



LibreOffice
The Document Foundation

Tutorial

Creating a Relational Database using Base

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Note for Mac users

Some keystrokes and menu items are different on a Mac from those used in Windows and Linux. The table below gives some common substitutions for the instructions in this chapter. For a more detailed list, see the application Help.

<i>Windows or Linux</i>	<i>Mac equivalent</i>	<i>Effect</i>
Tools > Options menu selection	LibreOffice > Preferences	Access setup options
<i>Right-click</i>	<i>Control+click</i>	Opens a context menu
<i>Ctrl (Control)</i>	<i>⌘ (Command)</i>	Used with other keys
<i>F5</i>	<i>Shift+⌘+F5</i>	Opens the Navigator
<i>F11</i>	<i>⌘+T</i>	Opens the Styles and Formatting window

Contents

Copyright.....	2
Contributors.....	2
Feedback.....	2
Acknowledgments.....	2
Publication date and software version.....	2
Note for Mac users.....	2
Introduction.....	4
Planning a database.....	5
Creating a new database.....	6
Creating database tables.....	7
Using the Wizard to create a table.....	7
Creating a table by copying an existing table.....	10
Creating tables in Design View.....	10
Defining relationships.....	13
Creating a database form.....	15
Using the Wizard to create a form.....	15
Modifying a form.....	18
Creating forms and sub forms in Design View.....	25
Entering data in a form.....	26
Creating queries.....	28
Using the Wizard to create a query.....	28
Using the Design View to create a query.....	30
Creating reports.....	36
Creating a report.....	36
Static vs dynamic reports.....	37
Vacations table report.....	37

Introduction

A data source, or database, is a collection of pieces of information that can be accessed or managed by LibreOffice. 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 LibreOffice.

This tutorial covers creating a database, showing what is contained in a database and how the different parts are used by LibreOffice.

Note

LibreOffice 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.

A *database* consists of a number of *fields* that contain 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 within it. *Forms* are for data entry into the fields of one or more tables which have been 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 from the fields of a query into a document according to your requirements.

Note

LibreOffice Base uses the HSQL database engine. All of the files created by this engine, including the database forms, are kept in one zipped file.

Caution



To use Base, you need to use a Java Runtime Environment (JRE). Please go to **Tools > Options > LibreOffice > Advanced** to choose a JRE from those installed on your computer.

If no JRE is already installed, you will need to download and install one. For Windows, you need to get Java from www.java.com. For Linux, you can download it from the same website or you can use openjdk-7-jre, available from the repository of your Linux version. Mac OS X users can install a JRE from Apple Inc.

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 numbers 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 a database works and how to use it, we will create one for automobile expenses.

Planning 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 write the answers later. 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 need not be included, as it can be calculated using 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

To create a new database, choose **File > New > Database** from the menu bar, or click the arrow next to the **New** icon on the Standard toolbar and select **Database** from the drop-down menu. Both methods open the Database Wizard.

On the first page of the Database Wizard, select **Create a new database** and then click **Next**.

The second page has two questions. Make sure the choice for the first question is **Yes, register the database for me** and the choice for the second question is **Open the database for editing**. Click **Finish**.

Note

The *F4* key opens and closes the Data Source window containing the list of registered databases. You can access this window and its data while using Writer and Calc. If the database is not registered, this window does not contain it. So, you can not access the database to use in Writer nor Calc.

Save the new database with the name *Automobile*. This opens the Automobile – LibreOffice Base window. Figure 1 shows part of this window.

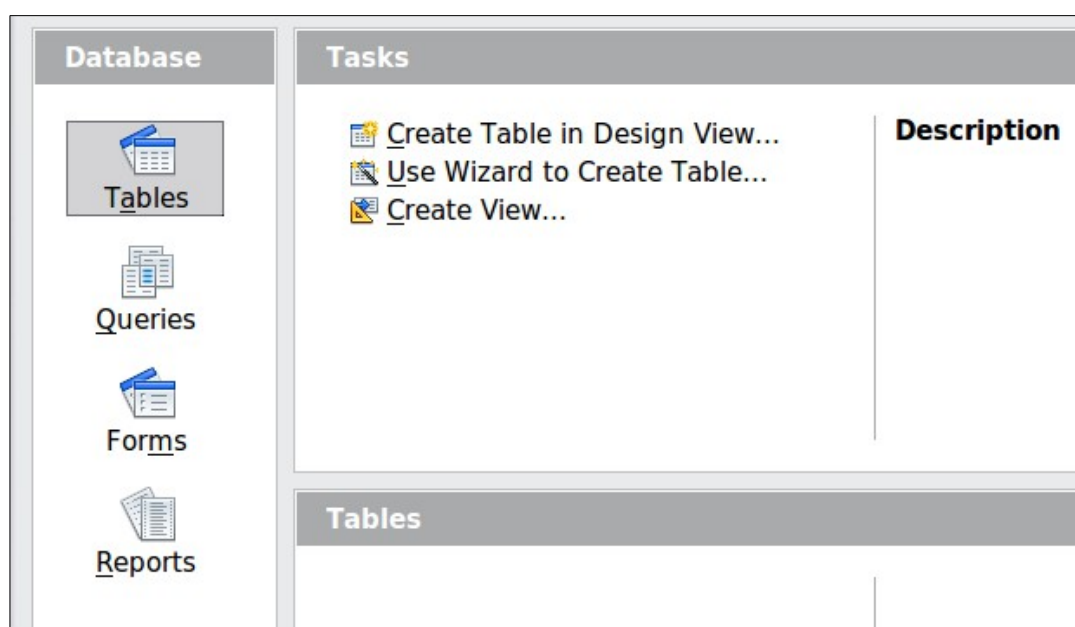


Figure 1: Creating database tables

Tip

Every time the *Automobile* database is opened, the Automobile – LibreOffice Base window opens. Changes can then be made to the database. The title for this window is always <database name> – LibreOffice Base.

Caution



As you create a database, you should save your work regularly. This means more than 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. When the table is first saved, it is also made part of the database in memory. Only when you save the database file do you write the table in the database file.

Creating database tables

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 must have at least one table and may have several.

To work with tables, click the *Tables* icon in the *Database* list, or press *Alt+a*. The three tasks that you can perform on a table are in the *Tasks* list (see Figure 1).

Using the Wizard to create a table

Wizards are designed to do the basic work. Sometimes this is not sufficient for what we want; in those cases we can use a wizard as a starting point and then build upon what it produces.

The Table Wizard in Base contains two categories of suggested tables: business and personal. Each category contains sample tables from which to choose. Each table has a list of available fields. We can delete some of these fields and add other fields.

A field in a table is one bit of information. For example, a price list table might have one field for item name, one for the description, and a third for the price.

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

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.

Click *Use Wizard to Create Table*. This opens the Table Wizard (Figure 2).

Step 1: Select 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* box changes to a list of available fields for this table.
- 3) *Selected fields*: Using the *>* button, move the following 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 drop down 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 you make a mistake in selecting fields, click on the field name in the *Selected fields* list and use the *<* button to move it from the *Selected fields* list back to the *Available fields* list.
- 6) If you make a mistake in the order of the selected fields, click on the field name that is in the wrong order and use the **Up** or **Down** arrow on the right side of the *Selected fields* list to move the field name to the correct position.
- 7) Click **Next**.

Figure 2: Selecting fields for the table

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. (See Figure 3.) You can then make changes to meet your needs. Click each field, one at a time, and make the changes listed below.

Figure 3: Changing field types

Note

If any of these fields requires a mandatory entry, set *Entry required* to **Yes**. A blank field will then 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**. (example of a mandatory entry)
- *AlbumTitle*:
 - *Entry required*: Leave *Entry required* as *No*, unless all of your music is in albums.
 - *Length*: Unless you have an album title that exceeds 100 characters counting the spaces, do not change the length.
- *Artist*: Use the Default setting. And since music has artists, set *Entry Required* to *Yes*.
- *Date Purchased*: *Field type*: default date setting. *Entry required* should be *No*. (You may not know the date.)

