



FileMaker 3

Intro to Relational Databases (FileMaker Pro v.5.5)

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<http://calpact.berkeley.edu/>



Use this
space for notes

Introduction

This class is a course created for CAL PACT participants to learn more about the features of FileMaker Pro. The course covers introductory material to provide you with the fundamental knowledge to create and use relational databases with FileMaker Pro. The material covered in class applies to both the Windows and Macintosh computer platforms. This document serves as a supplement and future reference to the class, as it is possible that not all material in this document will be covered in class.

Skills you need for this class

- How to use the mouse
- Familiarity with the Windows operating system
- Familiarity with word processing and spreadsheet software such as Microsoft Word and Microsoft Excel
- Familiarity with the FileMaker Pro Environment
- Experience with data entry and layouts in FileMaker Pro (as covered in FileMaker 1)

Skills and concepts you will learn in this class

- Creating relational databases
- Creating Complex Layouts with Relationships

Conventions used in this document

Menus and menu commands are separated by a vertical bar (|). In the document they will appear as **Menu|Command**. An example of this is: “Select **File|New...**”

Icons in the left margin

Occasionally, you will notice icons in the left margin. Their purpose is to highlight important information. Examples:



Review

To continue with the third class in the FileMaker Pro series, you should understand the topics below (please review the FileMaker 1 and 2 handouts for a refresher):

- What is a database?
- The FileMaker Pro Environment
- FileMaker Pro Modes
- Data Entry and Manipulation
- Creating Customized Layouts
- Printing
- Creating a new Database
- Intermediate Field Definition
- Intermediate Layout Setup
- Pop-up Lists, Pop-up Menus, Check Boxes, Radio Buttons
- Basic Lookup Fields
- Importing and Exporting

Creating a Relational Database

The purpose of creating relational databases is that you can organize information clearly with fewer data entry mistakes than in a flat table. By creating complex databases with relationships (linking two or more databases), you have more power to control your data, minimizing file size and processing speed. Relational databases reduce the amount of duplicate information by separating like fields into separate databases.

For example, you might have one database with people and address information linked to another database with job information. Since more than one person might have the same job title, you can simply enter the job title and information in one database and link that record to several people! Separating the data into two databases will ease data entry and editing because any changes to a job title can be modified once versus several times for each employee.

	B	C	D	E	F	G	H	I
1	First Name	Last Name	Award name	Amount	Award Contact Address	Award Contac	Award Contact State	Award
2	Christopher	Smith	Ford Motor Scholarship 2000	\$10,000	1 Sproul Hall	Berkeley	CA	94720
3	Laurence	Jeffreys	Ford Motor Scholarship 2001	\$2,000	1 Sproul Hall	Berkeley	CA	94720
4	Sam	Lee	Has Business Grant	\$20,000	2500 Explorer Ave.	Berkeley	CA	94720
5	Joyce	Lampey	Haas Business Grant	\$20,000	2500 Explorer Ave.	Detroit	Michigan	65437
6	Maggie	Lo	Honda Faculty Endowment	\$10,000	1 Big Blue Plaza	Detroit	Michigan	65437
7	Sam	Jones	IBM Scholarship Fund	\$5,000	300 Parkway Plaza	Los Angeles	California	95312
8	Jill	Jones	IBM Scholarship Fund	\$5,000	300 Parkway Plaza	Los Angeles	California	95312
9	Roxanne	Jones	Physics Electron Grant	\$25,000	230 LeConte Hall	Berkeley	CA	94720
10	Ernest	Wong	Physics Electron Grant	\$25,000	230 LeConte Hall	Berkeley	CA	94720
11	Synthia	Chee	Physics Electron Grant	\$25,000	230 LeConte Hall	Berkeley	CA	94720

In the table example above, the database repeats award information for each person receiving the same award (see “Physics Electron Grant”). To clean up the data, we can separate award information into another database so there is only one record for each award type. This will minimize errors because updates are only required ONCE for the entire file instead of once per individual record.

Also notice that “Haas Business Grant” is misspelled in one of the fields. You can imagine how many other fields may have errors in a database with 1000 or more records! Not only will the data appear wrong in reports, but the Find function will be useless with spelling errors, and any updates to award information will have to be updated in each record, one at a time. By using a relational database of award names and people, you will never have a problem with filtering, misspelling, or tedious edits.

Warning!



BACK UP YOUR DATABASE BEFORE MODIFYING IT!

BEFORE you create a relationship, it is important to back up your database!!! In case you create a bad relationship and accidentally lose data, you will still have a copy of the original.

