Getting Started Guide

Chapter *10*
Getting Started with Base

OpenOffice.org's Database Component

OpenOffice.org

Copyright

Authors

Dan Lewis
Iain Roberts
Magnus Adielsson
Jean Hollis Weber

Feedback

Acknowledgments

Publication date and software version

Published 4 June 2007. Based on OpenOffice.org 2.2.

Contents

Introduction

A data source, or database, is a collection of pieces of information that can be accessed or managed by OpenOffice.org (OOo). For example, a list of names and addresses is a data source that could be used for producing a mail merge letter. A shop stock list could be a data source managed through OOo.

Note	OpenOffice.org uses the terms "Data Source" and "Database" to refer to the same thing, which could be a database such as MySQL or dBase or a spreadsheet or text document holding data.

This chapter covers creating a database, showing what is contained in a database and how the different parts are used by OOo. It also covers using the Base component of OOo to register other data sources. A data source can be a database, spreadsheet, or text document.

Data sources are only introduced in this chapter. For more detailed information about the use of databases, see the *Database Guide*.

Note	OOo Base uses the HSQL database engine. All of the files created by this engine are kept in one zipped file. The database forms are included in this zipped file.

A *database* consists of a number of *fields* that contain the the individual pieces of data. Each *table* of the database is a group of fields. When creating a table, you also determine the characteristics of each field in the table. *Forms* are for data entry into the fields of one or more tables associated with the form. They can also be used for viewing fields from one or more tables associated with the form. A *query* creates a new table from the existing tables based upon how you create the query. A *report* organizes the information of the fields of a query in a document according to your requirements.

Caution ⚠️	The database in OOo requires Java Runtime Environment (JRE). If you do not have it on your computer, you can download it from www.java.com and install it following the instructions on the site. It should be Java 5.0 or higher. In OOo, use **Tools > Options > OpenOffice.org > Java** to register Java. Window's version of JRE can **not** be used, while there are other versions that can.

Base creates *relational databases*. This makes it fairly easy to create a database in which the fields of the database have relationships with each other.

For example: Consider a database for a library. It will contain a field for the names of the authors and another field for the names of the books. There is an obvious relationship between the authors and the books they have written. The library may contain more than one book by the same author. This is what is known as a one-to-many relationship: one author and more than one book. Most if not all the relationships in such a database are one-to-many relationships.

Consider an employment database for the same library. One of the fields contains the names of the employees while others contain the social security numbers, and other personal data. The relationship between the names and social security is one-to-one: only one social security number for each name.

If you are acquainted with mathematical sets, a relational database can easily be explained in terms of sets: elements, subsets, unions, and intersections. The fields of a database are the elements. The tables are subsets. Relationships are defined in terms of unions and intersections of the subsets (tables).

To explain how to use a database, we will create one for automobile expenses. In the process, we will be explaining how a database work.

Creating a database

The first step in creating a database is to ask yourself many questions. Write them down, and leave some space between the questions to later write the answers. At least some of the answers should seem obvious after you take some time to think.

You may have to go through this process a few times before everything becomes clear in your mind and on paper. Using a text document for these questions and answers makes it easier to move the questions around, add additional questions, or change the answers.

Here are some of the questions and answers I developed before I created a database for automobile expenses. I had an idea of what I wanted before I started, but as I began asking questions and listing the answers, I discovered that I needed additional tables and fields.

What are the fields going to be? My expenses divided into three broad areas: fuel purchases, maintenance, and vacations. The annual cost for the car's license plate and driver's license every four years did not fit into any of these. It will be a table of its own: license fees.

What fields fit the fuel purchases area? Date purchased, odometer reading, fuel cost, fuel quantity, and payment method fit. (Fuel economy can be calculated with a query.)

What fields fit the maintenance area? Date of service, odometer reading, type of service, cost of service, and next scheduled service of this type (for example, for oil changes list when the next oil change should be). But it would be nice if there was a way to write notes. So, a field for notes was added to the list.

What fields fit the vacations area? Date, odometer reading, fuel (including all the fields of the fuel table), food (including meals and snacks), motel, total tolls, and miscellaneous. Since these purchases are made by one of two bank cards or with cash, I want a field to state which payment type was used for each item.

What fields fit into the food category? Breakfast, lunch, supper, and snacks seem to fit. Do I list all the snacks individually or list the total cost for snacks for the day? I chose to divide snacks into two fields: number of snacks and total cost of snacks. I also need a payment type for each of these: breakfast, lunch, supper, and total cost of snacks.

What are the fields that are common to more than one area? Date appears in all of the areas as does odometer reading and payment type.

How will I use this information about these three fields? While on vacation, I want the expenses for each day to be listed together. The date fields suggest a relationship between the vacation table and the dates in each of these tables: fuel and food, This means that the date fields in these tables will be linked as we create the database.

The type of payment includes two bank cards and cash. So, we will create a table with a field for the type of payment and use it in list boxes in the forms.

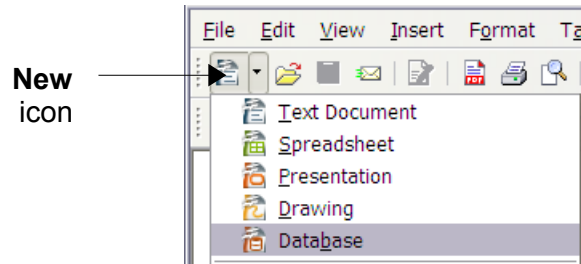| Tip	While we have listed fields we will create in the tables of the database, there is one more field that may be needed in a table: the field for the primary key. In some tables, the field for the primary key has already been listed. In other tables such as the payment type, an additional field for the primary key must be created.

Creating a new database

Figure 1: Creating a new database

To create a new database, click the arrow next to the **New** icon. In the drop-down menu, select **Database** (Figure 1). This opens the Database Wizard. You can also open the Database Wizard using **File > New > Database**.

The first step of the Database Wizard has one question with two choices: **Create a new database** or **Connect to an existing database**. For this example, select **Create a new database** and then click **Next**.

The second step has two questions with two choices each. The default choice for the first question is **Yes, register the database for me** and the default choice for the second question is **Open the database for editing**. Make sure these choices are selected and click **Finish**.

Note	If the database is not registered, it will not be accessible to the other OOo components such as Writer and Calc. If the database is registered, other components can access it.

Save the new database with the name *Automobile.* This opens the Automobile – OpenOffice.org Base window. Figure 2 shows part of this window.

Tip	Every time the *Automobile* database is opened, the Automobile – OpenOffice.org Base window opens. Changes can then be made to the database. The title for this window is always (database name) – OpenOffice.org.

Caution	As you create a database, you should save your work regularly. This means more than just saving what you have just created. You must save the whole database as well.
	For example, when you create your first table, you must save it before you can close it. If you look at the Save icon in the Standard toolbar at the top after closing the table, it will be active. Click the Save icon, and this icon will be grayed out again. Not only the table has been saved, but it also been made a part of the database.

Creating database tables

Note	In a database, a table stores information for a group of things we call fields. For example, a table might hold an address book, a stock list, a phone book or a price list. A database can have from one to several tables.

To work with tables, click the *Tables* icon in the *Database* list, or use *Alt+a*. The three tasks that you can perform on a table are in the *Task* list (see Figure 2).
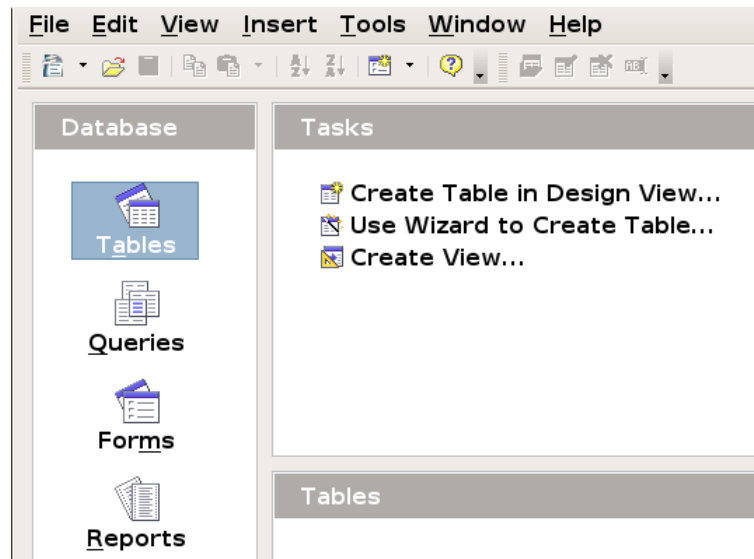
Figure 2: Creating tables

Using the Wizard to create a table

Caution	Every table requires a *Primary key field*. (What this field does will be explained later.) We will use this field to number our entries and want that number to automatically increase as we add each entry.

Since none of the fields we need for our Automobile database are contained in any of the wizard tables, we will create a simple table using the wizard that has nothing to do with our database. This section is an exercise in explaining how the Wizard works.

The Wizard permits the fields of the table to come from more than one suggested table. We will create a table with fields from three different suggested tables in the Wizard.

Click *Use Wizard to Create Table*. This opens the Table Wizard.

Note	A field in a table is one bit of information. For example, in a price list table, there might be one field for item name, one for the description and a third for the price. More fields may be added as needed.

Step 1: Select fields.

You have a choice of two categories of suggested tables: Business and Personal. Each category contains its own suggested tables from which to choose. Each table has a list of available fields. We will use the *CD-Collection* Sample table in the Personal category to select the fields we need.

1) *Category*: Select *Personal*. The *Sample Tables* drop down list changes to a list of personal sample tables.

2) *Sample Tables*: Select *CD-Collection*. The *Available* fields window changes to a list of available fields for this table.

3) *Selected Fields*: Using the **>** button, move these fields from the *Available fields* window to the *Selected fields* window in this order: *CollectionID, AlbumTitle, Artist, DatePurchased, Format, Notes,* and *NumberofTracks*.

4) *Selected Fields from another sample* table. Click Business as the Category. Select *Employees* from the dropdown list of sample tables. Use the **>** button to move the *Photo* field from the *Available fields* window to the *Selected fields* window. It will be at the bottom of the list directly below the *NumberofTracks* field.

5) If a mistake is made in the order as listed above, click on the field name that is in the wrong order to highlight it. Use the **Up** or **Down** arrow on the right side of the *Selected Fields* list (see Figure 3) to move the field name to the correct position. Click **Next**.
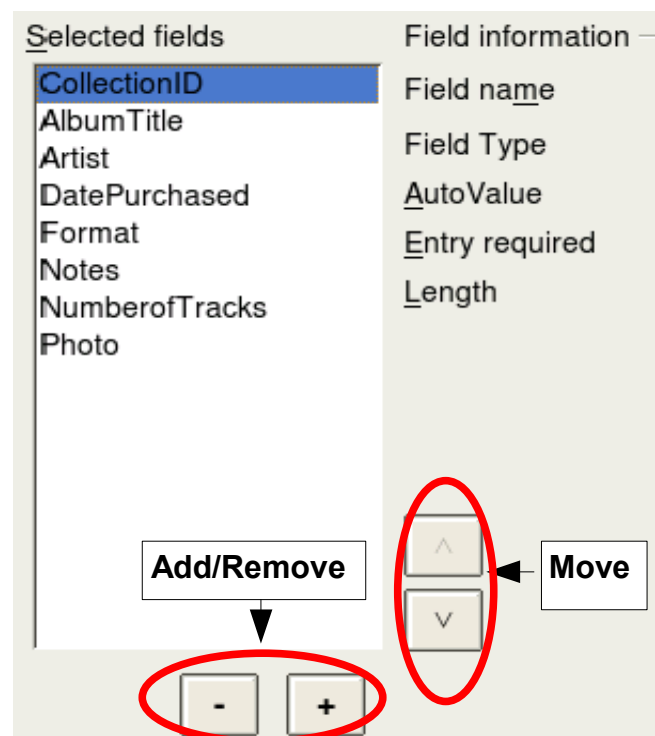

Figure 3: Order of fields

Caution

Below the *Selected Fields* list are two buttons: one with a +, and one with a –. These buttons are used to add or to remove fields from the *Selected Fields* list. Be careful when using these buttons until well acquainted with how to create tables (Figure 3).

Step 2: Set field types and formats.

In this step you give the fields their properties. When you click a field, the information on the right changes. You can then make changes to meet your needs. (See Figure 4.) Click each field, one at a time, and make the changes listed below.

Figure 4: Changing field types

Note

If any of these fields requires an entry, set *Entry required* to **Yes**. If *Entry required* is set to Yes, this field must have something in it. For example if FirstName has E*ntry required* set to Yes, having an entry with the first name missing will not be allowed. In general, only set *Entry required* to **Yes** if something must always be put in that field. By default, *Entry required* is set to **No**.

- *CollectionID:* Change *AutoValue* from **No** to **Yes**.

- *AlbumTitle*:

    - *Entry required*: If all of your music is in albums, change *Entry required* to *Yes*. Otherwise, leave *Entry required* as *No.*

    - *Length*: Unless you have an album title that exceeds 100 characters in length counting the spaces, do not change the length.

Note

In Base the maximum length of each field must be specified on creation. It is not easy to change this later, so if in doubt specify a greater length. Base uses VCHAR as the field format for text fields. This format only uses the actual number of characters in a field up to the limit set. So, a field containing 20 characters will only use space for 20 characters even if the limit is set at 100. So, two album titles containing 25 and 32 characters respectively will use space for 25 and 32 characters and not 100 characters.

- *Artist*: Use the Default setting. And since music has authors, set *Entry Required* to *Yes*.

- *Date Purchased*: *Length*: default setting. *Entry required* should be *No.* (You may not know the date.)

- *Format*: Only change the *Entry Required* setting: from *No* to *Yes*.

- *Notes*: No changes are required.

- *NumberofTracks*: Change the *Field Type to Tiny Integer[TINYINT]*. Your allowable number of tracks will be 999.

- *Photo:* Use the default settings. When you have finished, click **Next**.

Note	Each field also has a *Field Type*. In Base the field type must be specified. These types include text, integer, date and decimal. If the field is going to have general information in it (for example a name or a description) then you want to use text. If the field will always contain a number (for example a price) the type should be decimal or another appropriate numerical field. The wizard picks the right field type, so to get an idea of how this works, see what the wizard has chosen for different fields.

