



**LibreOffice**  
The Document Foundation

## Base Guide

# *Chapter 1* *Introducing Base*

*Creating an embedded flat database*

## Copyright

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## Contributors

Dan Lewis  
Reizinger Zoltán  
Hazel Russman  
John Viestenz  
Jean Hollis Weber

## Feedback

Please direct any comments or suggestions about this document to:  
[documentation@global.libreoffice.org](mailto:documentation@global.libreoffice.org).

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## Note for Mac users

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

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## Introduction

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Base is the database component of LibreOffice. A data source, or database, is a collection of information organized so that it can easily be accessed, managed, and updated. 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.

If you have information that you would like to organize, Base will help you do this. You could use a spreadsheet to organize information, but maintaining a spreadsheet with Calc can often be more complex and time consuming than using a database with Base.

This chapter is for the person who has not used Base before or who wants to review the basics of creating and using a database. Terminology is kept to a minimum. This chapter covers the wizards needed to create the database parts and the principles that the wizards use. It also provides references to more information in the *Base Handbook* or the *Base Guide* (being written).

The *Base Handbook* and the *Base Guide* are for people who understand some of the basics of how Base works and want a more in-depth discussion.

### Note

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](http://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.

One of the things that sometimes confuses people is terminology. Specifically, what is the difference between a database and a data source? Base uses the terms interchangeably, as synonyms. This is because a database is a collection of data that can come in different forms. These include text files, spreadsheets, or a file created by a database program.

A collection of data does not serve a good purpose unless we can use the information it contains. Therefore, a structure has to be built using data. In a spreadsheet, formulas and cell links are used to obtain information from the data contained in it. Database programs can do the same thing.

With Base, you create a *Database document file*. This file contains the data and all of the structures you create to obtain information from the data. Because everything is included in one file, it is known as an embedded database.

Base can also be used to connect to other databases. In this case, Base creates a file to make the connection. These are not embedded databases since they exist outside the Base file. They are front end database documents. See the *Base Handbook* and *Base Guide* for more information.

## Types of database

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The two types of database are known as *flat* and *relational*. Base can create and work with both types. This chapter discusses flat databases. Relational databases are covered in detail in the *Base Handbook* and the *Base Guide*.

A *flat database* contains one or more tables, each containing one or more fields. Each table is completely independent of all the other tables in the database. For example, you might have an address database with several tables in it. One might contain your family's contacts, another your business contacts, and another your spouse's family contacts. While some contacts are contained in more than one table, different tables may not have the same information about the same person.

A *relational database* contains one or more tables with one or more relationships defined between those tables; each relationship is defined by a pair of fields. One field of each pair belongs to one table and the second field belongs to the same or a different table. Where relationships exist between fields in the same or different tables, a flat database could still be used, but it provides no mechanism for defining the relationship. Instead the same data must be entered in both fields, making data entry errors more likely. A well designed relational database requires the data to be entered only once, reducing possible errors.

## Flat database

Consider an address book. Usually, the data in an address book can be divided into groups based upon the relationships between the data. For example, all the first names are put into one group. Other groups can include last names, spouse names, addresses, phone numbers, birthdays, and so on. You probably need to identify phone numbers based on their use (home, work, mobile). If you were keeping this information in a spreadsheet, you would use one column for each one of these groups. In a database, this column is called a *field*.

Other relationships that exist between data can be used to further define the structure of that data. In an address book, one value in each of these groups describes a specific individual. In a spreadsheet, the columns would be as above. We would rearrange the rows so that each contains information about an individual.

This divides the data into a table. Each column contains data with the same properties. Each row contains data that describes a specific entity or individual. Each row is called a *record*. The structure of rows and columns is called a *table*.

The collection of data we mentioned was a flat database without any structure. Now with the table, we have a flat database we can use to obtain information from the data.

We use *queries* to obtain the information. You can think of queries as way to ask questions in Base and receive the answers. If we want to give the information to someone else, we will give them a *report* that is based upon a query we created. (A report can be created from a table as well.)

So, a flat database consists of a *table* whose columns are called *fields* and whose rows are called *records*. We use the table structure to ask questions and to receive answers using queries. When providing others with information obtained from a query, we create a *report*. These, then, are the things we use in a database: table with its fields and records, queries, and reports.

## Planning your database

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### Caution



Before creating a database, you should take some time planning what you want it to do and why. The better your plan, the better the results you will get from using the database.

You need to have an idea of what you want to do with the data that you have. This includes how you will divide the data into columns, the fields, and into rows, the records. This determines what the table will be. What information do you want to get from the data? This determines what the queries will be. What information do you want to have in a report? So, take some time to think through what you want first before ever creating a database.

The *Base Guide* has an extensive discussion on this topic in Chapter 2, Planning and Designing your Database.

The Table Wizard (see discussion beginning on page 11) contains a list of suggested tables: some for business purposes, and some for personal purposes. The wizard also contains a list of fields for each of the suggested tables. Each of the fields also has been given the properties it needs.

As a result, the wizard does most of your planning for you. However, you do need to make some decisions, for example whether to use all of the suggested fields. Will you want to use additional fields that the wizard did not include? What properties should these fields have?

Therefore, you need to understand what you are doing as you do it. You need to practice creating the objects of a database before creating them in your database. Learn how to apply the principles first on an example. If necessary, take notes on the principles taught and how they are used.

## Creating a new Base file

After you have planned your database, create a new Base file. To do this, open the Database Wizard using one of the following methods:

- Choose **File > New > Database** from the main menu bar.
- Click the arrow by the *New* icon on the Standard toolbar and select **Database** from the drop-down menu.
- Click the **New Database** icon on the splash screen if it appears when LibreOffice opens.

Step 1 of the Database Wizard (Figure 1) has three parts. Use the top part to create a new database. The middle and bottom parts are used to open an existing database. (These two parts are briefly discussed in “Using Base with other data sources” on page 45.)

Creating a database using the wizard requires two steps.

- 1) On the *Select database* page (Figure 1):
  - a) Under the question *What do you want to do?*, choose **Create a new database** (it is selected by default).
  - b) Click the **Next >>** button at the bottom of the wizard.

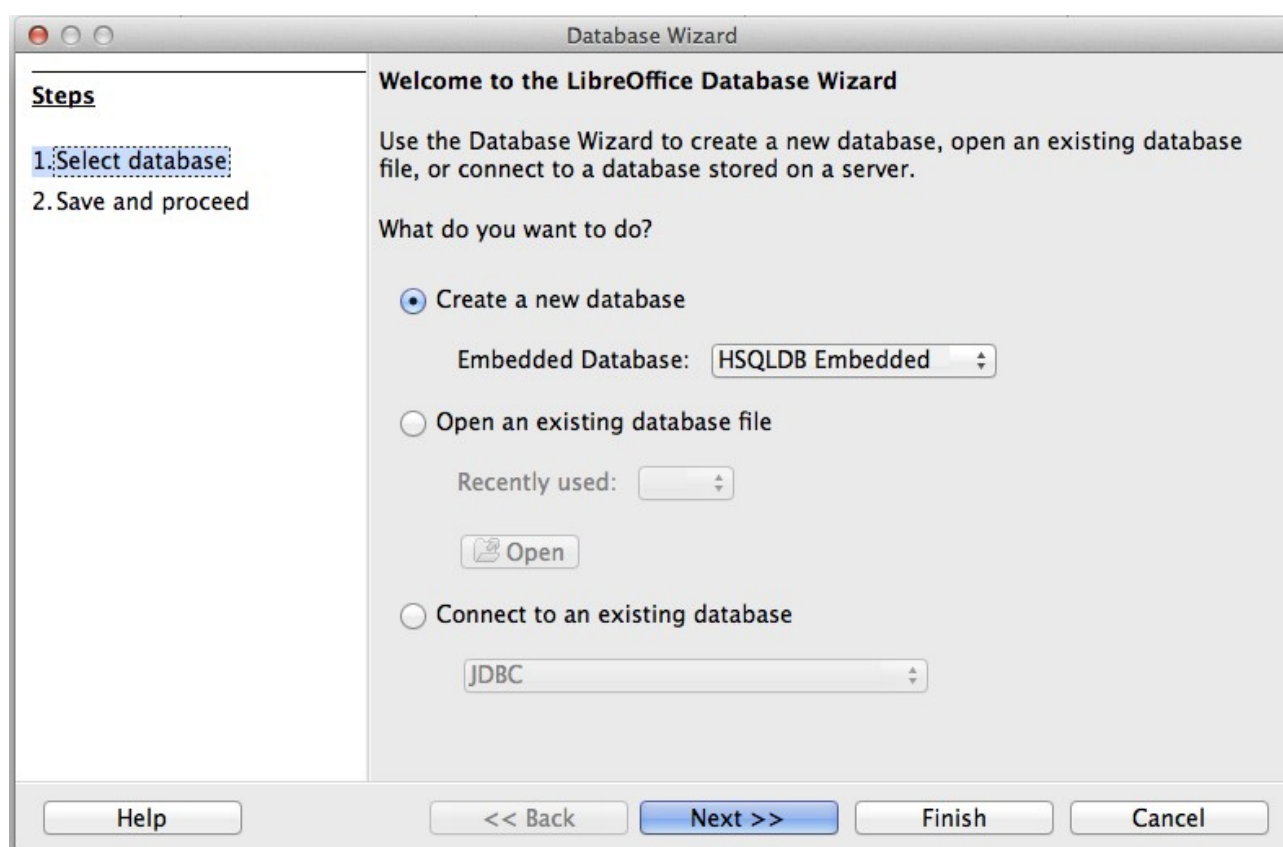


Figure 1: Creating a new database using the Database Wizard

## Note

Beginning with version 4.2.0, the first page of the Database Wizard has a new drop-down list for selecting the type of embedded database. At the time of writing, this feature has not yet been activated; it will not be discussed here.

## Note

When you create a new database, you should register it. Registration lists the location of the database location in one of the configuration files of LibreOffice. You can then access the database from Writer or Calc.

- 2) On the *Save and proceed* page (Figure 2):
  - a) Choose **Register the database for me** (the default setting).
  - b) Choose what you want to do after the database file is saved. In this example, we choose **Open the database for editing**.

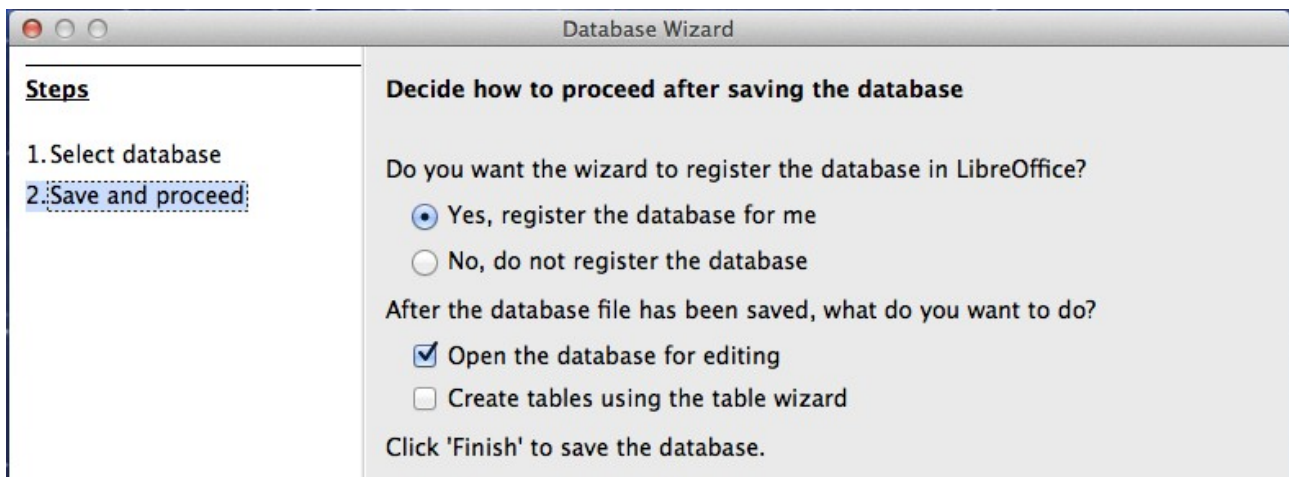


Figure 2: Registering and opening the database file

## Note

If you want to create a table with the wizard immediately after creating a new database, select **Create tables using the table wizard** in addition to **Open the database for editing**. If you do this, the main database window opens with the Table Wizard opening in front of it.

We will discuss the main database window before the Table Wizard, so in our example the second choice is not checked.

- 3) Click the **Finish** button at the bottom of the wizard. A standard *Save as* window opens. Name and save the database.

You have created and saved a new database file that has opened the main database window. If you wish, you can close it now and reopen it later.

## Opening an existing database

You can reopen your new database in several ways. In any file browser, you can browse to where you saved the database and double-click it. or you can right-click it and select LibreOffice to open it. You can also use the database wizard to open it, as described below.



## Using the database wizard to open an existing database

Below the **Open an existing database** option on the first page of the Database Wizard is a drop-down list of the databases you have recently used. After creating your first database, its name will appear as the default value for this list. Once you create or open another database, other names will appear in this list. You can use this list to select the database that you want to open.

- 1) Open the database wizard like you did when you created your database.
- 2) Click the *Open an existing database* option button.
  - From the *Recently used* drop-down list, select the name of the database.
  - **Or**, Click the **Open** button, browse to the location of the database, and select it.
- 3) Click the **Finish** button.

The third section of page 1 of the database wizard is used to connect to databases that have been created by other than Base. This includes text databases, spreadsheets, MySQL, PostgreSQL, Oracle, and Access among the more well known ones.

### Tip

These databases and how to connect to them using Base are discussed in Chapters 2 and 8 of the *Base Guide*.

## Main database window and its parts

Everything you do with a database begins with the main database window (Figure 3). When performing some tasks, you will have to come back to this window to complete the task. So, become well acquainted with it.

Once you have created a new database and saved it, this window opens. Opening a database file will also open it.

The main database window contains three sections: *Database*, *Tasks*, and *List*. However, you will not see *List* as the heading of a section as you do for Database and Tasks. Instead, its heading depends upon which icon is selected in the Database section.