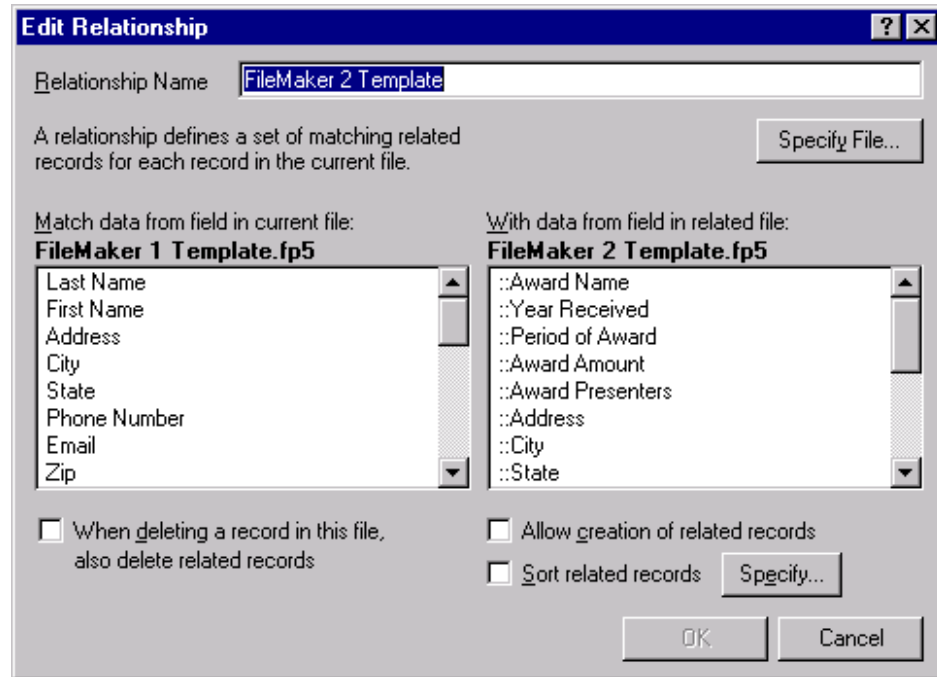
Database Planning

It is important to plan the structure of your database before you start creating relationships. Refer to the FileMaker Pro software manual for tips on “When to create relationships between files” and “Planning a relational database”. It is good practice to first decide what information will be included in the database by listing all of the fields of information that you will store. Next separate the data into categories and decide if you will require separate files for each category. For example, if you are dealing with reporting award information for a group of people, you would separate the related fields into two database files; one file for people information and one file for award information. Another example, if you are creating an invoice tracking database, you would separate the information into several files; one file for client information, one file for invoice information, one file for product information, and yet another file for vendor information.

As you plan your database, be sure to list all fields ahead of time and organize each list by a unique identifier. Using numbers for unique identifiers is the easiest method because you can have FileMaker Pro auto-enter a value for each new record that is created. Name these identifiers with descriptive names like “People ID”, “Award ID”, “Client ID”, “Invoice ID”, “Product ID”, etc. When you create the relationships between database files, you will use these fields to link the files.

Creating Relationships

Once you have setup the foundation of your relational database by defining all fields in each separate database file, you can relate the databases. To create a relationship, select **File|Define Relationships**. Click the “New” button and select the file to relate. Choose the file that will be linked to the file you are working with and click “Open”. The “Edit Relationship” dialog box will open.



Create a descriptive name for the relationship so you will know what fields are related as you make references to the relationship. In this case, we are creating a relationship between the “Awards Received” field in the **FileMaker 1 Template** database file and the “Award Name” field in the **FileMaker 2 Template** database file. Highlight the field names of the linked fields in both files. Notice the field names do not need to match, but if you already have data in the files, you **MUST** make sure that the data in the two fields match or you will have a broken link and lose some data. We’ll review lookup fields later to ensure that data in the relationship matches correctly.

Once you have chosen the fields for the relationship, you can specify whether you will allow creation and deletion of related records between the files or restrict the allowable data to the existing set by checking or unchecking “When deleting a record in this file, also delete related records” and “Allow creation of related records”. You can also specify an automatic sort here, but it is not necessary since you can sort data as you wish when you return to Browse Mode. When you are finished, click “OK” and “Done” and your databases are related! To complete the relationship, you must create the reverse relationship from the other file and you can begin creating layouts that utilize the relationship.

Note



Relationships are one way! You must create the relationship from each database individually.

Creating Complex Layouts with Relationships

Once you have created a relationship between files, you will need to create new layouts to present the related data fields.

Adding a lookup field to your database

A lookup field is a field that is formatted as a Pop-up list, Pop-up menu, Check boxes, or Radio buttons. Remember, we created lookup fields in FileMaker 2 with specific value lists. With relationships, you can create lookup fields to use value lists or field data from other files!