Step 3: Set primary key.

1) *Create a primary key* should be checked.

2) Select option *Use an existing field as a primary key*.

3) In *Fieldname* drop down list, select *CollectionID* .

4) Check *Auto* value if it is not already checked.

5) Click **Next**.

Note	A primary key uniquely identifies an item (or record) in the table. For example, you might know two people called "Randy Herring" or three people living at the same address and the database needs to distinguish between them.
	The simplest method is to assign a unique number to each one: number the first person 1, the second 2 and so on. Each entry has one number and every number is different, so it is easy to say "record ID 172". This is the option chosen here: CollectionID is just a number assigned automatically by Base to each record of this table.
	There are more complex ways of doing this, all answering the question "How do I make sure that every single record in my database can be uniquely identified?"

Step 4: Create the table.

1) If desired, rename the table at this point. If you rename it, make the name meaningful to you. For this example, make no changes.

2) Leave the option *Insert data immediately* checked.

3) Click **Finish** to complete the table wizard. Close the window created by the table wizard. You are now back to the main window of the database with the listing of the tables, queries, forms, and reports.

Creating a table by copying an existing table

If you have a large collection of music, you might want to create a table for each type of music you have. Rather than creating each table from the wizard, you can make a copy of the original table. Each table can be named according to the type of music contained in it. Possible names could include Classical, Pop, Country and Western, and Rock among others.

1) Click on the **Tables** icon in the Database pane to see the existing tables.

2) Right-click on the *CD-Collection* table icon. Select **Copy** from the context menu.

3) Move the mouse pointer below this table, right-click, and select **Paste** from the context menu. The *Copy table* window opens.

4) Change the table name to *Pop* and click **Next**.

5) Click the **>>** button to move all the Fields from the left window to the right window and click **Next**.

6) Since all the Fields already have the proper File Type formating, no changes should be needed. However, this is the time and place to make these changes if they are needed. (See **Caution** below for the reason why.) Click **Create**. The new table is created.

Caution	Once tables have been created using the wizard, editing them is limited. **The Primary key can not be changed in any way**. It is possible to add new fields and remove fields. It is possible to change the field type when creating the field as well as later as long as it is not the primary key. Once data has been added to the database, deleting a field will also delete any data contained in that field. When creating a new table, it pays to create the fields with the correct names, length and format before data is added.

Caution	Tables can be deleted in a very simple way. But doing so removes all of the data contained in every field of the table. Unless you are sure, do not delete a table.
	To delete a table, right-click it in the list of tables. Select **Delete** from the context menu. A pop up window asks if you are sure you want to delete the table. Once you click *Yes*, the table and its data are gone forever unless you have a backup.

Creating tables in Design View

Design View is a more advanced method for creating a new table. It allows you to directly enter information about each field in the table. We will use this method for the tables of our database.

Note	While the *Field type* and *formatting* are different in *Design View*, the concepts are the same as in the Wizard.

The first table to be created is *Fuel*. Its fields are *FuelID, Date, FuelCost, FuelQuantity,* Odometer, and *PaymentType*. *FuelCost* uses currency and two decimal places. *FuelQuantity and Odometer* uses the number format with 3 decimal places and 1 decimal place respectively. PaymentType uses the text format.

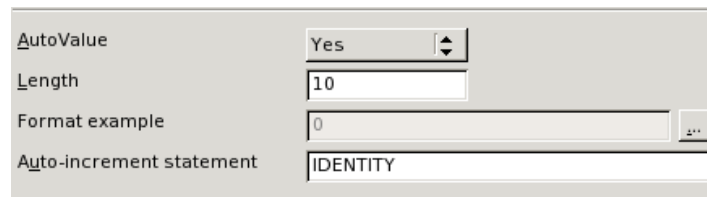1) Click *Create Table in Design View*.

2) *FuelID* entries:

  a) Enter *FuelID* as the first *Field Name*.

  b) Select *Integer[INTEGER]* as the *Field Type* from the dropdown list. (The default setting is Text[VARCHAR].)

Tip	Shortcut for selecting from the Field Type dropdown list: use the key for the first letter of the choice. This might require using the letter more than once to get the choice you want. You can cycle through the choices for a given letter by repeatedly using that letter.
	After typing the name of the field in the Fields column, use *the Tab* key to move to the Field Type column. This will enter the field name and highlight the dropdown list. You can then use the key for the first letter of your choice to select the field type. Just remember to use it the correct number of times if necessary.

c) Change the *Field Properties* in the bottom section.

   • Change *AutoValue* from *No* to *Yes* (Figure 5).

Figure 5: Field Properties section (AutoValue)

d) Set *FuelID* as the *Primary key*.

   • Right-click on the green triangle to the left of *FuelID* (Figure 6).

Figure 6: Primary key field

   • Click *Primary Key* in the context menu. This places a key icon in front of *FuelID*.

Note	The primary key serves only one purpose. Any name can be used for this field. It is not necessary to use *FuelID* as the name of the primary key field. We have used it so we know to which table it belong by its name.

3) All other entries:

   a) Enter the next field name in the first column (*Field Name* column).

   b) Select the *Field Type* for each field.

      • For *Date* use Date[DATE]. (Use the *D* key once to select it.)

      • PaymentType uses Text[VARCHAR], the default setting.

      • All other fields use Number[NUMERIC]. (Use the *N* key once to select it.)

   c) Select the *Field Properties* (Figure 7).

Figure 7: Field Properties section

- FuelCost, FuelQuantity, and Odometer need changes in the Field Properties section (Figure 7).

    - *FuelQuantity*: Change *Length* to 6 and *Decimal places* to 3. (Many fuel pumps measure fuel to thousands of a gallon in the USA where I live.)

    - Odometer: Change the *Length* to 10 and the *Decimal places* to 1.

    - *FuelCost*: Change the *Length* to 5 and *Decimal places* to 2. Click the **Format example** button. This opens the *Field Format* window (Figure 8).
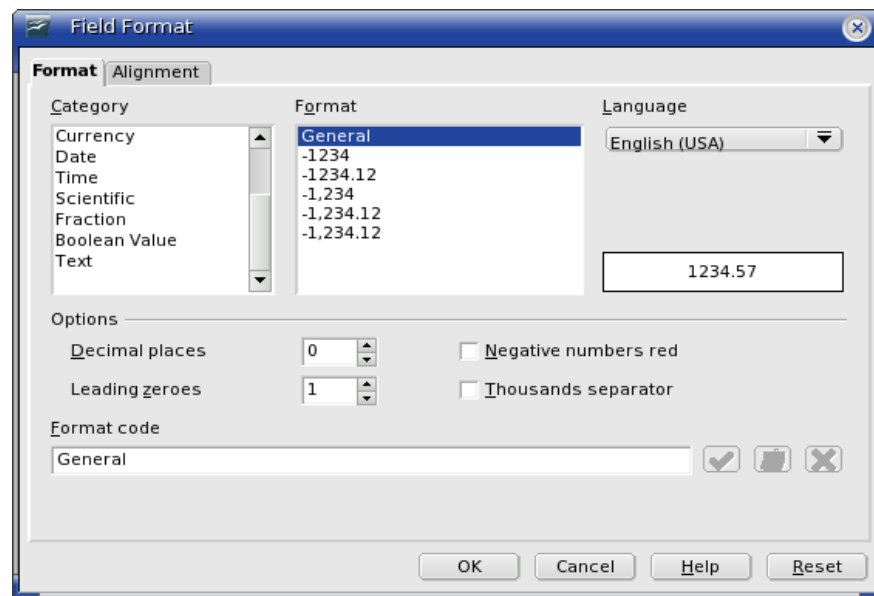
Figure 8: Field Format options

    - Use *Currency* as the Category and anything in the Format list with two decimal places.

4) Repeat these steps for each field in the table.

    To access additional formatting options, click the button to the right of the Format example panel (*Format example* button).

5) *Description* can be anything, or can be left blank. **(**Figure 9 is an example of this.**)**

6) To save and close the table, select **File > Close**. Name the table *Fuel*.

	Field Name	Field Type	
🔑	Date	Date [DATE]	
	Odometer	Number [NUMERIC]	Odometer reading
	Motel	Number [NUMERIC]	
	Tolls	Number [NUMERIC]	total tolls
	Breakfast	Number [NUMERIC]	
	BPayment	Text [VARCHAR]	payment type
	Lunch	Number [NUMERIC]	
	LPayment	Text [VARCHAR]	payment type
	Supper	Number [NUMERIC]	
	SPayment	Text [VARCHAR]	payment type
	SnackNo	Number [NUMERIC]	
	SnackCost	Number [NUMERIC]	
	SnPayment	Text [VARCHAR]	payment type for snacks
▶	Miscellaneous	Number [NUMERIC]	misc. costs
	MPayment	Text [VARCHAR]	payment type for motel
	MiscNotes	Memo [LONGVARCHA	
	MiscPayment	Text [VARCHAR]	payment type for miscellaneous

Figure 9: Example of Description entries

Follow the same steps to create the *Vacations* table. The fields and their field types are listed in Figure 9. Make sure you make Date field the primary key before closing, naming the table *Vacations*, and saving it.

Creating tables for the list box

When the same information can be used in several fields, design a table for each type of information. Each table will contain two fields: the information field, and *ID* in this order.

1) Follow the directions in "Creating tables in Design View" on page 8. In the table we will create, the two fields can be *Type* and *PaymentID*. Make sure that the *AutoValue* is set to **Yes** for the *PaymentID* field. Set the *PaymentID* field as the primary key. (See Figure 10.)

2) Save the table using the name *Payment Type*.

	Field Name	Field Type
▶	Type	Text [VARCHAR]
🔑	PaymentID	Integer [INTEGER]

Figure 10: Table in Design View

Note: If you have several tables to create with the same fields, design one table and produce the other tables by cutting and pasting. (See "Creating a table by copying an existing table" on page 7.)

Adding data to the list table

List tables do not require a form. Instead, add their data directly to the table. In this example, use the names of the two people with a bank card and cash for cash purchases.

1) In the main database window, click on the *Tables* icon (Figure 2). Right-click on *Payment Type* and select **Open** from the context menu.

   a) Enter *Dan* in the first row. Use the tab key to move to the second row.

   b) Enter *Kevin* in the second row.

   c) Enter *Cash* in the third row.

2) Save and close the table window.

Tip	The *Enter* key can also be used to move from field entry to field entry. For this example, enter Jan. in the first *Name* field. *Enter* moves the cursor to the *ID* field. *Enter* then moves the cursor to the second *Name* field.
	The *Down Arrow* key can also be used to move from row to row.

Note	The *PaymentID* field contains *<AutoField>* until you use the *Enter* key to move to the second row. Then it becomes a 0. As you add the entries to each row, the rows of the *PaymentID* field change to consecutive whole numbers. For example the first three numbers in this field are 0,1,2.

Creating a View

A View is a query. Because of this, the details of how to create and use a View are in the Creating queries section.

	Date	Breakfast	Lunch	Supper	SnackCosts
▶	04/12/07	$11.23	$12.56	$14.95	$7.34

Figure 11: View of some fields from the Vacations table

A View is also a table. Its fields come from the fields of one or more tables of the database. It provides a way to look at a number of fields without regard to the table to which any of the fields belong. A View can consists of some of the fields on one table as in Figure 11. Or, it can consist of fields from more than one field as in Figure 12.

	Date	FuelCost	FuelQuanity	Who
▶	04/12/07	24.99	8.299	Dan
	04/12/07	26.45	11.650	Kevin
	04/13/07	27.50	12.557	Cash
	04/15/07	35.12	10.233	Kevin

Figure 12: View of fields from the Fuel and Payment Type tables

Caution	Data can not be entered into a View like it can be added to a table. It is strictly for viewing data which has already been added.

Defining relationships

Now that the tables have been created, what are the relationships between our tables? This is the time to define them based upon the questions we asked and answered in the beginning.

When on vacation, we want to enter all of our expenses all at one time each day. Most of these expenses are in the Vacations table, but the fuel we buy is not. So, we will relate these two tables using the Date fields. Since the Fuel table may have more than one entry per date, this relationship between the Vacations and Fuel tables is one to many. (It is designated 1:n.)

The Vacations tables also contains several fields for the type of payment used. For each field listing the payment type, there is only one entry from the Payment Type table. This is a one to one relationship: one field in one table to one entry from the other table. (It is designated 1:1.) Other tables also contain fields for the type of payment. The relationship between these fields of those tables and the Payment Type table are also 1:1.

Since the Payment Type table only provides a static list, we will not be defining a relationship between the Payment Type table and the fields of the other tables which use the entries of the Payment Type table. That will be done when the forms are created.

The Fuel and Maintenance tables do not really have a relationship even though they share similar fields: Date, and Odometer. Unless a person is in a habit of regularly getting fuel and having their vehicle serviced, the entries in these tables do not share anything in common.

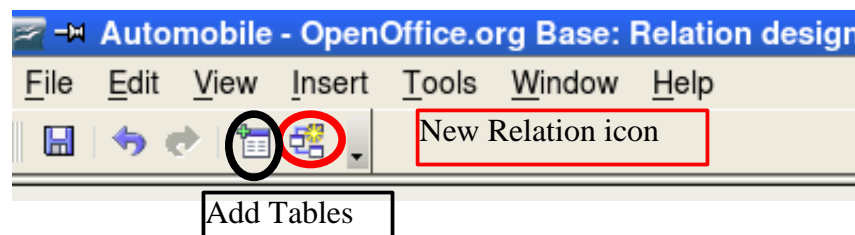| **Tip**	As you create your own databases, you need to also determine where tables are related and how.

Figure 13: Relation design window

We begin defining relationships by **Tools > Relationships**. The Automobile – OpenOffice.org Base: Relation design window opens (Figure 13). The icons we will use are **Add Tables** and **New Relation**.

1) Click the **Add Tables** icon. The Add Tables window opens.

   a) There are two ways to add a table to the Relation design window.

      • Double-click the name of the table. In our case, do this for both Vacations and Fuel.