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 uses only the actual number of characters in a field up to the limit set, so a field containing 20 characters will occupy only 20 characters even if the limit is set at 100. Two album titles containing 25 and 32 characters respectively will use space for 25 and 32 characters and not 100 characters.

- *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. Small Integer [SMALLINT] would allow 99999 tracks if you needed more than 999 tracks.
- *Photo*: Use the default settings.

When you have finished, click **Next**.

Note

Each field has a *Field Type*, which must be specified. 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), use text. If the field will always contain a number (for example, a price), the type should be decimal or another 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 the *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.

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. Notice that a table named "CD-Collection" is now listed in the Tables portion of the window.

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 copies of the original table, naming each according to the type of music contained in it.

- 1) Click on the **Tables** icon in the Database pane to see the existing tables.
- 2) Right-click on the *CD-Collection* table icon. Choose **Copy** from the pop-up menu.
- 3) Move the mouse pointer below this table, right-click, and select **Paste**. The Copy table dialog opens.
- 4) Change the table name to *Pop* and click **Next**.
- 5) Click the >> button to move all the fields from the left box to the right box and click **Next**.
- 6) Since all the fields already have the proper Field type, no changes should be needed. However, this is the time and place to make any 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, and data has been entered, editing them should be very limited. Fields can be added or deleted, but adding a field requires you to enter the data for that one field for every existing record with an entry for that field.

Deleting a field deletes **all the data** once contained in that field. Changing the field type of a field can lead to data being lost either partially or completely. When creating a new table, it pays to create the fields with the correct names, length, and format before you add any data.

Deleting a table removes all of the data contained in every field of the table. Unless you are sure, do not delete a table.

Creating tables in Design View

Design View is a more advanced method for creating a new table, in which you 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*.

- 1) Click Create Table in Design View.
- 2) *FuelID* field: Type *FuelID* as the first Field Name. Press the *Tab* key to move to the Field Type column. Select *Integer [INTEGER]* as the Field Type from the drop down list. (The default setting is Text [VARCHAR].)

Tip

A shortcut for selecting from the Field Type drop down list: press the key for the first letter of the choice. You can cycle through the choices for a given letter by repeatedly pressing that key.

- a) Change the Field Properties in the bottom section.
Change *AutoValue* from *No* to *Yes*.

- b) Set *FuelID* as the *Primary key*.

Right-click on the green triangle to the left of *FuelID* (Figure 4) and choose *Primary Key* from the menu. This places a key icon in front of *FuelID*.

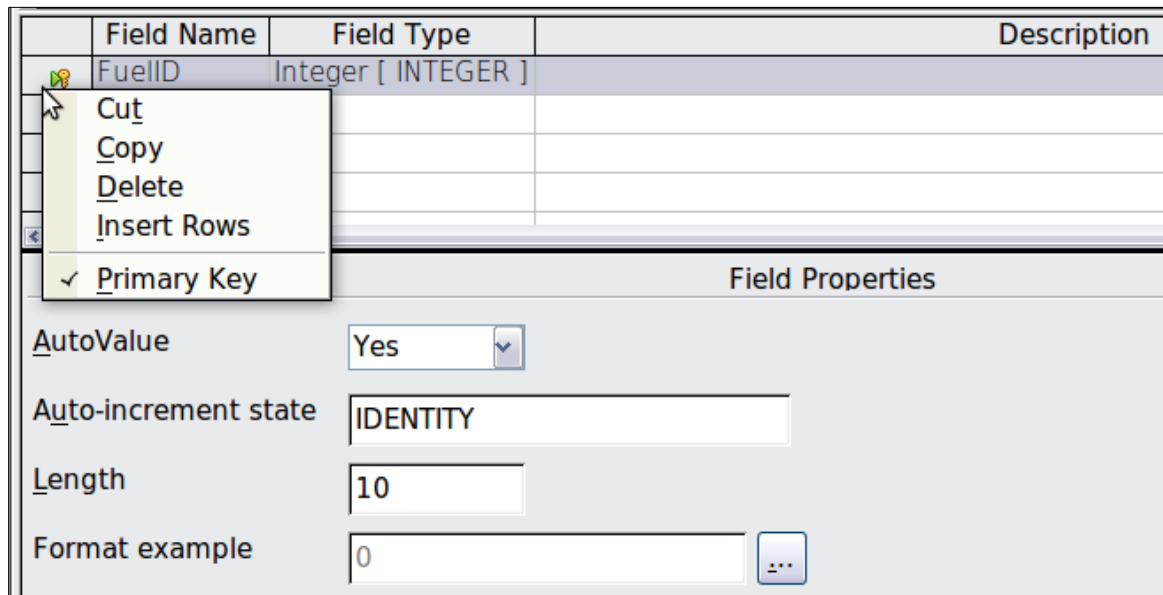


Figure 4: Defining the primary key field

Note

The primary key serves only one purpose: to identify the record uniquely. Any name can be used for this field. We have used *FuelID* for convenience, so we know to which table it belongs.

- 3) All other fields (*Date*, *FuelCost*, *FuelQuantity*, *Odometer*, and *PaymentType*):
- Type the next field name in the Field Name column.
 - Select the Field Type for each field.
 - For *Date* use Date[DATE]. (Press the *D* key to select it.)
 - PaymentType* uses Text [VARCHAR], the default setting.
 - All other fields use Number [NUMERIC]. (Press the *N* key once to select it.)
 - FuelCost*, *FuelQuantity*, and *Odometer* need changes in the Field Properties section (Figure 5).
 - FuelQuantity*: Change *Length* to 6 and *Decimal places* to 3. (Many fuel pumps measure fuel to thousandths 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 (Figure 5). This opens the Field Format window (Figure 6). Use *Currency* as the Category and your currency as the Format. My currency has two decimal places. Use what is appropriate for yours.

	Field Name	Field Type
🔑	FuelID	Integer [INTEGER]
	Date	Date [DATE]
▶	FuelCost	Number [NUME ▼
	FuelQuantity	Number [NUMERIC
	Odometer	Number [NUMERIC
	PaymentTyp	Text [VARCHAR]

Field Properties

Entry required: No ▼

Length: 5

Decimal places: 2

Default value:

Format example: \$0.00 ⋮

Figure 5: Changing field properties

- 4) To access additional formatting options, click the button to the right of the Format example field.
- 5) *Description* can be anything, or can be left blank.

Format Alignment

Category	Format	Language
All	USD \$ English (USA) ▼	English (USA) ▼
User-defined	-1,234.00 USD	
Number	-1,234.00 USD	
Percent	-\$1,234	
Currency	-\$1,234.00	
Date	-\$1,234	
Time	-\$1,234.00	
Scientific	-\$1,234.-	

\$1,234.57

Options

Decimal places: 2	<input checked="" type="checkbox"/> Negative numbers red
Leading zeroes: 1	<input checked="" type="checkbox"/> Thousands separator

Figure 6: Field Format options

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

Follow the same steps to create the *Vacations* table. The fields and their field types are listed in Figure 7. Make sure you make the Date field the primary key before closing. (Right-click the gray box to the left of Date and select **Primary key** from the menu.) Save the table and name it *Vacations*. Close the Vacations table.


	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 [LONGVARCHAR]	
	MiscPayment	Text [VARCHAR]	payment type for miscellaneous

Figure 7: Fields in Vacations table

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 at once each day. Most of these expenses are in the Vacations table, but the fuel we buy is not. So we will link 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 Fuel and Maintenance tables do not really have a relationship even though they share similar fields: Date and Odometer.

Tip

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

- 1) To begin defining relationships, choose **Tools > Relationships**. The Automobile – LibreOffice Base: Relation Design window opens and the Add Tables dialog pops up. (You can also open it by clicking the Add Tables icon on the Relation Design window.)
- 2) On the Add Tables dialog, use either of these 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** for each table.
- 3) Click **Close** to close the Add Tables dialog when you have added the tables you want.

- 4) You can define the relationship between the Vacations and Fuel tables in two ways:
- Click and drag the *Date* field in the Fuel table to the *Date* field in the Vacations table. When you release the mouse button, a connecting line forms between the two date fields.
 - Or, click the **New Relation** icon. This opens the Relations window (Figure 9). Our two tables are listed in the *Tables involved* section.
 - In the *Fields involved* section, click the drop down list under the Fuel label.
 - Select *Date* from the Fuel table list.
 - Click in the cell to the right of this drop down list. This opens a drop down list for the Vacations table.
 - Select *Date* from the Vacations table list. It should now look like Figure 9.
 - Click **OK**.