Note



You should create a relationship before you add a lookup field that pulls data from another file.

A good place to format a pop-up list would be the “Award Name” field in the people database. By using the existing data from the award database in a pop-up list, we will prevent future spelling errors which would break the link between the two databases. It will also facilitate data entry and searching when the database is utilized.

Exercise:

Create a layout in the **People** database file with a lookup field for “Award Name” and related fields with Award information.

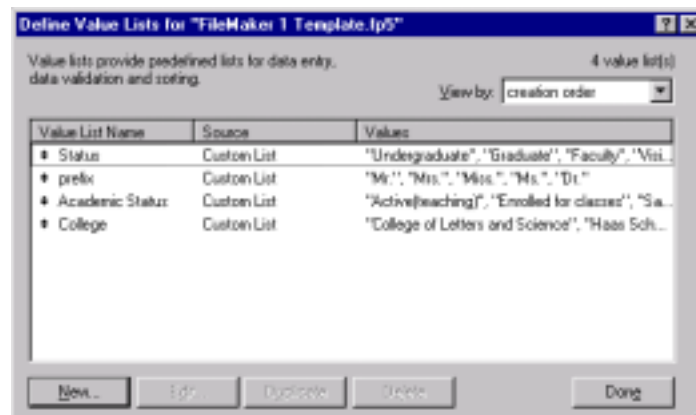
Solution:

In Layout Mode, create a new layout by selecting **Layouts|New Layout/Report**. Call it “Awards Given”, choose “Standard Form” and click “Next”. In the “Specify Fields” window, select the fields to appear from the “Current File...” listing (First Name, Last Name, Status, Award Received, Amount Received). Click “Next” and choose a Layout Theme. Click “Finish” to create the layout.

Now we can create the lookup. Click the “Award Received” field and select **Format|Field Format....**

Under “Style” Select “Pop-up list” from the pull-down list. In the “Using Value list” field, select “Define Value Lists...” and a dialog box will appear.

Click “New” and the “Edit Value List” dialog box will open.



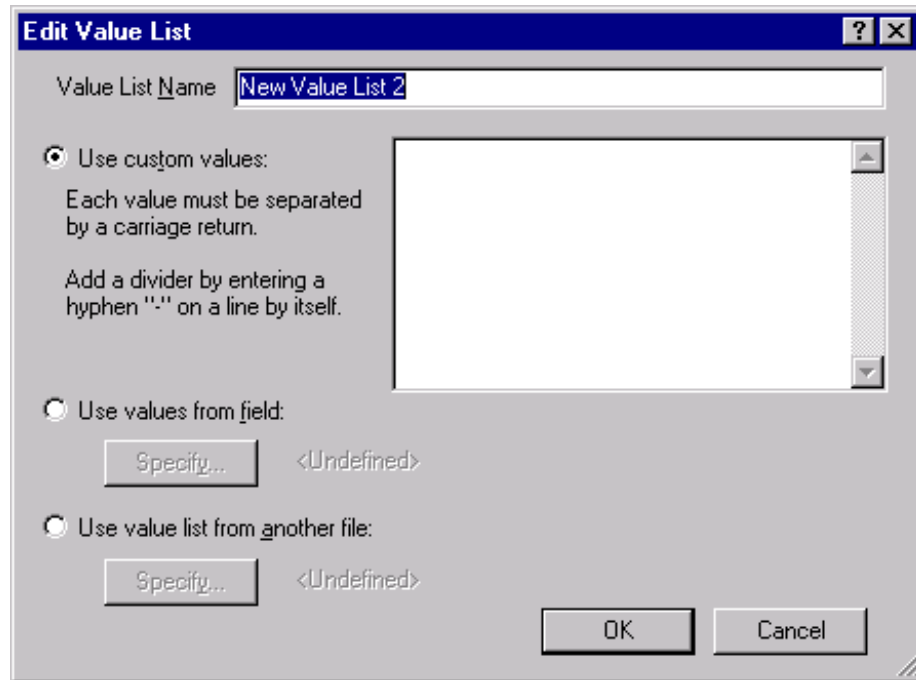
Name the list and select the list type.