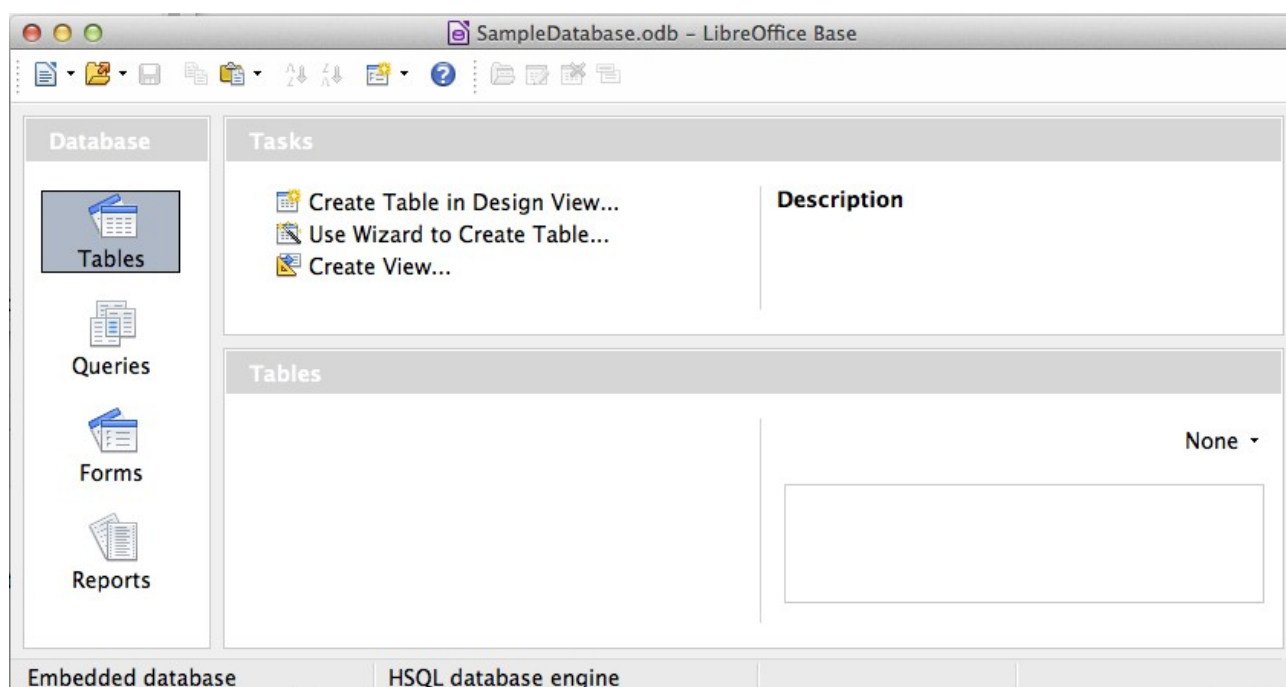


Figure 3: Main Database Window

## Database section

This section is the column of icons on the left side of the window. There is an icon for each part of the database. Your first step after opening a database is to select what part of the database you will work in. The selection you make here changes what appears in the other sections, as explained below.

## Tasks section

This section contains a list of tasks that can be done related to the icon selected in the Database section. When the Tables icon is selected in the Database section, three tasks appear in this section. Two of them help you create a table, and one helps you create a view. When the Queries icon is selected, three tasks appear to help you create a query. When the Forms icon is selected, two tasks appear to help you create a form. When the Reports icon is selected, two tasks appear to help you create a report.

The right side of the Tasks section has the heading *Description*. This area gives you information about each of the tasks. Click any one of the tasks to see its description.

### Note

In this chapter, we are using only the wizards to create the tables, queries, forms, and reports. The *Base Guide* discusses the rest of the tasks, their principles, and an example of their uses.

## List section

This section contains a list of the objects whose icon is selected in the Database section. Click the Tables, Queries, Forms, or Report icon, and this section contains a list of the tables, queries, forms, or reports respectively. The title for this section is the name of the icon selected.

A variety of things can be done with any member of the visible list by right-clicking the item and selecting an action that appears in the context menu. The standard actions are Copy, Delete, Rename, Edit, and Open. The context menu includes additional choices that depend upon the type of list.

To the right of the list is a small window labeled *Document view*, giving you more information about the specific document (table, query, form, or report) you have selected. The view is controlled by a drop-down list containing three options: None, Document Information, and Document.

When Tables or Queries is selected in the Database section, only two choices are available: None or Document. When Forms or Reports are selected, all three choices are available. Selecting *None* leaves the Document view window blank.

Select *Document information* for a form to see who last modified the form and when it was modified. If it has not been modified, there is no information.

Select *Document* and a member of the list, and you will see a snapshot of what you selected. In most cases, you see only the top left portion because of size limitations. For a table or query, you will see only the first few columns and rows along with any data. For a form, you will see the top left portion of it. (If the form is small, you will see all of it.)

### Tip

Document view does not work for reports. You will see all three choices in the drop-down list, but you will not see anything when you make a selection.

## Views

A View is a virtual table or stored query you create using the fields from one or more tables that you have already created. A View allows you to set relationships between tables using selected fields and view the results. View structures are written in the script file in the database folder of the database document file. (Queries are written in a different file in another location of the database document file.)

When we click **Create View** in the Tasks section, the *View Design* dialog opens. This dialog is similar to the Query Design dialog. Discussing these dialogs is beyond the scope of this chapter. Both are discussed in detail in Chapter 5, Queries, in the *Base Guide*.

## Database objects

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Database objects are the tables, queries, forms, and reports of the database. When a new database is created, they have to also be created to make the database's data useful.

This chapter discusses the use of wizards for creating these objects. The principles used by the wizards are included. The example database will be a household inventory.

## Tables: use wizard to create tables

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To open the table wizard, begin in the Database file window. Click the *Tables* icon in the Database section on the left. This places three tasks in the Tasks section. Click this task: *Use Wizard to Create Table*. The wizard opens to its first page.

The table wizard uses several steps to create a table. Each step is located on a separate page. Within each step are smaller steps to do. The major steps are:

- 1) Select fields.
- 2) Set types and formats.
- 3) Set primary key.
- 4) Create table.

### Note

Page 2, *Set types and formats*, refers to setting the types and formats for the fields. On this page, you can choose among the supplied fields, create new fields and set their type and format, and rename fields.

### Table

A *table* consists of one or more vertical columns and one or more horizontal rows containing the data of the database. The data of a given table of a database share one or more common characteristic.

### Field

A *field* is an attribute or characteristic that divides the data of a table into columns, one column for each attribute.

### Record

A *record* is a row of a table. The word *Tuple* is sometimes used in place of *record* in database literature, but record is used more often. The contents of each row share a common characteristic.

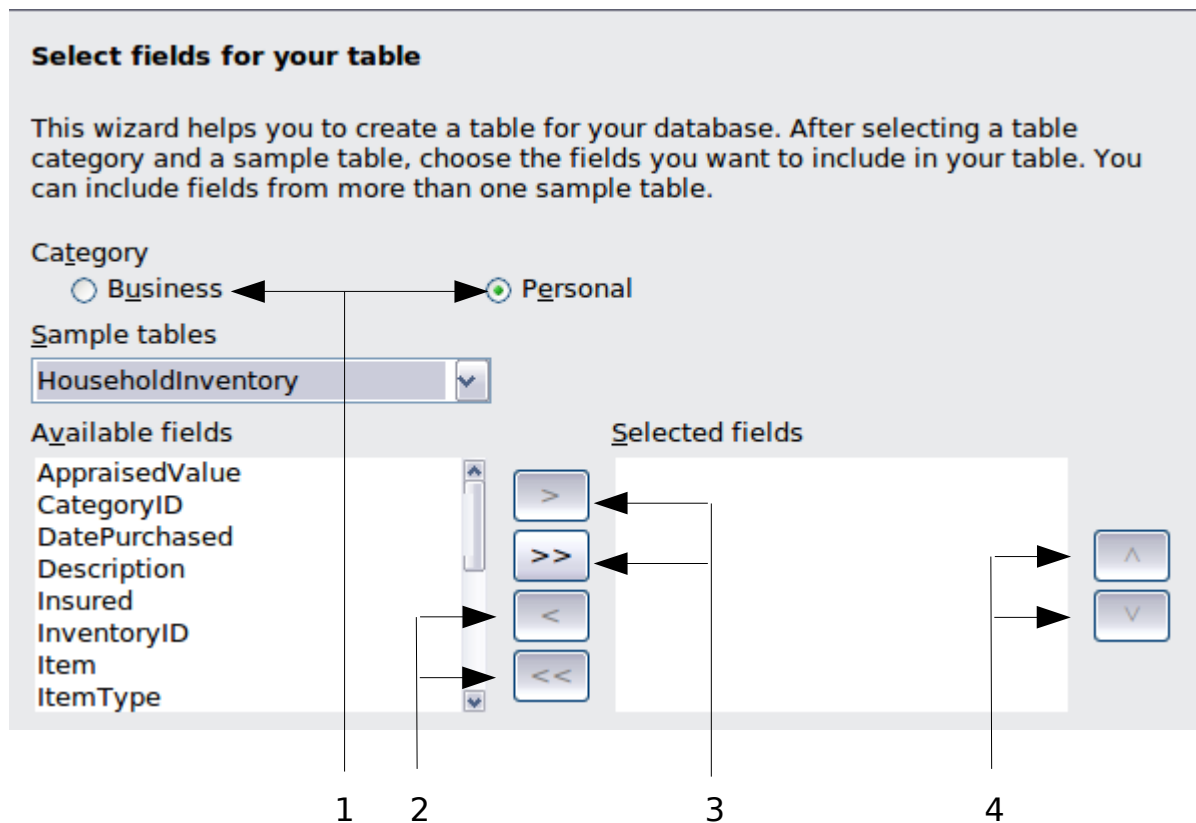
## Step 1: Select fields for your table

*Category* has two choices that determines the type of tables that you can use: Business, and Personal. Select Business for business purposes and Personal for personal purposes.

*Sample tables* is a drop-down list of tables based upon the table's purpose. Select a table from this list, and its fields appear in the *Available fields* list.

Use the arrows in the middle to move fields in the *Available fields* list to or from the *Selected fields*. A single arrow moves a single field; a double arrow moves all of the fields at one time. If you want to move more than one field at a time, highlight the fields first and then click the proper single arrow.

The arrows on the right are for changing the order of the fields in the *Selected fields* list. Click a field to highlight it. Click the up arrow to move it toward the top, or click the down arrow to move it toward the bottom.



- |   |   |
|---|---|
| 1 Category labeled option buttons         | 3 Move selected fields from left to right |
| 2 Move selected fields from right to left | 4 Change the order of the listed fields   |

Figure 4: Step 1 of Table Wizard: Select fields

Here are the smaller steps required on this page. These will be applied to selecting *HouseholdInventory* as the table and the fields in it in the example following these steps.

- 1) Select the category: Business or Personal. This determines what is listed in the *Sample tables* drop-down list. (Select Personal for the example.)
- 2) Open the *Sample tables* drop-down list by clicking the down arrow.
- 3) Select the table you want to use.  
(Select *HouseholdInventory* for the example. *Available fields* contains a list of this table's fields.)
- 4) Move the fields you want to use in your database to the *Selected fields* list.

- 5) To move all the fields at one time, click the double right arrow.
- 6) To move one or more fields, highlight the fields and then click the single right arrow.
- 7) To remove one or more fields from the *Selected fields* list, highlight the fields and click the left single arrow. (To remove them all, click the left double arrow.)
- 8) Change the order of the fields.
  - a) Click the field which you want to move up or down in the list of fields.
  - b) Click the up arrow to move the field higher, or click the down arrow to move it lower.
- 9) Click **Next** to go to Page 2.

### **Practice exercise: Create the HouseholdInventory table**

Begin in the Database file window by clicking the *Table* icon. From the Task section, click *Use Wizard to Create Table* to open the Table Wizard.

The wizard contains many suggested tables that you can use. Some of them are for business purposes and some are for personal purposes. The first thing to do is some research for the names of the sample tables. This requires you to click either the Business option button and search through the sample table names or click the Personal option button and search through its Sample table names. Make a note of any tables that you may find useful. Also note the category of the table (Business or Personal). When you want to use a sample table in a database, you will know where to look for it.

If you looked through the sample table names, you discovered that its category is Personal. The available fields list appears when you select Personal as the category and HouseholdInventory from the Sample table drop-down list. So, make these selections now.

Sixteen fields are available for this table. You can select all or only a few of them, depending upon the information needed for your database.

Choosing what fields to use is part of the planning of the database. It pays to look through the available fields to see if specific fields should be part of the table. If you think that any of the fields should not be apart of the database, do not select them for your table.

What if there is a field that you want to be part of the table, but it does not exist? You can create one in step 2 of the wizard. You can also select a similar field in step 1 and change its type and format in step 2.

For example: you want to include the names of the rooms that contain furniture. One of the 16 fields is RoomID. You can select this field in this step. Then in page 2, change the name of the field from RoomID to Room. Also change the field type and format.

For this exercise, use these fields: AppraisedValue, DatePurchased, Description, Insured, Item, Manufacturer, ModelNumber, Notes, PlacePurchased, PurchasePrice, RoomID, SerialNumber, and InventoryID.

Move these fields from the *Available fields* to the *Selected fields*. You can click a single field or *Control+click* multiple fields to highlight them. Then click the single right arrow. If you accidentally move a field that should not be moved, click the field and then click the single left arrow.

Now comes another part of the planning. Think about the order that you want to use when entering the data into your table. The fields are listed now in alphabetical order. Is that what you want? Chances are that the answer is no. Then what order do you want? One possible order is shown in Figure 5. This order will be used in the exercises for the rest of the steps of this wizard.

To complete this part of the practice exercise, click the **Next >** button. The exercise continues on page 16.

## Step 2: Set types and formats

This page has two parts: the list of selected fields, and field information. The first part contains the same list as you created in page 1 including the order you gave them. When you select one of the fields in this list, the field's information appears in the second part (Figure 5).

### Selected fields list

There are a couple of things that you can do with the Selected fields list (Figure 5). It has a pair of arrows at the bottom right. You can reorder the fields in this list just as you did on page 1.