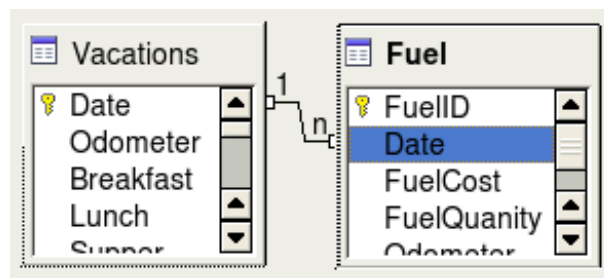


Figure 8: Designation for a 1:n relationship

Fuel	Vacations
Date	Date

Figure 9: Selected fields in a relationship

- 5) Modifying the *Update options* and *Delete options* section of the Relation window.
- Right-click the line connecting the *Date* fields in the two table lists to open a menu.
 - Select **Edit** to open the Relations dialog (Figure 10).

Figure 10: Update options and Delete options section

- Select **Update cascade**.

- d) Select **Delete cascade**.
- e) Click **OK** to close the Relations dialog and choose **File > Save** to save the Relation Design window.

While these options are not strictly necessary, they do help. Having them selected permits you to update a table that has a relationship defined with another table which has been modified. It also permits you to delete a field from the table without causing inconsistencies.

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.

Figure 11: Fields of a simple form

Figure 12: Simple form with additions

A simple form consists of the fields from a table (Figure 11). More complex forms can contain much more, including additional text, graphics, selection boxes, and many other elements. Figure 12 is made from the same table with a text label (Fuel Purchases), a list box placed in PaymentType, and a graphic background.

A list box is useful when a field contains a fixed choice of options. It saves you from having to type in data by hand, and ensures that invalid options are not entered.

In our database, payments for food or fuel might be made from one of two credit cards (Dan or Kevin) or in cash, so these would be the available options for all boxes that contain payments.

To create a list box, we first need to create a small, separate table containing the options. This is then linked to the corresponding field in the form. The topic is dealt with in detail in the Base User Guide and will not be pursued further here.

Using the Wizard to create a form

We will use the Form Wizard to create a Vacations form, which will contain a form and a subform

In the main database window (Figure 1), click the **Forms** icon in the left column. In the Tasks list, double-click **Use Wizard to Create Form** to open the Form Wizard (Figure 13). Simple forms require only some of these steps, while more complex forms may use all of them.

Step 1: Select fields.

- 1) Under Tables or queries, select Table: Vacations. *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**.

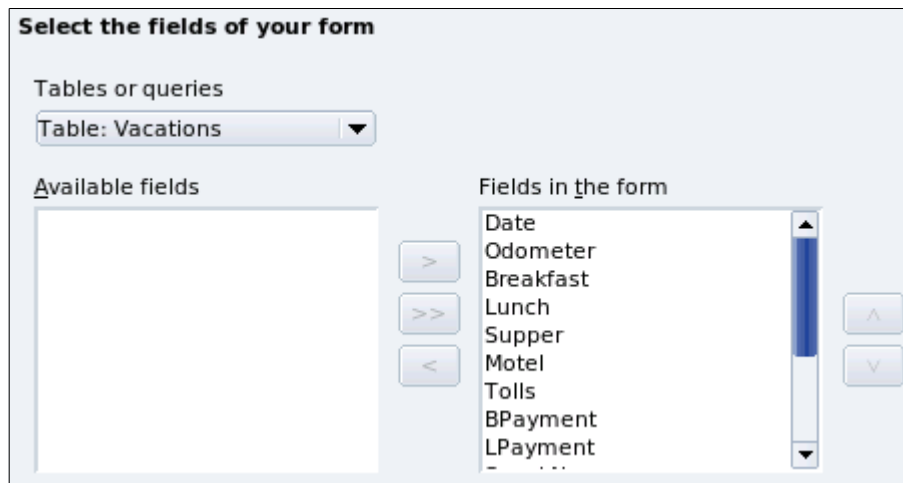


Figure 13: Form Wizard steps

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 need to be done in step 4.

- 1) Click the box labeled *Add Subform*
- 2) Click Sub form *based upon existing relation*.
- 3) Fuel is listed as a relation we want to add. So click Fuel to highlight it, as in Figure 14. Click **Next**.

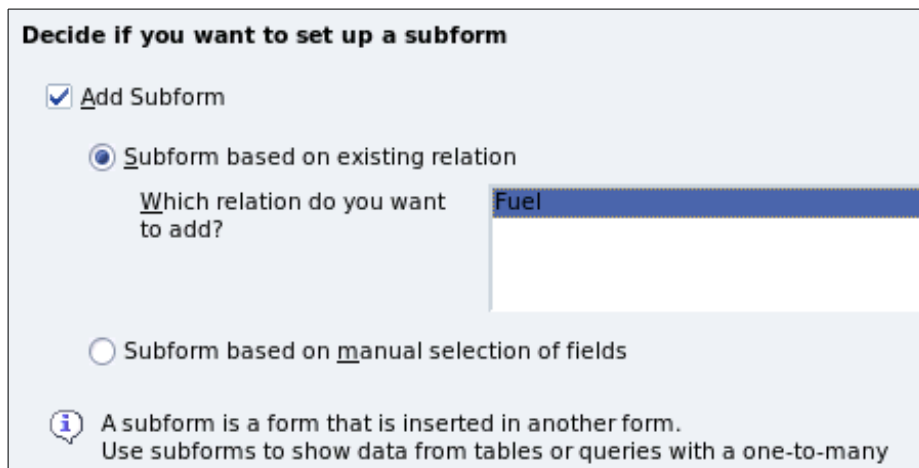


Figure 14: Adding a subform

Step 3: Add subform fields.

This step is similar to step 1. The only difference is that not all of the fields will be used in the subform.

- 1) Fuel is preselected 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 15).
- 5) Click **Next**.

Select the fields of your subform

Tables or queries
Table: Fuel

Available fields
FuelID

Fields in the form
Date
FuelCost
FuelQuantity
Odometer
PaymentType

Figure 15: Selecting fields of a sub form

Step 4: Get joined fields.

This step is for tables or queries for which no relationship has been defined. Because we have already defined the relationship, the wizard skips this step.

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.)

Arrange the controls on your form

Label placement —

☒ Align left
☐ Align right

Arrangement of the main form —

Columnar - Labels on Top

Arrangement of the subform —

As Data Sheet

Step 5: Arrange controls.

A control in a form consists of two parts: label and field. This step in creating the form determines where a control's label and field are placed relative to each other. The four choices from left to right are *Columnar left*, *Columnar - Labels on top*, *As Data Sheet*, and *In Blocks - Labels Above*.

- 1) Arrangement of the main form: Click the second icon (*Columnar - Labels on top*). The labels will be placed above their field.
- 2) Arrangement of the sub form: Click the third icon (*As Data Sheet*). (The labels are column headings and the field entries are in spreadsheet format.) Click **Next**.

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 3D 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 *Modify the form*.
- 3) Click **Finish**. 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. The discussion will follow this ten step outline of our planned changes.

- Provide a drop-down capability for the Date field in the main form, and lengthen the field to show the day of the week, month, day, and year.
- Shorten the length of the payment fields (all fields containing the word Payment).
- Move the controls into groups: food, fuel subform, and miscellaneous.
- Change the wording of some of the labels. Some single words should be two words. Some abbreviations should be used if possible (Misc. for miscellaneous).
- Change the lengths of several fields and labels. Only Lunch, Supper, Motel, and Tolls have acceptable lengths. But for a better appearance, changes will be made to these as well.
- Lengthen the Note field vertically, add a scroll bar, and move it.
- Make changes in the Date and PaymentType columns of the subform to match the changes in the main form.
- Add headings for each group in the main form.
- Change the background to a picture, then modify some of the labels so that they can be read clearly against this background. Change the font color of the headings.