      • Or, click the name of the table and then click **Add.**

   b) Click **Close** when you have added the tables you want (Figure 14).
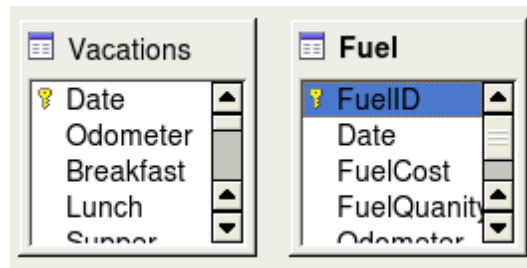
Figure 14: Added table lists

2) Defining the relationship between the Vacations and Fuel tables.

   a) Two ways exist to do this:

- Click and drag the *Date* field in the Fuel table to the *Date* field in the Vacations table. When you release the left mouse button, a connecting line forms between the two date fields (Figure 15).
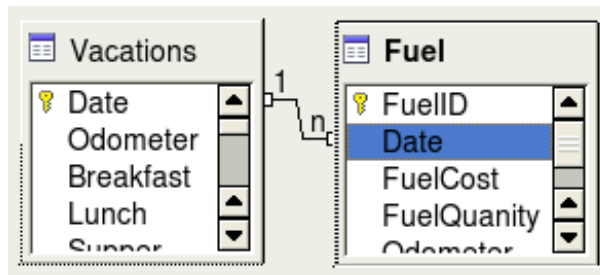

Figure 15: Designation for a 1:n relationship

- Or, click the **New Relation** icon. This opens the Relations window (Figure 16). Our two tables are listed in the *Tables involved* section.

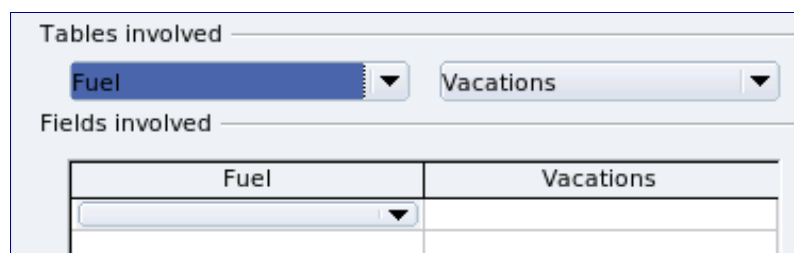 - In the *Fields involved* section, click the dropdown list under the Fuel label.

Figure 16: Setting the relationship between tables

- Select *Date* from the Fuel table list.

- Click in the cell to the right of this dropdown list. This opens a dropdown list for the Vacations table.

- Select *Date* from the Vacations table list. It should now look like Figure 17.
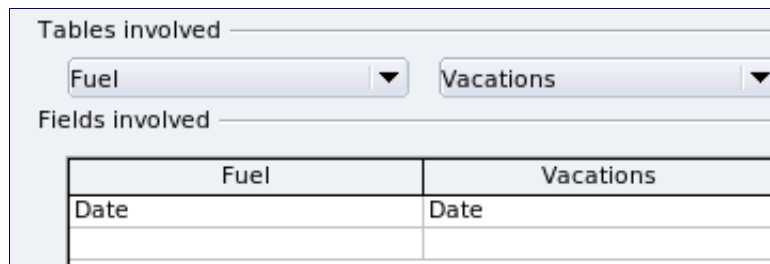
- Click **OK**.

Figure 17: Selected fields in a relationship

3) Modifying the *Update options* and *Delete options* section of the Relation window.

   a) Right-click the line connecting the Date fields in the two table lists to open a context menu.

   b) Select **Edit** to open the Relation window (Figure 18).

   c) Select **Update cascade**.
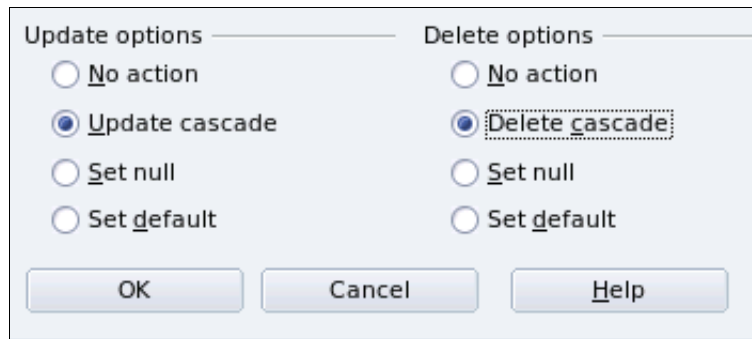
   d) Select **Delete cascade**.

Figure 18: Update options and Delete options section

While these options are not absolutely necessary, they do help. Having these options selected permits you to update a table that has a relationship defined with another table. It also permits you to delete a field from the table.

Creating a database form

Databases are used to store data. But, how is the data put into the database? Forms are used to do this. In the language of databases, a form is a front end for data entry and editing.

A simple form consists of the fields from a table (Figure 19). More complex forms can contain much more. These can contain additional text, graphics, selection boxes and many other elements. Figure 20 is made from the same table with a text label (Fuel Purchases), a list box placed in PaymentType, and a graphic background.

Figure 19: Fields of a simple form

Figure 20: Simple Form with additions

Using the Wizard to create a form

We will use the Wizard to create two forms: Fuel and Vacations. The Fuel form will be a simple form while the Vacations form will contain a form and a subform. We will create the Vacations form with its subform and let you modify the Fuel form using the same process.

In the main database window (Figure 2), click the Form icon. Double-click **Use Wizard to Create Form** to open the wizard (Figure 21). Simple forms use only require some of these steps while more complex forms may use all of them.

Step 1: Select fields.

1) Under Tables or queries, select Vacations as the table. *Available fields* lists the fields for the Vacations table.

2) Click the right double arrow to move all of these fields to the *Fields in the form* list. Click **Next**.

Figure 21: Form Wizard steps

Step 2: Set up a subform.

Since we have already created a relationship between the Fuel and Vacations tables, we will use that relationship. If no relationship had been defined, this would be done in step 4.

1) Click the box labeled *Add Subform*.

2) Click the radio button labeled *Subform based upon existing relation*.

3) Fuel is listed as a relation we want to add. So, click Fuel to highlight it as in Figure 22. Click **Next**.

Figure 22: Adding a subform

Step 3: Add subform fields.

This step is exactly the same as step 1. The only difference is that not all of the fields will be used in the subform.

1. Select Fuel under *Tables or queries*.

2. Use the >> button to move all the fields to the right.

3. Click the FuelID field to highlight it.

4. Use the < button to move the FuelID to the left (Figure 23).

5. Click **Next**.

Figure 23: Selecting fields of a subform

Step 4: Get joined fields.

This step is for tables or queries for which no relationship has been defined. Since we want to list all expenses by the day they occur in both the form and subform, we will joint the Date fields of these two tables (Figure 24).

Figure 24: Selection of joined subform and main form fields

1) Select Date from the *First joined subform field* dropdown list. This is the Date field in the Fuel table. This is **not** the Primary key for the Fuel table, but it is known as a Foreign key.

2) Select Date from the *First joined main form field* dropdown list. This is the Date field in the Vacations table. This **is** the Primary key for the Vacations table. Click **Next**.

Note	It is possible to create a relationship between two tables that is based upon more than one pair of fields. How to do that and why is discussed in the Base Guide.

Caution	When selecting a pair of fields from two tables to use as a relationship, they have to have the same field type. That is why we used the Date field from both tables: both their field types are Date[DATE].
	Whether a single pair of fields from two tables are chosen as the relationship or two or more pairs are chosen, certain requirements must be met for the form to work.

- No field from the subform can be the Primary key for its table. (FuelID cannot be used.)
- Each pair of joined fields must have the same file type.
- One of the fields from the main form must be the Primary key for its table. (Date would have to be used.)

Step 5: Arrange controls.

Note	Each control in a form consists of two parts: label and field. This step in creating the form determine where a control's label and field are placed in relationship with each other. The four choices from left to right are Columnar left, Columnar - Labels on top, As Data Sheet, and In Blocks - Labels Above (Figure 25).

1) Arrangement of the main form: Click *Columnar - Labels on top.* (The labels will be placed above their field.

2) Arrangement of the subform: Click *As Data Sheet*. (The labels are column headings and the field entries are in spreadsheet format.) Click **Next**.
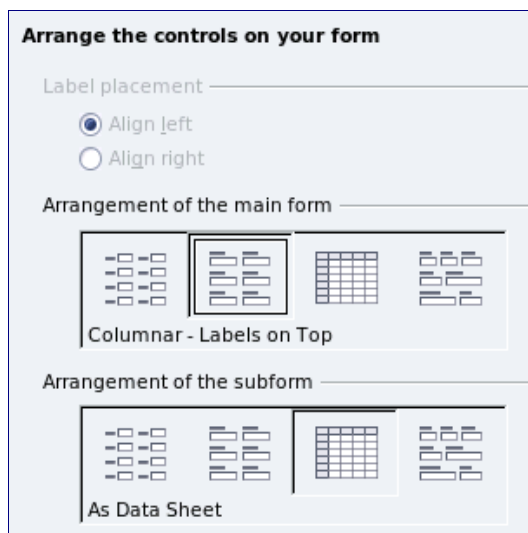

Figure 25: Control arrangements

Step 6: Set data entry.

Unless you have a need for any of these entries to be checked, accept the default settings. Click **Next**.

Step 7: Apply styles.

1) Select the color you want in the *Apply Styles* list. (I chose the beige which is Orange 4 in the Color table.)

2) Select the Field border you want. (I prefer the 3-D look. You might want to experiment with the different possible settings.)

3) Click **Next**.

Step 8: Set name.

1) Enter the name for the form. In this case, it is *Fuel*.

2) Click the circle in from of *Modify the form*. (This circle is called a radio button.)

3) Click **Next**. The form opens in Edit mode.

Modifying a form

We will be moving the controls to different places in the form and changing the background to a picture. We will also modify the label for the PaymentType field as well as change the field to a list box.

First, we must decide what we want to change and to what. The discussion will follow this ten step outline.

1) The Date field in the main form needs a dropdown capability. It also needs to be lengthened to show the day of the week, month, day, and year.

2) Shorten the length of the payment fields (all fields containing the word payment).

3) The controls need to be move into groups: food, fuel subform, and miscellaneous.

4) Some of the labels need to have their wording changed. Some single words should be two words. Some abbreviations should be used if possible (Misc. for miscellaneous).

5) The widths of several fields and labels need to be changed. Only Lunch, Supper, Motel, and Tolls have acceptable lengths. But for a better appearance, changes will be made to these as well.

6) All the fields whose label ends in *Payment* will be replaced with a list box. This box contains the entries from the Payment Type table.

7) The Note field needs to be lengthened vertically and a scroll bar added. It also needs to be moved.

8) Changes need to be made in the Date and PaymentType columns of the subform that are similar to the changes in the main form.

9) Headings need to be added for each group in the main form.

10) The background needs to be changed to a picture. Some of the labels will have to be modified so that they can be read clearly. The font color of the headings need to be changed as well.

Here are some pointers that we will be using in these steps. The controls in the main form consists of a label and its field. Sometimes we want to work with the entire control, and other times we want to work with only the label or field. There are times when we want to work with a group of controls.

• Clicking a label or field selects the entire control. A border appears around the control with eight green handles (Figure 26). You can then drag and drop it where you want.

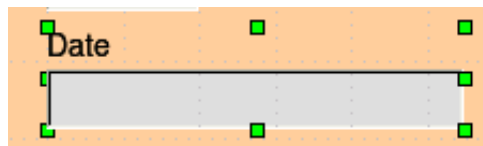• *Control+click* a label or field selects only the label or field (Figure 27).

Figure 26: A selected control

• By using the *Tab* key, you can change the selection from the field to the label or the label to the field.
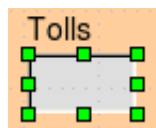

Figure 27: Selecting a field of a control

- Moving a group of controls is almost as easy as moving one of them.

    a) Click the field of one of the top left control to be moved to select it.

    b) Move the cursor to just above and to the left of the selected control.

    c) Drag the cursor to the bottom right of the group of controls and release the mouse button.

        - As you drag the cursor, a dashed box appears showing what is contained in your selection. Make sure it is big enough to include the entire length of all the controls.

        - When you release the mouse button, a border with its green handles appears around the controls you selected (Figure 28).
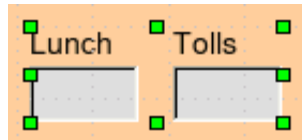
Figure 28: Selecting multiple controls

    d) Move the cursor over one of the fields. It changes to a double arrow (Figure 29).

Figure 29: Double arrow

    e) Drag the group of controls to where you want them.

Before changing the Date field, we will move the Lunch and Tolls controls to the right 5 cm (2 inches).

Tip	When either changing a size or moving a control, two properties of the Form Design toolbar should be selected: *Snap to Grid*, and *Guides when Moving*. Your controls will line up better, and an outline of what you are moving moves as the cursor moves. You should also have both rulers active (**Tools > Options > OpenOffice.org Writer > View**). Since the form is created in Writer, that is where you have to make sure both horizontal and vertical rulers have a check in the box in front of them.

Note	I use centimeters when making changes in a form because centimeters are more accurate than inches. When moving controls (fields and their labels), placement is also more accurate. You can change your rulers from inches to centimeters by right-clicking each ruler and selecting centimeter from the context menu. You do not have to understand what centimeters are. You only have to match your controls, labels, or fields to specific numerals on a ruler.

Step 1: Change the Date field.

1) *Control+click* the Date field to select it (Figure 27).

2) Move the cursor over the middle green handle on the right side. It should change to a single arrow (Figure 30).

Figure 30: Single arrow

3) Hold the left mouse button down as you drag the cursor to the right until the length is 6 cm. The vertical dashed line is lined up with the 6. (This is approximately 2.4 inches.) Release the mouse button.

4) Click the Control icon in the Form Controls toolbar (Figure 31). It is the one circled in red. The *Properties: Date Field* window opens. Each line contains a property of the field.

Figure 31: Form Controls toolbar

a) Go to the *Date format* property. This is a dropdown list with Standard (short) as the default setting.

- Click the default *Standard (short)* to open the list.

- Click the *Standard (long)* entry to select it.

b) Scroll down to the *Dropdown* property. Its default setting is No. It is also a dropdown list.

- Click the default *No* setting to open the list.

- Click *Yes* to select it.

Tip	To see what the Date field will look like, click the Form Mode On/Off icon (the second icon from the left in Figure 31). You can do this any time you want to see the form with the changes you have made.

Step 2: Shorten the width of a field.