It also has a plus (+) button and minus (-) button. Use these to create a new field or delete an existing field. Use the plus to add a field or the minus to remove one.

Be careful when removing a field. If you delete a field that should not be deleted, you will have to use the plus to add the field to the list. Then you will have to give this field its field information. So, before deleting any field, click it in the selected field list. Copy the field information that appears. Then if you accidentally delete a field, you can recreate it with all of its field information.

The screenshot shows the 'Table Wizard' window at step 2, 'Set field types and formats'. On the left, a 'Steps' sidebar lists four steps: 1. Select fields, 2. Set types and formats (highlighted), 3. Set primary key, and 4. Create table. The main area is divided into two panes. The left pane, 'Selected fields', lists twelve fields: Item, RoomID, Description, SerialNumber, Manufacturer, ModelNumber, PlacePurchased, DatePurchased, PurchasePrice, AppraisedValue, Insured, Notes, and InventoryID. The 'Item' field is selected and highlighted. The right pane, 'Field information', displays details for the selected field: 'Field name' is 'Item', 'Field type' is 'Text [ VARCHAR ]', 'Entry required' is 'No', and 'Length' is '50'. Below the field list are up and down arrow buttons for reordering, and minus and plus buttons for removing or adding fields. At the bottom of the window are buttons for 'Help', '< Back', 'Next >', 'Finish', and 'Cancel'.

Figure 5: Ordered selected fields list with field information items

### Field information

All the fields have at least four items as field information. The actual number of items depends upon the field type. When the field type is Integer, there are five items.

Most of the field types used in Base are similar to those used in database programs. However, different programs are likely to have some field types that are not available in Base. For example, *MEDIUMINT*, is used in MySQL. Its Length is less than *INTEGER* and larger than *SMALLINT* which Base uses.



**Tip**

Whether you are new to creating databases or new to using Base to create them, you will be selecting the field information for all of your fields. For this reason, those used in Base are discussed in Appendix I of the Base Guide, *Field Information for Base*.

The *Field name* permits you to change the spelling of the field's name. The *Field type* determines the main characteristic of the field such as text, numbers, dates, times, timestamps, Boolean (for example, yes/no, true/false, or male/female), and very large fields including images.

Use *Entry required* for any field that must always have a value by selecting Yes. Always be sure that an entry will always be required before selecting Yes.

**Caution**

If you have a field that requires an entry, you will get an error message if you do not enter a value. You will be able to add values to all the other fields once only before the error message, But you can not add any more values until you enter one in the field that requires one.

The *Length* property determines the size of the entry that can be used for a field. Each of the field types have specific maximum lengths. So, check what these are when entering a length, and enter what you need. You might need to change the field type if you need a larger length than your chosen field type will permit. Then again, a field type that has a smaller length might be more appropriate.

Text field types include CHAR, VARCHAR, VARCHAR\_IGNORECASE, and MEMO. CHAR stores entries in a fixed length. For example, the selected length is 10 and the values entered were cat, mouse, leather, and something. These would be stored as cat0000000, mouse00000, leather000, and something0. The zeros are added to make the length of each one 10. When this field is later read, the zeros are ignored.

VARCHAR is variable character. Only the actual characters entered are stored up to the length selected. If it also has a selected length of 10, the above examples are stored as cat, mouse, leather, and something. So less storage is needed when using VARCHAR instead of CHAR. This is especially useful when a field's values vary considerable in length. So the suggested length of 50 can be used for VARCHAR as long as the longest entry is less than or equal to 50. With 50 as the selected length for VARCHAR with the examples above, the stored values are still cat, mouse, leather, and something.

Use these steps to set the fields and their properties for your table:

- 1) To verify or modify the *Field information* for the selected fields,
  - a) Click the field name in the *Selected field* list.
  - b) Compare the field information to what you want the field to have.
  - c) Change any of it if necessary.
  - d) Repeat steps 1a-c for the rest of the fields.
- 2) To create a new field:
  - a) Click the plus (+) button. (See Figure 5.)
  - b) Change *Field name* to the field name you want.
  - c) Modify any of the other *Field information* to what you need.
  - d) Repeat steps 2a-c for additional fields to be created.
- 3) To delete an unneeded field:
  - a) Click the field you want to delete.
  - b) Click the minus (-) button.
  - c) Repeat steps 3a-b to delete any additional fields.

## Practice exercise

The field, *RoomID*, needs to change its name, field type, and length. Two of the fields, *AppraisedValue* and *PurchasePrice*, require a change in the number of decimal places. Both are accomplished in the same manner: click the field in the *Selected Fields* list, and then change the part of the field information that needs it. Finally, for field, *InventoryID*, Change *Auto value* from *No* to *Yes*. After making the changes a particular field needs, use the *Tab* key or click one of the other fields. This saves the values to memory.

First click the field, *RoomID*. Change the *Field name* to *Room*. Now use the *Tab* key to move to *Field type*. Click its drop-down list to open it. Now select *Text[VARCHAR]*. To finish the changes, change the Length to 50 unless you have a room with a name longer than 50 characters. Use the *Tab* key or click one of the other fields.

Click the field, *AppraisedValue*. Change *Decimal places* from 0 to 2. Now we can store values in dollars and cents. Change *Decimal places* for *PurchasePrice* the same way.

Click the field, *InventoryID*. Change the *Auto value* from *No* to *Yes*. This is because this field will be used as the table's primary key. (See Step 3 below for more information about primary keys.)

Use the *Tab* key or click one of the other fields. This saves the values you entered for the last field you changed.

- Click **Next >** to go to Step 3.

### Note

When using the table wizard to create a table, very seldom will you need to make any changes in the field information since the suggested values are usually the ones you need. However, check the *Decimal places* value for currency fields as the wizard suggests using 0.

## Step 3: Set primary key

First of all, what is a primary key, and what is its purpose? It consists of one or more fields that have a special characteristic: no two values of the primary key are the same. Its purpose is to identify the rows of a table.

For beginners, any primary key used should be a single field. It is even better if this field has the field type, *Integer*, and has *Auto value* set to *Yes*. When you create your primary key this way, Base will assign values to the field beginning at 0. Each new value for this field will be an Integer that is one greater than the previous one. This guarantees this field will contain distinct values.

A table consists of rows and columns of data. When the table contains a primary key, we can select a given row by selecting the primary key value for that row. Each column of the table contains the values of a specific field. So when we specify both a single value of the primary key and the name of a field, we can select a specific cell of the table. This is what we need when we want to search for specific information that the table contains: a way to determine what row and column we want to use in our search.

Primary keys containing more than one field require more vigilance to make sure no two rows have the same values for these fields. Consider the table below. No two rows are identical even though *Field1* has duplicate values as does *Field2*. However, together there are no duplications of the combination.

Some types of tables do not require a primary key, but remembering which type of table does and which does not can lead to potential problems. So, it is best to have a primary key for every field unless you can **always** remember whether a table type requires one or not.



Table 1: Example of values for a two-field primary key

Field1	Field2
1	0
0	1
0	0
1	1

### Caution



When a table is created without a primary key and should have one, you will not be able to enter any data into the table. This can be frustrating. You will first have to learn how to use the Table Design dialog before you can correct this error. (See Chapter 3 of the *Base Guide*.) So when using the table wizard **always** have this checked on Page 3: **Create a primary key**.

There are three choices on this page of the table wizard once you have made sure that *Create primary key* has been selected. This should be the default setting, but make sure anyway. The choices are *Automatically add a primary key*, *Use an existing field as a primary key*, and *Define primary key as a combination of several fields*.

The first option adds an additional field, *ID* as the table's primary key. Its field type is Integer. However, Auto value is set to No. This means you would have to manually enter each value for the field, ID. Using the second option instead of this one will permit you to have Base create the values for the primary key for you.

The second option selection has been selected in the figure below. The field name has been selected from the drop-down list of field names. Check the Auto value checkbox to have Base select the values for this field automatically.

**Table Wizard**

**Steps**

1. Select fields
2. Set types and formats
3. Set primary key
4. Create table

**Set primary key**

A primary key uniquely identifies each record in a database table. Primary keys ease the linking of information in separate tables, and it is recommended that you have a primary key in every table. Without a primary key, it will not be possible to enter data into this table.

☒ Create a primary key

☐ Automatically add a primary key

☐ Auto value

☒ Use an existing field as a primary key

Fieldname:  ☒ Auto value

☐ Define primary key as a combination of several fields

Available fields: Item, Room, Description, SerialNumber

Primary key fields:

Buttons: Help, < Back, Next >, Finish, Cancel

Figure 6: Table Wizard Step 3

The third option allows you to select two or more fields to use for the primary key. If you select this, you can select the fields from the *Available fields* list and move them to the *Primary key field* list using the right arrow in the middle. You can even change the order in the *Primary key field* list using the up or down arrow.

If you want to experiment with a multiple field primary key, select the Personal Category and the Addresses sample table. Select *FirstName*, *LastName*, and any other fields you want. Then in this page, select the third option. Move *FirstName* and *LastName* from *Available fields* to *Primary key fields*. When you added data to this table make sure that you do not use the same first name last name combination more than once.

### Practice exercise

Select *InventoryID* to be the primary key for the table and give it the Auto value property.

- Click **Next** to go to page 4.

## Step 4: Create table

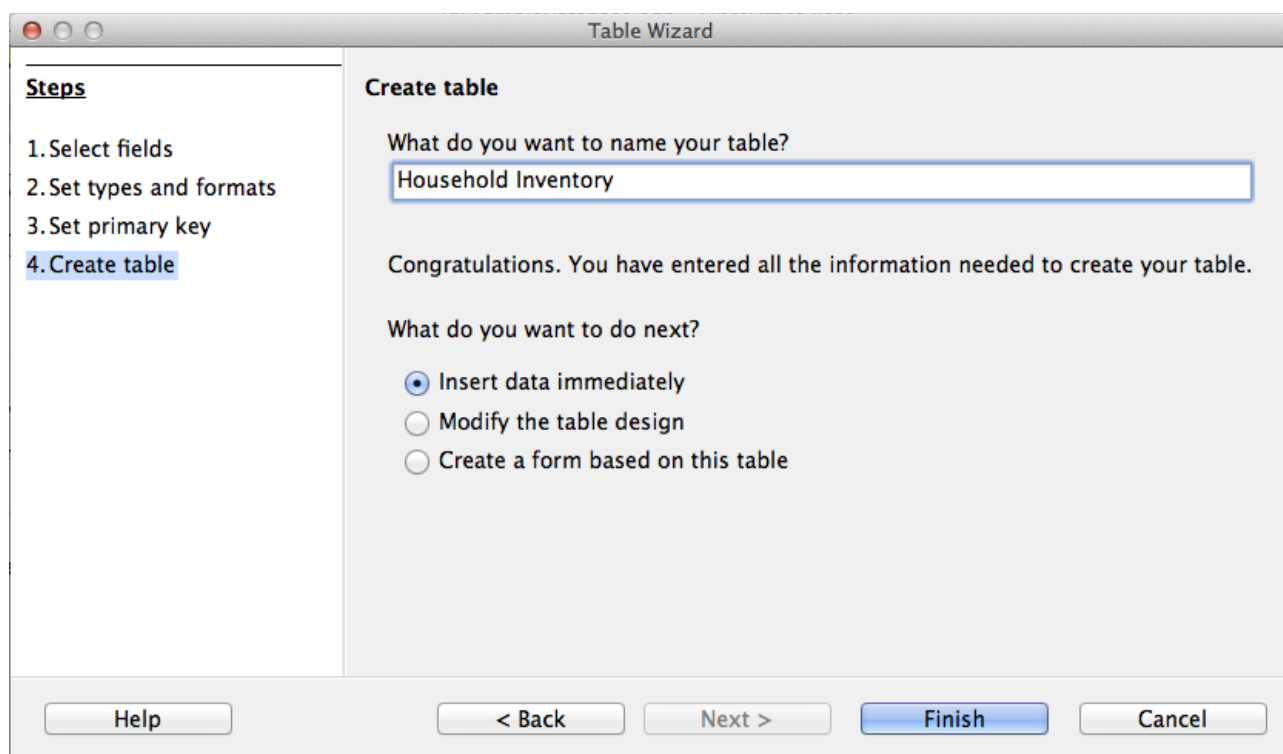


Figure 7: Table Wizard Step 4

#### Tip

A common naming practice has been to make two or more words into one word for the name of a field or database. (Each word is capitalized when joining them.) *HouseholdInventory* and *InventoryID* are two examples. You may use spaces in names used in a database if you want. Such names may require double quotes when using SQL to create, delete, or modify a table or field. (See Chapter 3 of the Base Guide for detailed information.)

Use this page to name the table you are creating. You can use the name suggested, modify it, or give it a name of your choice. Then you have three options regarding what to do next: *Insert data immediately*, *Modify the table design*, or *Create a form based on this table*. After making any modification in the table name and selecting your option, close the table wizard.

When the first option is selected and the table wizard is closed, the *Table Data View* dialog opens. At this point you can add information in this table. (See Figure 8.)

When the second option is selected and the table wizard is closed, the *Table Design* dialog opens. With this you can modify the fields of the table. (See Chapter 3, “Tables” in the *Base Guide*.)

With the third option and the Table Wizard closed, the Form Wizard opens. With this you can create a form for the Household Inventory table. (See Forms.)

### Practice exercise

Modify the name of the table to *Household Inventory*. Then select the first option, Insert data immediately. Click **Finish** to close the Table Wizard. The Table Data View dialog (Figure 8) opens.

## Enter or remove data using the Table Data View dialog

Data can be entered into a table using this dialog or the form based upon this table. Instructions are give here about how to enter data using this dialog; later instructions will be given for how to insert, modify, or remove data in a form at the end of the Forms section.

### Note

This section contains basic instructions for adding and removing data in a table. Chapters 3 and 4 of the *Base Guide* discuss this in more detail.

To insert or remove data using this dialog, it has to be opened. This can be done while creating the table by selecting *Insert data immediately* in the last step of creation. Also, you can always open any table at any time from the Main Database window to edit its data.

- 1) Click the *Tables* icon in the Database section.
- 2) Right-click the name of the table in the list of tables.
- 3) Select *Open* from the context menu. The table data view dialog opens.