Here are some methods 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, sometimes with only the label or the field, and 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. You can then drag and drop it where you want.

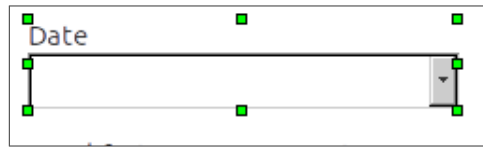


Figure 16: A selected control

- *Control+click* a label or field selects only the label or the field. You can press the *Tab* key to change the selection from the field to the label or the label to the field.

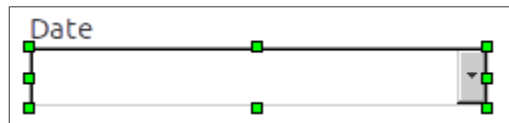


Figure 17: Selecting a field of a control

- Moving a group of controls is almost as easy as moving one of them.
 - 1) Click the field of the top left control to be moved, to select it.
 - 2) Move the cursor to just above and to the left of the selected control.
 - 3) 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 18: Selecting multiple controls

Move the cursor over one of the fields. It changes to a drag icon. Drag the group of controls to where you want them.

- Click the Tolls control to select it. Then drag it to the right close to the Lunch control.

Tip

When either changing 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 (**View > Ruler**).

Step 1: Change the Date field.

- 1) *Control+click* the Date field to select it.
- 2) Move the cursor over the middle green handle on the right side. It should change to a double-headed 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. Release the mouse button.
- 4) Click the Control icon in the Form Controls toolbar. If it is not visible, choose **View > Toolbars > Form Controls**. The *Properties: Date Field* window opens. Each line contains a property of the field.



Figure 19: Form Controls toolbar

- Scroll down to the *Date format* property. This is a drop down list with Standard (short) as the default setting. Click it to open the list. Select the *Standard (long)* entry.
- Scroll down to the *Drop down* property. Its default setting is No. It is also a drop down list. Click to open the list. Select Yes.

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 19). You can do this any time you want to see the form with the changes you have made.

Step 2: Shorten the width of some fields.

All of the fields with a label containing the word payment are too wide. They need to be shortened before the controls are moved.

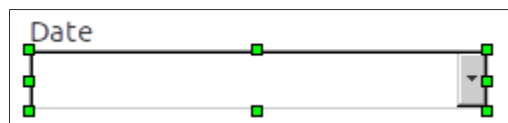


Figure 20: Selecting a field

- 1) **Control+click** the BPayment field.
- 2) Move the cursor over the middle green handle on the right. The cursor becomes a double-headed arrow.
- 3) Drag the cursor to the left until the field is 2.5 cm (1 inch) wide.
- 4) Repeat these steps to shorten these fields: Lpayment, SPayment, SnPayment, Mpayment, and MiscPayment.

Tip

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.

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

We want to move the controls so that they look like Figure 21.

- 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 changes shape to a drag icon.
- 3) Drag and drop the control to where you want it.
- 4) Use the same steps to move the rest of the controls to where they belong.

Date		Odometer		Tolls		Motel		Payment		Misc.		Misc. Payment	
Breakfast		Payment		Snack No		Snack Cost		Payment		Misc. Notes			
Lunch		Payment											
Supper		Payment											

Figure 21: Positioning of controls

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 plain *mouse click* and drag to the desired spot.

Step 4: Change the label wording.

Field names have been required to be single words for some time. However, the labels for the fields in a form can be more than one word. So we will change them by editing the text in the label.

- 1) *Control+click* the SnackNo label. Do one of the following:
 - Right-click the SnackNo label and select **Control** from the pop-up menu.
 - Or click the Control icon in the Form Control toolbar (Figure 19).
- 2) The dialog that opens is labeled Properties: Label Field. It contains all the properties of the selected label.
 - In the Label selection, edit the label to Snack No.
 - Close the Properties dialog.
- 3) 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

You can modify all of the listings in the Properties window. For example, if you change 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) Right-click Breakfast and choose **Position and Size**. On the Position and Size dialog, change Width to 2 cm.
- 2) Repeat for the other listed controls, using 3 cm for Misc.Payment.

Caution



When changing the position or size of an entire control, use the Position and Size dialog or the drag and drop method.

When working with either the label or the field (but not both at the same time), you can use the Properties dialog to make these changes when you want to be exact. However, you need to be careful not to accidentally select the entire control for use with the Properties dialog or you will apply exactly the same values to both the label and field. For example, if you enter the values for a new position, both the field and the label moves to the same position and the field is positioned on top of the label. Then you will have to move each of them to where you really want them.

Note

To open the Properties window, right-click a control and select **Control** from the pop-up menu. Or, you can click the Control icon in the *Form Controls* toolbar. Just be careful, and use *Control+Z* to undo any mistakes you may make. Detailed instructions on how to use the Properties window are given in the *Base Guide*.

Step 6: Change the Misc. Notes field.

We want the Misc. Notes control, which has a field type of Memo, to have a vertical scroll bar for additional text space if desired.

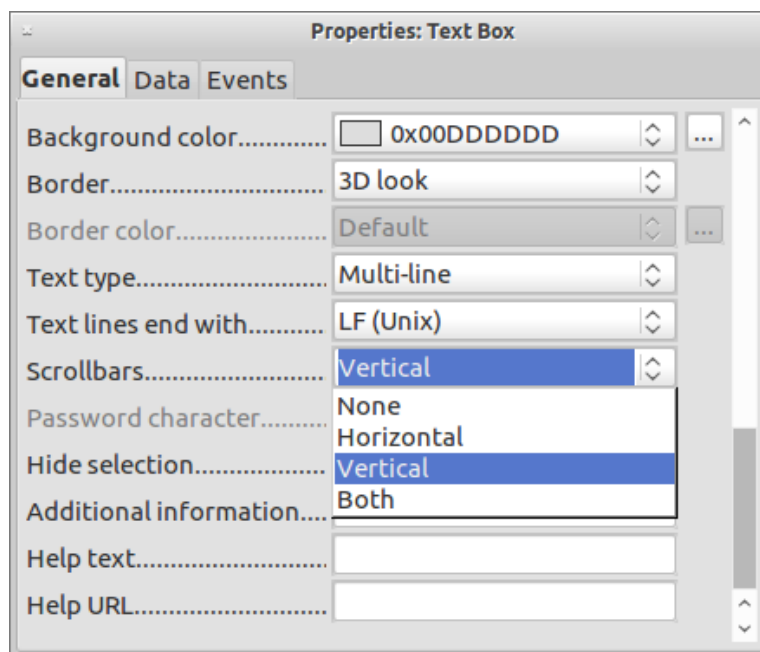


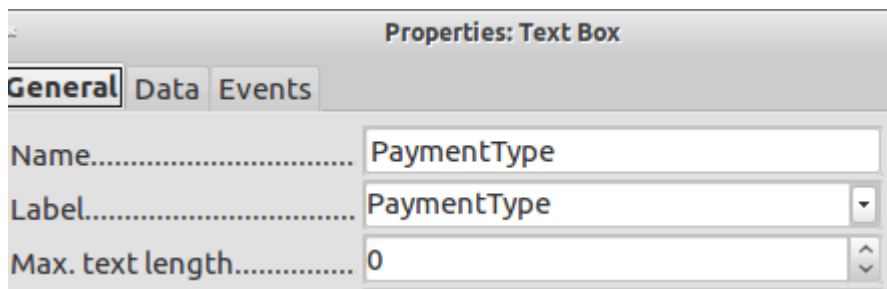
Figure 22: Scroll bar selections in the Properties window

- 1) *Control+click* the Misc. Notes field. The green handles should surround the field but not its label.
- 2) Click the **Control** icon to open the Properties window (Figure 22).
- 3) Scroll down to the Text type property with single-line as the default value.
 - Change it to Multi-line.
- 4) Scroll down to the *Scrollbars* setting. Change the selection from *None* to *Vertical* in this list.
- 5) Close the Properties window. (*Esc* key)
- 6) Lengthen the Misc. Notes field by moving the cursor over the middle green handle at the bottom of the field and dragging down until the length is 6 cm (2.4 inches).

