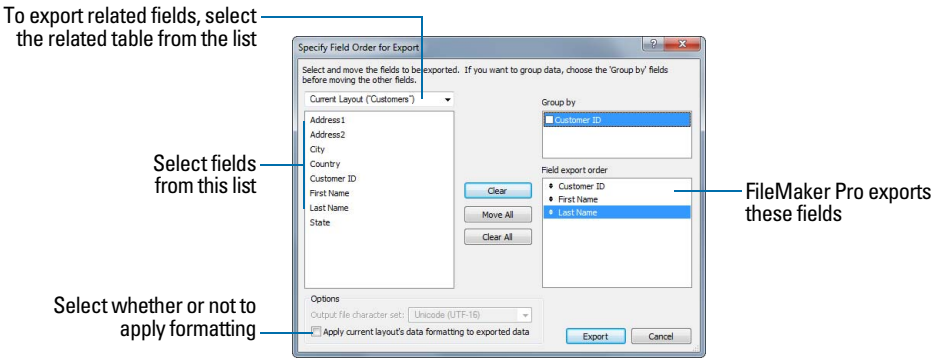
You can export FileMaker Pro data to a new file, then open it in another application.

The basic steps for exporting records are:

1. Open the FileMaker Pro file and display a layout that shows the records you want to export.
2. Find and sort the records to export. See "Finding records" on page 31 and "Sorting records" on page 43.
3. Choose **File** menu > **Export Records**.
4. In the Export Records to File dialog box, type a name and choose a location for the exported file, and choose a file type.
5. In the Specify Field Order for Export dialog box, select how you want FileMaker Pro to export the data.

To export	Choose
A field on the current layout	**Current Layout (LayoutName)** from the table list, then double-click a field in the list
A field in the current layout's table	**Current Table (TableName)** from the table list, then double-click a field in the list

6. If necessary, choose the character set you want the exported file to use.
7. Select whether or not to apply the current layout's formatting to the exported data.



For more information about exporting data, see Help.

Working with external data sources

You can define data sources in a FileMaker Pro file to access data from:

- other FileMaker Pro files
- SQL databases that use ODBC technology for sharing information

When you define data sources in FileMaker Pro files, current data from external databases is displayed in your files. You can use FileMaker Pro to add, edit, delete, search, and sort data in the external files.

The following procedures provide an overview of how to access data in external FileMaker Pro files or external ODBC data sources. For detailed information on accessing external data sources, see Help.

Working with external FileMaker Pro files

To set up a file to access data from another FileMaker Pro file:

- Add tables from other FileMaker Pro data sources to the relationships graph in the current FileMaker Pro file.
- Add fields to layouts to display data from the other FileMaker Pro file.

Working with ODBC data sources

To set up a file to access data in supported ODBC data sources:

- Install and configure an ODBC driver for the external data sources you want to access.
- On the computer that hosts the current FileMaker Pro file, define a system Data Source Name (DSN) for each ODBC data source you want to access.
- Set options for the ODBC data sources you want to access (for example, whether users are prompted for a user name and password).
- Add one or more tables from the ODBC data source to the relationships graph in the current FileMaker Pro file.
- Add fields to layouts in the FileMaker Pro file to display external data.
- Optionally, add supplemental fields to external tables and layouts to display calculation and summary results based on data stored in external ODBC data sources.

Publishing databases on the web

If you have FileMaker Server, you can use FileMaker WebDirect to quickly and easily publish layouts from your database on the web. You don't need to install additional software—anyone with compatible web browser software and access to the Internet or an intranet can connect to your FileMaker WebDirect solution to view, edit, sort, or search records, if you give them access privileges. With FileMaker WebDirect, data in the web browser updates automatically as FileMaker Server pushes data to the web browser.

For more information, see *FileMaker WebDirect Guide*.

Chapter 6
Protecting databases

This chapter describes the basics of how to restrict what users can see and do in a FileMaker Pro file. You'll learn about:

- planning security for a file
- viewing and creating user accounts and passwords
- viewing and creating privilege sets
- viewing extended privileges
- authorizing other files to access your files
- taking measures to secure your database solution, and your operating system, network, and hardware
- backing up databases and other files
- installing, running, and upgrading antivirus software

Note See Help for detailed, comprehensive information and step-by-step procedures about using FileMaker Pro.

Although your operating system includes file security features, you should use FileMaker Pro access privileges as the fundamental way to control access to and protect the security of your database files.

For information about how security settings in older databases convert to the current version of FileMaker Pro, see "Converting databases from FileMaker Pro 11 and earlier" on page 154 and Help.

Protecting databases with accounts and privilege sets

You can limit what users can see and do in a database file. You can restrict:

- **Data access:** Make particular records or fields from individual tables view-only, or hide them completely.
- **Layout access:** Prevent users from modifying layouts in Layout mode.
- **Access to value lists and scripts:** Prevent users from accessing and modifying value lists and scripts, and from running scripts.
- **Access to file sharing:** Individually enable file sharing via the FileMaker Network, ODBC and JDBC, and FileMaker WebDirect.
- **Outputting data:** Prevent users from printing or exporting data.
- **Menu access:** Make only a limited set of menu commands available.

You restrict what users do in a file by requiring them to enter an account name and password when they attempt to open a file. The account name and password they enter determines which privilege set will be used and the privilege set limits what they can do in a file. For more information about accounts and privilege sets, see the following section.

