[Academic Script]
[Database Basics (Using MS-Access)]

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Course:	B. A. (Hons.), 5th Semester, Undergraduate
Paper No. & Title:	Paper – 502 Computational Techniques Business Economics
Unit No. & Title:	Unit – 1 Use of Office Software
Lecture No. & Title:	6 (Six) Database Basics (Using MS-Access)

Database basics

(Using MS-Access 2007)

Objectives

To discuss about basics of database: its terminologies and various features of Microsoft Office Access with examples.

1. Introduction

A database is a tool for collecting and organizing information. Database can store information about people, products, orders, or anything else. Many databases start as a list in a word-processing program or spreadsheet. As the list grows bigger, redundancies and inconsistencies begin to appear in the data. The data becomes hard to understand in list form, and there are limited ways of searching or pulling subsets of data out for review. Once these problems start to appear, it's a good idea to transfer the data to a database created by a database management system (DBMS), such as Microsoft Access, Oracle or SQL Server that provides software tools to organize that data in a flexible manner.

2. Starting with Microsoft Access

MS Access is a Relational Database Management System (RDBMS) designed primarily for home or small business usage. It handles data management tasks the same way as MS Word handles document management and MS Excel handles statistics.

Access has traditionally been known as a desktop database system because its functions are intended to be run from a single computer (as opposed to a server database application where the application is installed on a server, and data accessed remotely from multiple client machines like MS SQL, MYSQL etc). An Access database stores its tables in a single file, along with other objects, such as forms, reports, macros, and modules. Microsoft Access provides users with one of the simplest and most flexible DBMS solutions on the market today.

3. Parts of Microsoft Access database

The basic components of a database are tables, records, fields, forms, reports, and queries. All these components compose an Access database file.

3.1 Tables - The root of any database is tables. Access tables are a lot like Excel spreadsheets where Information is organized into columns and rows. A database file can have contained many tables. We might have one table listing customers and addresses, for example, and another table listing products details.

3.2 Records - Each entry in a database is called a record. Records appear as rows in a database table; each row represents one record.

3.3 Fields - The detailed information that makes up a single record is broken into categories, called fields. When we plan a database, we need to decide fields for each record. An address database, for example, needs fields for Name, Address, City, ZIP code, and Phone number.

3.4 Forms - To make things easier, use a form. A form is an onscreen fill-in-the-blanks sheet for completing a record. The form comprises all the fields needed to create a record.

3.4 Reports - After building a database, we will probably want to organize certain aspects of the information and create specialized reports. Reports summarize and organize the data. Typically, they are printed out.

3.5 Queries - Queries are a formal way of sorting and filtering the data to produce specific results. With queries, we can specify the fields that we want to see the order in which we want to view them, filter criteria for each field, and more.

3.6 Macros - Macros is a simplified programming language used in Access, to add functionality to the databases. For example, we can attach a macro to a command button on a form so that the macro runs whenever the button is clicked. Macros contain actions that perform tasks, such as opening a report, running a query, or closing the database.

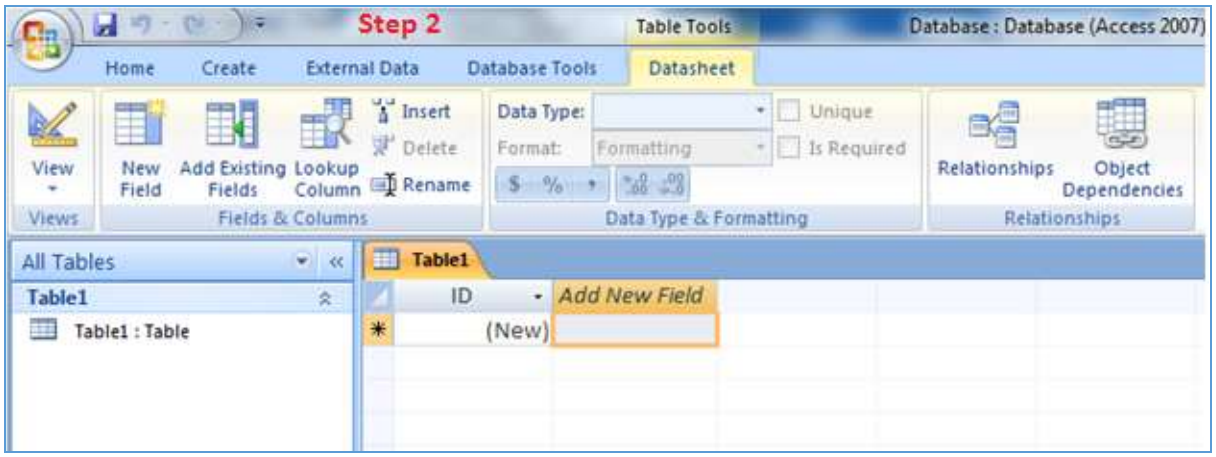
3.7 Modules - Modules, like macros, are objects we can use to add functionality to our database. A module is a collection of declarations, statements, and procedures that are stored together as a unit. A module can be either a class module or a standard module. Class modules are attached to forms or reports, and usually contain procedures that are specific to the form or report they're attached to. Standard modules contain general procedures that aren't associated with any other object. Standard modules are listed under **Modules** in the Navigation Pane, whereas class modules are not.