Step 7: Change labels and fields in the subform

The subform is located at the bottom of the form. We want to widen the Date column, and change the label for the PaymentType column to two words.

- To widen the Date column, move the mouse pointer over the dividing line between the Date and FuelCost columns. When the pointer changes shape, click and drag to move the divider to the right.
- To change the PaymentType column:
 - Right-click the label PaymentType to open the menu.
 - Select **Column** to open the Properties dialog. In the *Label* property, change PaymentType to Payment Type.
 - Close the Properties dialog.



Step 8: Add headings to groups.

This step is easier to do if you have end-of-paragraph markers visible. Choose **View > Non printing Characters** to turn them on.

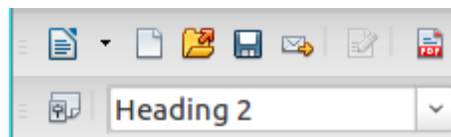


Figure 23: Apply Styles list

- 1) Make sure the cursor is in the upper left corner. If it is not, click in that corner to move it there.
- 2) Press the *Enter* key to move the cursor down to the space between the Date field and the Breakfast field.
- 3) Change the *Apply Styles* drop down list from *Default* to *Heading 2*.
- 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 Chapter 6 of the *Writer Guide* for details.

Step 9: 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 > LibreOffice > Colors**. If you know how to create custom colors, you can use them. You can also use a picture (graphic file) as the background.

- 1) Right-click the form to open a context menu.
- 2) Select **Page**.
- 3) Make sure the *Background* tab has been selected. (It will be in bold type while the other tabs will be in default type.)

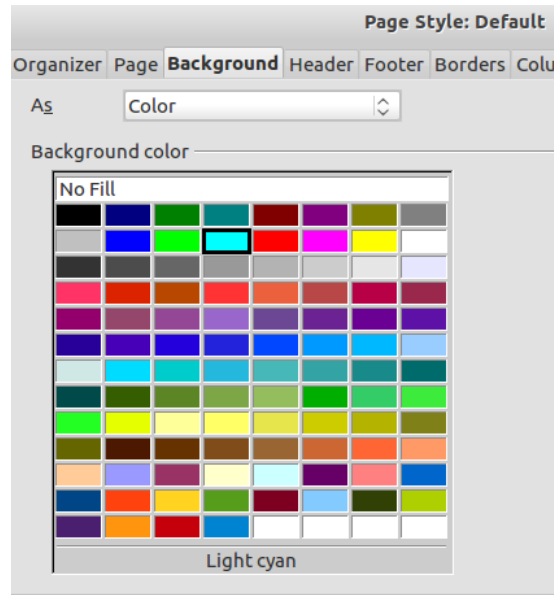


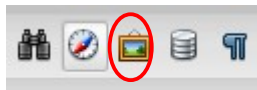
Figure 24: Page style dialog

- 4) Click *Light cyan*. (Second row, fourth column from the left.)
- 5) Click **Apply** to see the effects of adding the color. OR, click **OK** to close the dialog.

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.

- 6) To add a graphic to the background:
 - a) Click the Gallery tool (circled in red). The gallery window opens.



- b) Select the graphic you want to use. (I have done these steps selecting pebble-light.)
 - i) Browse through the choices.
 - ii) Right-click your choice.
 - iii) **Insert > Background > Page**
 - c) Click the Gallery tool to close the gallery window.
 - d) The form should look like Figure 25.

Figure 25: Finished form

Step 10: 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.



Figure 26: Form Design toolbar with Activation Order icon circled

- 1) **Control+click** the Date field.
- 2) Click the **Form Design** icon in the Form Controls toolbar to open the Form Design toolbar (Figure 26), or choose **View > Toolbar > Form Design** to open this toolbar.
- 3) Click the **Activation Order** icon (circled).
- 4) Rearrange the order of the fields in the 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 27. Click **OK**.
- 5) Save and close the form.
- 6) Save the database.

Creating forms and sub 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*.

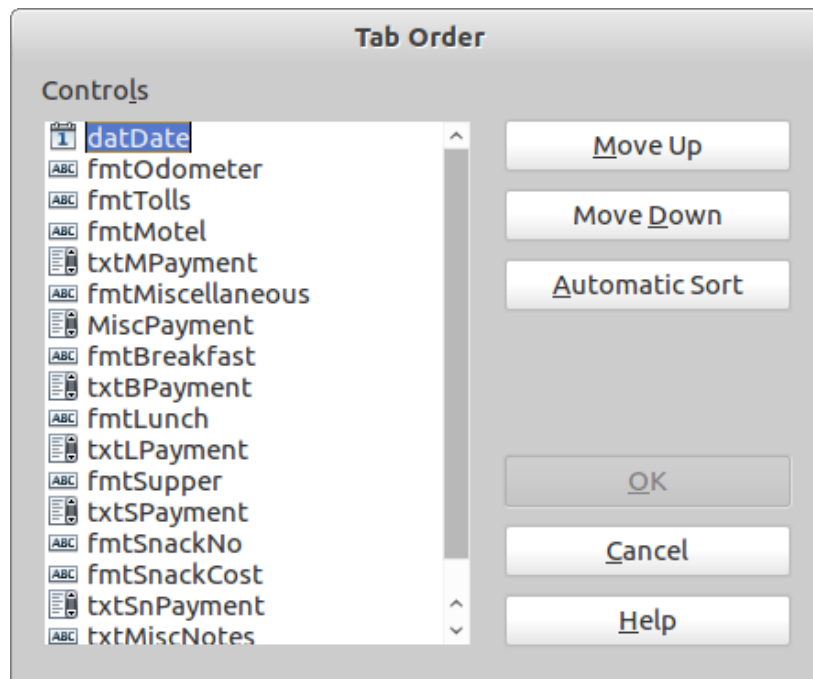


Figure 27: Tab order for the main form

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

Different types of field allow different methods of data entry. In many 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 (Figure 1).

- 1) Click the Forms icon in the *Database* list.
- 2) Find the form's name in the *Forms* list (Vacations).
- 3) 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 drop down calendar (Figure 28). Then click the day the you want. Then press the *Tab* key to go to the Odometer field.

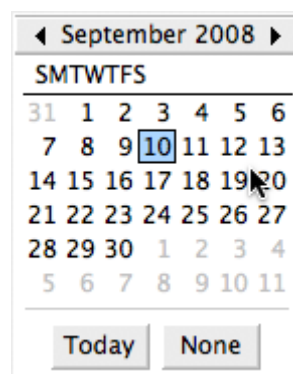


Figure 28: Calendar drop down

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

- Clicking the *up arrow* increases the value, and the *down arrow* decreases the value by one unit.
- 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 drop-down list. If, as in my case, all of the elements of the list start with different letters, typing the first letter selects the desired entry.

- If two or more elements of the list have the same first letter, repeated typing of the first letter will cycle through these elements.
- 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 numeric fields or drop-down 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.

Note

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*. Furthermore in text fields, the *Enter* key acts only as a line break to move the cursor to the next line. While the *Enter* key will move between non-text fields, it will not do so from a text field. Use the *Tab* key instead.

If we did not have a subform for fuel data, pressing the *Tab* key in the last field 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, 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, FuelQuantity, and Odometer fields are numeric fields. The Payment field is a drop-down 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, click any of the fields of the main form. In this case, click the Date field of the main form. Then use the directional arrows at the bottom. There are four of them from left to right: *First Record*, *Previous Record*, *Next Record*, and *Last Record* (Error: Reference source not found). To the right of these arrows is the *New Record* icon.

To create a new record while in another record in the main form, click either the *Next Record* icon or the *New Record* icon.

Tip

The number in the Record box is the number of the record whose data is shown in the form.

If you know the number of the record you want, you can enter it into the record box and then press *Enter* to take you to that record.

Figure 29 is a record with data inserted in its fields.