All of the fields whose label contains the word payment are too wide. They need shortening before the controls are moved.
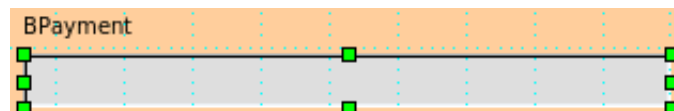
1) *Control+click* the BPayment field (Figure 32).

Figure 32: Selecting a field

a) Move the cursor over the middle green handle on the right. The cursor becomes a single arrow.

b) Drag the cursor to the left until the field is 2.5 cm wide (1 inch).

Note	If you have the *Snap to Grid* and *Guides when moving* icons selected in the Design Format toolbar, you will see how wide the field is as you shorten it.

c) Repeat these steps to shorten these fields: Lpayment, SPayment, SnPayment, Mpayment, and MiscPayment.

Step 3: Move the controls to group them by category.

We want to move the controls so that they look like Figure 33.

Figure 33: Positioning of Controls

1) Click the first control you want to move. A border appears around the control with eight green handles.

2) Move the cursor over the label or field of the control. It becomes a double arrow (Figure 29).

3) Drag and drop the control to where you want it.

Caution	Do not use *Control+click* when moving a field. It moves either the field or the label but not both. To move both, use a *mouse click* and drag to the desired spot.

4) Use the same steps to move the rest of the controls to where they belong.

Note	The only way to learn to do these two steps well is to practice them. Another way exists which will place controls where you want them, but this is a more advanced feature and will be explained in the *Base Guide*.

Step 4: Change the label wording.

Field names need to be single words. However, the labels for the fields can be more than one word. So, we will change them. To do so, we will be editing the text in the label.

1) *Control+click* the SnackNo label. Do one of the following:

a) Right-click the SnackNo label.

- Select **Control** from the context menu (Figure 34). The window that opens is labeled Properties: Label field. It contains all of the properties of the selected label.
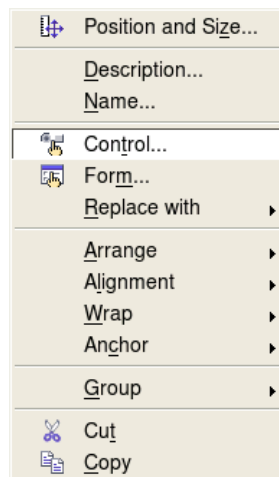
Figure 34: Context menu

- In the Label selection, click between the *k* and *N* in SnackNo.

- Use the *spacebar* to make SnackNo into two words.

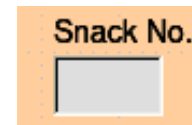- Place a . (period) after the No.

- Close the Properties window.

Figure 35: Multi-word label

b) Or, click the *Control* icon in the Form Control toolbar (Figure 36). The Properties window opens. The rest of the steps are the same.

Figure 36: Form Controls toolbar

2) Use the same procedure to change these labels as well: BPayment to Payment, LPayment to Payment, SPayment to Payment, Miscellaneous to Misc., SnackCost to Snack Cost, MPayment to Payment, MiscPayment to Misc. Payment, and MiscNotes to Misc. Notes.

Tip	All of the listings in the Properties window can be modified by you. For example, by changing the Alignment from Left to Center, the word or words in the label are centered within the Label. When you have some time, you might want to experiment with different settings just to see the results you get.

Step 5: Change the widths of the labels and fields.

We want the following controls to be 2 cm wide (0.8 inches): Breakfast, Lunch, Supper, Odometer, Snack No., Tolls, Snack Cost, Motel, and Misc. All of the payment fields were changed in step 2, but Misc. Payment needs to be changed to 3 cm (1.2 inches).

1) Click Breakfast. The border around it appears with eight green handles.

2) Move the cursor over the middle green handle on the right. The cursor changes into a single arrow.

3) Drag and drop the cursor to the left to shorten the control or to the right to lengthen the control. Use the guide lines to determine the width.

4) Repeat for the other listed controls.

Step 6: Replace fields with other fields.

We want to replace the PaymentType field with a List Box. Then we can choose the type of payment from the Payment Type table rather than having to manually enter the type. In my case, each of my payment types begins with a different letter. If I enter the first letter of the payment type, the rest of the word automatically appears. I can then go to the next field.

1) *Control+click* the Payment field for Breakfast. The green handles appear around the field but not around the Label.
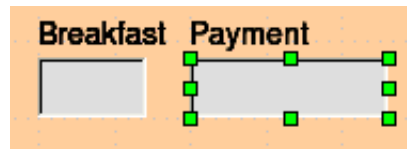
Figure 37: Selecting a field of a control

2) *Right-click* within the green handles and select **Replace with > List Box. (**Figure 34 is the context menu which contains the Replace with select, and Figure 38 is the list of replacement fields.)
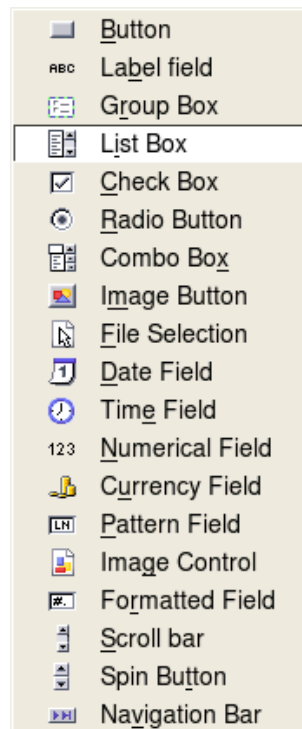
Figure 38: Replacement fields

3) *Click* the Control icon in the Form Controls toolbar (Figure 36) to open the Properties window.

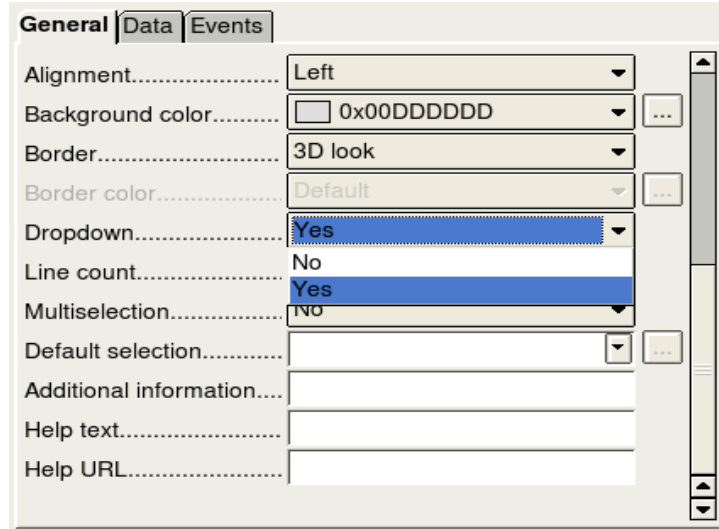4) On the General tab, scroll down to the Dropdown selection. Change the *No* to *Yes* in this dropdown list.

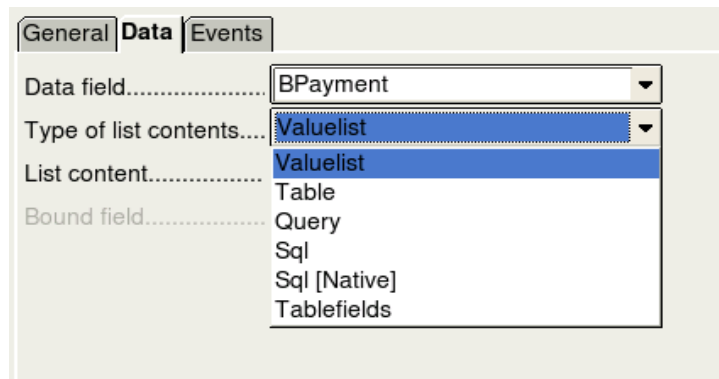*Figure 39: Dropdown list open to reveal choices*

5) Click the **Data** tab.

Figure 40: Type of list contents dropdown list

a) *Type of list contents* is a dropdown list. Change it to *Sql*.

b) Type the following **exactly** as it is in the *List contents* box:

SELECT "Type", "Type" FROM "Payment Type"

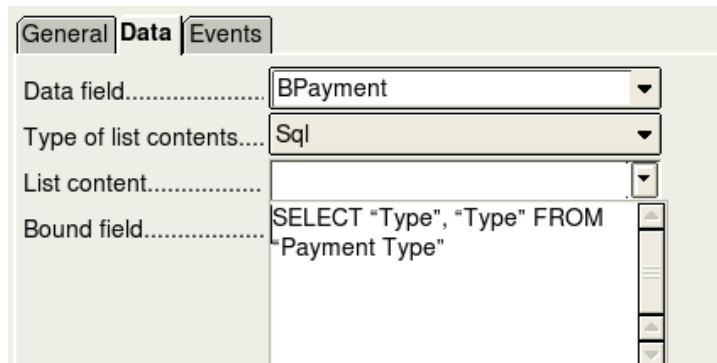| **Tip**	You should be able to copy and paste *SELECT "Type", "Type" FROM "Payment Type"* from above directly into the *List content* box. Just make sure you copy from the *S* in SELECT to the double quotation mark after the phrase *Payment Type* and no more than this.

Figure 41: List content for payment type fields

Note	What you wrote is called an SQL command. The words *SELECT* and *FROM* are written in capital letters because they are commands. When the command SELECT is used, it requires a field name within quotation marks and then the field's alias, also within quotation marks. In this case, the field and its alias are the same. The FROM command requires the name of the table which contains the field. Single-word table names do not require quotation marks, but multiple-word table names do.

6) Repeat these steps for the payment fields for Lunch, Supper, Motel, Snacks, and Misc. The main form should look like Figure 42 as far as where the controls are located. It also shows what the Note control should look like. Those changes are explained in the next step.
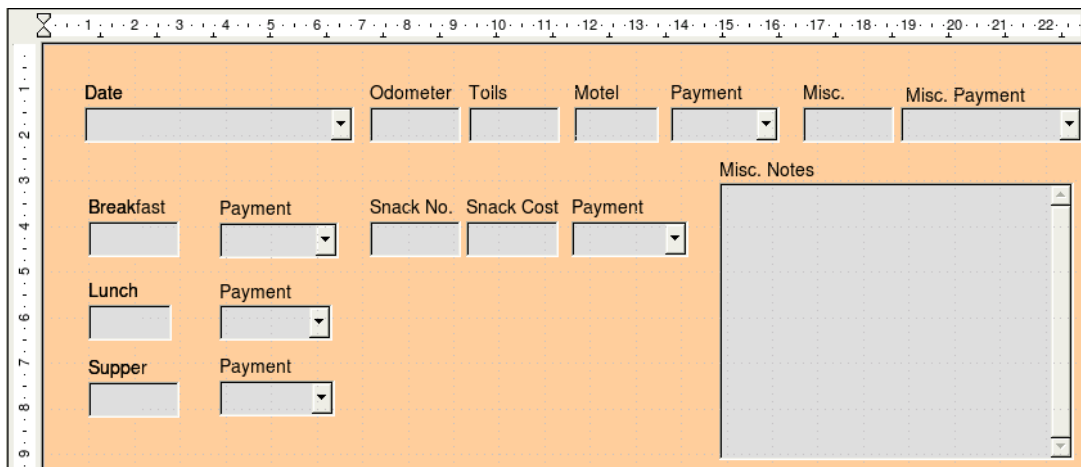
7) Close the Properties window.

Figure 42: Position of controls in main form

Step 7: Change the Note field.

We want the Note control where it is located in Figure 42. Since it has a memo field type, it needs a vertical scrollbar for additional text space if desired.

1) Click the Note control.

2) *Control+click* the *Note* field. The green handles should surround the Note field but not its label.

3) Click the **Control** icon to open the Properties window (Figure 31).

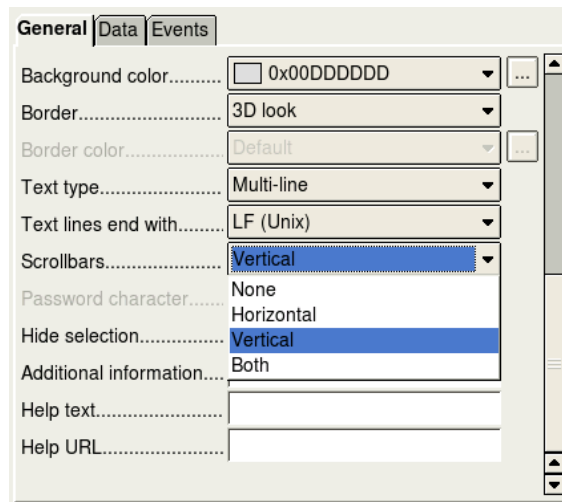4) Scroll down to the *Scrollbars* setting. Change the selection from *None* to *Vertical* in this dropdown list.

Figure 43: Scrollbar selections in Properties window

5) Close the Properties window.

6) Lengthen the Note field.

   a) Move the cursor over the middle green handle at the bottom of the Note field. It becomes a vertical single arrow.

   b) Drag the cursor down until the length is 6 cm (2.4 inches).

Step 8: Change labels and fields in a subform.

The Date column needs to be widened. The field in the PaymentType column needs to be changed to a list box. The label for PaymentType column needs to be two words.

1) Change the PaymentType column.

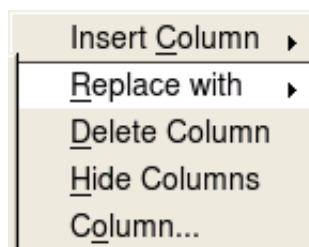   a) Right-click the label PaymentType to open a context menu (Figure 44).