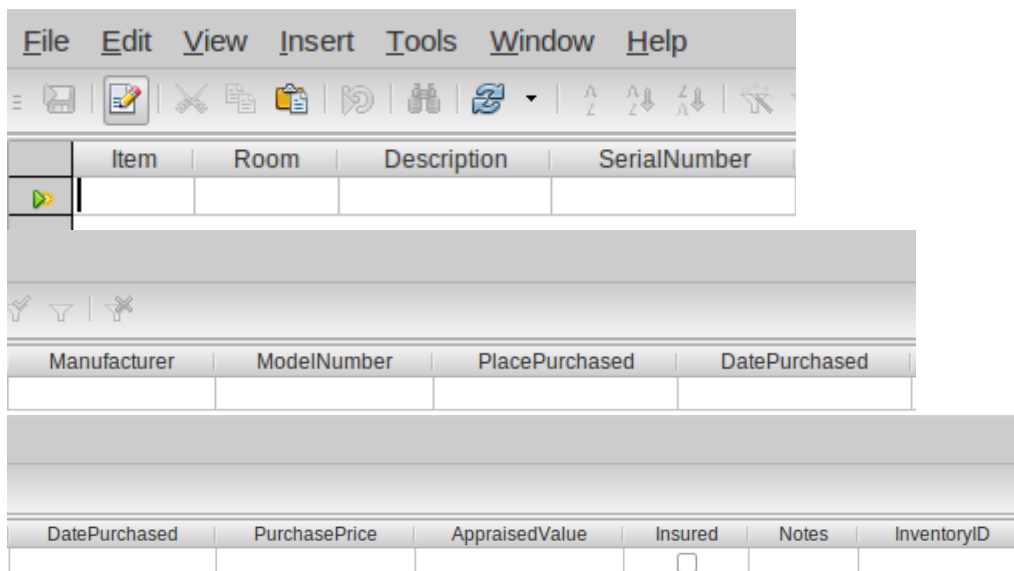


Figure 8: Table Data View dialog

### Enter data into a table

When the table is first created, it contains no data as shown in the above figure. It consists of a row and a column for each field contained in the table. (The table is divided into three snapshots because of the width of the table.) The heading for each column is the name of field whose data is contained in it.

Before entering data into the cells, you may need some reminders about the rows and columns of a table. All the data contained in a given row apply to a given item. All the data contained in a given column belong to the field whose name appears as the heading of that column.

For example, each row in the figure above contains data about a distinct item, say a sofa which is in the living room. The data entered in this row are its name, *Item*; its location, *Room*; information about it, *Description*; identification number, *SerialNumber*; who built it, *Manufacturer*; its model, *ModelNumber*; where bought, *PlacePurchased*; bought when, *DatePurchased*; cost, *PurchasePrice*; its worth, *AppaisedValue*; insurance, *Insured*; other information, *Notes*; and primary key value, *InventoryID*.

For a second example, a second sofa is also in the inventory. It is an older sofa that is in the family den. The row of data that applies to this sofa has some differences from the row that applies to the first sofa. (*DatePurchased* is one such difference.)

Because of these differences, care must be taken when entering data to make sure that all of the data entered into a given row applies to only one item. Otherwise, the data you obtain from the table contains errors.

Now consider the columns of our two examples about the sofas. The *Item* column contains the name of the items. The *Room* column contains their locations. The *Description* column contains information about them ... The *InventoryID* column contains their unique identification numbers.

So, this is another area in which care must be taken. The data entered into a table must be placed into the correct column. Otherwise, this too will produce errors in the data.

### Note

An item's serial number should be unique for a given manufacturer, we have no guarantee that different manufacturers may use the same serial number. That is why we need to use a unique identification number for the items of our inventory.

When the dialog is opened, a cursor appears in the first cell of the row. It is ready for you to enter data into that cell. Once you have entered data into a cell, you can move the cursor into the other cells so that data can be entered there as well.

Entering data into the dialog is similar to entering data into the cells of a spreadsheet. The cursor can be moved from one cell to another using the arrow keys. (In a spreadsheet, sometimes the *Enter* key must be used.) Typing data only places it into the cell where the cursor is located.

There are important differences as well. Typing data into a cell of a table does **not** enter the data into the table as it does in a spreadsheet. The data only appears in the cell. To enter it into the cell, the cursor must be moved by either the *Enter* or by an arrow key. Finally, using the *Enter* key when the cursor is in the last column of a row moves the cursor to the first column of the next row.

Entering data into an empty table: (The cursor is located in the first column of the first row.)

- 1) The first row:
  - a) Type the data into the first cell.
  - b) Move the cursor to the next cell. (Use the *Enter* or *right arrow* key.)
  - c) Repeat steps a) and b) until the cursor is in the last cell of the row.
  - d) Type the data into the last cell.
  - e) Move the cursor to the first cell of the second row. (Use the *Enter* key.)
- 2) Additional rows:

Repeat steps a) – e) in 1).
- 3) Close the table data view dialog, saving it if necessary.

Entering data into any empty cell of a table is very similar to the above steps.

- 1) Use the mouse to move the cursor to the empty cell.
- 2) Type the data into it.

- 3) Move the cursor to another cell. (Use the *Enter* or *right arrow* key.)
- 4) Close the table data view dialog, saving it if necessary.

When creating lists of the data that you want to enter into a table, you should consider the format of the list. Consider which of the following two lists is easier to use.

This is a list of data separated by commas and semicolons:

Row 1: Item, Keyboard; Room, Den; Description, " "; Serial Number, 1426894123;  
 Manufacturer, Casio; Model Number, CTK-720; Place Purchased, Target; Date Purchased,  
 05/16/2008; Purchase Price, 90.00; Appraised Value, 75.00 ...

The table below shows the same data in table format.

<b>Item</b>	<b>Room</b>	<b>Description</b>	<b>Serial Number</b>	<b>Manufacturer</b>	<b>Model Number</b>
Keyboard	Den		1426894123	Casio	CTK-720
HP Pavillion	Computer	Computer w/printer	KQ946AA#AB	Hewlett Packard	a6503f

### Practical exercise

Enter this data into the Household Inventory table:

*Table 2: Sample data (first 6 fields)*

<b>Item</b>	<b>Room</b>	<b>Description</b>	<b>SerialNumber</b>	<b>Manufacturer</b>	<b>ModelNumber</b>
Keyboard	Den		14268941235	Casio	CTK-720
HP Pavillion	Computer	computer w/printer	KQ946AA#ABA	Hewlett Packard	A6503f
Piano	Living	Upright	STE112211	Steinway	2002STE4556
Table	Dining	round	WW2113	Woodworks, Inc.	WW126
Microwave	Kitchen	900W	SHR4568de222	Sharp	SHR54678KL

*Table 3: Sample data (last 7 fields)*

<b>Place Purchased</b>	<b>Date Purchased</b>	<b>Purchase Price</b>	<b>Appraised Value</b>	<b>Insured</b>	<b>Notes</b>	<b>InventoryID</b>
Target	05/16/08	90	75	TRUE		1
Best Buy	09/04/11	1097	1097	TRUE		2
Classical Instruments	08/12/02	5895	6000	TRUE		3
Sonny's Furniture	10/19/67	825	125	TRUE	6 chairs	4
Service Deluxe	08/30/11	145.99	145.99	TRUE		5

## Modify data in a cell of a table

Modifying data requires only five steps:

- 1) Open the table.
- 2) Click the cell containing the data.
- 3) Change the data as you would data in any text box.
- 4) Save the table.
- 5) Close the table.

## Delete data from a table

Deleting data involves one of two things: either deleting the data from a single cell or deleting the data from all the cells of a row. Deleting data from a single cell is done the same way as modifying the data of a single cell. In step 3, you delete the data that you no longer want.

Deleting all the data in a table's row requires only a few steps:

- 1) Open the table.
- 2) Click the gray box to the left of the row whose data you want to delete to highlight it.
- 3) Right the gray box and select *Delete Row* from the context menu. A dialog appears labeled *Do you want to delete the selected data?*
- 4) Click **OK** if that is the row of data you want to delete. Click **NO** if it is not.
- 5) Save the table.
- 6) Close it.

### Caution



Be very careful when deleting a row of data.

If you delete the wrong row, you will have to reenter the data. This will take an unnecessary use of time but it may not be too much of a problem if you have a copy of the data somewhere.

If you do not have a copy and can not obtain the data somewhere else, you have permanently deleted data that you need.

## Forms: using the Forms Wizard

If we had to enter all of our data directly into our table, it would be more time consuming than it needs to be. Creating a form based upon the table we created will allow us to enter our data in a more meaningful way. When we look at a table, we see many rows of data simultaneously. The form allows us to see only one row (one record) at a time.

## Create a simple form using the Form Wizard

The wizard guides us through some fairly easy steps for creating a form based on the table we have already created. The wizard creates a layout of controls (the table's fields and their labels) based upon the choices we make while using it.

Once the form is created, it can be edited. Because of the additional complexity that editing involves, editing of forms is discussed in Chapter 3 of the *Base Guide*.

Here are two ways to open the wizard for create a form. Use 1) **OR** 2). Do not use both.

- 1) Click the *Table* icon in the Database section of the main database window.
  - a) Right-click the table you want to use. (Right click the Inventory table.)
  - b) Select *Form Wizard* from the context menu.

- 2) **OR**, click the *Forms* icon in the Database section of the main window, then in the *Task* section, click **Use Wizard to create form**.

### Step 1: Field selection (Figure 9)

- 1) Select the table, *Inventory*, in the *Tables and queries* drop-down list.
- 2) If you right-clicked the *Inventory* table and selected *Form Wizard* from the context menu, *Table: Inventory* will already be selected. **OR**
- 3) If you had earlier clicked **Use Wizard to create form**, select *Table: Household Inventory*.
- 4) Choose fields from the *Household Inventory* table to be used in the form.
  - Since we want to use all of the fields, click the right double arrow to move all the fields listed under *Available fields* to the *Fields in the form* list.
  - **OR**, if you only want to move part of the fields, click the field you want to move and click the right arrow to move this field.
  - Repeat for the rest of the fields to be moved.
- 5) Click **Next**.

**Steps**

1. Field selection
2. Set up a subform
3. Add subform fields
4. Get joined fields
5. Arrange controls
6. Set data entry
7. Apply styles
8. Set name

**Select the fields of your form**

Tables or queries  
Table: Household Inventory

**Available fields**

- CategoryID
- AppraisedValue
- DatePurchased
- Description
- Insured
- Item
- Manufacturer
- ModelNumber
- Notes
- PlacePurchased

**Fields in the form**

Binary fields are always listed and selectable from the left list. If possible, they are interpreted as images.

Buttons: Help, < Back, Next >, Finish, Cancel

1	Move selected field to the right	4	Move selected field to the left
2	Move all fields to the right	5	Move selected field higher in list
3	Move all fields to the left	6	Move selected field lower in list

Figure 9: Page 1 of the Form Wizard

### Tip

Notice that the drop-down list we used to select the *Household Inventory* table is labeled, *Tables or queries*. This is because a form can be created from a query just as it can be from a table.



### Step 2: Set up a subform.

- 1) We will not use another table along with the Household Inventory table. So, we will not be using a subform.
- 2) Click **Next**.

### Step 3, Add Subform fields, and 4, Get joined fields.

Both of these pages only apply when you are using a second table to create a subform. Since we did not select the second table in page 2, pages 3 and 4 are grayed out.

### Step 5: Arrange the controls on your form.

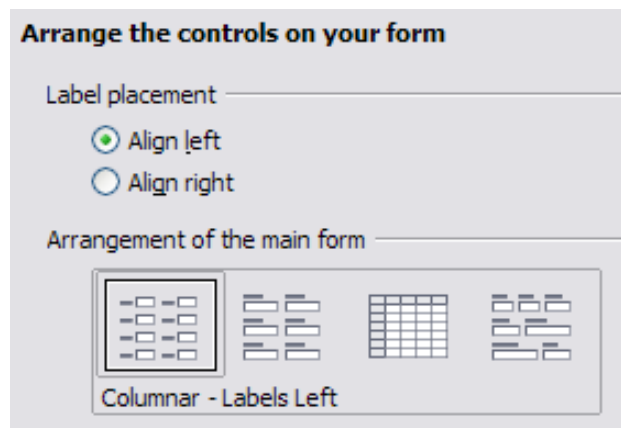


Figure 10: Arranging the controls of the form

### Control

A *Control* consists of a label and field. The *label* contains the name of the control, and the *Field* contains the data entered into the form.

You have four choices in arranging your controls as shown in the figure from left to right: *Columnar – Label left*, *Columnar – Label on top*, *As Data Sheet*, and *In Blocks – Labels Above*. Each choice gives a slightly different layout.

Both of the columnar layouts create the controls in columns beginning with the first control at the upper left and continuing down the left side. If additional columns are needed, they are filled in from top to bottom and then columns from left to right. The first control is the top control in the left column. The last control is the bottom control in the column on the right.

The *Data Sheet* arrangement looks like a spreadsheet with the labels across the top. This is probably best used for a subform rather than for the main form. It is your choice.

The *In Blocks – Labels Above* arrangement places the controls in rows from left to right. When one row is filled, the next control is placed at the left end of the row below. So, the first control is at the left end of the top row, and the last control is at the right end of the bottom row.

We will use *Columnar – Labels Left* for the Household Inventory form.

The *In Blocks – Labels Above* arrangement places the controls in rows from left to right. When one row is filled, the next control is placed at the left end of the next row below the row that is filled. So, the first control is at the left end of the top row, and the last control is at the right end of the bottom row.

We will use *Columnar – Labels Left* for the Household Inventory form.

- 1) *Label placement*: Select how you want the labels to be aligned: left or right.  
Accept the Default value of *Align left*, or click the bottom option button to select *Align right*.



- 2) *Arrangement of the main form*: click the graphic on the left. (See Figure 10 for the correct appearance of the window.)
- 3) *Arrangement of the subform*: we are using only one table in this form, so this is grayed out.
  - Click **Next**.

#### Step 6: Select the data entry mode.

- The default choice match our needs. Click **Next**.