Meals

Breakfast: \$11.00, Payment: Dan

Lunch: \$15.00, Payment: Dan

Supper: \$13.00, Payment: Kevin

Snacks

Snack No.: 3, Snack Cost: \$5.00, Payment: Cash

Fuel Data

Date	Fuel Cost	Fuel Quantity	Odometer	Payment Type
Friday, May 25, 2007	\$16.00	14.690	704.2	Kevin
Friday, May 25, 2007	\$7.00	6.430	778.7	Dan

Record 1 of 2

Figure 29: Sample record of the Vacation form and sub form

Creating queries

Queries are used to get specific information from a database. Query results are special tables within the database.

To demonstrate the use of queries, we will use two different methods:

- 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. (Queries that require calculations are best created with the Design view.)

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.

In the main database window (Figure 1), 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 30). 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.field name*, with a period (.) between the table name and the field name. For example, the Lunch field of the Vacation table used in a query has the name *Vacation.Lunch*.

Step 1: Select the fields.

- 1) Select the CD-Collection table from the drop down list of tables.
- 2) Select fields from the CD-Collection table in the *Available fields* list.
 - a) Click *Artist*, and use the > button to move it to the *Fields in the Query* list.
 - b) Move the AlbumTitle and DatePurchased fields in the same manner.
 - c) Click **Next**.

Tip

To change the order of the fields, select the field you want to move and click the up or down arrow.

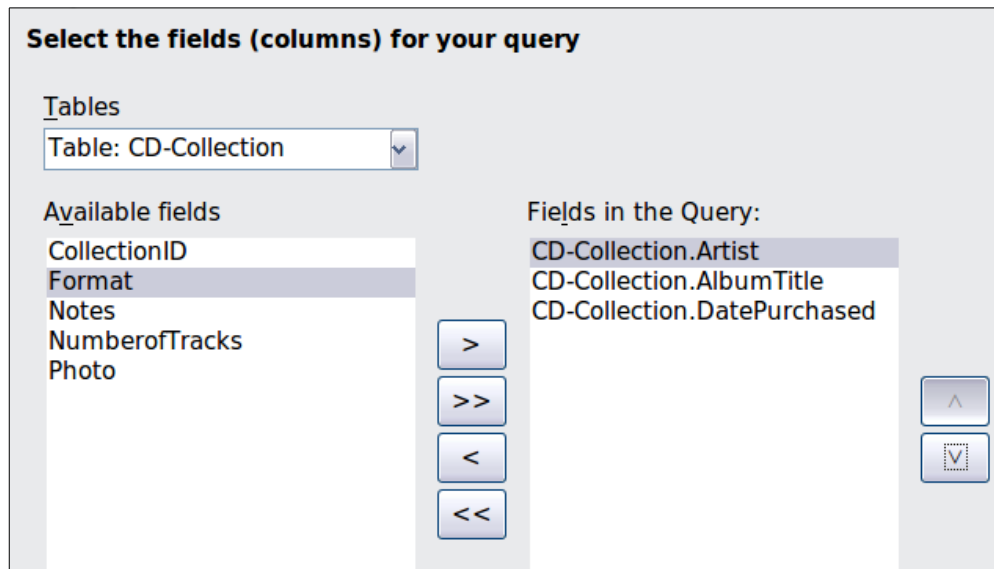


Figure 30: First page of the Query Wizard

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 31: Sorting order page

- 1) Click the first *Sort by* drop down list.
 - a) Click *CD-Collection.Artist* to select it.
 - b) To list the artists in alphabetical order (a-z), select *Ascending* on the right.

- 2) Click the second *Sort by* drop down list.
 - Click *CD-Collection.ArtistTitle.* and select *Ascending.*
- 3) Repeat this process for *CD-Collection.DatePurchased.*
- 4) Click **Next.**

Step 3: Select the search conditions.

The search conditions 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.

- *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 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 *CD-Collection. Artist* in the Fields list and *is equal to* as the Condition.
- 3) Type 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. Steps 5 and 6 of the wizard 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.**

Using the Design View to create a query

Creating a query using Design View is not as difficult 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 used as part of the second query.

Step 1: Open the first query in Design View.

- Click **Create Query in Design View**.

Step 2: Add tables.

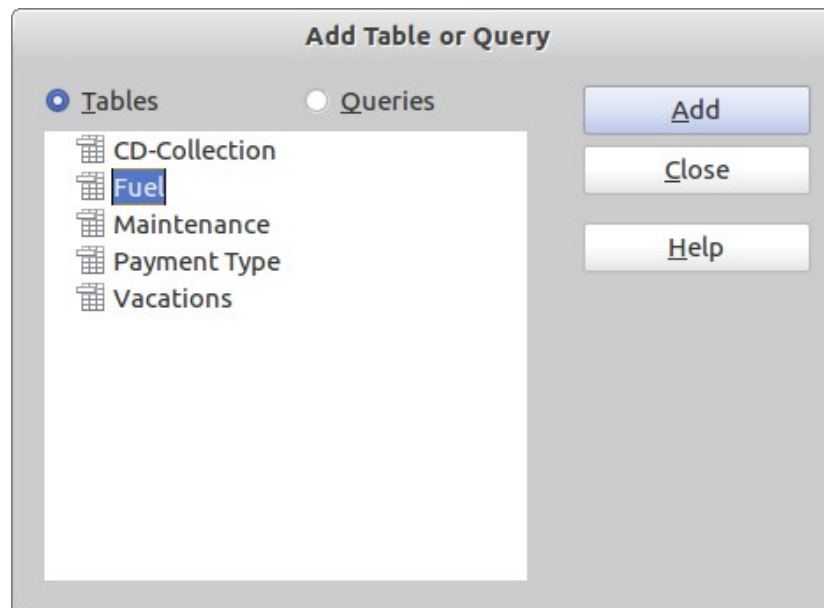


Figure 32: Add Tables or Query dialog

- 1) Click *Fuel* to highlight it.
- 2) Click **Add**. Click **Close**.

Tip

Move the cursor over the bottom edge of the fuel table (Figure 33) and drag the edge to make it longer and easier to see all of the fields in the table.

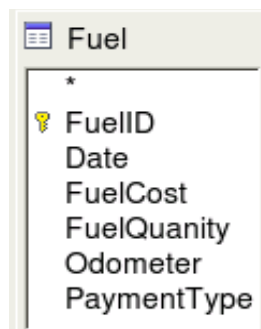


Figure 33: Fuel table in query

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.

Field	FuelID	Odometer	FuelQuantity
Alias			
Table	Fuel	Fuel	Fuel
Sort			
Visible	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Function			
Criterion			

Figure 34: Query table

Step 4: Set the criterion for the query.

We want 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.

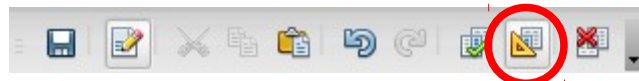


Figure 35: Query Design toolbar

Figure 36 contains the Fuel table with my entries and the query results based upon the Fuel table: the query results are in the right table.

FuelID	Date	FuelCost	FuelQuantity	Odometer
0	Friday, May 25, 2007	\$16.00	14.690	704.2
1	Friday, May 25, 2007	\$7.00	6.430	778.7
2	Saturday, May 26, 2007	\$20.00	19.570	1032.3
3	Saturday, May 26, 2007	\$16.00	15.150	1239.4
5	Saturday, May 26, 2007	\$16.00	15.144	1639.4
<AutoField				

Figure 36: Fuel table

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

Figure 37: Query of Fuel table

Step 5: Save and close the query.

Since this query contains the final 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 *Queries* to get the list of queries in the database (Figure 38).
 - b) Click End-Reading.
 - c) Click **Add**, and then click **Close**.