You can define privileges in a shared file while clients are using it. Any privilege changes that affect a current client do not take effect until the client closes and reopens the file.

The privileges that you set up apply to a single file only and all database tables within that file. If your database solution consists of multiple files that you want to protect, you may want to combine all of these files into one multi-table file. Then you can define privileges in only a single file to manage access to the entire database solution. If you don't want to combine the files into one file, then you should define privileges in each file that contains items you want to protect.

Important If you create a relationship in one file that references a table in another file, you cannot manage access privileges for the related table in the first file. The privileges defined in the other file control access to that table.

Accounts, privilege sets, and extended privileges

This section describes FileMaker Pro accounts, privilege sets, and extended privileges.

For more information on sharing data, see chapter 5, "Sharing and exchanging data."

Accounts

Accounts authenticate users who are attempting to open a protected file. Each account specifies an account name and usually a password. Any user that cannot specify valid account information won't be able to open a protected file.

Each database file contains two predefined accounts: Admin and Guest. For more information, see "About the predefined accounts" on page 140.

You may want to create an account for every individual who accesses a file, or you may want to create a small number of accounts that are shared among many individuals, such as a "Marketing" account and a "Sales" account.

- Create accounts for individuals when it is necessary to verify the identities of particular users and you want to manage access at an individual level.
- Create shared accounts when you want fewer accounts to maintain and you are less concerned about managing individual access to the database file.

If you host files on FileMaker Server, you can create External Server accounts that obtain authentication information from an authentication server such as an Apple Open Directory or Windows Domain. For more information, see "Creating accounts that authenticate via an external server" on page 146.

Privilege sets

A *privilege set* specifies a level of access to a database file. Each database file contains three predefined privilege sets for common types of access levels: Full Access, Data Entry Only, and Read-Only Access. When you create a privilege set, there are many options available that you can use to limit database access, such as which layouts are viewable, which menus are available, and whether printing is permitted. Privilege sets can also restrict access to records or fields from particular tables within a file. Each account is assigned a privilege set, which determines the level of access when someone opens a file using that account.

You can create as many privilege sets as you need to define the types of access you want to permit to a file. For more information about privilege sets, see "About the predefined privilege sets" on page 140.

Extended privileges

Extended privileges determine the data sharing options that are permitted by a privilege set, such as whether a privilege set permits users to open a shared file or view a database in a web browser.

The following table lists the default extended privileges that are available. (FileMaker as well as third-party developers may define additional extended privileges to manage access for other software products designed to work with FileMaker Pro or FileMaker Server.)

Keyword	Extended privilege	Determines if a privilege permits
fmwebdirect	Access via FileMaker WebDirect	Accessing a database file from a web browser via FileMaker WebDirect.
fmxdbc	Access via ODBC/JDBC	Accessing a database file from another application via ODBC or JDBC.
fmapp	Access via FileMaker Network and Server Side Scripting	Opening a networked shared file (either a file hosted by FileMaker Pro or FileMaker Server).
fmreauthenticate10	Require re-authentication after the specified minutes in sleep/background - Go only	Accessing a file in FileMaker Go without having to re-login after file hibernation or after using a different app. The default time is 10 minutes; maximum time is 10080 minutes (one week) (FileMaker Go only).
fmxml	Access via XML Web Publishing - FMS only	Accessing a database file from a web browser or other application via XML web publishing (FileMaker Server only).
fmphp	Access via PHP Web Publishing - FMS only	Accessing a database file from a web browser or other application via PHP web publishing (FileMaker Server only).

Note FileMaker Pro no longer supports the fmiwp extended privilege. However, opening database files created in versions of FileMaker Pro earlier than version 13 that use the fmiwp extended privilege does not remove the extended privilege from the privilege sets it is assigned to.

When a user attempts to open or access a protected file using one of the above methods, the user will be prompted to provide account information. If the privilege set for the account does not permit the type of extended privilege access the user is requesting, the user will get an error indicating that they cannot access the file.

All extended privileges except fmreauthenticate10 are disabled by default, even in the Full Access privilege set.

Enabling extended privileges only makes it allowable for certain privilege sets to access shared data. To actually access the shared data, you must also set up sharing for the type of access that you want. For more information on extended privileges, see “Viewing extended privileges” on page 148.

Keep the following points in mind:

- If you are hosting a FileMaker Pro database, the database must include at least one of the access extended privileges. If you upload a database to FileMaker Server and if no sharing is enabled, the Database Server enables fmapp for the Full Access privilege set when the database is opened. If you enable only the fmwebdirect extended privilege for sharing via FileMaker WebDirect and don’t enable fmapp, then users can’t access the file with FileMaker Pro.
- Keywords for extended privileges that begin with “fm” are reserved by FileMaker.

About the predefined accounts

Each database file contains two predefined accounts: Admin and Guest.

Admin account

The Admin account is assigned the Full Access privilege set, which permits access to everything in a file. The Admin account is not assigned a password. In files for which privileges are not set up, the file options are set up to automatically log in to the file using the Admin account.

The Admin account is fully editable. You can rename it, assign it a password, or make the account inactive. You can even delete the Admin account; however, you must assign the Full Access privilege set to at least one other active account.

Important Don't forget the account name and password that is assigned to the Full Access privilege set. If necessary, write it down and store it in a secure place. If you lose or forget this account name and password, you may not be able to access the file.