Figure 44: Choices for modifying a control in a subform

   b) Select **Replace with**, and then select **List box** from the context menu.

   c) Again right-click the label PaymentType to open a context menu.

   d) Select **Column**. This opens the Properties window. (Figure 45)
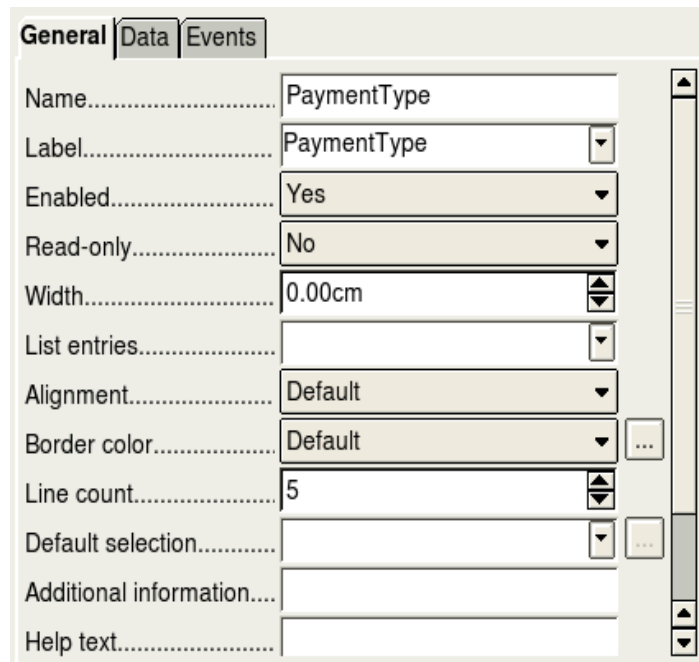
e) In the *Label* box, change PaymentType to Payment Type.

Figure 45: Properties window for control in a subform

f) Click the **Data** tab.

g) From the *Type of list contents* dropdown list, select *sql*.

h) Type the following exactly as it is written:

SELECT "Type", "Type" FROM "Payment Type"

i) Close the Properties window.

| **Tip** | ing, beginning with part 5, contains more detailed instruction. |

Step 9: Add headings to groups.

1) Make sure the cursor in in the upper left corner. If it is not, click in that corner to move it there.

2) Use the *Enter* key to move the cursor to the fifth line from the top.

3) Change the *Apply Styles* dropdown list from *Default* to *Heading 2* (Figure 46).
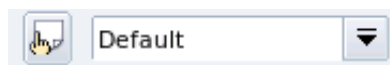

Figure 46: Apply Styles list

4) Use the spacebar to move the cursor to where you want the heading to start.

5) Type the heading *Meals*.

6) Use the spacebar to move the cursor to the center of snack area.

7) Type the heading *Snacks*.

8) Use the *Enter* key to move the cursor between the Supper control and the subform.

9) Use the spacebar to move the cursor to the center of the subform.

10) Type the heading *Fuel Data*.

Note	If you know how to use styles, you can open the Styles and Formatting window using *F11*. Right-clicking the Heading 2 paragraph style allows you to modify the appearance of all three headings. See the *Writer Guide* Chapter 6.

Step 10: Change the background of a form.

The background for a form can be a color, or a graphic (picture). You can use any of the colors in the Color Table at **Tools > Options > OpenOffice.org > Colors**. If you know how to create custom colors, you can use them. You can also use a picture (graphic file) as the background. We will use a picture found in OOo: sky.gif (Figure 47). Since the background is dark in places, many of the labels and headings will need changing in order to be seen.
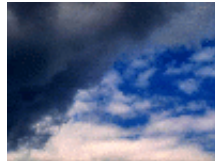

Figure 47: background graphic

1) Select the labels of the top row of controls.

   a) *Control+click* the Date label.

   b) *Control+shift+click* the rest of the labels of the top row. The border will gradually grow to the right as you do this until all the labels are enclosed in it.

Figure 48: Selecting multiple labels at one time

   c) Click the **Control** icon in the Design Form toolbar to open the Properties window.

   d) Change the *Background* selection from *Default* to *Light cyan*. (This is a dropdown list.)

2) Select the other labels in the same way and then change their background color.

3) Close the Properties window.

Note	I have chosen to use Light cyan as the background color for my labels. You are free to choose whatever color you wish including a custom color you earlier created.

4) Press the *F11* key to open the Styles and Formatting window (Figure 49). Notice the left icon has a black outline around it. This is the *Paragraph Styles* icon. Below it is a list of paragraph styles including headings.
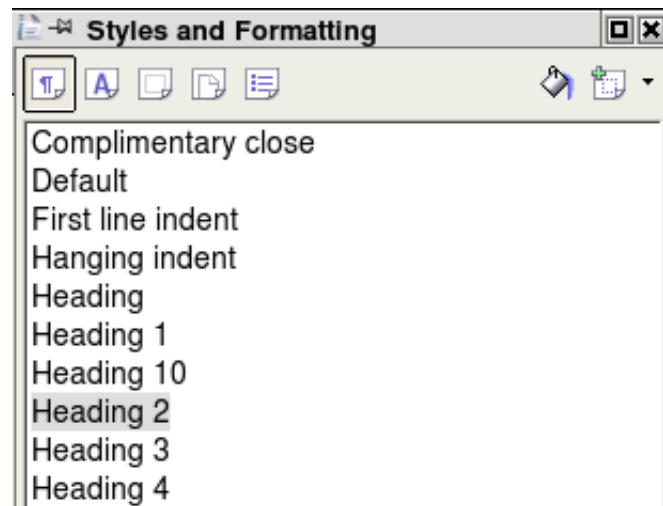
Figure 49: Top portion of the Styles and Formatting window

a) Right-click *Heading 2* and select **Modify** from the context menu.
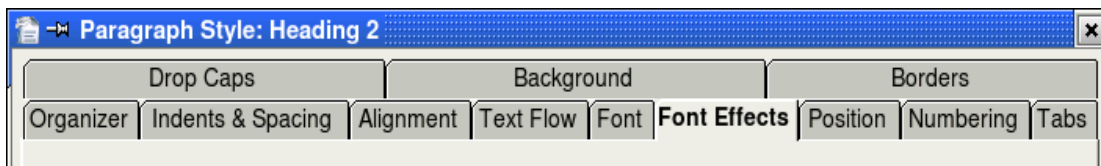

Figure 50: Tabs of the Paragraphs: Heading 2 window

b) On the Paragraph Style dialog (Figure 50), click the **Font Effects** tab.

Figure 51: Left side of Font Effects tab

c) Change the *Font color* dropdown list to *Light cyan*.

d) Click **OK** to close the Paragraph Style: Heading 2 dialog.

e) Press the *F11* key to close the Formatting and Styles window.

Tip	Learning how to use styles can be very helpful at times. By using styles, we changed the font color for all three headings at one time. There are other methods of changing the font color, but they require repeating the same steps for each heading.

5) Right-click the background and select **Page** from the context menu.
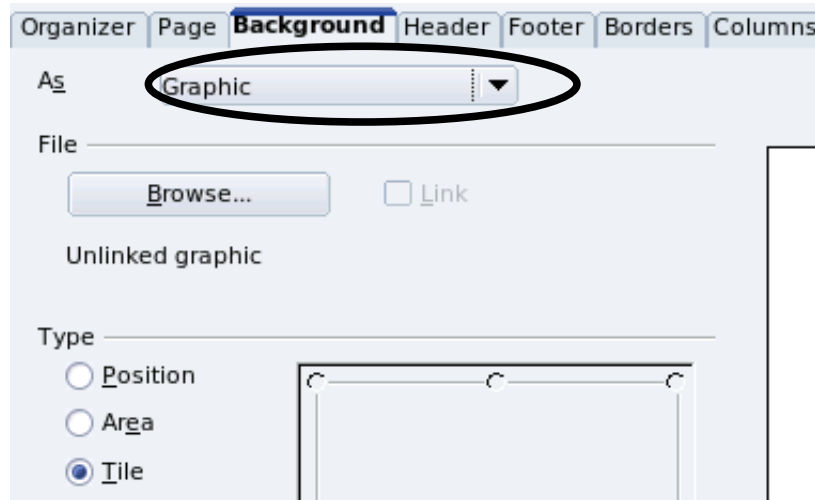
6) Click the Background tab (Figure 52).

Figure 52: Background tab of Page Styles

a) Change the *As* dropdown list from *Color* to *Graphic*.

b) Search for this file: sky.gif. It is located in the Gallery folder of OOo.

c) Click the **Browse** button in the File section. Browse to the folder containing sky.gif.

d) Select this file and click **Open**.

e) In the Type section, select *Area*.

f) Click **OK** to close the Page Style: Default window.

The form should look like Figure 54.

Step 11: Change the tab order.

The *Tab* key moves the cursor from field to field. This is much easier to do than to click each field to enter data into it. It also permits us to group our expenses into areas before we begin entering data. For example, all of our meal receipts can be grouped together as can our snacks and also our fuel purchases.

1) *Control+click* the Date field.

2) Click the **Form Design** icon in the Form Controls toolbar to open the Form Design toolbar (Figure 53).

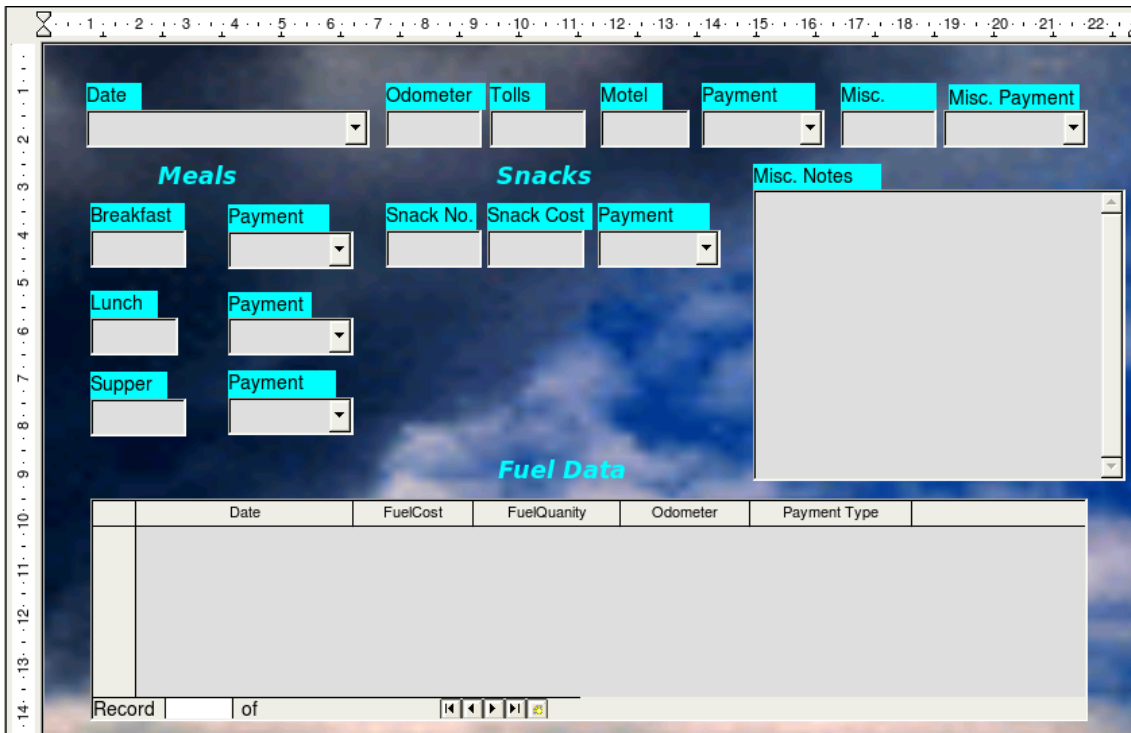*Figure 53: Form Controls toolbar with Form Design icon circled*

Figure 54: Finished form

3) Click the **Activation Order** icon (Figure 55).

Figure 55: Form Design toolbar with Activation Order icon circled

4) Rearrange the order of the fields in the Tab Order window (Figure 56).
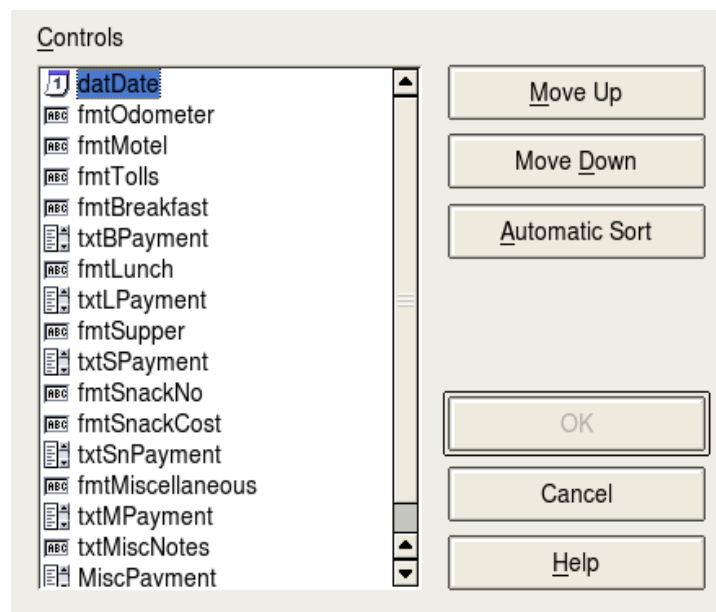
Figure 56: Tab Order window

a) Find the txtMPayment listing near the bottom of the list and click it.

b) Click the **Move Up** button until txtPayment is just below fmtMotel.

c) Use the same two steps to put the fields in the same order as in Figure 57.
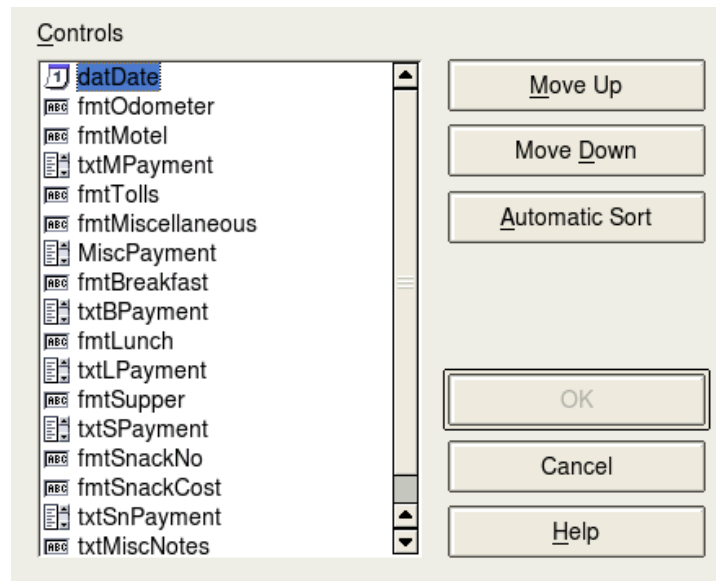
Figure 57: Tab order for the main form

d) Click **OK**.