“Use custom values:” will allow you to create your own list

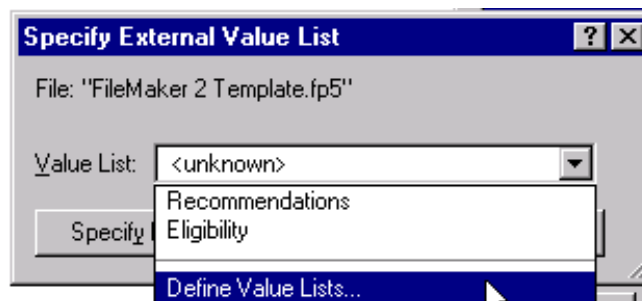
“Use values from a field:” will allow you to use data from an existing field in the database

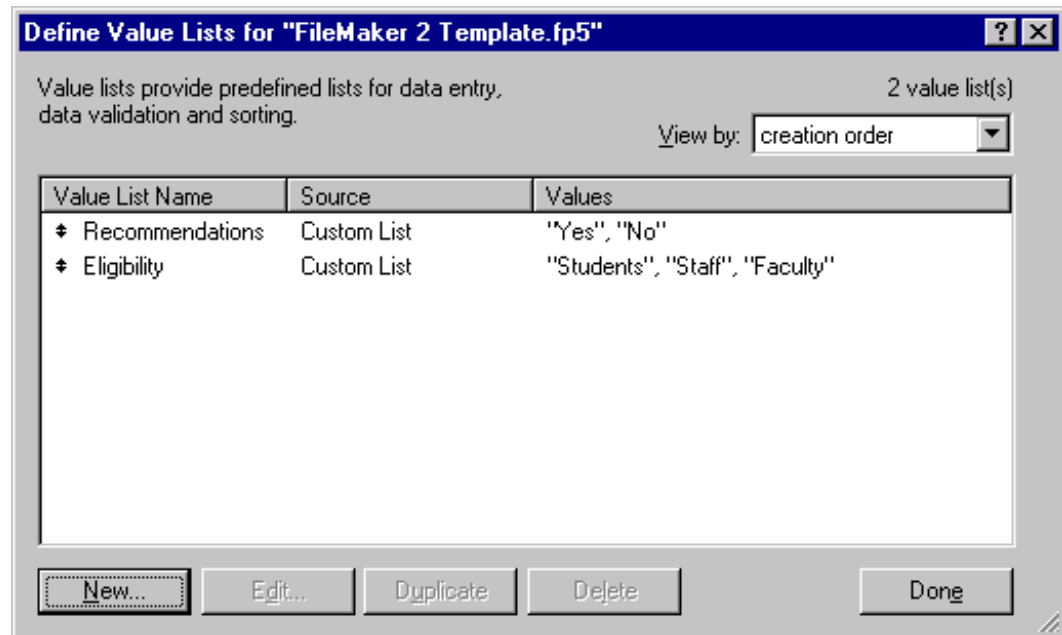
“Use value list from another file:” will allow you to use data from another file

Select the radio button next to “Use value list from another file:”.

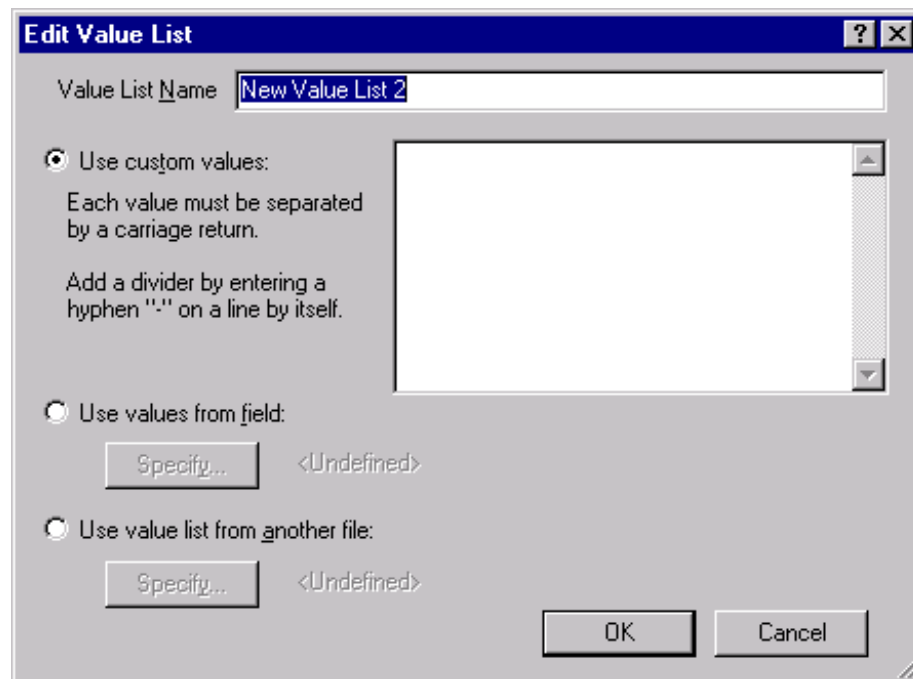


Specify the file and search the value list pull-down list. If the value list doesn't already exist, select “Define Value Lists...” from the other file and click “New” to create a new list.