Guest account

The Guest account permits users to open a file without specifying any account information. The Guest account is not assigned a password. By default, the Guest account is assigned the Read-Only Access privilege set, but you can assign any privilege set you want to the Guest account.

Initially, the Guest account is inactive, which disables the guest option in the password dialog box and prohibits users from opening files as a guest. You can enable the Guest account to permit guest access.

The Guest account is not fully editable. You cannot delete the Guest account, change the Guest account name, or assign it a password.

About the predefined privilege sets

Every new database file contains three predefined privilege sets.

- Full Access: permits accessing and changing everything in the file
- Data Entry Only: permits viewing and entering of data only
- Read-Only Access: permits viewing but not changing data

  Note The Read-Only Access privilege set permits write access to all global fields. To create a privilege set in which global fields and all record data are view-only, you can duplicate the Read-Only Access privilege set and change **Records** from **Custom privileges** to **View only in all tables**.

You cannot change or delete these predefined privilege sets, except to enable or disable extended privileges for them. You can either use them as is, or duplicate them and then modify the duplicate copies.

The following table summarizes the properties of these privilege sets.

Privilege	Full Access privilege set	Data Entry Only privilege set	Read-Only Access privilege set
Records (in all tables)	create, edit, delete	create, edit, delete	view only
Layouts	all modifiable	view only	view only
Value lists	all modifiable	view only	view only
Scripts	all modifiable and executable	all executable only	all executable only
Extended Privileges	all off, except fmreauthenticate10	all off, except fmreauthenticate10	all off, except fmreauthenticate10
Allow printing	on	on	on
Allow exporting	on	on	on
Manage extended privileges	on	off	off
Override data validation warnings	on	off	off
Disconnect user from FileMaker Server when idle	off	on	on
Allow password modification	on	on	on
Password change number of days	off	off	off
Minimum password length	off	off	off
Available menu commands	All	All	All

You must have Allow Printing privileges to save records as a PDF file. You must have Allow Exporting privileges to export records as a Microsoft Excel worksheet. For more information about saving records as PDF or Excel files, see “Saving and sending data in other formats” on page 130.

Note The Full Access privilege set is the only one that permits access to the Manage Database and Manage External Data Sources dialog boxes in order to modify fields, tables, relationships, and data sources. It is also the only privilege set that permits changing accounts and privileges. Because you cannot enable these privileges in any other privilege set, any user that wants to make database definition changes or privileges changes must open the file with an account that is assigned the Full Access privilege set.

At least one active, FileMaker authenticated account in each file must be assigned the Full Access privilege set. An error message will appear if you edit accounts so that no active account is assigned the Full Access privilege set.

Planning security for a file

A new FileMaker Pro file is initially unprotected. Whenever the file opens, it automatically logs in the user with the Admin account, which is assigned the Full Access privilege set.

- If you simply want to keep someone else from opening a database file on your computer, you can password-protect the file. For more information, see “Password-protecting a file” on page 143.

- If you need to share a database file with others and provide varying levels of file access to different users, you need to plan the security for the file. Consider listing the types of users and their privileges:

	Managers	Marketing	Sales	HR	Legal	Guests
View records	Yes	Yes	Yes	Yes	Yes	Yes
Create records	Yes	Yes	Yes	Yes	No	No
Edit records	Yes	Yes	Yes	Yes	No	No
Delete records	Yes	Limited*	Limited*	Yes	No	No
Modify scripts	Yes	Limited*	No	Yes	No	No
Execute scripts	Yes	Yes	Yes	Yes	Yes	No
Modify value lists	Yes	No	No	No	No	No
Menus	All	Editing only	Editing only	All	Minimum	Minimum

* You can provide limited access to some features, for example deleting records, by using record-by-record privileges. For more information on record-by-record privileges, see Help.

You can additionally protect a file by requiring authorization of any file that attempts to access its tables, layouts, value lists, and scripts. For more information, see “Authorizing access to files” on page 148.

To plan the security for a shared file:

1. Determine the privilege sets that you need for the file.

   Make a list of the areas of the file that you want to protect, such as particular tables, fields, records, layouts, value lists, and scripts. Plan the number of privilege sets you need to enforce the varying levels of file access that you require.

2. Determine whether you need individual accounts for each user, or group accounts that multiple users can share.

3. Decide if you want to enable the Guest account, which permits users to open the file without specifying account information.

4. Create the privilege sets that you need in the file.

5. Determine if you need to enable any extended privileges for certain privilege sets.

   Don’t enable extended privileges unless they’re needed.

6. Create the accounts you need in the file, and assign the appropriate privilege set to each account.

   For more information, see the next section. If you’re using the Guest account, assign a privilege set to it as well. Otherwise, disable the Guest account.

7. Open the file using different accounts and test each privilege set that you created. Make sure the restrictions work the way you want, and make any needed corrections to your privilege sets.

8. Optionally limit other files from accessing the schema of your file by using the File Access tab. For more information, see “Authorizing access to files” on page 148.

Password-protecting a file

If you have a non-shared database file on your computer and you want to prevent others from opening it, you can password-protect the file.

After password-protecting a file, you will be prompted to enter an account name and password every time you open the file. Anyone who does not know this account information will not be able to open the file.