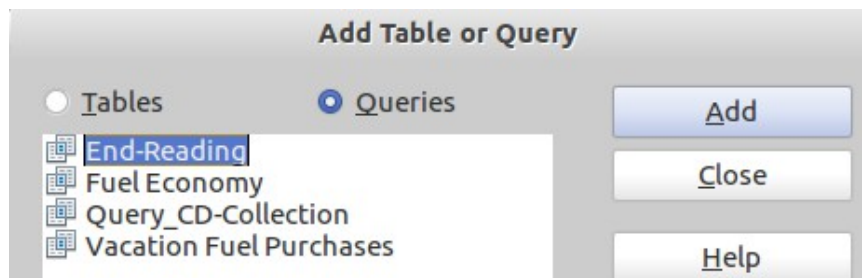


Figure 38: Selecting queries to add to another query

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

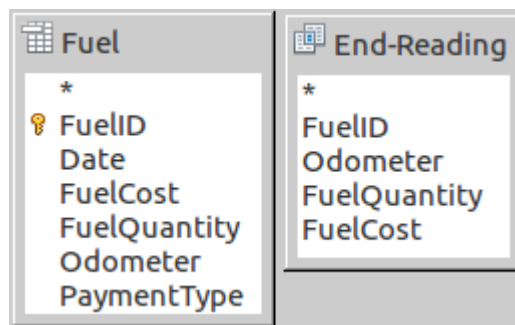


Figure 39: Tables in this query

- 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	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 40: 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.

- 2) Type the numeral 1 (one) in the Criterion cell of this column.
- 3) Calculate the distance traveled:
 - Type "End-Reading"."Odometer" - "Fuel"."Odometer" in the Field cell.
 - Type >0 in the Criterion cell.
- 4) Calculate fuel economy: Type ("End-Reading"."Odometer" - "Fuel"."Odometer") / "End-Reading"."FuelQuantity" in the next column to the right of the word Field.

FuelQuantity	Odometer	Odometer	"End-Reading"."FuelID" - "Fuel"."FuelID"
Quantity	Begin	End	
End-Reading	Fuel	End-Reading	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			1

Figure 41: Typing in calculation of fields

"End-Reading"."Odometer" - "Fuel"."Odometer"
Distance
<input checked="" type="checkbox"/>
> 0

Figure 42: Field for distance traveled calculations

("End-Reading"."Odometer" - "Fuel"."Odometer") / "End-Reading"."FuelQuantity"
Fuel Economy
<input checked="" type="checkbox"/>

Figure 43: Fuel economy calculation field

Note

When entering fields for these calculations, you must follow this format: table or query name followed by a period followed 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 43.

Use the arithmetical symbol between the two. More than one calculation can be done by using parentheses to group the arithmetical operations.

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.

FuelQuantity	Odometer	Odometer	("End-Reading"."Odometer" - "Fuel".
6.430	704.2	778.7	11.59
19.570	778.7	1032.3	12.96
15.150	1032.3	1239.4	13.67

Figure 44: Result of running the fuel economy query

- 1) Click the Run Query icon in the Design Query toolbar (Figure 35). The results are in Figure 44.

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 the aliases as they are listed in Figure 45.

FuelQuantity	Odometer	Odometer	"End-Reading"	("End-Reading".
Quantity	Begin	End		Fuel Economy
End-Reading	End-Reading	Fuel		

Figure 45: Query table with aliases added

- 3) Run the query again. The results are in Figure 46.

Quantity	Begin	End	Distance	Fuel Economy	Fuel Cost	Cents per mile	"End-Reading"."FuelID" - "Fuel"."FuelID"
6.430	704.2	778.7	74.5	11.59	7	9.4	1
19.570	778.7	1032.3	253.6	12.96	20	7.9	1
15.150	1032.3	1239.4	207.1	13.67	16	7.7	1

Figure 46: 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 column that does not need to be seen.

Remove the check in the box of the Visible cell as in Figure 47.

Field	Date	FuelQuantity	Odometer	Odometer	"End-Reading"."FuelID" - "Fuel"."FuelID"
Alias		Quantity	Begin	End	
Table	Fuel	End-Reading	Fuel	End-Reading	
Sort					
Visible	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Figure 47: Making a field invisible in a query run

- 5) Rerun the query (Figure 48).

Date	Quantity	Begin	End	Distance	Fuel Economy	Fuel Cost	Cents per mile
Friday, May 25, 2007	6.430	704.2	778.7	74.5	11.59	7	9.4
Friday, May 25, 2007	19.570	778.7	1032.3	253.6	12.96	20	7.9
Saturday, May 26, 2007	15.150	1032.3	1239.4	207.1	13.67	16	7.7

Figure 48: Query run with a hidden column

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

My suggestion for a name is *Fuel Economy*.

- 1) Click the Save icon.
- 2) Name the query.
- 3) Close the query.
- 4) Save the database file.

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 payment types.

Note

To fully use queries requires a knowledge of set operations (*unions, intersections, and, or, complements*, and any combinations of these). Having a copy of the *HSQldb User Guide*, available from <http://hsqldb.org/>, is also extremely useful.

Creating reports

Reports provide information found in the database arranged in a useful way. In this respect, they are similar to queries. Reports are generated from the database's tables, views, or queries.

All reports are based upon a single table, view, 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 or view. Then you can create a report from this.

For example, a report on vacation expenses includes both fuel costs and meal costs. These values are contained in fields of two different tables: Vacations and Fuel. So this report requires you to create a query or view.

Caution



Dynamic reports update only the *data* that is changed or added to a table or query. They do **not** show any modifications made to the table or query itself. For example, **after** creating the report below, open the fuel economy query created in the previous section. For the "End-Reading"."Odometer" – "Fuel"."Odometer" column, change the number 1 to the number 3. The report will be identical before and after you make the change. But if you add more data to the query and run the report again, it will contain the new data.

Creating a 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 arranged?
- What fields are required to provide this information?
- Will a query or view 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 could list the totals of each of these expense groups. Another could list the expense totals for each day of the vacation. A third could 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.) Once you create a query to do any one of these, you can create a report based upon the query.

We will create two reports, one listing the expenses each day (other than fuel) and the second listing fuel statistics. The fields we need for the first report from the Vacations table are: Date, Motel, Toll, Breakfast, Lunch, Supper, SnackCost, and Miscellaneous. This report only requires the Vacation table. Had the report listed the total expenses for each of these fields, we would have to create a query to provide us with these totals.

The second report involves the Fuel table. Since this table includes fuel purchases at times other than during the vacation, we need to create a query that contains only the fuel purchased during the vacation.

Static vs dynamic reports

When creating a report using the Report Wizard, you have a choice of two types of reports in the last page of the wizard: static or dynamic. What you should select depends more upon whether you have a working Report Builder extension or not. If this extension works in your version of LibreOffice, you should select dynamic every time. Otherwise, your selection should depend upon whether you want to update the report later. In this case, select dynamic. If you choose static, the report will always contain the data for the original report date.

LibreOffice has always included the Report Builder extension. For some reason, it does not work in some versions. For these, creating a report is done the same way as is done using OpenOffice.org 3.3, and the Getting Started with Base chapter for OpenOffice.org 3.3 explains the basics for creating a report that can be used.

With the report builder extension working, selecting the type of report as static gives only a table layout of the report's data similar to Figure 53 on page 40. The area above the data can contain things like the author of the report, its date, and its name. A company logo can be placed there as well. The area below the data can also contain text and fields such as *page number of page count*.

Note

Editing a static report will be discussed in Chapter 4 of the Base Guide, Data Output.

When dynamic is selected as the report type and the report builder extension is working, the report can be edited. Its layout can be in one of two formats: a text document or a spreadsheet. Also, it can be saved in a variety of formats that are available for Writer and Calc documents.

My recommendation for those that have the report builder extension working in their version of LibreOffice is that they always select dynamic as the report type. You will have more control over the layout of the report than if you had selected static instead.

Vacations table report

To create a new report.

- 1) Click the *Reports* icon in the Database list in the Automobile – LibreOffice Base window (Figure 1).
- 2) In the Tasks list, click **Use Wizard to Create Report**. The Report Wizard opens.

Tip

When the Report Wizard opens, the Oracle Report Builder opens in the background. As you perform the steps of the wizard, it applies these steps to the Report Builder. You will not be directly using the Report Builder in these steps.

Step 1: Field selection

- 1) Select *Table: Vacations* in the Tables or Queries drop down list.
- 2) 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. Click **Next**.