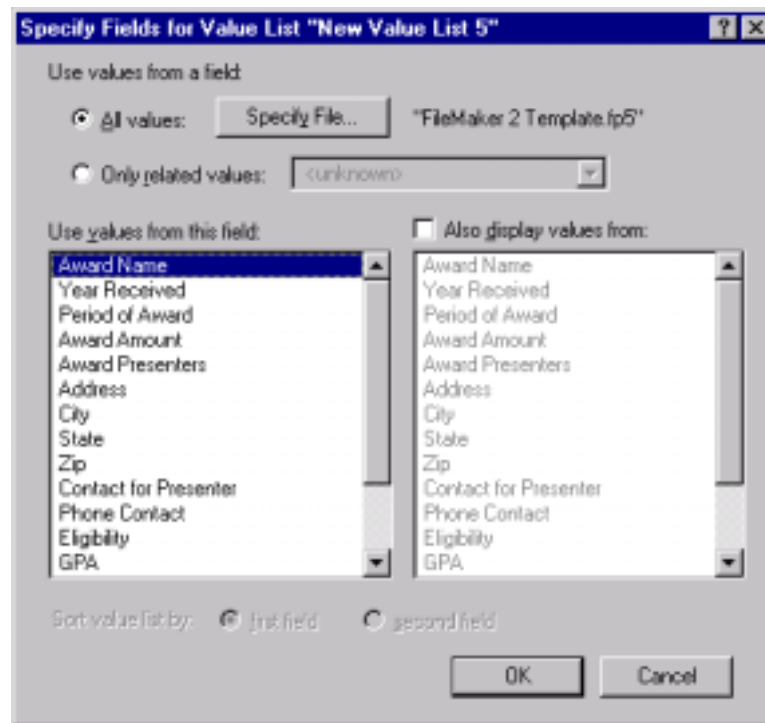




We are now creating a value list for the related database. Name the list and select "Use values from field:".



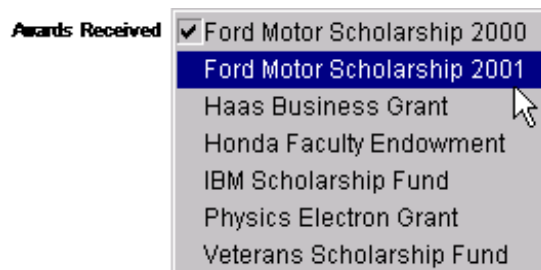
In the next dialog, highlight the field name and click “OK”.



In our example, the values originate from the “Award Name” field of the “FileMaker 2 Template” file. Click “OK” and “Done” to exit the “Define Value Lists” dialog boxes. Make sure the new values list is selected in the “Specify External Value List” dialog and click “OK”.

Click “OK” again to exit the “Edit Value List” dialog and you will see your new value list definition in the listings for the current file.

Click “Done” and make sure the value list is selected next to the “Pop-up menu” option. Finally, click “OK” to exit the “Field Format” dialog and switch to Browse Mode to see the result.



Now we can easily scroll through each person in our people database and choose the Award that was issued to them from our Pop-up list!

Warning

Related field data on a form will change the data in the related file if the field format is not set to prevent entry into the field. If “Allow entry into field” is not UNchecked, any changes made in browse mode will change the data in the linked database.

Lookup Fields vs. Related fields

So what’s the difference? There is actually a method to this madness. Lookup fields actually copy the data from a record in the linked database file to a defined field in the open file. A related field will only show the data from the linked database. Be careful! Related fields can be modified if the field format is not set to prevent entry into the field. If “Allow entry into field” is not Unchecked, any changes made in browse mode will change the data in the linked database!

Exercise:

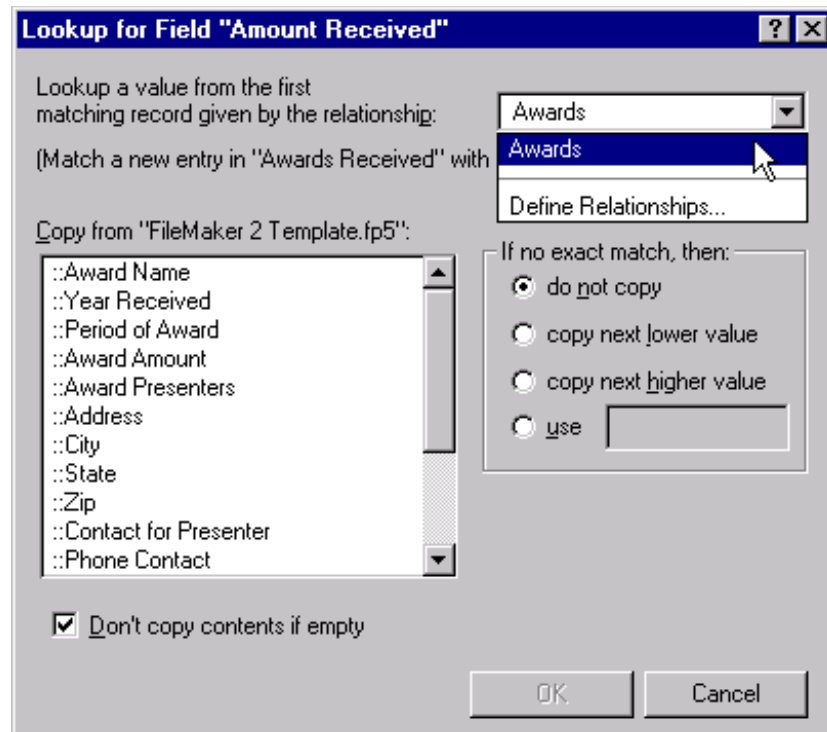
Add a lookup field for “Award Amount” so the money data is saved to our people database for each individual. Then add related fields to show Award contact information without saving the data to the people database.

Solution:

Define a field called “Award Amount” in the people FileMaker 1 Template. Click “Options” to specify the lookup.

The screenshot shows the 'Options for Field "Amount Received"' dialog box with the 'Storage' tab selected. The 'Looked-up value' checkbox is checked, and the 'Specify...' button next to it is highlighted with a mouse cursor. Other options include 'Creation Date', 'Serial number', 'Value from previous record', 'Data', 'Calculated value', and 'Prohibit modification of value'.

Check “Looked-up value” and click “Specify...” to specify the field from the related database.

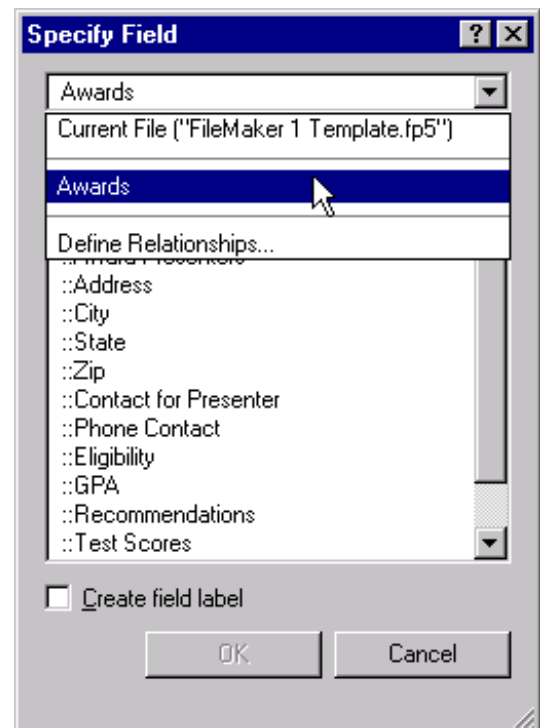


Select the relationship and choose the field “Award Amount” from the FileMaker 2 Template and click OK. By making the “Award Amount” field in the FileMaker 1 Template a lookup field to the “Award Amount” field in the FileMaker 2 Template, we are actually copying the data value.

To add the related fields to show Award data without defining fields, simply go to Layout Mode and add the fields.

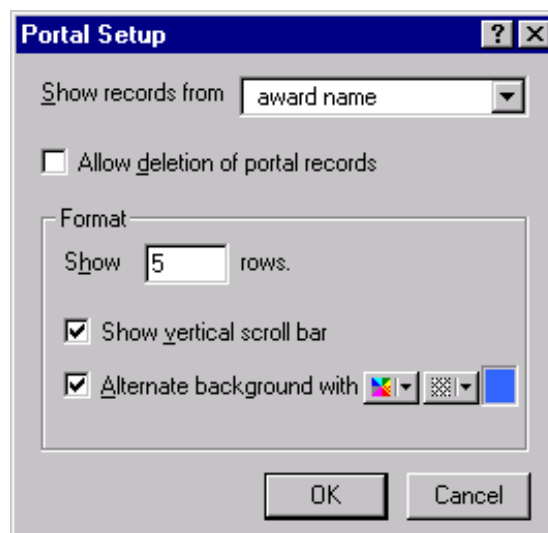
Use the field tool (Field.....) to add the fields to your layout. In the “Specify Field” dialog box, select the relationship from the pulldown menu.