To password-protect a file:

1. Make the following changes to the accounts in the file:
   - Edit the Admin account so that it has a different account name, a password, and uses the Full Access privilege set.
   - Make sure the Guest account is inactive.
   - Delete any other accounts in the file or make them inactive.
2. If necessary, edit the Full Access privilege set to allow yourself any extended privileges you may want for yourself.

   Don't enable extended privileges unless they're needed.

Suggestions for creating secure passwords

- Secure passwords are typically eight or more characters in length, and include at least one numeric character.
- Passwords are case-sensitive. For example, if you specify a password as `zFootBallz2`, FileMaker Pro will not accept `zfootballz2`. When you're entering a password for an account, you may want to make sure the Caps Lock key on your keyboard is not inadvertently enabled.
- If the file is shared via web publishing, account names and passwords can only use characters included in the ISO Latin-1 character set (except colons). To avoid characters that may be interpreted incorrectly over the web, you may want to limit account names and passwords to alphabetic and numeric characters only.

For more information about protecting FileMaker Pro databases, see Help.

Creating accounts and privilege sets

Accounts specify account names and (usually) passwords for a file. When a user opens a file that contains accounts, a dialog box prompts the user to enter account information. When a user opens a file with a correct account name and password, the privilege set assigned to that account determines what the user can do in that file.

Privilege sets specify levels of access to a database, such as which layouts are viewable, which menus are available, and whether printing is permitted.

To create and manage accounts and privilege sets for a file, you need to open the file with an account that is assigned the Full Access privilege set.

You can create and modify accounts and privilege sets in a shared file while clients are using it. The account changes you make take effect immediately. However, the changes do not disrupt any current clients. For example, if you change the password for an account that is in use by one or more clients, their FileMaker Pro usage is not interrupted. However, they will need to enter the new password the next time they open the file.

You can create as many accounts as you need. You can create individual accounts for each user, or a smaller number of accounts that users can share.

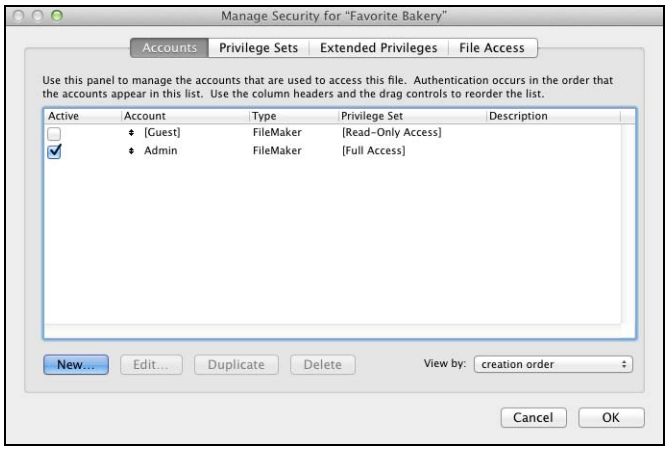
Viewing accounts and privilege sets

The Manage Security dialog box displays a list of all the accounts and privilege sets for a file.

To view the accounts and privilege sets for a file:

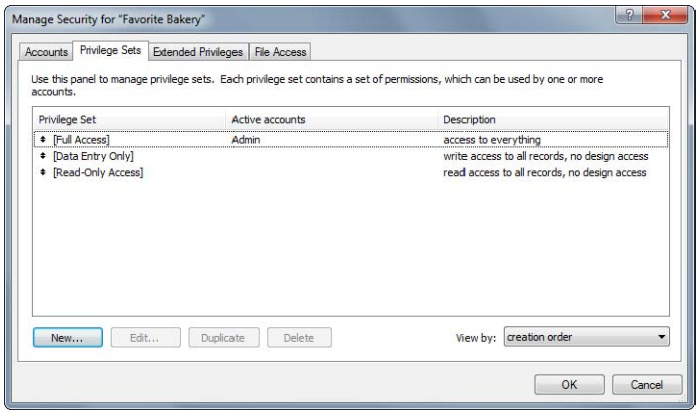
1. Open the database file.
2. Choose **File** menu > **Manage** > **Security**.

   You see the accounts defined for this file.



3. In the Manage Security dialog box, click the **Privilege Sets** tab.

   You see the privilege sets defined for this file.

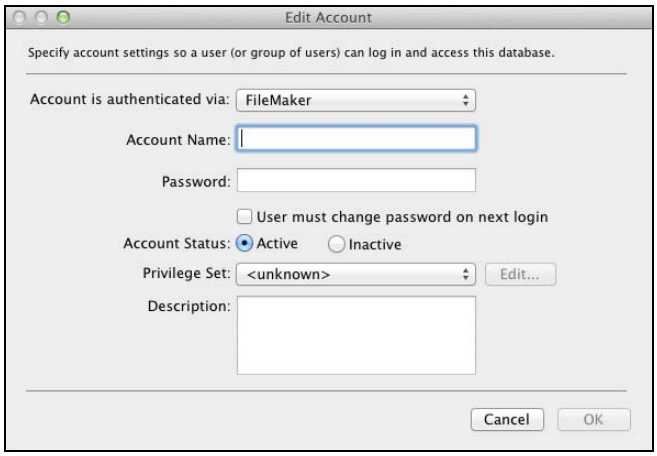


Creating accounts

You can create accounts for every individual who accesses a file, or create fewer accounts that are shared among many individuals, such as a “Marketing” account and a “Sales” account. You must assign a privilege set to each new account.