5) Save and close the form.

6) Save the database.

Creating forms in Design View

This method requires using the *Form Controls* and *Form Design* toolbars extensively. These techniques are beyond the scope of this document. Instructions for creating forms using Design view will be described in the *Database Guide*.

Creating subforms in Design View

Again, this is beyond the scope of this document. Creation of subforms in Design View will be described in the *Database Guide*.

Accessing other data sources

OpenOffice.org allows data sources to be accessed and then linked into OOo documents. For example, a mail merge links an external document containing a list of names and addresses into a letter, with one copy of the letter being generated for each entry.

To register a data source, choose **File > New > Database** to open the *Database Wizard*. Select **Connect to an existing database**. This allows access to the list of data sources that can be registered with OOo. These data sources can be accessed similarly to a dBase database as explained in the next section.

Once a data source has been registered, it can be used in any other OOo component (for example Writer or Calc) by selecting **View > Data Sources** or pressing the *F4* key.

Tip	Mozilla Address Books and dBase databases (among others) can be accessed, and entries can be added or changed.

Caution	Spreadsheets can be accessed, but no changes can be made in the spreadsheet entries. All changes in a spreadsheet sheet must be made in the spreadsheet, itself. Update the database afterwards to see the changes made in the spreadsheet.

Accessing a dBase database

1) **File > New > Database** opens the *Database Wizard* window.

Note	Clicking the *New* icon and *Database* in the drop-down menu also open the *Database Wizard* window. (See Figure 1.)

2) Select **Connect to an existing database**. Pressing the *TAB* key highlights the *Database type* drop-down list. Typing *D* selects *dBase*. Click **Next.**

Note	Clicking the arrows opens a menu from which you can select *dBase* (Figure 58*).*

Figure 58: Database type selection

3) Click *Browse* and select the folder containing the database. Click **Next**.

4) Accept the default settings: *Register the database for me,* and *Open the database for editing*. Click **Finish**. Name and save the database in the location of your choice.

5) Create the *Form* using the *Form Wizard* as explained in "Creating a database form" beginning on page 15.

Accessing a Mozilla address book

Accessing a Mozilla Address Book is very similar to accessing a dBase database.

1) Select **File > New >** Database.

2) Select *Connect to an existing database*. Select *Mozilla Address Book* as the database type (Figure 58).

3) Register this data source.

These are steps 1, 2 and 4 of "Accessing a dBase database" on page 35.

Accessing spreadsheets

Accessing a spreadsheet is also very similar to accessing a dBase database.

1) Select **File > New > Database**.

2) Select *Connect to an existing database*. Select *Spreadsheet* as the *Database type* (Figure 58).

3) Click **Browse** to locate the spreadsheet you want to access. If the spreadsheet is password protected, check the *Password required* box. Click **Next**.

4) If the spreadsheet requires a user's name, enter it. If a password is also required, check its box. Click **Next**.

Caution	This method of accessing a spreadsheet does not allow you to change anything in the spreadsheet. All modifications must be made in the spreadsheet itself. This method only allows you to view the contents of the spreadsheet, run queries, and create reports based upon the data already entered into the spreadsheet.

Registering databases created by OOo2.x

This is a simple procedure. **Tools > Options > OpenOffice.org Base > Databases.** Under *Registered databases,* there is a list of these databases. Below this list are three buttons: **New..., Delete, Edit...** To register a database created by OOo2.x:

1) Click **New.**

2) **Browse** to where the database is located.

3) Make sure the registered name is correct.

4) Click **OK.**

Using data sources in OpenOffice.org

Having registered the data source, whether a spreadsheet, text document, external database or other accepted data source, you can use it in other OpenOffice.org components including Writer and Calc.

Viewing data sources

Open a document in Writer or Calc. To view the data sources available, press *F4* or select **View > Data Sources** from the pull-down menu. This brings up a list of registered databases, which will include Bibliography and any other database registered.

To view each database, click on the + to the left of the database's name. (This has been done for the Automobile database in Figure 59.) This brings up Tables and Queries. Click on the + next to Tables to view the individual tables created. Now double-click on a table to see all the records held in it.
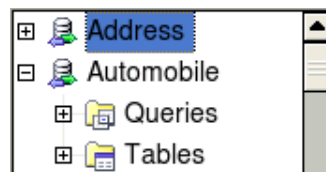

Figure 59: Databases

Editing data sources

Some data sources can be edited in the View Data Sources dialog. A spreadsheet can not. A record can be edited, added or deleted.

The data is displayed on the right side of the screen. Click in a field to edit the value.

Beneath the records are five tiny buttons. The first four move backwards or forwards through the records, or to the beginning or end. The fifth button, with a small star, inserts a new record (Figure 60).

Figure 60: View Data Sources navigation buttons

To delete a record, right-click on the gray box to the left of a row to highlight the entire row, and select **Delete Rows** to remove the selected row.

Figure 61: Deleting a row in the Data View window

Launching Base to work on data sources

You can launch OOo Base at any time from the View Data Source pane. Just right-click on a database or the Tables or Queries icons and select **Edit Database File**. Once in Base, you can edit, add and delete tables, queries, forms and reports.

Using data sources in OOo documents

To insert a field from a table into a document (for example a Calc spreadsheet or Writer document), click on the field name (the gray square at the top of the field list) and, with the left mouse button held down, drag the field onto the document. In a Writer document, it will appear as <FIELD> (where FIELD is the name of the field you dragged). In Calc it will appear as a text box.

One common way to use a data source is to perform a mail merge. Selecting **Tools > Mail Merge Wizard** or clicking on the Mail Merge icon (a small paper-and-envelope icon on the View Data Source pane) launches the Mail Merge wizard which steps through creating a mail merge document. This is covered in Chapter 11 (Using Mail Merge) in the *Writer Guide*.

Entering data in a form

Records are used to organize the data we enter into a form. They also organize the data we enter into a subform (Figure 62).

Figure 62: Single Record

Each type of field allows a different method to enter the data. In most if not all cases, more than one method can be used.

The first step to entering data in a form is to open it from the main database window.

- Click the Forms icon in the *Database* list.

- Find the form's name in the *Forms* list (Vacations).

- Double-click the form's name.

The quickest way to enter a date in the Date field is to click the arrow that opens the dropdown calendar. Then click the date you want (Figure 63). Use the *Tab* key to go to the Odometer field.

- Click the left arrow before May to go back one month (April 2007).

- Click the right arrow after 2007 to go forward one month (June 2007).

- Multiple clicks in either direction will change the month and year the same number of times as the number of clicks.
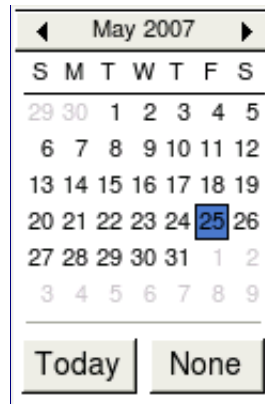

Figure 63: Calendar dropdown

The Odometer, Tolls, and Motel fields are numerical fields. Enter values directly into them, or use the *up* and *down arrows*. When the value is entered, use the *Tab* key to go to the next field.

- The *up arrow* increases the value, and the *down arrow* decreases the value.

- These two arrows only change the numerals to the left of the decimal place.

- Numerals to the right of the decimal place must be changed by deleting them and typing the desired ones.

The Motel's Payment field is a dropdown list. If as in my case, all of the elements of the list start with different letters, typing the first letter will select the desired letter.

- If two or more elements of the list have the same first letter, repeated typing of the first letter will cycle through the elements with this same first letter. So, if you accidentally go past the the element you wanted, you can keep typing the first letter until it reappears again.

- When the selection is correct, use the *Tab* key to go to the Misc. field.

The rest of the fields of the main form are either numerical fields or dropdown lists until we reach the Misc. Notes field. It is a text field. Type anything you desire in this field just as you would any simple text editor.

Caution	Since the *Tab* key is used to move between fields, it can not be used in a text field. All spacing must be done by the *spacebar*. Finally, the *Enter* key only acts as a line break to move the cursor to the next line.

Note	If we did not have a subform for fuel data, using the *Tab* key would save all of the fields, clear them, and make the form ready to accept data on the second record.

Since we have a subform form, using the *Tab* key places the cursor in the first Date field of the subform with the date automatically entered to match the Date field of the main form.

The FuelCost, FuelQuanity, and Odometer fields are numerical fields. The Payment field is a dropdown list. Enter the data just as you did in the main form, and use the *Tab* key to go to the next field.

When you use the *Tab* key to leave the Payment field, it goes to the Date field of the next line and automatically enters the date. Now you can enter your second set of fuel data for this day.

To move to another record when the form has a subform, the directional arrows at the bottom must be use. There are four of them from left to right: *First Record, Previous Record, Next Record*, and *Last Record* (Figure 64). To the right of these arrows in the *New Record* icon.

To create a new record while in another record, click the *New Record* icon. And, two choices exist for creating a new record following the present record.

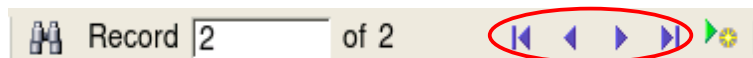- Click the *Next Record* icon.

- Or, click the *New Record* icon.

Figure 64: Navigation arrows of a form

Tip	The number in the Record box is the number of the record whose data is shown in the form. (The data from the second record of the Vacations form was displayed when I took the screenshot for Figure 64.)
	If you know the number of the record you want, you can enter it into the record box and then use the *Enter* key to take you to that record.

Figure 65 is a record with data inserted in its fields. Note that not all fields have data in them. It is only necessary to have data in every field if you determine ahead of time to require all fields contain data.

Figure 65: Sample record of the Vacation form and subform

Creating queries

Queries are used to get specific information from a database. Using our CD-Collection table, we will create a list of albums by a particular artist. We will do this using the Wizard. The information we might want from the Fuel table includes what our fuel economy is. We will do this using the Design View.

Note	Queries blur the differences between a database and a data source. A database is only one type of data source. However, searching for usable information from a data source requires a query. Since the query (one part of a database) does this, the data source appears to become one part of that database: its table or tables. Query results, themselves, are special tables within the database.

Using the Wizard to create a query

Queries created by the wizard provide a list or lists of information based upon what one wants to know. It is possible to obtain a single answer or multiple answers, depending upon the circumstances. Queries which require calculations are best created with the Design view.

In the main database window (Figure 2), click the Queries icon in the Databases section, then in the Tasks section, click *Use Wizard to Create Query*. The Query Wizard window opens (Figure 66). The information we want is what albums are by a certain musical group or individual (the album's author). We can include when each album was bought.

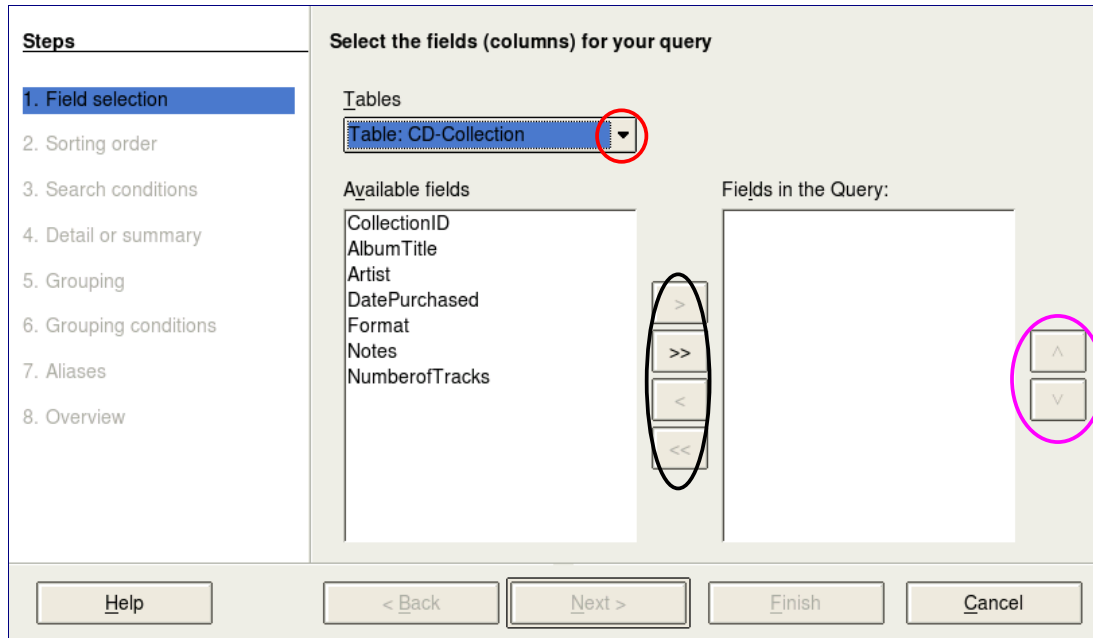| **Note**	When working with a query, more than one table can be used. Since different tables may contain the same field names, the format for naming fields in a query is Table name and field name. A period (.) is placed between the table name and the field name.

Figure 66: First page of the Query Wizard

Step 1: Select the fields.

1) Select the CD-Collection table from the dropdown list of tables.

   a) If the Tables selection is not *Table: CD-Collection*, click the arrow (circled in red in Figure 66).

   b) Click *Table: CD-Collection* in the list to select it.

2) Select fields from the CD-Collection table in *the Available* fields list.

   a) Click *AlbumTitle*, and use the **>** button (black oval in Figure 66) to move it to the *Fields in Query* list.

   b) Move the *Artist* and *DatePurchased* fields in the same manner.

Tip	To change the order of the fields, select the field you want to move and click the up or down arrow to move it up or down (circled in magenta in Figure 66).

   c) Use the up arrow to change the order of the fields: artist, album, and date purchased.

   • Click the *CD-Collection.Artist* field.

   • Click the up arrow to move it above *CD-Collection.AlbumTitle.*
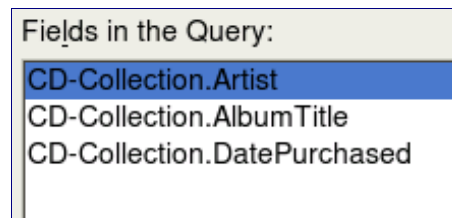
Figure 67: List of fields added to the query

      d) Click **Next**.

Step 2: Select the sorting order.