Then choose the field name from the list. You know these are related fields because the field names begin with a special character (::) to show that the field exists in another file.

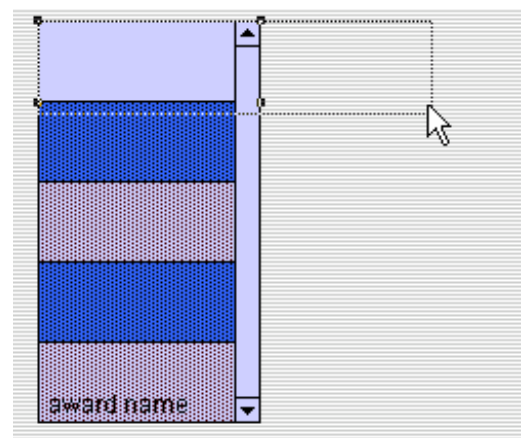


Portals

A portal is a window into data from another database. We can use a portal to list all of the people who received a particular award in our FileMaker 2 Template file. In Layout Mode, create a new layout by selecting **Layouts|New Layout/Report**. Choose “Standard Form” and click “Next”. In the “Specify Fields” window, select the fields to appear from the “Current File...” listing “Award Name” and “Year Received”. Click “Next” and choose a Layout Theme. Click “Finish” to create the layout. In Layout Mode, select **Insert|Portal...** and in the “Show Records From” pull-down menu, select the Awards relationship. Choose the number of rows you would like to appear, and check “Show vertical scrollbar” so you can scroll through records if more than four records exist in your database. You can choose background colors for the Portal as well.



Resize the Portal by using the resizing handles at the top of the portal window.



To place fields in the Portal, click on the Field tool in the Status Area (**Field.....**). Click and drag the Field into the first row of the portal. The “Specify Field” dialog box will open. Choose the Field you want to appear.

Add the following fields to the first row of the portal: “Campus ID”, “First Name”, “Last Name”, and “Amount Received”. As you drag the fields, you will need to move the field headers above the portal to align with the field data.

Warning!



Portal fields can be modified if the field format is not set to prevent entry into the field. If “Allow entry into field” is not Unchecked, any changes made in browse mode will change the data in the linked database!

Campus ID	First Name	Last Name	Amount Received
::Campus.ID	::First Name	::Last Name	::Amount.Received
award name			

Switch to Browse Mode, and you will see your portal with Award Data!

Award Name Ford Motor Scholarship 2000			
Year Received \$2,000.00			
Campus ID	First Name	Last Name	Amount Received
10234567	Christopher	Smith	\$10,000.00


Summary Fields


Summary fields are automatically updated based on a calculation reference. This calculation is based on field data from all records combined in your database. For example, you might use a summary field to find total revenue made in one year, or to calculate average salary between employees.

Exercise:

Create a subtotal for “Amount Awarded” in your portal layout of the Grants database.

Solution:

First, create the summary field “Award total” in **File|Define Fields** and use the relationship we just created to pull the field data from the People Database. Next, use the part tool () to create a subtotals area below the portal.

Select the option “Sub-summary when sorted by:” and select the field “Award Name” from the Grants database. Now, if we use the field tool () to insert the “Award total” field in the Sub-summary part of the layout, the field will show a subtotal of money given for each award.

Note



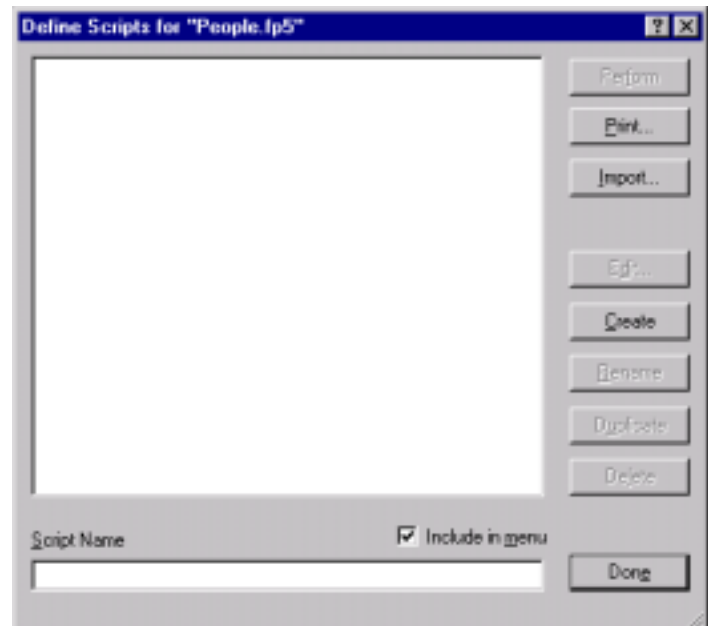
If you want to format the number options, you must go to **Format|Number** to set the decimal and currency.