To create an account:

1. Choose **File** menu > **Manage** > **Security**.
2. In the **Accounts** tab, click **New**.
3. In the Edit Account dialog box, for **Account is authenticated via**, choose **FileMaker**.



For information about accounts managed by an external server, see “Creating accounts that authenticate via an external server” on page 146.

4. Enter an account name and password for the account.

Tip If you plan to create accounts for individual users, you may want to base each account name on the User Name defined in the Preferences dialog box. This User Name is the default account name that appears in the dialog box that prompts a user for an account name and password. The user won’t have to re-type the account name if it matches the User Name.

5. To force the account users to choose a new password the first time they log in, choose **User must change password on next login**.

   In most cases, an account that is shared by multiple users should not force a password change upon first login. Instead, you should specify a password and provide it to the users that need it. Also, the privilege set for a shared account should not permit password changes because one user could change the password and lock out all other users who share the account.

6. For **Account Status**, choose whether you want the account to be active or inactive.

   For example, you may want to keep the account inactive until you finish setting up its privilege set. Users cannot open a database using an inactive account name and password.

7. For **Privilege Set**, choose the privilege set you want to use with this account.

   You can choose an existing privilege set, or choose **New Privilege Set** and create a new one. For more information, see “Creating privilege sets” on page 147.

8. For **Description**, enter a description of the account (optional).
9. Click **OK**.
10. In the Manage Security dialog box, click **OK**.
11. In the dialog box that appears, enter an account name and password that is assigned the Full Access privilege set, and click **OK.**

Creating accounts that authenticate via an external server

If you're hosting FileMaker Pro database files with FileMaker Server and your organization uses centrally managed authentication for users and groups such as Apple Open Directory or a Windows Domain, you can set up accounts that authenticate users based on your authentication server. This allows you to use your existing authentication server to control access to databases without having to manage an independent list of accounts in each FileMaker Pro database file.

Note Only database files hosted by FileMaker Server can authenticate users against an authentication server. Database files shared by FileMaker Pro won't authenticate against an authentication server.

Important When a database file contains one or more External Server accounts, make sure you use operating system security settings to limit direct access to the file. Otherwise, it might be possible for an unauthorized user to move the file to another system that replicates your authentication server environment and gain access to the file. For more information, see FileMaker Server Help.

To create an account that authenticates via an external server:

1. Choose **File** menu > **Manage** > **Security**.
2. In the **Accounts** tab, click **New**.
3. In the Edit Account dialog box, for **Account is authenticated via**, choose **External Server**.
4. For **Group Name**, enter the name of a group that is defined on an external authentication server.
5. For **Account Status**, choose whether you want the account to be active or inactive.
6. For **Privilege Set**, choose the privilege set you want to use with this account.

   The privilege set assigned to the account determines what the externally authenticated group members can do in the database file. You can choose an existing privilege set, or choose **New Privilege Set** and create a new one. For more information, see the next section.
7. For **Description**, enter a description of the account (optional).
8. Click **OK**.
9. In the Manage Security dialog box, click **OK**.
10. In the dialog box that appears, enter an account name and password that is assigned the Full Access privilege set, and click **OK.**

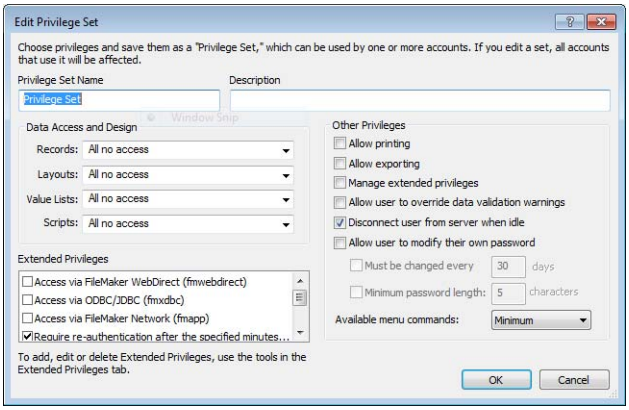
Creating privilege sets

You can assign each privilege set to one or more accounts.

To create a privilege set:

1. Follow the steps above to display the privilege sets for a file.
2. Click **New**.

   The Edit Privilege Set dialog box appears. By default, each privilege set option is set to its most restrictive setting.



3. Enter a name and optional description for the privilege set.
4. Define the privileges for the privilege set.
5. Click **OK**.

After you create the privilege sets that you want, you need to create or edit accounts so that they use the appropriate privilege sets. For more information, see “Creating accounts” on page 145.

For more information about creating accounts and privilege sets, see Help.

About enabling record-level access

You can set individual record access for each table. For example, the privilege set can limit the ability to:

- View, edit, create, or delete all or certain records within each table.
- Access or modify certain fields within each table.

You can only set record access privileges for tables defined in the current file. If the file contains relationships to tables in other files that you want to protect, you need to create accounts and privilege sets in the other files to protect those tables.

For more information about using the Edit Privilege Set dialog box, see Help.

Viewing extended privileges

Extended privileges determine the data sharing options that are permitted by a privilege set for a file. For example, if the file is shared, the Access via FileMaker Network extended privilege determines if the privilege set allows opening the shared file as a client. The Access via FileMaker WebDirect extended privilege determines whether the privilege set allows accessing the database from a web browser.

There are six default extended privileges. For more information about them, see “Accounts, privilege sets, and extended privileges” on page 138.