#### Tip

I strongly advise that you look at the data entry choices available, thinking about how each of these choices might meet your future needs. For instructions on the purpose of each of these choices, see Chapter 3 of the Base Guide.

#### Step 7: Apply the style of your form.

- 1) *Apply styles*: page color:
  - a) Chose one of the listed colors. The default color is as good as any. (This color can be changed when we modify the form.)
  - b) You can create your own color to use using **Tools > Options > LibreOffice > Colors**. You can use RGB or CMYK values in this dialog. After creating the color you want, you can select your color while modifying the form.
- 2) *Field border*:
  - a) Experiment with the three choices.
  - b) Use the mouse to move the Form window around so that you can see each of the three choices in the form.
  - c) Use the default value. (This choice can be changed if the form is edited. The border of the control labels could be changed then as well if you so desire.)
- 3) Click **Next**.

#### Step 8: Set the name of the form.

- 1) The suggested name for the form is the same as the table that was used to create the form: *Household Inventory*. Use the suggested name this time, but remember that you can choose the name you want to use. You can rename the form if you like.
- 2) *How do you want to precede after creating the form?*
  - If you want to add data immediately after creating the form, use *Work with the form*. Select this choice for this example.
- 3) Click **Finish**.
  - a) Since we chose *Work with the form* above, the Household Inventory form opens in the “read only” mode, as in Figure 11. You can start inserting data into your table.
  - b) If you had chosen *Modify the form*, the Household Inventory form would have opened in edit mode. (Modifying a form is discussed in Chapter 4 of the *Base Guide*.)

#### Tip

“Read only” is confusing to many people. In Edit mode, you can modify anything that you earlier created: controls, background, and text you may have added to the page. In this mode, you can not add nor remove any data previously entered into any of the fields unless you click the **Design Mode On/Off** icon to turn the design mode off. In Read Only mode, none of the controls nor styles of the form can be changed. However, you can add, delete, or modify data in any of the fields.

This form, which is actually created by Writer, can be modified in many different ways that are described in Chapter 4 of the *Base Guide*.

## Enter or remove data from forms

The data for any of the fields in a given record can be entered, removed, or changed at the same time. There are some similarities and differences between adding data to a table and a form. This discussion involves two parts: working with individual controls, and removing an entire record from the database. The latter is similar to deleting an entire row from a table with the same possible consequences.

Figure 11: Newly created Household Inventory form

## Enter or remove data from individual controls

The form contains a control for each of the fields in the table. Each control contains a label which identifies the field from the table and a box which contains data from the field. When the cursor is in a box, data can be typed into it.

Before entering or removing data from individual controls, you need to acquaint yourself with both the newly created form and the left side of the *Form Navigation* toolbar, shown in Figure 12. (The rest of the tools on it are discussed in Chapter 4, Forms, in the *Base Guide*.)

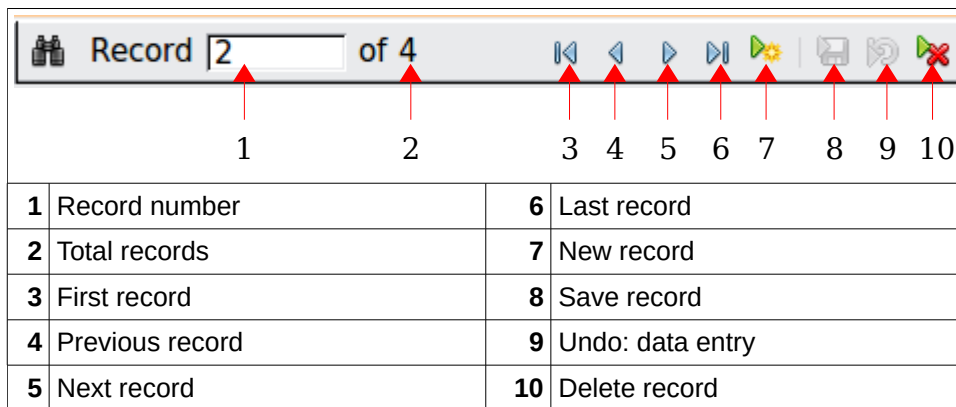


Figure 12: Form Navigation toolbar

- *Record number*: The form numbers the rows of the underlying table from the top row to the bottom row. The record number shown is the number of the row that appears on the form.
- *Total records*: This shows the total number of records of the underlying table when the number of rows is small. With larger tables, this shows only part of the total number.
- *First record*: Click this arrow to go to the first record. (The record number becomes 1 or whatever is the smallest number. If the present record is the first record, this arrow is grayed out and not useable.)
- *Previous record*: Click this arrow to go to the previous record. (The record number becomes one less than what it had been. If the present record is the first record, this arrow is grayed out and can not be used.)
- *Next record*: Click this arrow to go to the next record. (The record number will be one larger than what it has been. If the present record is the last one, no data will appear in this record with one exception: the form contains the table's primary key, and its field property, *AutoValue*, is set to *Yes*. Only then will the primary key show *AutoValue*.)
- *Last record*: Click this arrow to go to the last record. (The record number becomes the largest one. If the present record is the last record, this arrow is grayed out and can not be used.)
- *New record*: Click this icon if you want to create a new record becoming the last record. (The record number becomes one larger than the previous largest one. No data appears in the controls of this record except for a primary key control whose field property for *AutoValue* is *Yes*.)
- *Save record*: Click this icon to save data that has been typed into one or more controls. The data entered is saved to the table.
- *Undo data entry*: If you have made some entries but have not saved them, you can click this icon to remove all the entries you have made in the present record since the last time the record was saved.
- *Delete record*: Click this icon if you want to delete the data from all of the controls in the present record. This will remove data that you just entered as well as the data that had been saved earlier. (A window appears requiring you to verify that you want to delete the data from all the controls of the present record.)

### Caution



Be very careful when clicking the *Delete record* icon. This is equivalent to deleting a row from a table. Only do this if you are **absolutely sure** that you will no longer need the data that you are deleting. The present record no longer exist in the form, and the corresponding row of the underlying table also ceases to exist.

### Tip

Some of these tools in the Form Navigation toolbar serve other purposes. When active, these tools can be used to save data typed into a record:

- First record
- Previous record
- Next record
- Last record
- New record
- Save record

### Caution



When records are saved, they are written to the underlying table. However, this is done in the computer's memory (RAM). Only when the database is closed is the data written to the Base file (.odb). As long as you are not entering a large quantity of data to your database between closing it, you should not have a problem.

Entering data in a new record requires only a few individual steps.

- 1) Click the *New record* icon to create a new record. (The cursor appears in the first control.)
- 2) Type the data into the first control.
- 3) To move to another control:
  - Use the *Tab* or *Enter* key to move to the next control.
  - Use the *Shift+Tab* key to move to the previous control.
- 4) Type the data into the control to where you have moved.
- 5) Repeat steps 1-4 to enter the data into the record.
- 6) After typing data into the last control, use the *Tab* or *Enter* key to save the data and create another new record.

Removing or modifying data from an individual control:

- 1) Go to the record that contains the data to be deleted or modified using the first, previous, next, or last record arrow.
- 2) Click the field (box) that contains the data you want to change.
- 3) Delete or modify the data.
- 4) Save the record.

### Practice exercise

- 1) Create five more records in the form using the data in Tables 1 and 2 below.
- 2) Modify the following records with the data given:
  - a) Change the appraised value for the piano from 6000 to 5700.
  - b) Delete the Description for the WiFi. (802.11g is not needed.)

Table 1: Data for first six controls

<i>Item</i>	<i>Room</i>	<i>Description</i>	<i>SerialNumber</i>	<i>Manufacturer</i>	<i>Model Number</i>
Dishwasher	Kitchen	built-in	GE4581839315	General Electric	GE456ee781
Refrigerator	Kitchen	side by side	HP4865818634	Hot Point	SBS44588F1990
Stove	Kitchen	counter top w/built-in oven	456789123258	Whirlpool	WP5748we84
TV	Den	19" Digital ready	MOT123456789	Motorola	MOT57dde85815
WiFi modem	Computer	802.11g compatible	CGNC1H111980	Linksys	WRT54GS V7

Table 2: Data for last seven controls

<i>Place Purchased</i>	<i>Date Purchased</i>	<i>Purchase Price</i>	<i>Appraised Value</i>	<i>Insured</i>	<i>Notes</i>	<i>Inventory ID</i>
Lowes	04/20/99	450.95	250	TRUE	5 cycles	6
Brothers Appliances	12/16/90	1599.99	528	TRUE		7
Sears	12/30/99	899	452	TRUE	oven built-in	8
Sanders TV & Repair	03/31/09	249.99	143	TRUE		9
Webster's Computers	04/22/04	35.99	20	TRUE	4-RJ45	10

### Deleting records in a form

This can be done fairly quickly once the specific record to be deleted is located. You click the *Delete record* icon in the Form Navigation toolbar and then click the Yes button in the message: **You intend to delete 1 record. If you click Yes, you won't be able to undo this operation. Do you want to continue anyway.**

#### Practice exercise:

Delete the record for the WiFi modem. While you are at it, add a new record for the WiFi modem.

## Queries: using the Query Wizard

The query is used to obtain information from the database and present it in a useful way. Search conditions are applied to the database data to limit it to the specific data we are wanting. We can do this using the Query Wizard for simple queries using a single table. The Query Design dialog is designed for the more complex queries using multiple tables. It is discussed in Chapter 5, Queries, of the *Base Guide*.

### Query example

When we are sick, we go to a doctor who gathers data about our condition.

The medical tests your doctor has ordered is a database (data source). The knowledge the doctor has from training and education is another database. A diagnosis is a query of his training and education databases for what matches the symptoms you have: the doctor seeks this information. This query will also suggest that some other symptoms may be present. The doctor searches your medical tests for them: another query.

### Query

A query is a search of the database to locate specific types of information.

Some of this information may be what has been entered. We may want to know the appraised value of the items in the Living Room. This produces a query whose output is a detailed list. A query can also manipulate the data to obtain desirable information. For example: Based upon the appraised values of the individual items, what is the total appraised value of the entire inventory? This produces a single cell containing the total appraised value of the inventory.

### Detailed query

A query that produces a detailed list as its output. The data in this list are part of the data contained in the database. The list consists of one or more rows.

### Summary query

A query that manipulates database data to produce its output. Unless the summary query is group, its output will contain only one row and each column will contain manipulated data.

#### Tip

Three tools are available to help you to work with your data to get the information you need. One is the View located in the Table section of the database. This tool allows you to view selected data. Another is the Query, which allows you to both view and manipulate selected data. Finally, you can use the Report to create a text document that uses a table, view, or query from the database for its information.

## Plan the query

Creating a query is similar to solving a word problem in basic algebra. Doing either one of these requires asking questions, finding the answers, and then using the answers to solve the problem.

As when creating a table, some thinking needs to be done about the purposes of the query before creating it. Questions based on them should be asked, questions based upon the eight steps that the wizard uses. It is best to ask the questions before using the wizard. Then you have the answers you need to make your selections in each of the steps.

#### Note

Steps 5 and 6 are for summary queries that groups the information you seek. While an example of one of these is given, the detailed discussion of them is in Chapter 5 of the *Base Guide*.

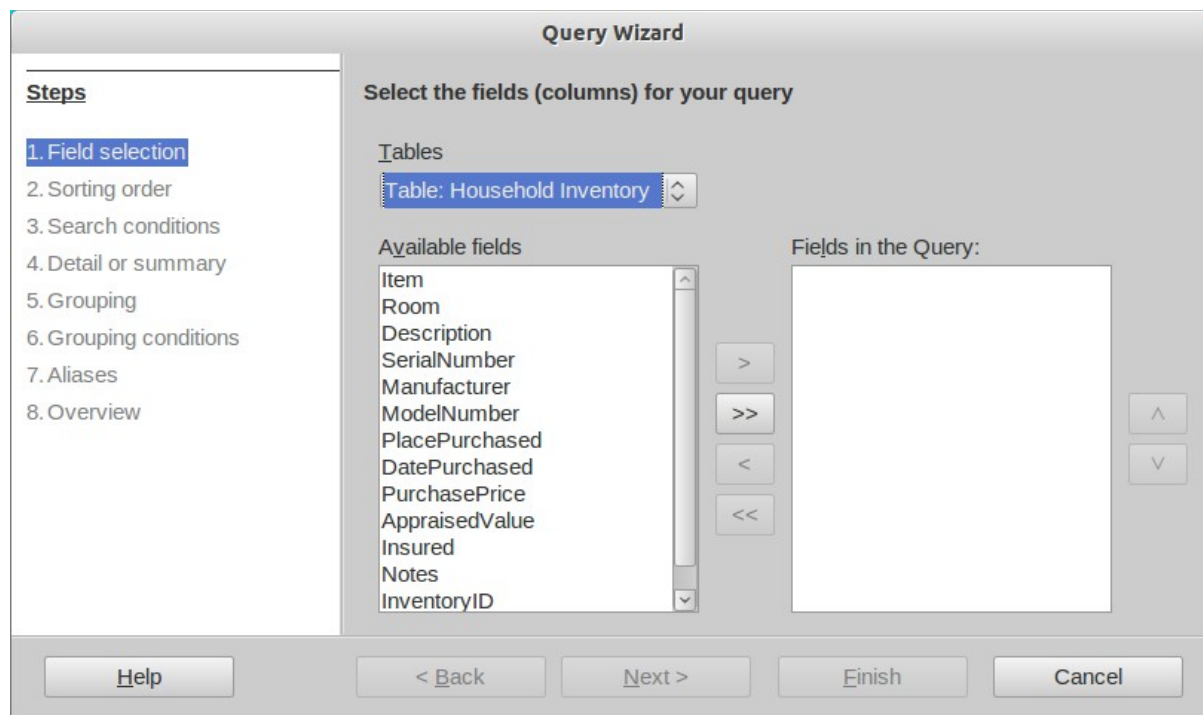


Figure 13: Query wizard Step 1

Step 1. Field Selection:

- What table or query contains the fields the query needs?
- What fields are needed?

Step 2. Sorting order:

- What fields will you use to sort the query output?
- Will the sorting for a give field be ascending or descending?

Step 3. Search conditions:

- What fields need to have conditions added to them?
- What are the specific conditions?