Up to four fields can be used to sort the information of our query. A little simple logic helps at this point. Which field is most important?

In our query, the artist is most important. The album title is less important, and the date purchased is of least importance. Of course, if we were interested in what music we bought on a given day, the date purchased would be the most important.
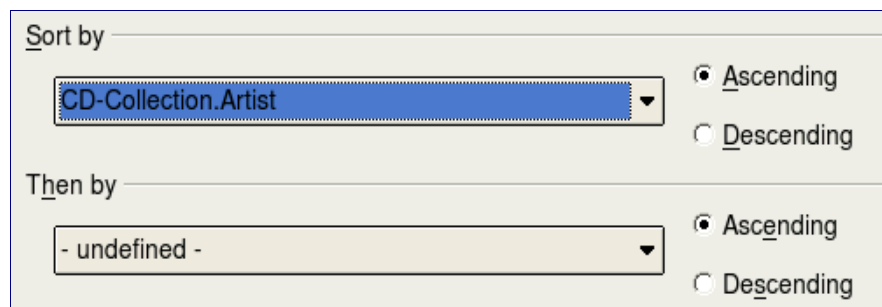

Figure 68: Sorting order page

1) Click the first *Sort by* dropdown list.

    a) Click *CD-Collection.Artist* to select it.

    b) If you want the artists to be listed in alphabetical order (a-z), select *Ascending* on the right. If you want the artist listed in reverse order (z-a), select *Descending* on the right (Figure 68).

2) Click the second *Sort by* dropdown list.

    a) Click *CD-Collection.ArtistTitle*

    b) Select *Ascending* or *Descending* according to the order you want.

3) Repeat this process for *CD-Collection.DatePurchased.*

4) Click **Next**.

Step 3: Select the search conditions.

The search conditions available are listed in Figure 69. They allow us to compare the name we entered with the names of the artist in our database and decide whether to include a particular artist in our query or not.
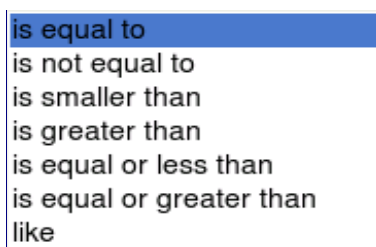
Figure 69: Search conditions in the Query Wizard

- *is equal to*: the same as

- *is not equal to*: not the same as

- *is smaller than*: comes before

- *is greater than*: comes after

- *is equal or less than*: the same as or comes before

- *is equal or greater than*: the same as or comes after

- *like*: similar to in some way

Note	These conditions apply to numbers, letters (using the alphabetical order), and dates.

1) Since we are only searching for one thing, we will use the default setting of *Match all of the following.*

2) We are looking for a particular artist, so select *is equal to*.

3) Enter the name of the artist in the *Value* box. Click **Next**.

Step 4: Select type of query.

We want simple information, so the default setting: *Detailed query* is what we want. Click **Next** at the bottom of the window.

Note	Since we have a simple query, the *Grouping* and *Grouping conditions* are not needed. Those two steps are skipped in our query.

Step 5: Assign aliases if desired.

We want the default settings. Click **Next**.

Step 6: Overview.

Name the query (suggestion: *Query_Artists*). To the right of this are two choices. Select *Display Query*. Click **Finish**.

Step 7: Modify the query.

We are skipping this step since we have nothing to modify. If you select the Modify Query choice, the query would open in Design view. To make modifications, follow the instructions in the next section, "Using the Design View to create a query".

Using the Design View to create a query

Creating a query using Design View is not as hard as it may first seem. It may take multiple steps, but each step is fairly simple.

What fuel economy is our vehicle getting (miles per gallon in the USA)? This question requires creating two queries, with the first query being used as part of the second query.

Caution	The procedures we will be using only work with relational databases. This is because of how relational databases are constructed. The elements of a relational database are unique. (The primary key insures this uniqueness.) That is, there are no two elements which are exactly alike. This allows us to select specific elements to place into our queries. Without the elements of the relational database being unique from all other elements, we could not perform these procedures.

Step 1: Open the first query in Design View.

Click **Create Query in Design View.**

Step 2: Add tables.

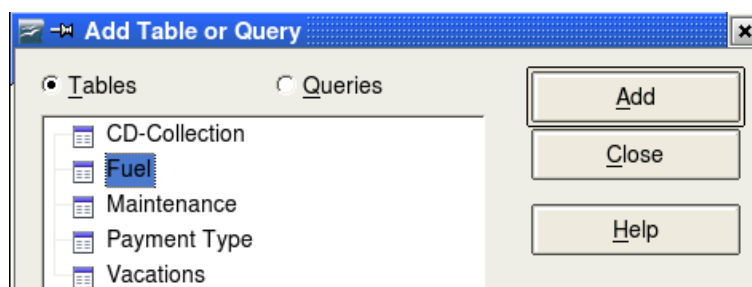*Figure 70: Add Tables or Query window*

1) Click *Fuel* to highlight it.

2) Click **Add**.

3) Click **Close.**

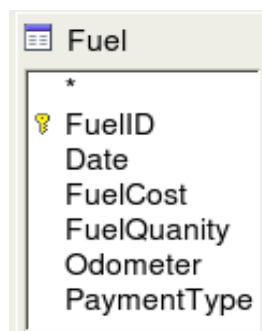| Tip	Move the cursor over the bottom edge of the fuel table (Figure 71). The cursor become a single arrow with two heads. Drag the bottom of the table to make it longer and easier to see all of the fields in the table.

Figure 71: Fuel table in query

Step 3: Add fields to the table at the bottom.

1) Double-click the *FuelID* field in the Fuel table.

2) Double-click the Odometer field.

3) Double-click the FuelQuantity field.

The table at the bottom of the query window should now have three columns (Figure 72).

FuelID	Odometer	FuelQuantity
1	778.7	6.430
2	1032.3	19.570
3	1239.4	15.150
4		
<AutoFie		

Figure 72: Query table

Step 4: Set the criterion for the query.

We want to the query's FuelID to begin with the numeral 1.

1) Type *>0* in the Criterion cell under FuelID in the query table

2) Click the *Run Query* icon in the Query Design toolbar. This icon is circled in red in Figure 73.

Figure 73: Query Design toolbar

Figure 74 contains the Fuel table with my entries and the query results based upon the Fuel table.

FuelID	Date	FuelCost	FuelQuantity	Odometer
0	Friday, M	$16.00	14.690	704.2
1	Friday, M	$7.00	6.430	778.7
2	Saturday	$20.00	19.570	1032.3
3	Saturday	$16.00	15.150	1239.4
4	Sunday, I			
<AutoFie				

FuelID	Odometer	FuelQuantity
1	778.7	6.430
2	1032.3	19.570
3	1239.4	15.150
4		
<AutoFie		

Figure 74: Fuel table and query of the fuel table

Step 5: Save and close the query.

Since this query contains the ending odometer reading for our calculations, name it End-Reading when saving it. Then close the query.

Step 6: Create the query to calculate the fuel economy.

1) Click **Create Query in Design View** to open a new query.

---

2) Add the Fuel table to the query just as you did in step 2: Add tables. But, **do not** close the Add Tables window.

3) Add the End-Reading query to this query.

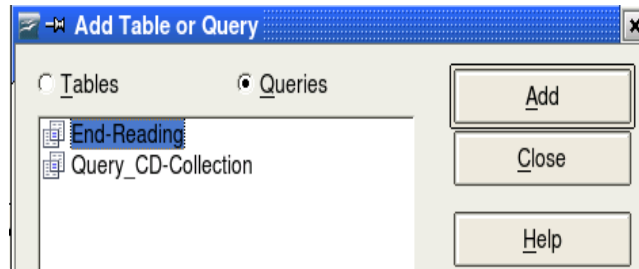a) Click the *Query* radio button to get the list of queries in the database (Figure 75).

Figure 75: Selecting queries to add to another query

b) Click End-Reading.

c) Click **Add**, and then click **Close**.

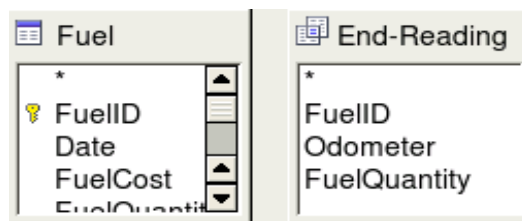**Step 7: Add fields to the table at the bottom of the query.**

Figure 76: Tables in this query

We are going to calculate the fuel economy. To do this we need the FuelQuantity and distance traveled. Since the FuelQuantity we want to use is at the ending odometer reading, we will use the End-Reading query to get it. We will also use the Odometer field from the Fuel table and End-Reading query.

1) Double-click *FuelQuantity* in the End-Reading query.

2) Double-click *Odometer* in the End-Reading query.

3) Double-click *Odometer* in the Fuel table.

Field	FuelQuantity	Odometer	Odometer
Alias			
Table	End-Reading	End-Reading	Fuel
Sort			
Visible	☒	☒	☒
Function			
Criterion			
Or			

Figure 77: Added fields to the query

Step 8: Enter the FuelID difference field.

We want the difference between the FuelID value of the Fuel table and FuelID value of the End-Reading query to equal one (1).

1) Type *"End-Reading".FuelID - Fuel.FuelID* in the field to the right of the Odometer field of the Fuel Table (Figure 78).

   Type the numeral 1 (one) in the Criterion cell of this column.

Caution	When entering fields for these calculations, you must follow this format: table or query name followed by a period follow by the field name. For hyphenated or multiple-word names (table or query), use double quotes around the table or query name. The query will then add the rest of the double quotes as in Figure 78.
	Use the arithmetical symbol between the two. More than one calculation can be done by using parentheses to group the arithmetical operations.

Field	FuelQuantity	Odometer	Odometer	"End-Reading"."FuelID" - "Fuel"."FuelID" ▼
Alias				
Table	End-Reading	End-Reading	Fuel	
Sort				
Visible	☒	☒	☒	☒
Function				
Criterion			1	

Figure 78: Typing in calculation of fields

2) Calculate the distance traveled (Figure 79):

   • Type *"End-Reading".Odometer – Fuel.Odometer* in the Field cell.

   • Type *>0* in the Criterion cell.

Field	"End-Reading"."Odometer" - "Fuel"."Odometer"
Alias	
Table	
Sort	
Visible	☒
Function	
Criterion	>0
Or	

Figure 79: Field for distance traveled calculations

3) Calculate fuel economy (Figure 80):

   a) Type *("End-Reading".Odometer – Fuel.Odometer)/"End-Reading".FuelQuanity* in the Field in the next column to the right.

Figure 80: Fuel economy calculation field

Step 9: Run the query and make some modification.

After we run the query to make sure it works correctly, we will hide all of the fields that we do not need.

1) Click the Run Query icon in the Design Query toolbar. (Figure 73) The results are in Figure 81.

Figure 81: Result of running the fuel economy query

Notice that not all of the last column label is visible because some of the labels are long. We can fix this problem by using an alias for many of the fields. The labels are replaced by their aliases.

2) Add Aliases: Type in aliases as they are listed in Figure 82.

Figure 82: Query table with aliases added

3) Run the query again. The results are in Figure 83.

Figure 83: Query run with aliases

We really do not need the column showing the difference between the FuelID fields from the table and query. So, we will hide it. While it will not be visible, it will still be used in the calculations.

4) Hide a field that does not need to be seen.

Remove the check in the box of the Visible cell as in Figure 84.

Figure 84: Making a field invisible in a query run

5) Rerun the query (Figure 85).

Figure 85: Query run with aliases

Step 10: Close, save, and name the query.

My suggestion for a name is *Fuel Economy*.

There are obviously other calculations that can be made in this query such as cost per distance traveled and how much of the cost belongs to each of the payments types.

Note	To fully use queries requires a knowledge of mathematics and specifically set operations (*unions, intersections, and, or, complements,* and any combinations of these). For example, we listed all of our criteria in one row. That means that all of these criteria have to be met before a row of values will be created in the query. This is how the *and* operator works on sets.
	It also requires having a copy of the *Hsqldb User Guide* available from http://hsqldb.org/.

Creating reports

Reports provide information found in the database in a useful way. In this they are similar to queries. Reports are generated from the database's tables or queries. They can contain all of the fields of the table or query or just a selected group of fields. Reports can be static or dynamic. Static reports contain the data in the selected fields at the time the report was created. Dynamic reports can be updated to show the latest data.

For example, a report on vacation expenses divided into categories should probably be a static report because it is based upon specific data that does not change. However, a report on the fuel data should probably be a dynamic report, because this report depends upon data that does change.

Caution	All reports are based upon a single table or query. So you need first to decide what fields you want to use in the report. If you want to use fields from different tables, you must first combine these fields in a single query. Then you can create a report on this query.

An example of this caution is creating a report on vacation expenses. Fuel costs are one part of that report as are meal costs. These values are contained in fields of two different tables: Vacations and Fuel. So this report requires creating a query.

Creating a static report

We will create a report on vacation expenses. Certain questions need to be asked before creating the report.

- What information do we want in the report?
- How do we want the information arraigned?
- What fields are required to provide this information?
- Will a query have to be created because these fields are in different tables?
- Are there any calculations required in the data before being added to the report?

The expenses for our vacation are motel, tolls, miscellaneous, breakfast, lunch, supper, snacks, and fuel. One possible report would simply list the totals of each of these expense groups. Another possible report would list the expense totals for each day of the vacation. A third possible report would list the totals for each expense group for each type of payment. (This would let us know where the money came from to pay the expenses.) At the present time, using the data from the queries in a spreadsheet is the best way to handle reports like this. In the near future, the report feature will include these abilities.

For our purposes, we will create two reports. The first one will list the expenses each day other than fuel. The second report will list the fuel costs each day.

The fields we will need for the first report from the Vacations table are: Date, Motel, Toll, Breakfast, Lunch, Supper, SnackCost, and Miscellaneous. This report will not require an additional query.

The second report involves the Fuel table. Since fuel was purchased and entered into this table at times other than during the vacation, a query needs to be created that contains only the fuel purchased during the vacation.

Vacations table report

1) Create a new report.

   a) Click the *Reports* icon in the Database list in the Automobile – OpenOffice.org window (Figure 2).

   b) In the Tasks list, click **Use Wizard to Create Report**. The Report Wizard window opens.