You can view extended privileges in the Manage Security dialog box, as well as enable each extended privilege for selected privilege sets. All extended privileges except fmreauthenticate10 are disabled by default, even in the Full Access privilege set.

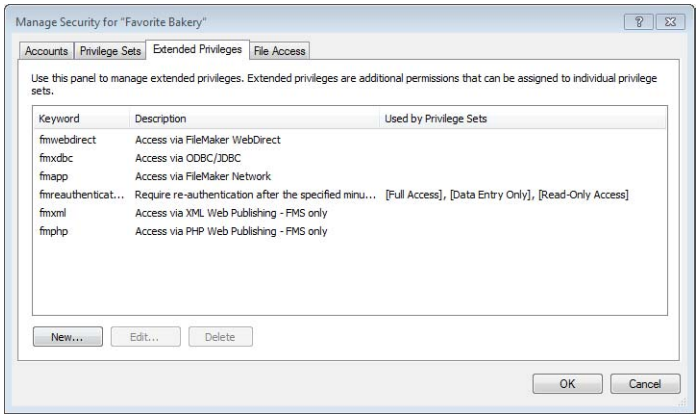
It may be necessary to delete an extended privilege that is no longer required.

To view the extended privileges:

1. Open the database file.

2. Choose **File** menu > **Manage** > **Security**.

3. In the Manage Security dialog box, click the **Extended Privileges** tab.



For more information about extended privileges, see Help.

Authorizing access to files

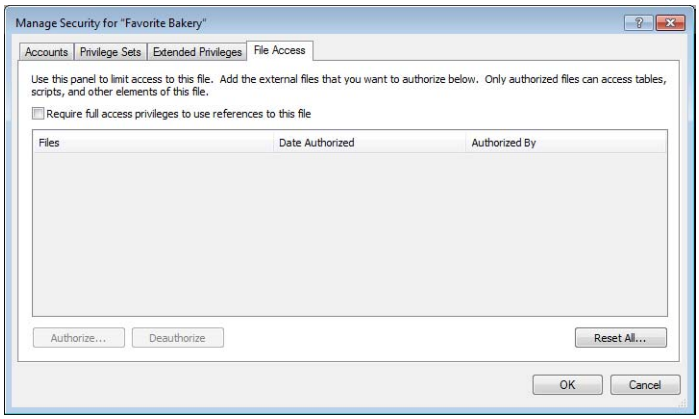
As part of your overall security plan, you can control whether other FileMaker Pro files are permitted to access the schema in a file (including its tables, layouts, scripts, and value lists) in your secured solution. When protection is enabled, any use of the protected file through a FileMaker data source will require authorization. Therefore, in a multi-file solution, you will need to authorize the other files.

For example, enabling protection prevents someone with an account in your file from creating another file that uses tables in your file but does not implement the same business logic (such as the same script triggers). The use of this alternative file can bypass your intended business logic (although record-level access would still be enforced). Turning on this option also prevents files that are not authorized from opening a protected file using the Open File script step.

Note You must have the Full Access privilege set for any file that you want to protect and any file that you want to authorize.

To authorize access to a file:

1. Open the file that you want to protect.
2. Choose **File** menu > **Manage** > **Security**, then click the **File Access** tab.



3. To protect this file against unwanted access from other files, select **Require full access privileges to create references to this file**.
4. If any files that reference the protected file are currently open, you see an alert for each file, asking if you want to authorize the file. Click **Yes**.
5. If you want to authorize additional files that are not currently open, click **Authorize**. In the Open File dialog box, choose a local or remote file to authorize, and click **Open**.

   You may be asked to enter the name and password of an account with Full Access privileges.
6. Click **OK**.

Keep the following points in mind:

- A protected file retains its list of authorized files if the file is cloned or included in a runtime solution, so you don't have to repeat the authorization process. However, if you duplicate or clone a protected file, each file will also have the same ID. If you use both files in the same multi-file solution, you must reset the ID in one of the files so that each file has a unique ID. To reset the protected file's unique ID, click **Reset All**, then click **Yes**. After resetting, you will need to reauthorize all files that are authorized to access the protected file and any protected files that file was authorized to access.
- To set a file option that prevents a file from being opened with a version of FileMaker Pro, FileMaker Go, or FileMaker Server that's earlier than the specified version, see Help.

For more information about authorizing access to files, see Help.

Security measures

Be sure that your database files, host computers, workstations, and the networks that access them are safe from theft and corruption. To protect your data and equipment, you should implement the following five important security measures:

- Enhance physical security
- Enhance operating system security
- Establish network security
- Back up databases and other important files
- Install, run, and upgrade antivirus software

For more information about securing FileMaker Pro files, see www.filemaker.com/support/security.

Enhancing physical security

Evaluate your computers to make sure they are physically secure:

- The host computer should be a dedicated machine, anchored to a desk or immovable object with a lock. Secure the computer so that its hard drive cannot be removed. Restrict access to the computer by storing it in a locked room.
- Secure the client workstations that access a database. Lock the computers down and restrict access by using a screensaver that requires a password.
- Ensure the physical security of backup copies of files stored on portable media, such as tapes and CDs.