Step 4. Detailed or Summary:

- Do you want the output to be a detailed list or a summary of selected database data?

Step 5. Grouped by:

- (No selections are available for this step. Instead the selection in Step 2 is used.)

Step 6. Grouping conditions:

- (No selections available for this step. Instead the selection in Step 3 is used.)

Step 7. Aliases:

- What fields should have their names modified?
- What should the modifications be?

Step 8. Overview:

- In the Overview window, what does not match what you wanted?
- What should the name of the query be? (Base suggests a name.)
- Do you want to display or modify the query? (The latter is discussed in Chapter 5, Queries, in the *Base Guide*.)

The importance of these questions should become clearer when you create two sample queries using the Household Inventory database (detailed and summary). First we will explain what needs to be done for each of these eight steps.

## Create the query

To do this, we begin with the main database window open.

- 1) Click the *Queries* icon in the *Database* section.
- 2) In the Task section, click *Use Wizard to Create Query*. The wizard opens.

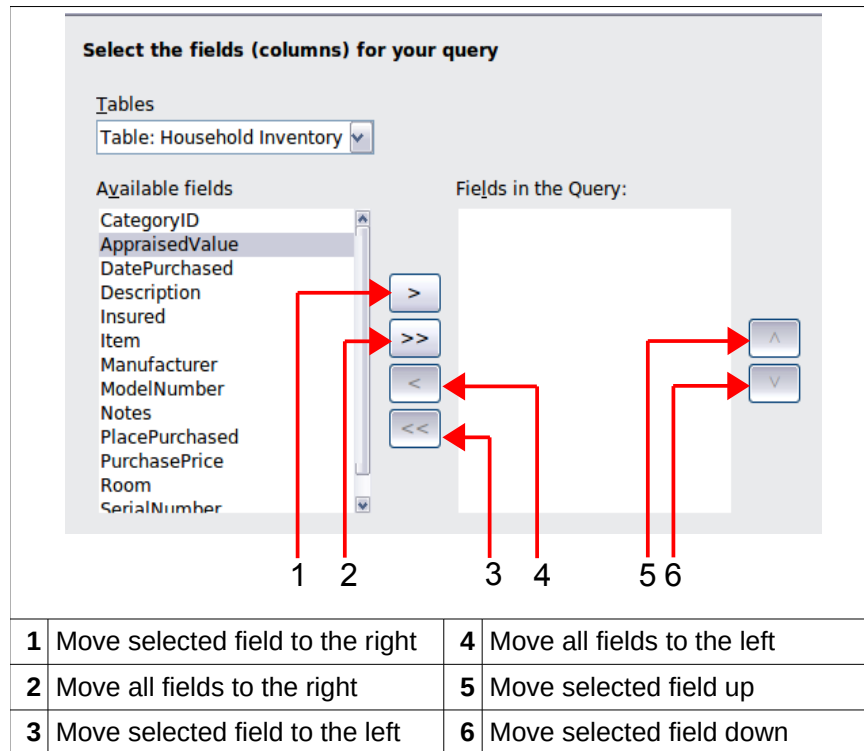


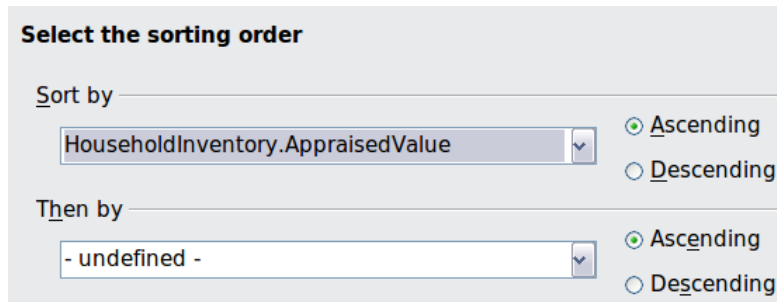
Figure 14: Selection of fields in a query

### Step 1: Field selection

- 1) Click *Tables*: Select the table or query to be used from the Table list.
- 2) Select the fields to be used from the Inventory table.
- 3) Click one that is in the Available fields list.  
Click the right arrow to move it to the *Fields in the Query* list.
- 4) Change the order of the field in the *Fields in the Query*.  
Click the name of the field you want to move.  
Use the up arrow to move it higher in the list, or the down arrow to move it lower.
- 5) Rearrange the order of fields if necessary (AppraisedValue, then Purchase Price, then Room).



## Step 2: Sorting order



**Select the sorting order**

Sort by  ☒ Ascending ☐ Descending

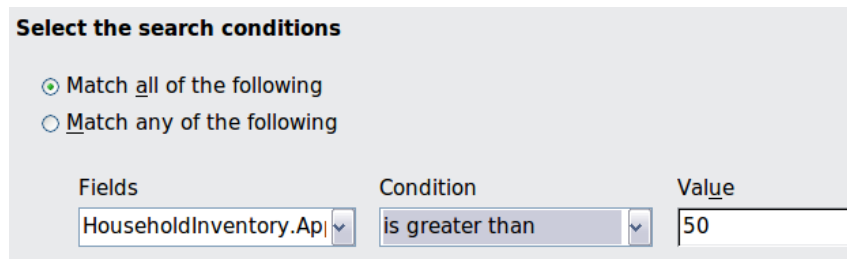
Then by  ☒ Ascending ☐ Descending

Figure 15: Sorting order selection

Select the field to be used for sorting the information you want.

- 1) Open the **Sort by** drop-down menu by clicking the box labeled Undefined.
- 2) Click the field's name in this drop-down list to select it.
- 3) Select **Ascending** or **Descending** as the order of the sorting.
- 4) Click **Next**.

## Step 3: Search conditions



**Select the search conditions**

☒ Match all of the following  
☐ Match any of the following

Fields	Condition	Value
<input type="text" value="HouseholdInventory.Api"/>	<input type="text" value="is greater than"/>	<input type="text" value="50"/>

Figure 16: Selecting the search conditions

Define the search conditions that will be applied to the query data.

- 1) Select the field in the *Fields* drop-down list in the top row.
- 2) Select the first condition from the *Condition* drop-down list.
- 3) Enter the value in *Value*.
- 4) If additional conditions should be defined, follow steps 1–3 in the succeeding rows of *Fields*, *Condition*, and *Value*.
- 5) If you have selected multiple conditions,
  - If you want all of the data to match all conditions in your query output, select the *Match all of the following option* button.
  - If you want any individual datum (singular of *data*) to match any of the selected search conditions, select *Match any of the following option* button.
- 6) Click **Next**.

Two examples of a query with multiple search conditions: the last name must be Smith and the city must be Selma; and the last name can be Smith or Jones.

For the first example, you need two rows. Select *Last Name* in *Fields*; for *Condition*, select *is equal to*; and enter *Smith* in *Value*. For the second row, enter *City* in *Fields*; for *Condition*, select *is equal to*; and enter *Selma* in *Value*. When this query is run, the only rows in the output will be those containing Smith in the Last Name field and Selma in the City field.

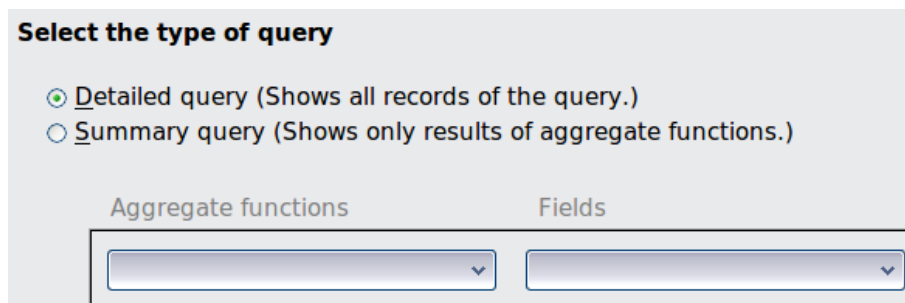
For the second example, you also need two rows. Select *Last Name* in *Fields*; for *Condition*, select *is equal to*; and enter *Smith* in *Value*. For the second row, select *Last Name* in *Fields*; for

Condition, select *is equal to*; and enter *Jones* in *Value*. With this query, the only rows in the output will be those containing either *Smith* or *Jones* in the *Last Name* field.

### Step 4: Detailed or Summary

This is where you define whether the query is detailed or summary.

- Click **Next**.



### Steps 5 and 6: Group by and Grouping conditions

Grouping is only used with summary queries. Because of the very limited applications of these two steps, only an example will be given of a summary query with grouping. Chapter 5, *Queries*, in the *Base Guide* includes examples and detailed instructions about summary queries with grouping.

- Click **Next**.

### Step 7: Aliases

#### Alias

A name given to a field, table, or expression that can be used instead of a name it already has.

In everyday life, people are given nicknames. Sometimes they are a shorter version of the given name, and sometimes they are quite different.

An alias is similar to a nickname. For example, the name of suggested fields in the table wizard are often two or more words that have been combined into one word. At this point you may wish to create aliases that have these names divided into their original words or changed to something more meaningful.

Summary queries are a good place to use aliases. For example, we want the total appraised value of our furnishings. The name for this, without any changes, is `SUM("AppraisedValue")`. We could use the alias: *Total Appraised Value*. More complex summary queries can have names that are rather involved, and an alias is recommended.

- Click **Next**.

### Step 8: Overview

Figure 17 shows the overview of a query. It contains three parts: naming the query, what will be done next after the query is created, and an overview of the selections made using the wizard.

You should enter what you want to call the query in the **Name of the query** text box. The suggested name combines *Query* with the name of the table used in the query using an underline.

Do not use the name of the table as the name of the query as well; doing so will cause an error message. Because tables and queries can be used when creating queries, forms, and reports, a name for a table or query can be used only one time to prevent selecting the wrong one if duplicate names are allowed.

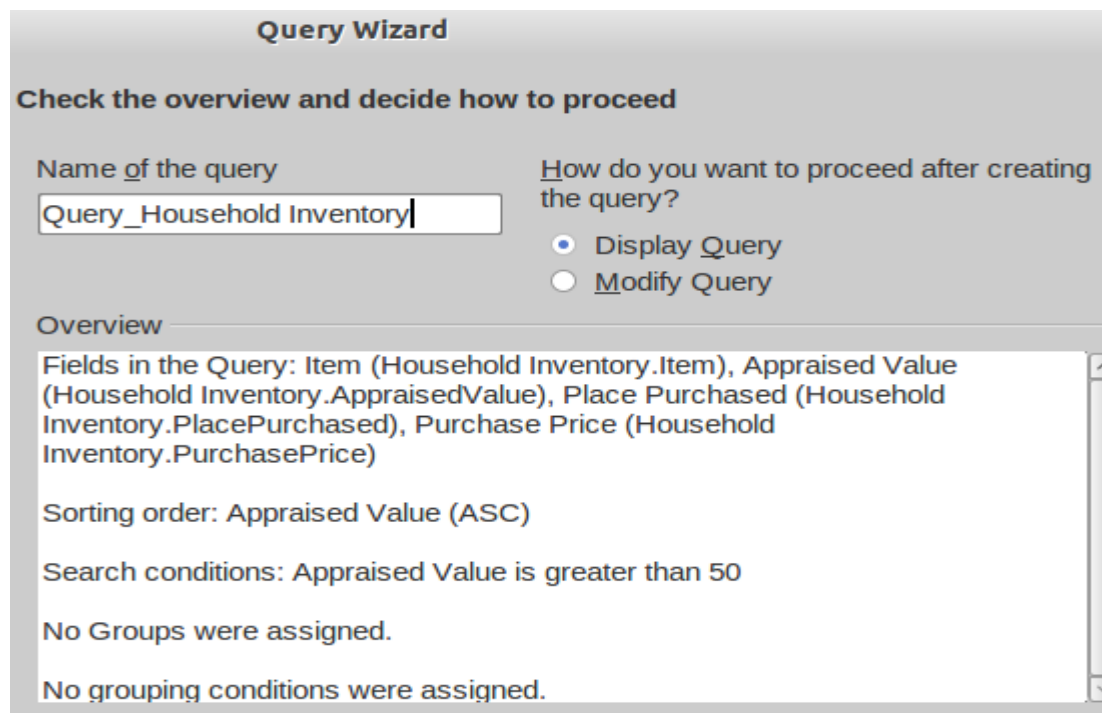


Figure 17: Overview of a query

You have two choices after closing the query wizard: display the query results, or modify the query. The first choice runs the query to give you an output. The second choice opens the Query Design dialog. Because the second choice leads to something that is beyond the discussion of this chapter, do not change the default setting (Display Query).

Like the naming of the query, the overview list is rather important. It contains three pieces of information that we need to verify matches what we originally wanted in the query.

There are four fields in the query, all from the *Household Inventory* table: *Item*, *AppraisedValue*, *PlacePurchased*, and *PurchasePrice*. These have been given the aliases *Item*, *Appraised Value*, *Place Purchased*, and *Purchase Price* respectively.

**Verification:** Household Inventory is the correct table, the listed fields are the correct fields, and the alias are also correct.

The field, Appraised Value, is the field that will be used for sorting, and the direction of the sort is ascending (from the least value to the greatest). (The alias, Appraised Value, is used in place of the field name, AppraisedValue.)

**Verification:** This is the correct field, and the sorting is in the correct direction.

The search condition applies only to Appraised Value and it restricts its values to \$50 or more. Any items worth less than or equal to \$50 will not be shown when the query is run.

**Verification:** This is the correct field, and the search condition is also correct.

**Verification:** Since none of the fields are manipulated, we have a detailed query. This is correct.

If this were a query that we wanted to use, we would click the **Finish** button. The query wizard would close, and a Table Data View dialog would open with the query output.

## Detailed query example

We want a listing of our inventory containing the following information about each item: the name of each item, its appraised value, the date purchased, and the place purchased. Furthermore, we want the list to contain only those items whose appraised value is greater than \$50. We also want the information to be sorted using the appraised values of the items.

Create a query using the wizard by following the instructions in the eight steps above. Name the query: *Query\_Household Inventory*. When you get to step 8 of the wizard, it should look like the figure below. Try to do all of the eight steps before referring to this figure to compare your work with it.