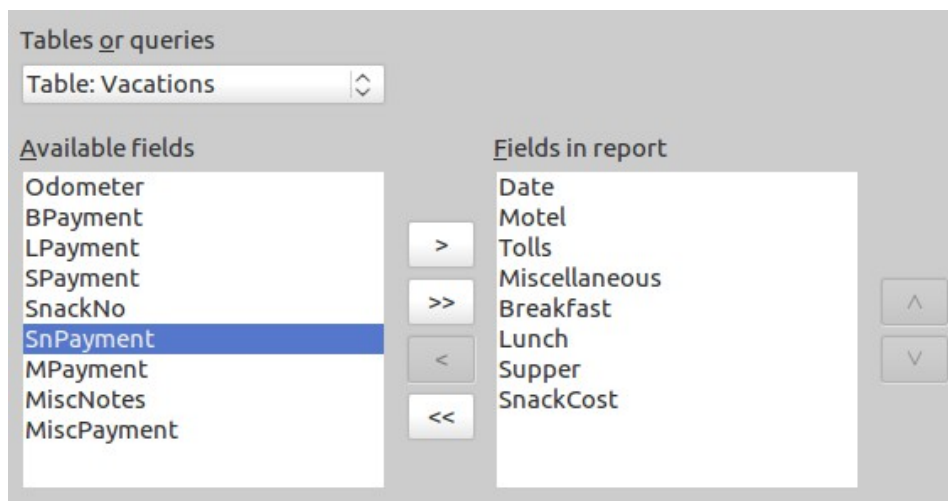


Figure 49: Adding fields to a report

Step 2: Labeling fields

Change any field labels you wish. We will shorten Miscellaneous to Misc. and make SnackCost into two words.

- 1) Shorten Miscellaneous to Misc.
- 2) Add a space to separate SnackCost into Snack Cost.
- 3) Click **Next**.

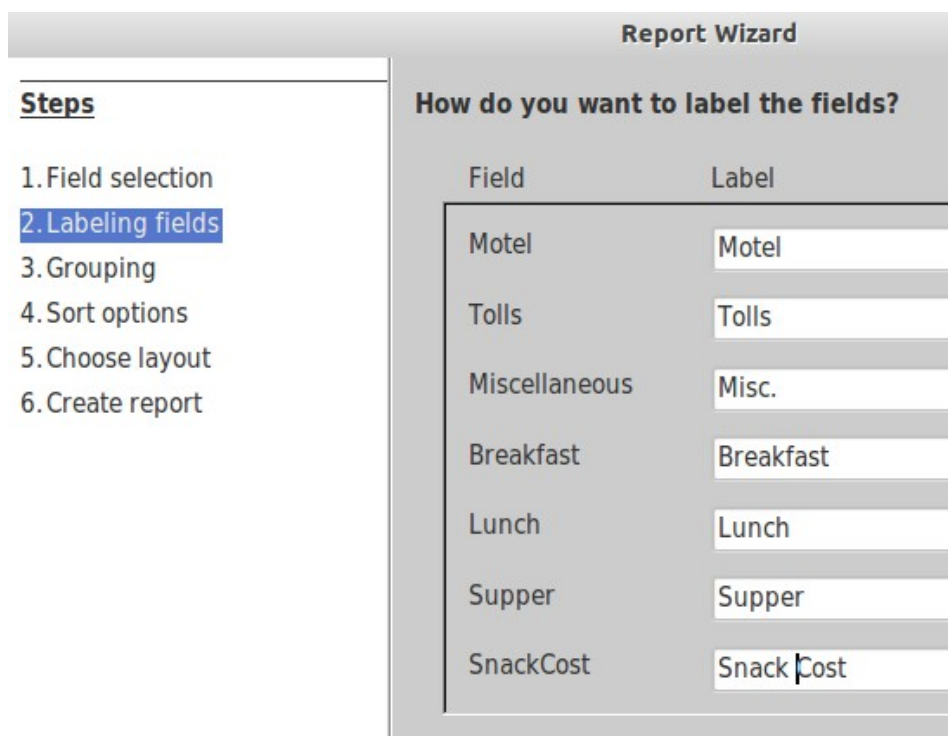


Figure 50: Giving aliases to fields

Step 3: Grouping

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

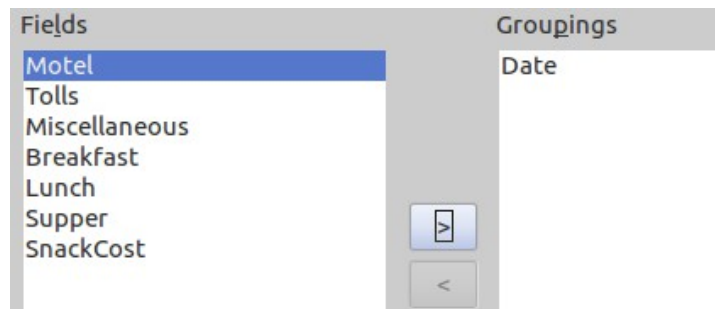


Figure 51: Selecting fields for grouping data

Step 4: Sort options

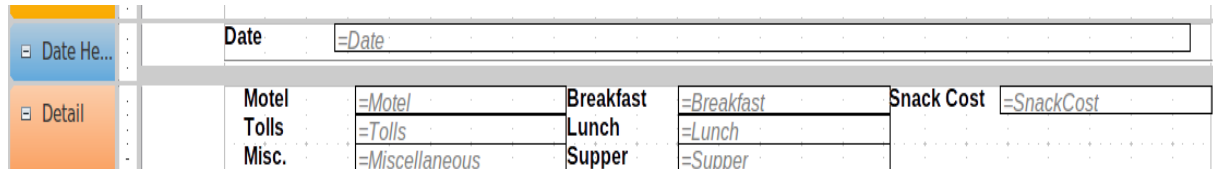
We do not want to do any additional sorting.

- Click **Next**.

Step 5: Choose layout

Use *Columnar, three columns* for the layout.

- 1) Select *Columnar, three columns* for the Layout of data.
- 2) *Layout of headers and footers* has no possible selections.
- 3) Select *Landscape* as the Orientation for the page layout.
- 4) Click **Next**.



Date	=Date				
Motel	=Motel	Breakfast	=Breakfast	Snack Cost	=SnackCost
Tolls	=Tolls	Lunch	=Lunch		
Misc.	=Miscellaneous	Supper	=Supper		

Figure 52: Report Builder template determined by the Report Wizard

Step 6: Create report

- 1) Label the report: Vacation Expenses.
- 2) Select *Dynamic report*.
- 3) Click **Finish**.

The report (Figure 53) has been created, but it needs some editing. The date could be formatted better, and all the numbers need to be formatted as currency. It could use a heading that includes its name, its author, and the date it was prepared. If the report had more than one page, the page numbers could be put in a footer of each page, perhaps including the total number of pages.

Date	05/25/07			
Motel	50	Breakfast	11	Snack Cost 5
Tolls		Lunch	15	
Misc.	2	Supper	13	
Date	05/26/07			
Motel	48	Breakfast	13	Snack Cost 7
Tolls	4	Lunch	10	
Misc.		Supper	15	
Date	05/27/07			
Motel		Breakfast		Snack Cost
Tolls		Lunch		
Misc.		Supper		
Date	09/10/08			
Motel		Breakfast		Snack Cost
Tolls		Lunch		
Misc.		Supper		

Figure 53: Report without modifications

Report Builder: another way to create reports

When we used the Report Wizard, we created a template in Report Builder for our report. If we edit our report, we open Report Builder with this template. By modifying the template, we also modify the report. For example, we can change the Date field's format, and it will change the format of all the dates contained in that field in the above report. Similarly, we can change the field formatting of any of the other fields and change the format everywhere that field appears in the report.

Report Builder can also create reports by itself. To do this you click **Create Report in design View**. For instructions on how to use the Report Builder, see Chapter 4 of the Base Guide, Data Output. We will discuss it in detail there.

For detailed instructions on using Report Builder, see Dmitri Popov's *Sun Report Builder Guidebook*, available in PDF (search for "Sun Report Builder Guidebook") and printed versions from Lulu.com: <http://www.lulu.com/spotlight/writertools>

Note

Report Builder is a LibreOffice extension to assist in report creation. With Report Builder, you can create stylish, complex database reports. You can define group and page headers, group and page footers, and calculation fields. It is installed by default with LibreOffice.