Enhancing operating system security

Use the security features of your operating system to restrict access to important data. The network administrator should provide access only to individuals authorized to administer and maintain the system or the FileMaker databases. In addition, they should:

- Track system user IDs and passwords.
- Restrict access to the FileMaker Pro application and file directories, servers, and web pages.
- Review remote access settings for file sharing and FTP.
- Restrict file upload or download access.
- Make sure all users have the latest, most secure versions of operating system software.
- To streamline processes, you can enable external authentication, which uses accounts that have been configured in the Windows Domain Authentication or in Apple Open Directory. For more information, see Help.
- Do not put FileMaker Pro files on file servers to share them. Use the built-in networking feature in FileMaker Pro and FileMaker Server. This prevents the files from being inappropriately copied or from introducing record locking and potential corruption issues when files are shared with inappropriate methods.

Establishing network security

Databases shared on an intranet or the Internet use the TCP/IP protocol. You may also use the TCP/IP protocol when you share databases peer-to-peer, or with FileMaker Server. Though TCP/IP is good for moving data and allowing clients to connect to your data, it was not designed with security as a primary objective. Unless you take precautions, it can provide uninvited access to your host computer, server software, databases, and perhaps to other client machines on your internal network. TCP/IP doesn't provide very much protection for data, so it is important to place barricades such as firewalls and SSL data encryption in the path of uninvited visitors.

- The most common barricade method used is the firewall, which separates your network into two distinct environments: a public environment that is “outside the firewall,” and a private environment that is “behind the firewall.” Users outside of the firewall will only have access to those TCP/IP or hardware addresses that you expose. You can concentrate your security on those server machines that are exposed, while allowing machines behind the firewall to operate with fewer safeguards.
- Using wireless networking devices, like the Apple AirPort Extreme and other 802.11n networking cards and base stations, can pose security challenges. These devices can broadcast your network traffic beyond the walls of your building, so it is extremely important to encrypt your wireless networking signals. Always use the maximum level of signal encryption available.

Backing up databases and other important files

Develop plans for restoring data, including alternate sites and systems to run business-critical information services. A current backup can help you recover from a situation where someone loses the administrator account information for a file, or from a situation where user error (and sometimes bad database design) causes data to be deleted or modified inappropriately.

Keep the following points in mind:

- Host databases with FileMaker Server and create regularly-scheduled, automated backups.

  Don’t use third-party backup software on hosted FileMaker Pro databases. First, use FileMaker Server to make a backup copy of your database, then run your third-party backup software on the copy. Backup software can damage open, hosted databases.

  For example, make local backups of files at 6:00 am, 9:00 am, 12:00 noon, 3:00 pm, 6:00 pm, and 11:30 pm weekdays. At midnight, make an incremental backup of the entire system to the enterprise backup system. Finally, Friday night at midnight, perform a full system backup. Copy and store the backup tapes at a remote location. This way, if the server goes down for some reason other than catastrophic failure of multiple drives, the more recent backup of the data files can be used, meaning a maximum of 3 hours of lost data. If there is a catastrophic drive failure, then the previous evening’s tape can be used, minimizing the loss to one day’s data. Of course, these procedures can be tailored to your situation and data value.
- Make sure backup copies aren’t damaged or inaccessible. Verify that they are functioning properly *before* you need them. Run diagnostic tools on your hard drive and your backup files regularly.
- Ensure that you can restore an entire set of files from backup copies.
- Regularly export the data to protect against file corruption.
- Protect the backup media itself. Store backups in a separate and fire-proof location.
- Assign backup administrators who can retrieve files, in case the network administrator is unavailable.

- Plan for redundancy. If the power goes off, a universal power supply (UPS) should sustain power for at least 15 minutes, enabling you to safely close all files. If the power can't be restored in a timely fashion, consider using a generator to supply power to servers. Also consider power sources for routers and firewalls. Will communication be a problem if your internet access is interrupted for 48 hours or longer?
- Consider how you will continue to provide services if an intruder takes down your database server and that server can't be restored to its previous condition.
- Evaluate additional scenarios that could occur, and create a plan to respond to each one.

Also, network administrators should assess risks to data systems and business-critical functions. For example, consider:

- Theft of data or theft of proprietary intellectual property.
- Disruption, theft, or damage to network infrastructure such as servers, networks, data storage, or data backup storage. Damage can be caused by password crackers or by other types of malicious sabotage and destruction. Most incidents originate from within the organization.
- Disruption or damage to the organization infrastructure such as building fires, environmental or biological hazards, floods, and so on.
- Disruption or damage to the public infrastructure, including electrical power, telecommunications (voice and data), transportation grids (roadways, buses, trains) caused by environmental conditions, or severe weather such as tornadoes or floods.

FileMaker Pro provides two mechanisms for handling databases that might be damaged: consistency checks and file recovery. Consistency checks occur automatically, if needed, when the file is opened. You can also choose to verify the consistency of a file that you suspect is damaged. You can also have FileMaker Pro attempt to recover a damaged file. For more information about checking consistency and recovering files, see Help.

Important In the event of a server failure, such as an unexpected loss of power, hard drive failure, or software failure, use the backup files. Any system failure causing FileMaker Server to shut down inappropriately can result in corrupted files if cached data was not written to disk and the files were not closed properly. Even if the files re-open and go through a consistency check or recovery (initiated by either FileMaker Pro or you), corruption might be buried in the file. File recovery cannot guarantee that problems have been fixed.