When you click the **Finish** button, the query wizard closes and the *Query\_Household Inventory-Inventory-LibreOffice Base: Table Data View* dialog opens with the output for the query. (See Figure 18.) All of the items have an appraised value greater than \$50. The WiFi modem is not part of the output because its appraised value is less than \$50. If an item in the inventory had an appraised value of \$50, it would not be in the output either.

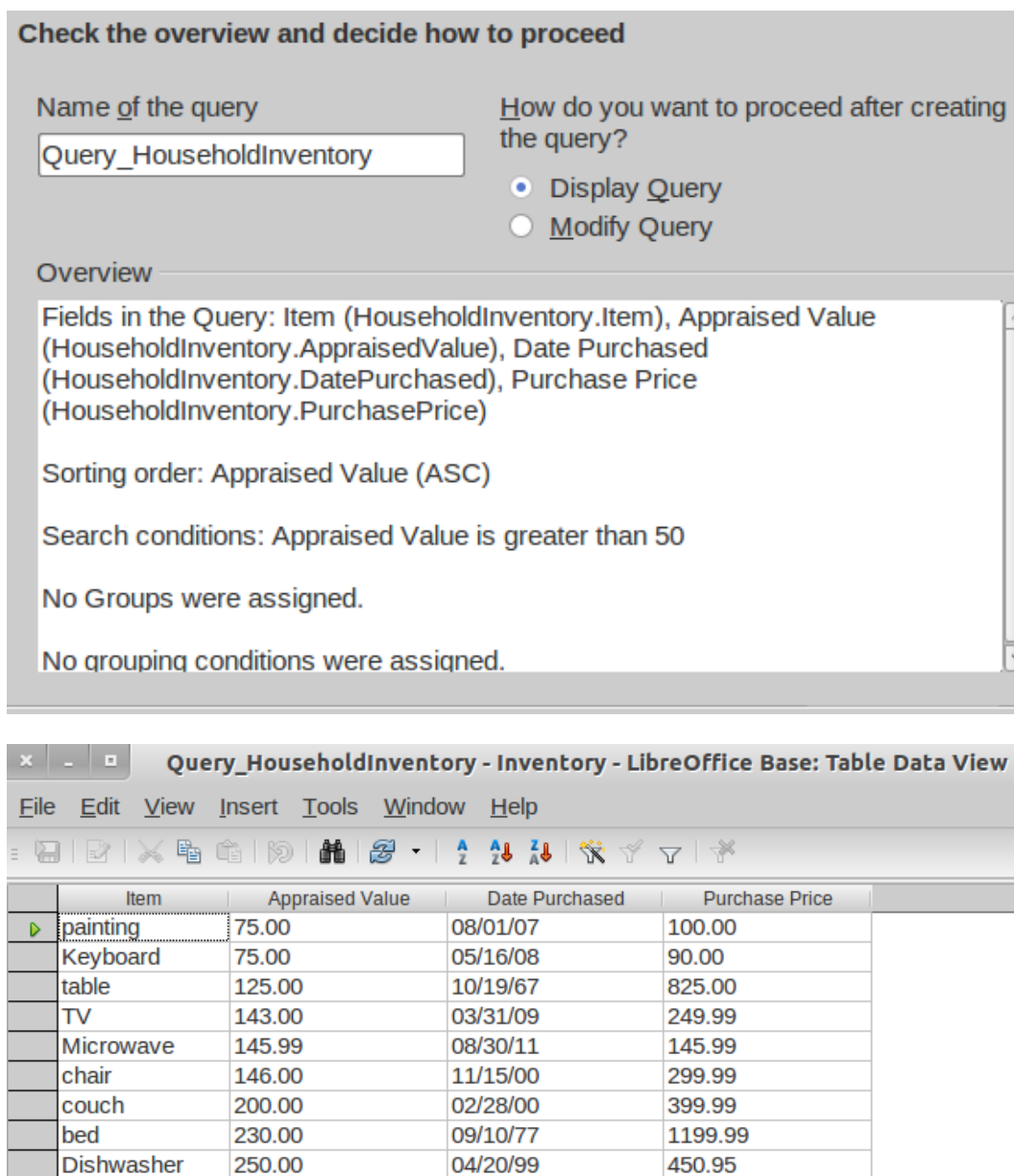


Figure 18: The Table Data View for this query

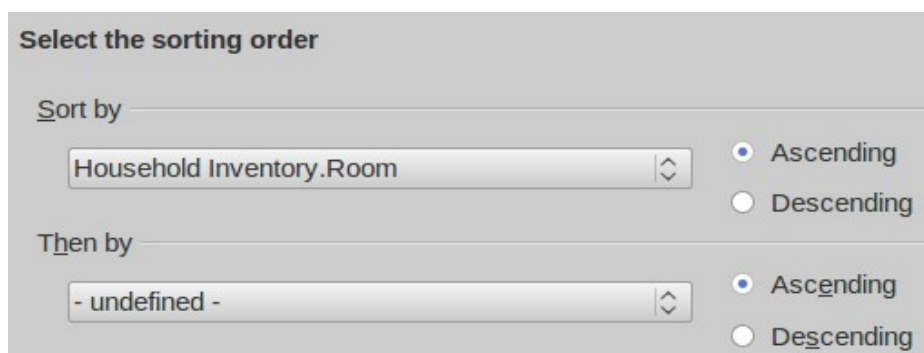
## Summary query example

For this example query, what you want to know is this: What is the total purchase price and appraised price for the contents of each room in our inventory? The output should be in alphabetical order by *Room*. Finally, only the totals that exceed \$500 in a given room should be shown.

This requires grouping the values for these two fields by room. Then the SUM function is applied to the values of these two fields for each group.

### Step 1: Field Selection.

- 1) The table will be Household Inventory.
- 2) Select these fields from it: PurchasePrice and AppraisedValue.
- 3) Click **Next**.



**Select the sorting order**

Sort by  
Household Inventory.Room  
☒ Ascending  
☐ Descending

Then by  
- undefined -  
☒ Ascending  
☐ Descending

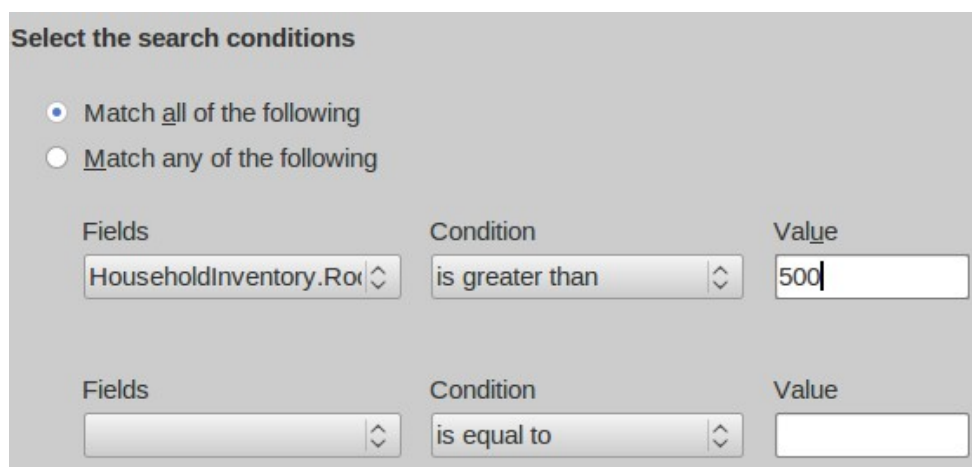
### Step 2: Sort Order.

- 1) Select the field, Room, as the one to sort by.
- 2) Select Ascending as the direction of the sort.
- 3) Click **Next**.

#### Tip

When you create a summary query with grouping of the results, enter the field by which the grouping is done in Step 2 instead of Step 5.

When the summary query also contains a restriction on the values for each group, use Step 3 to do this instead of Step 6.



**Select the search conditions**

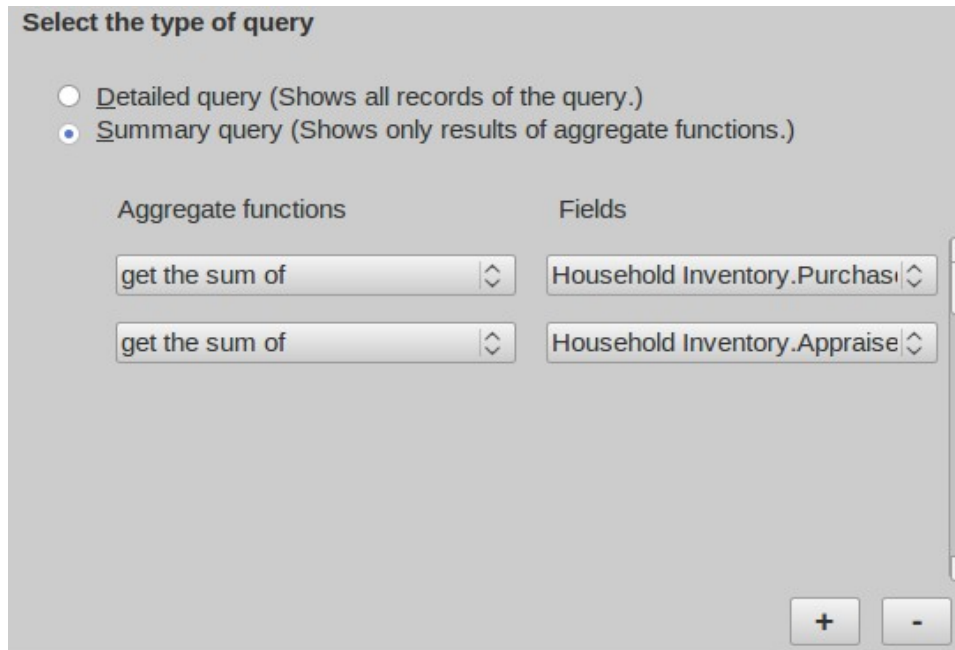
☒ Match all of the following  
☐ Match any of the following

Fields	Condition	Value
HouseholdInventory.Room	is greater than	500
	is equal to	

### Step 3: Search Condition.

- 1) Select Room as the *Fields*.
- 2) Select *is greater than* as the *Condition*.
- 3) Enter 500 as the *Value*.
- 4) Since there is only one condition, *Match all of the following* (Default) is appropriate.
- 5) Click **Next**.

### Step 4: Detailed or Summary.



- 1) Select the *Summary query (Shows only results of aggregate functions.)*
- 2) *Aggregate functions*
  - a) Click the arrows at the right end of its drop-down list.
  - b) From this list, select *get the sum of*.
  - c) From the *Fields* dropdown list, select *Household Inventory.PurchasePrice*
  - d) Click the plus (+) button to reveal a second row of drop-down lists.
  - e) From the *Aggregate functions* drop-down list, select *get the sum of*.
  - f) From the *Fields* dropdown list, select *Household Inventory.AppraisedValue*.
- 3) Click **Next**.

**Steps 5 and 6.** (These are not used by the wizard, which uses Steps 2 and 3 instead.)

- Click **Next** in Step 5 and then in Step 6.

### Step 7: Aliases.

- 1) Change PurchasePrice to Purchase Price.
- 2) Change AppraisedValue to Appraised Value.
- 3) Click **Next**.

**Assign aliases if desired**

Field	Alias
Household Inventory.Room	<input type="text" value="Room"/>
Household Inventory.PurchasePrice	<input type="text" value="Purchase Price"/>
Household Inventory.AppraisedValue	<input type="text" value="Appraised Value"/>

### Step 8: Overview.

- 1) Name the query *Household Inventory Summary*.
- 2) Display the query after closing the query (Default selection).
- 3) Check the Overview:
  - a) The *table* used is *Household Inventory*. (**Correct**)
  - b) The *fields* used are *Room*, *PurchasePrice*, and *AppraisedValue*. (**Correct**)
  - c) The *Sorting order* is *Room*. (This is really the field by which the data will be grouped because we are creating a summary query.)
  - d) The *Searching conditions* is *Room is greater than 500*. (**Correct**) (This is really the grouping condition because of the limitations of the wizard.)

To close the wizard and display the query in a Table Data View dialog, click **Finish**.

**Check the overview and decide how to proceed**

<b>Name of the query</b> <input type="text" value="Household Inventory Summary"/>	<b>How do you want to proceed after creating the query?</b> <input checked="" type="radio"/> Display Query <input type="radio"/> Modify Query
--	---

**Overview**

Fields in the Query: Room (Household Inventory.Room), Purchase Price (Household Inventory.PurchasePrice), Appraised Value (Household Inventory.AppraisedValue)

Sorting order: Room (ASC)

Search conditions: Room is greater than '500'

Grouped by: Room

No grouping conditions were assigned.

## Reports: use wizard to create reports

Reports present information found in the database in a useful way. In this respect 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. Since the data that concerns us is contained in a query, we will use that.

Reports can be static or dynamic. Static reports contain the data from the selected fields at the time the report was created. Dynamic reports can be updated to show the latest data. If you are



sure that data for your report does not change with time, creating a static report is a good choice. A report of your inventory's total appraised value for the year 2008 is an example of a static report. (It is very unlikely that the data for 2008 will change.) But a similar report for your insurance agent for updating your policy needs to be a dynamic report. This report needs to contain any purchases made since the last report was made. When you purchase or replace an item, this report can tell you whether you even need to contact your agent or not.

The report that we will create, is based upon *Query\_Household Inventory*. We will look for all items listed in this query.

Follow these steps to create a report.

**Step 1: Open the Report Wizard.** (See Figure 19.)

- 1) In the main database window, click the Report icon in the Database section.
- 2) In the Task section, click Use **Wizard to Create Report**. (The Report Wizard opens with the Report Builder opening in the background.)

**Tip**

As you go through the steps of the Report Wizard, use the mouse to move it so that you can see what effects your selections in the wizard have on the Report Builder.

Under *Tables or queries*, a drop-down list contains the tables and queries you have created.