2) Select the fields.

   a) Select Table: Vacations in the Tables or Queries dropdown list.

   b) Use the > to move these fields from the *Available fields* list to the *Fields in report* list: Date, Motel, Tolls, Miscellaneous, Breakfast, Lunch, Supper, and SnackCost (Figure 86). Click **Next**.
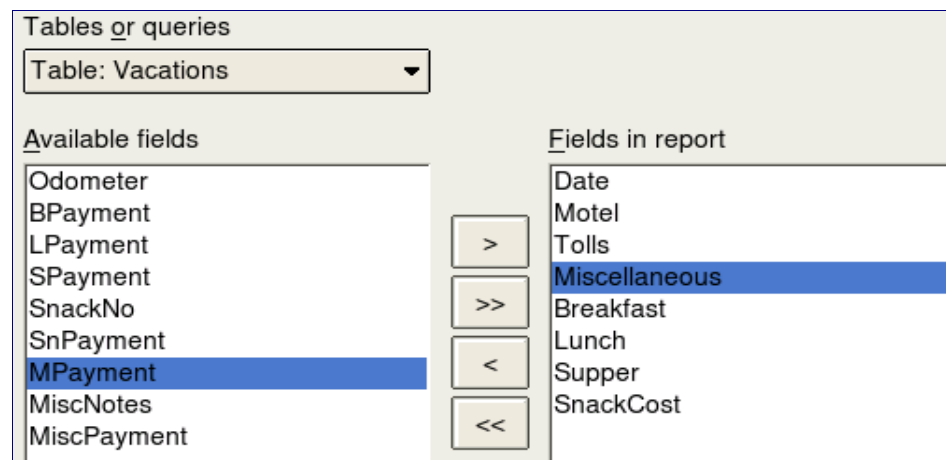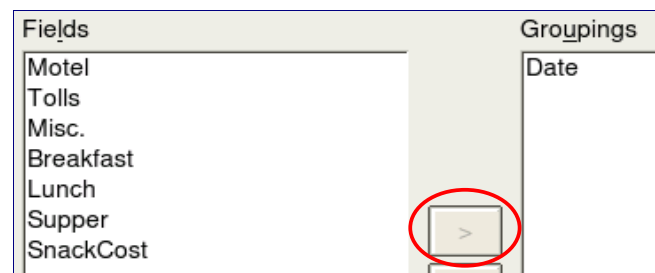
Figure 86: Adding fields to a report

3) Label the fields.

   Shorten Miscellaneous to Misc. Click **Next**.

4) Group fields.

   Since we are grouping by the date, use the **>** button to move the *Date* field to the Grouping list. Click **Next**.

5) Sort options.

   We do not want to do any additional sorting. Click **Next**.

6) Choose layout.

   We will be using the default settings for the layout. Click **Next**.

Note   If you feel adventurous, try selecting some of the other layout choices. After selecting a choice, drag and drop the Report Wizard window so that you can see what you have selected. (Move the cursor over the Heading of this window, and then drag and drop.)

---

7) Create report.

   a) Label the report: Vacation Expenses.

   b) Select Static report.

   c) Click **Finished**.

Vacation fuel report

1) Create a query containing only fuel bought on the days of the vacation.

   a) Open a query in Design View.

   b) Follow the steps for adding tables in Add tables. Add the Fuel table.

   c) Double-click these fields in the Fuel table listing: Date and FuelCost to enter them in the table at the bottom of the query.

   d) In the Criterion cell of the Date field, type the following:

   BETWEEN #5/25/2007# AND #5/26/2007#

Field	Date	▾	FuelCost
Alias			
Table	Fuel		Fuel
Sort			
Visible	☒		☒
Function			
Criterion	BETWEEN #05/25/2007# AND #05/26/2007#		

Figure 87: Setting the criterion for a query

   e) Save, name, and close the query. (Suggestion: *Vacation Fuel Purchases.*)

Tip	When using dates in a query, enter them in numerical form MM/DDYYYY or DD/MM/YYYY depending upon your language's default setting for dates (my default setting is MM/DD/YYYY).
	All dates must have a # before and after it. Hence, May 25, 2007 is written #05/25/2007#.

2) Open a new report.

   a) Right-click the *Vacation Fuel Purchases* query.

   b) Select *Report Wizard* from the context menu.

Note	When a new report is opened in this way, the query used to open it is automatically selected in the Tables or Queries dropdown list.

3) Create the report.

   Use >> to move both fields from the *Available Fields* to the *Fields in Report* list. Click **Next**.

4) Label fields.

   Add a space to FuelCost to make it Fuel Cost (two words). Click **Next**.

5) Group fields.

   a) Click Date to highlight it.

   b) Use > to move the Date field to the Groupings list. Click **Next**.

6) Choose layout.

We will be making no changes in the layout. Click **Next**.

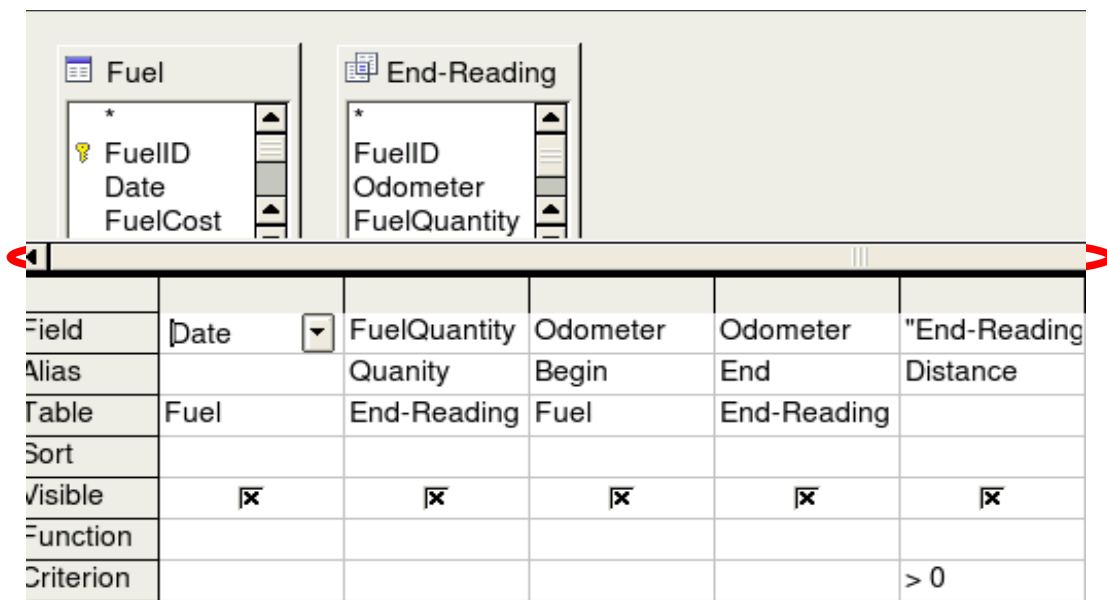7) Create report (final settings).

a) Use the suggested name, which is the same as the query.

b) Select *Static report.* Click **Finish**.

Creating a dynamic report

We will create a report with some statistics on our fuel consumption. To do this, we have to modify two queries: End-Reading and Fuel Economy. We will be adding the FuelCost field to the End-Reading query. Then we will add the FuelCost field from the End-Reading query to the Fuel Economy query.

Tip	When opening a query to edit it, it might appear as in Figure 88. If you move your cursor over the black line (circled in red), it becomes a double headed arrow. Drag and drop it to a lower position.

Figure 88: Appearance of query when opened for editing

1) Add the *FuelCost* field to the End-Reading query:

a) Right-click the *End-Reading* query and select **Edit** from the context menu.

b) In the Fuel table list, double-click to add *FuelCost* to the bottom table (Figure 89).

c) Save and close the query.

Figure 89: Adding an additional field to the query

2) Add the *FuelCost* field from the End-Reading query to the Fuel Economy query.

   a) Right-click the *Fuel Economy* query and select **Edit** from the context menu.

   b) Double-click the *FuelCost* field in the End-Reading query list to the table at the bottom.

3) Add a calculation field to the right of the FuelCost field.

   a) Type the following in the Field cell:

      "End-Reading".FuelCost/("End-Reading".Odometer – Fuel.Odometer)

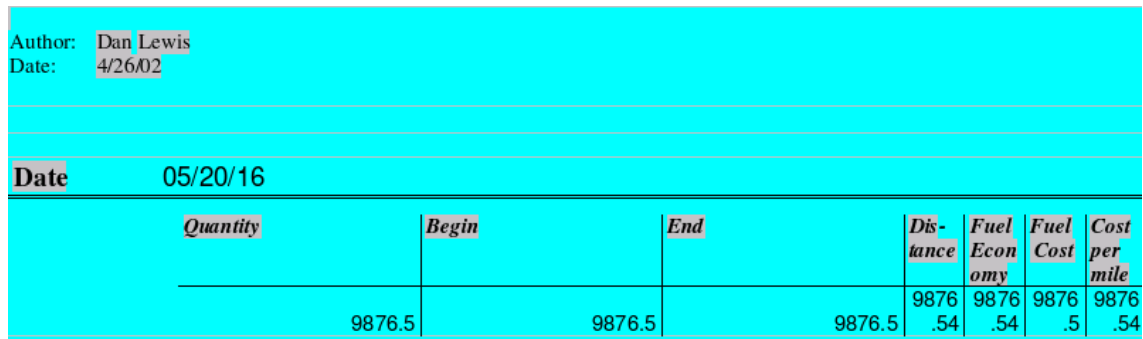   b) Type the following in the Alias cell:

      cost per mile

Note	If you use the metric system, cost per km is the appropriate alias.

4) Save and close the query.

5) Open a new report.

   Right-click the Fuel Economy query and select **Report Wizard**.

6) Select fields.

   Move all the fields from the *Available fields* to the *Fields in report* list. Use the **>>** to do so. Click **Next**.

7) Label fields.

   Change FuelCost to Fuel Cost by placing a space between the words. Click **Next**.

8) Group fields.

   Use **>** to move the Date field to the Groupings list. Click **Next**.

9) Sort options: the wizard skipped this one.

10) Choose layout.

    Accept the default. Click **Next**.

11) Create the report.

    a) Change the report name to Fuel Statistics.

b) The default setting is Dynamic report, so no change is necessary.

c) Select *Modify report layout.* Click **Finish**.

Modifying a report

At the end of the last section, we left the Fuel Statistics report open in the edit mode (Figure 90). We will be working on that report. These same steps can be used with any report that you open for editing.

Author:	Dan Lewis							
Date:	4/26/02							
Date	05/20/16							
	Quantity	*Begin*	*End*	*Dis-tance*	*Fuel Econ omy*	*Fuel Cost*	*Cost per mile*	
				9876 .54	9876 .54	9876 .5	9876 .54	
	9876.5	9876.5	9876.5					

Figure 90: A report in edit mode

The Author is the name you listed in **Tools > Options > OpenOffice.org > User Data**. The date is not correct. The columns need to be moved to the left to give a better appearance. None of the numbers are correct, but their only purpose is to show the number of decimal places.

Step 1: Change the date.

1) Click to the right of the date (4/26/20) so that the cursor is next to the field. Use the *Backspace* key to erase the date.

2) **Insert > Fields > Date**. This places today's date where the original date was.

3) Changing the date formating:

a) Double-click the date field you just inserted. The Edit Fields: Document window opens (Figure 91).

Edit Fields: Document		
Type	Select	Format
Date	Date (fixed)	12/31/99
	Date	12/31/1999
		Dec 31, 99
		Dec 31, 1999
		31. Dec. 1999

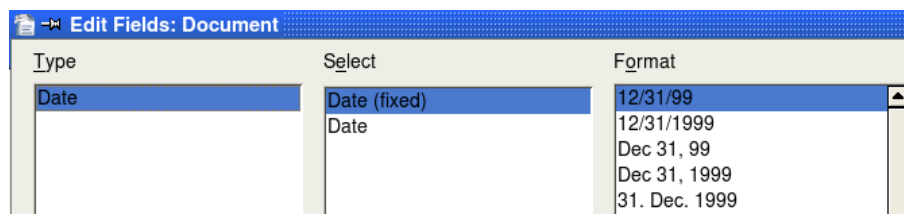*Figure 91: Modifying a date field*

b) Since this is a dynamic report, change the Select field from Date (fixed) to Date.

c) Change the Format to what you desire. (I use the Friday, December 31, 1999 choice.) Click **OK**.

Step 2: Change the column widths.

The column widths can be changed by moving the cursor over the right border of each column so that it becomes a double-headed arrow. Then drag and drop it where you want it. This has to be done for each column in each table in the report. This can also be done with the last column on the right even though there is no black border. It should now look something like Figure 92.

Figure 92: Realigned columns in a report

Step 3: Change the number formating in the cells.

The fuel quantity should have three decimal places. The Begin, End, and Distance should have one decimal place. Fuel Cost should be currency and have two decimal places, and Cost per mile should have three decimal places.

1) Right-click the cell below Quantity to open the context menu. (The cell is circled in red in Figure 92.)

2) Select **Number format.**

3) In the *Options* section (Figure 93),

    a) Change the number of Decimal places to 3.

    b) Click the green checkmark. Click **OK**.

Figure 93: Option section of the Number Formating window

4) Change the Fuel Cost field.

    a) Right-click in the cell below *Fuel Cost*.

    b) Select **Number Format**.

    c) In the Category list, select *Currency*. Click **OK**.

5) Change the Cost per mile field.

    a) Right-click in the cell below *Cost per mile*.

    b) Select **Number Format**.

    c) In the Category list, select *Currency*.

    d) In the Option section:

        • Set the number of decimal places to 3.

        • Click the green checkmark.

    e) Click **OK**.

Step 4: Save and close the report.

Double-click the report. It should now look like Figure 94.

Title:

| Author: | Dan Lewis |
| Date: | Thursday, May 31, 2007 |

Date   05/25/07

Quantity	Begin	End	Distance	Fuel Economy	Fuel Cost	Cost per mile
6.430	704.2	778.7	74.5	11.59	$7.00	$0.100
19.570	778.7	1032.3	253.6	12.96	$20.00	$0.100

Date   05/26/07

Quantity	Begin	End	Distance	Fuel Economy	Fuel Cost	Cost per mile
15.150	1032.3	1239.4	207.1	13.67	$16.00	$0.100

Figure 94: Final report