Installing, running, and upgrading antivirus software

Because most computers have internet access, they are vulnerable to harm, such as from viruses being transmitted through email attachments. Make sure all employees run antivirus checking software regularly, and that they are aware of typical virus warning signs. Employees should scan all files before copying or downloading them to their computer, and they should never open unsolicited attachments, even if they're from someone they know.

While antivirus software is essential in protecting your systems and data, some caution should be observed in how they are used on computers that host FileMaker Pro databases.

Antivirus programs sometimes lock bytes within a file when they scan for viruses. These locks can cause the operating system to return an error when FileMaker Pro or FileMaker Server try to write data to the file, which sometimes causes the file to be flagged as damaged and closed.

This situation also applies to files that FileMaker Server uses as backup targets. If the backup file is being scanned by antivirus software when a scheduled backup occurs, the destination file might be locked. This causes the backup process to fail, which may result in data loss. This same data loss issue applies when an open, non-shared FileMaker Pro database file is scanned by antivirus software.

When running antivirus software on computers that host FileMaker Pro databases, follow these recommendations:

- Do not run virus protection software on open or hosted databases. First, close the databases, then run the virus protection software.
- When you scan your computer for viruses, do not scan the Databases folder and subfolders or any folder that contains files that actively hosts files through FileMaker Server or FileMaker Pro. Instead, set your antivirus software to scan your database backup destination folder and make sure your antivirus scan schedule does not coincide with your FileMaker Server backup schedule. Wait until databases are completely backed up before scanning them.

Chapter 7
Converting databases from FileMaker Pro 11 and earlier

You must convert files created in FileMaker Pro 11 and earlier to the FileMaker Pro 12 format in order to use them with FileMaker Pro 13.

When you convert a file, FileMaker Pro creates a Conversion.log file, so you can view the conversion status and any problems that may have occurred during the conversion process.

Keep the following points in mind:

- You can only convert files created in FileMaker Pro version 7.x, 8.x, 9.x, 10.x, or 11.x to the FileMaker Pro 12 format. After conversion, files will only be compatible with FileMaker Pro 12 or later supported versions. To convert files earlier than FileMaker Pro 7, use the latest trial version of FileMaker Pro 11, which you can download at http://www.filemaker.com/downloads.
- Manual corrections may be necessary. You might need to correct items in the converted file that did not convert properly. In some cases, you may need to correct items in the original file and then convert the file again. After you convert any file, you should review the Conversion.log file for items that may need to be corrected.
- You should test the converted file. The Conversion.log file may not indicate every item in the file that needs to be corrected. Before you begin using a converted database solution, you should test it thoroughly to make sure every aspect has converted successfully. For example, make sure every script works as you expect, and that accounts and privilege sets provide the required file security.

Keep the following points in mind:

- Although FileMaker Pro 12 and FileMaker Pro 13 use the same file format, using FileMaker Pro 12 to modify files that use features new in FileMaker Pro 13 is not recommended.
- See Help for comprehensive information and step-by-step procedures about converting FileMaker Pro files.

Conversion overview

When you convert files, FileMaker Pro 13 preserves the contents of your original files and creates new, converted files in FileMaker Pro 12 format. The content of the original files are not modified, and you can open them in a previous version of FileMaker Pro. Before you convert a FileMaker Pro database, you should plan the conversion carefully.

You can convert a single file or convert multiple files at once:

- Convert single files for standalone database files that don’t display related data from other files.

- Convert multiple files all at the same time to convert all the files in a relational database. There are several ways to select the files that you want to convert; you can drag and drop the files (or a folder containing the files) onto the FileMaker Pro 13 application icon, or you can select multiple files in the FileMaker Pro Open dialog box.

Note When multiple files from separate folders are converted, all converted files are created in the same folder. The original files' locations are not preserved. To make converting files easier, convert all the files from a multi-file relational database at the same time. After the conversion, you can move either set of files into a duplicate of your original file structure.

For more information about converting single and multiple files, see Help.

Solving basic conversion problems

Here are some suggestions for correcting problems that could occur during conversion.

FileMaker Pro 13 can't open my file

If the file you want to convert is open in an earlier version of FileMaker Pro (for example, an Inventory.fp7 file is open in FileMaker Pro 11), close the file in the earlier version.

My file didn't convert properly

- If you are converting a copy of a file, make sure that the original file was closed before you copied it. Otherwise, the copy will not convert correctly.
- Check the Conversion.log file located in the folder with the database you are attempting to convert.
- Try recovering the file first using a previous version of FileMaker Pro and then convert the file again.

I received a consistency check or auto-repair message when I opened my original file with that version of FileMaker Pro

Try recovering the original file using your version of FileMaker Pro. Then open the recovered file with that same version, close the file, and then try converting it with FileMaker Pro 13.

The converted file won't accept my password

Passwords are case-sensitive in FileMaker Pro. Make sure you enter your password exactly as it was created in a previous version of FileMaker Pro. If you are not the owner of the file or the database administrator, consult your database administrator for password information.

I can't open a snapshot link

You cannot open a snapshot link that was created using FileMaker Pro 11. You must convert the database from which the records were found and then re-create the snapshot link.

I can't edit a layout object that I copied from a FileMaker Pro 11 file

You cannot edit layout objects that were copied from files created with versions of FileMaker Pro earlier than FileMaker Pro 13. Either convert the file to FileMaker Pro 13 and edit the object, or re-create the object in a new FileMaker Pro 13 file.

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