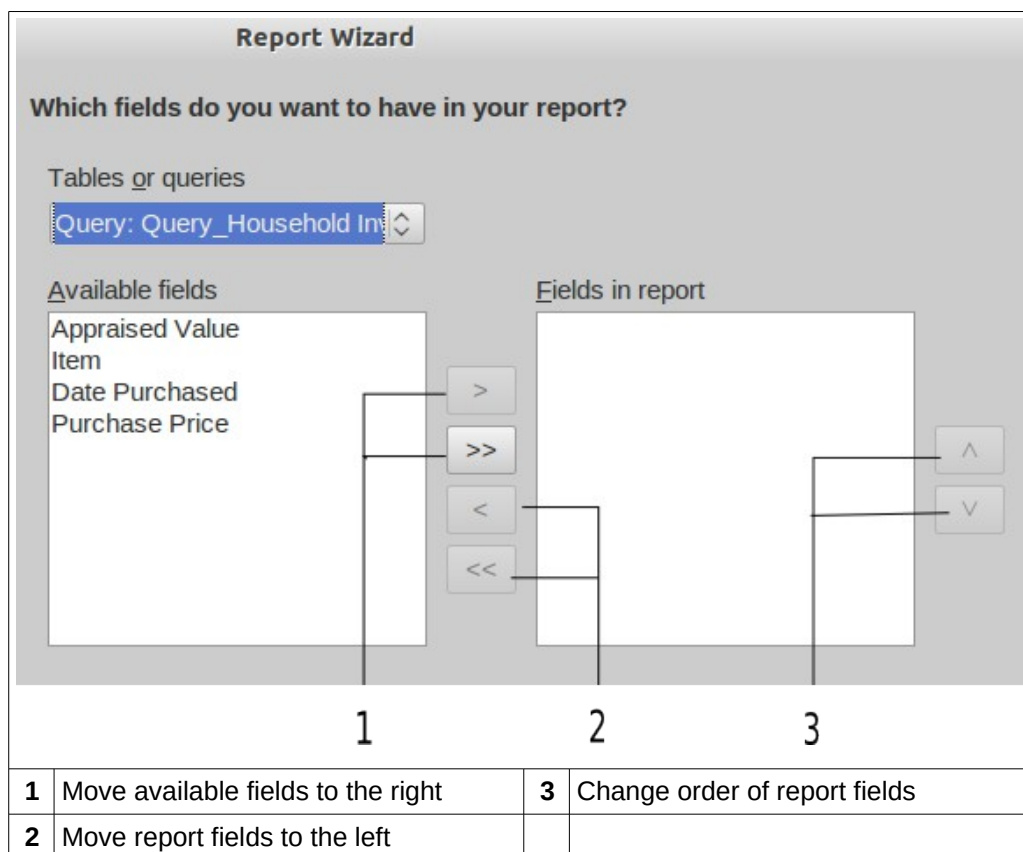


Figure 19: Report Wizard field selection

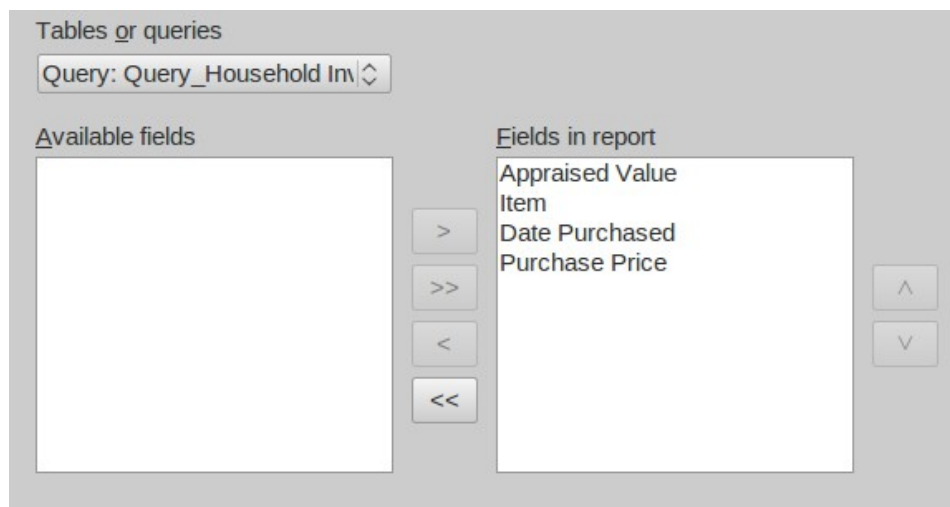
**Step 2: Select the table and its field for the report.**

- 1) Select *Query\_Household Inventory* from the *Tables or queries* drop-down list.
- 2) Move the list of *Available fields* to the list of *Fields in report* using the double right arrow button.



- 3) If you want to change the order of the fields in the *Fields in report* list, click the field you want to move up or down in this list. Click one of the arrows (#3 above) to move the field up or down to where you want it.

The fields in your report should match the ones in the figure below.



### Step 3: Labeling fields.

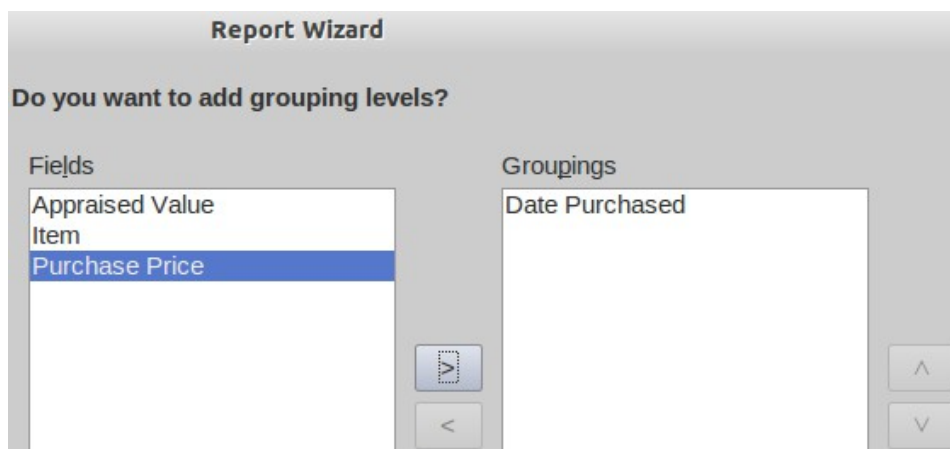
Here you can give aliases to one or more fields. The report suggests using the name of the fields of the query. If you have added the aliases you wanted when creating the query, you will not have to make any changes in this step. If, however, you want to make some changes, now is the time to make them.

- 1) Review the suggested labels for the fields. Change them if you think your name is better.
- 2) Remember to use the vertical scrollbar if all of the fields are not visible, and then review the rest of the suggested labels.

We added aliases for these fields in the query earlier: AppraisedValue, DatePurchased, and PurchasePrice. So, the report will use the aliases of the query instead: Appraised Value, Date Purchased, and Purchase Price respectively.

- 3) Click **Next**.

### Step 4: Grouping.



- 1) Click *Date Purchased* in the Fields list.
- 2) Click the right arrow button to move it to the Groupings list.

- 3) Make sure your lists match those in the figure above. If a field is in the wrong list, select it and use the right or left arrow button to move it the correct list.

#### Step 5: Sort options.

The screenshot shows a dialog box titled "According to which fields do you want to sort the data?". It has two sections. The first section is labeled "Sort by" and contains a dropdown menu with "Date Purchased" selected, and two radio buttons: "Ascending" (which is selected) and "Descending". The second section is labeled "Then by" and contains a dropdown menu with "- undefined -" selected, and two radio buttons: "Ascending" (which is selected) and "Descending".

By selecting how the report should group the data, we have already selected the field, Date Purchased, as the first sort option. We want the field's sorting order to be ascending. No more fields will be used in the sorting.

- 1) If you want to sort by more fields of the report, do so now.
  - a) Click the drop-down list below *Then by* to open the list.
  - b) Select the field you want to use to sort the report by. This sorting will be in addition to the sorting by the *Date Purchased* field.
- 2) Click **Next**.

#### Step 5: Choose layout.

The screenshot shows a dialog box titled "Report Wizard" with the question "How do you want your report to look?". It has two main sections. The first section is labeled "Layout of data" and contains a list of options: "Tabular" (which is selected), "Columnar, single-column", "Columnar, two columns", "Columnar, three columns", "In blocks, labels above", and "In blocks, labels left". The second section is labeled "Layout of headers and footers" and contains a single option: "default" (which is selected). At the bottom, there is a section labeled "Orientation" with two radio buttons: "Landscape" (which is selected) and "Portrait".

Page orientation can be either *Landscape* or *Portrait*. Which one you use depends upon the number of fields contained in the report. For a large number of fields in the report, use the Landscape orientation. For a smaller number of fields, Portrait will probably be the best selection.

To see each of the data layout choices, move the Report Wizard so you can see the layout in the Report Builder. Then select the layouts one at a time while observing what happens in the Report Builder.

- 1) Select the *Layout of data* that meets your needs. For this example, select *Columnar, three columns*.
- 2) Select the *Orientation* for your report. For this example, select Portrait.
- 3) Click **Next**.

Date Pu...	Date Purchased	=Date Purchased		
Detail	Appraised Value	=Appraise	Item	=Item Purchase Price =Purchase

Figure 20: Report Builder layout for the selections above

### Step 6: Create report.

**Report Wizard**

**Decide how you want to proceed**

Title of report  
Report\_Household Inventory

What kind of report do you want to create?

☐ Static report

☒ Dynamic report

How do you want to proceed after creating the report?

☐ Modify report layout

☒ Create report now

Name the report. The suggestion given is *Query\_Household Inventory*. This is the same name as the query we used to create this report. Change *Query\_Household Inventory* to *Report\_Household Inventory*.

You can create two types of report: static or dynamic. A static report is a Writer document which can be modified like any text document, but any changes in the data in the underlying query will not change the report. A dynamic report is much more flexible. Changes in the data of the database will change the report the next time the report is run.

The Report Builder can also be used to modify the fields of the report. For example, the date format for the Date Purchased can be changed and the Report saved. The next time the Report is run, the data in this field will have the changed format. In a static report, you would have to change the date format for each place this field appears in the report.

The final selection involves what should happen next. Selecting *Modify report layout* will open the Report Builder so that the report can be edited. This is beyond the scope of this chapter. (See Chapter 6 for how to use the Report Builder.) So, use the Default choice, *Create report now*.

Click **Finish**.

<b>Date Purchased</b>	10/19/67				
<b>Appraised Value</b>	125.00	<b>Item</b>	table	<b>Purchase Price</b>	825.00
<b>Date Purchased</b>	09/10/77				
<b>Appraised Value</b>	230.00	<b>Item</b>	bed	<b>Purchase Price</b>	1199.99
<b>Date Purchased</b>	12/16/90				
<b>Appraised Value</b>	528.00	<b>Item</b>	Refrigerator	<b>Purchase Price</b>	1599.99
<b>Date Purchased</b>	01/02/96				
<b>Appraised Value</b>	789.00	<b>Item</b>	couch	<b>Purchase Price</b>	1499.99

Figure 21: Top portion of the report

Figure 21 shows that sometimes the report needs to be edited once created. The layout did not allow enough room for the word *Refrigerator*, and the space allowed for the field label *Item* is wider than it needs to be. The data format might be changed as well, and this might require a change in the length of this field. The fields containing currency amounts should be modified to the currency being used in the Inventory database.

## Mixing Base with the rest of LibreOffice

Base can be used alone or be used with other components of LibreOffice. Your choice depends on what you want to do with the information in the database.

This section mentions a few ways in which Base can be used with the other components of LibreOffice. Chapter 7, *Exchanging Data*, in the *Base Guide*, as well as the individual guides for the other components of LibreOffice, contain instructions how to do this.

### Writer

One very common database is the address book. Base will connect to several of them. Using Writer with Base, you can print envelopes using the postal addresses in the address book and you can send an email to several people in the address book at one time. This process is called mail merge. It is explained in Chapter 11, *Mail Merge*, of the *Writer Guide*.

To include in a Writer document data that exists in one of our databases, we could look up the data and type it into the document, but we might make a mistake in typing. By using Base with Writer, we can place a field linked to the desired data in the document. Doing it this way guarantees the data shown in the document will be as accurate as the data in the corresponding database. This is explained in Chapter 14, *Working with Fields*, of the *Writer Guide*.

Using Writer, tables in text documents can be copied into a table in a database. A new table can be created in the database including the data in the text document table. Or, a new table can be created in the database without any data. Or, if the data in the table is arranged properly, this data can be added to an existing table of a database. This is discussed in Chapter 7 of the *Base Guide*.

### Calc

Base and Calc work together well. Using **F4** or **View Data Sources** in Calc opens the Data window. Data and column names can be copied from the data source to the spreadsheet that is open in Calc. Data can also be copied from the spreadsheet to the data source. These methods are discussed in the *Calc Guide* and in Chapter 7 of the *Base Guide*.

Once the data has been copied from the data source to the spreadsheet, you can apply all of the available Calc functions to the data, including creating charts from the data. This is also discussed in the *Calc Guide* and in Chapter 7 of the *Base Guide*.

There are different ways to use the data in a spreadsheet as a data source. One way is to create a Base file to connect to the spreadsheet. A second way is to save the spreadsheet using the .dbf file format. This is the file format used by dBase. Base will open this file format. This is discussed in Chapter 7 of the *Base Guide*.

## Impress

Base and Impress are not directly used together, but they can be used together in an indirect way. Calc spreadsheets can be inserted into slides. So when you want to use data from a database in a slide, you first copy the data into a spreadsheet and then insert this spreadsheet into the slide. This is discussed in Chapter 7, Inserting Spreadsheets, Charts, and Other Objects, in the *Impress Guide*.

## Using Base with other data sources

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Base can be used with a variety of data sources, including Oracle, Groupwise, Evolution (LDAP and Local), KDE Address Book, Thunderbird/Icedove Address Book, Spreadsheet, dBASE, Text, MySQL, and Postgresql. Also included are the data sources which Base can access using JDBC (java database connectivity or ODBC (open database connectivity)).

You can connect Base directly to some of these data sources (text files and spreadsheets) by making only a few selections in the Base Wizard. Chapter 7 of the *Base Guide* contains instructions for how to work with these data sources.

Base requires a special driver to connect to some data sources. PostgreSQL, MySQL, JDBC, and Oracle JDBC are examples of these data sources. Chapter 7 of the *Base Guide* discusses how to connect to these database sources as well as how to work with them.