Scripting

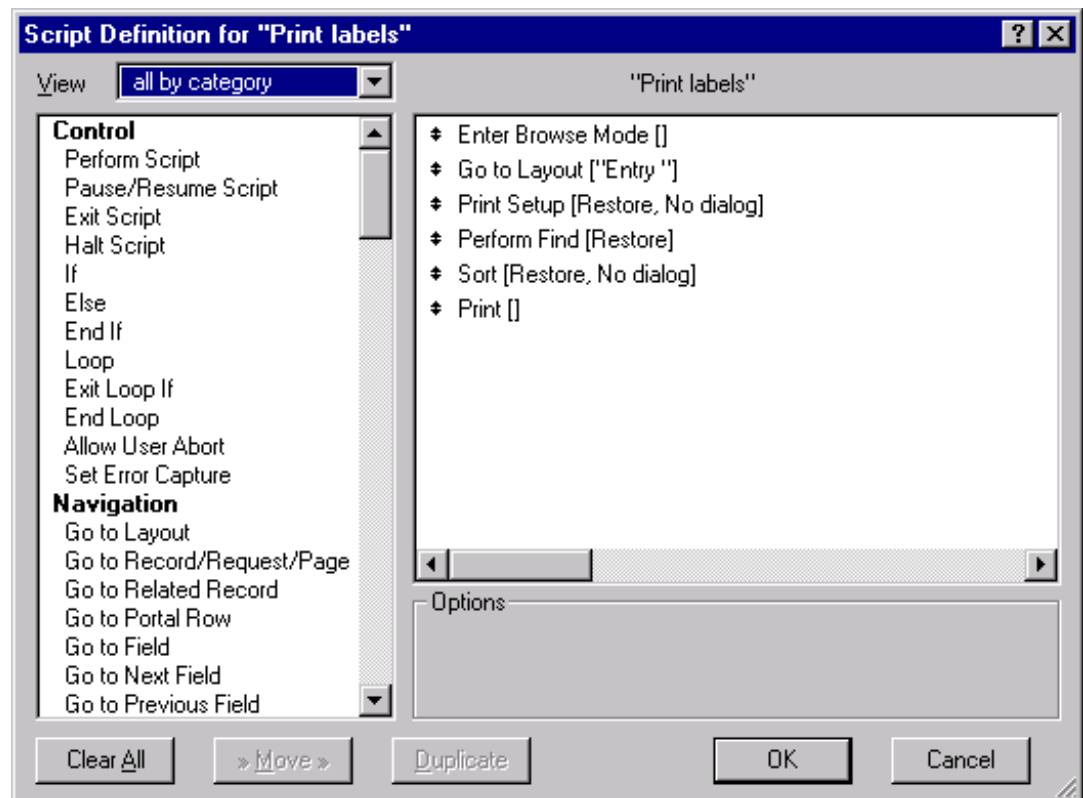
Scripting is similar to a macro that you might find in other software programs. FileMaker can save sequences of repetitive tasks with a “script” so it is available at the click of a button. FileMaker users find scripts useful for automating reports and switching between different layouts in FileMaker. Some people prefer to create buttons for simple tasks like adding new records rather than using the menu options we learned about in FileMaker 1 - Data Entry and Database Navigation.

The easiest way to create a script is to walk through the steps first. FileMaker will save all of the steps that you perform by switching layouts and performing finds. Go to **Scripts|Scriptmaker...** and all of the steps will be listed for you!

First, name the script and click “Create”.




Next, check the steps in the script to make sure that they are correct. If you are unsure of the function of any of the steps, use the help menu to get a detailed description of each function.



Scripting resources

Scripting can get very complex depending on the task you have in mind. FileMaker has several resources available from its website: www.filemaker.com. You will also find information on scripting at www.scriptology.com. If you ever get lost in the scriptmaking process, click F1 for the help menu to find a detailed description of the script functions.

Buttons

Once you have created a script you might find it easier to run it through a button on a layout rather than using the Script menu each time. Go to Layout Mode. Use the button tool () to add a button to the layout. Format the button to the color, size and shape that you want. Double click on the button to specify what command you want it to run. You can select a script, or a built in command to create a new record, advance to the next record, etc. The options are endless!