4. Features of Microsoft Access

4.1 Database Creation

Creating a database in Microsoft Access is as easy as creating a Word document. Clicking on "Blank database"(step 1), Access will create a blank database where we can create tables under the **Datasheet** menu (step 2).

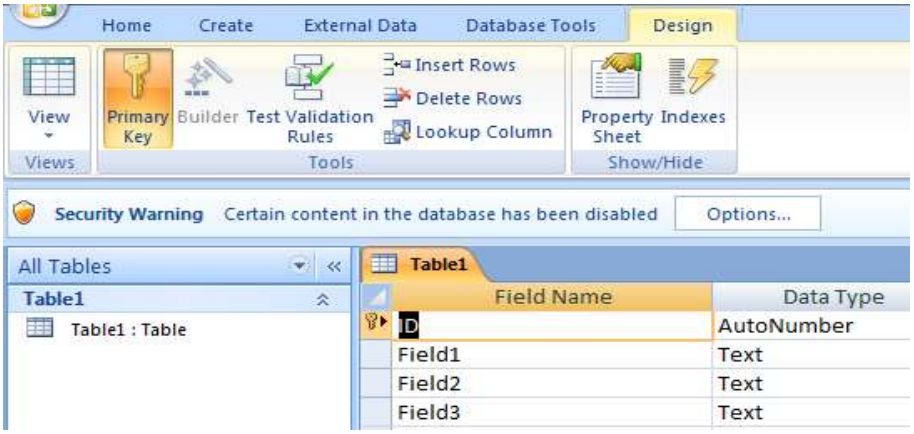
4.2 Create Tables



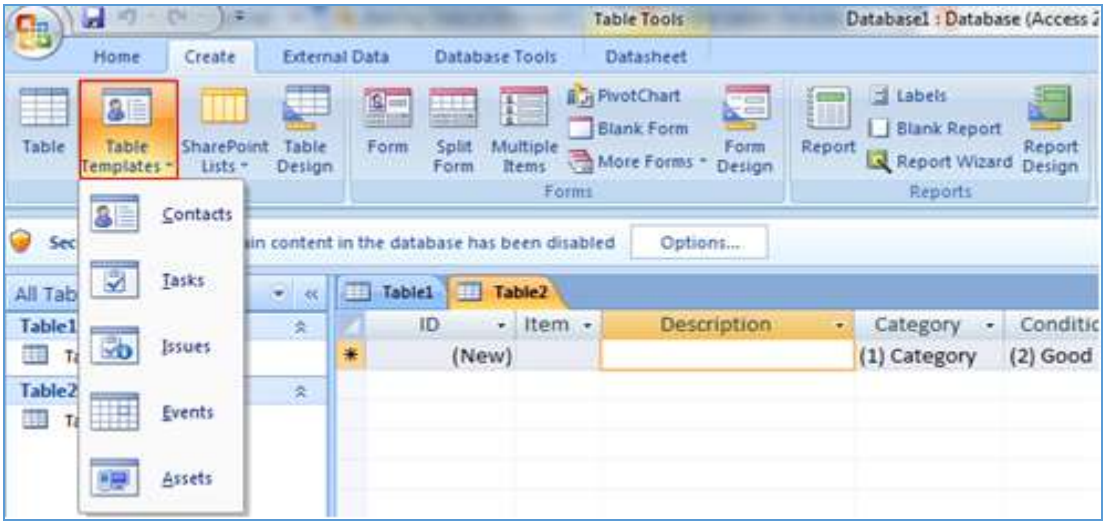
In a relational database, data are stored in the tables, and that makes tables the central component of our database. There are several ways to create tables: Datasheet view, table templates, and Design view.

a. **In Datasheet view**, we can build a table by entering field names and setting data types manually. Datasheet view provides a visual way to create a table. We start by creating a new blank database or by adding a new table to an existing database. The new table opens automatically in Datasheet view.

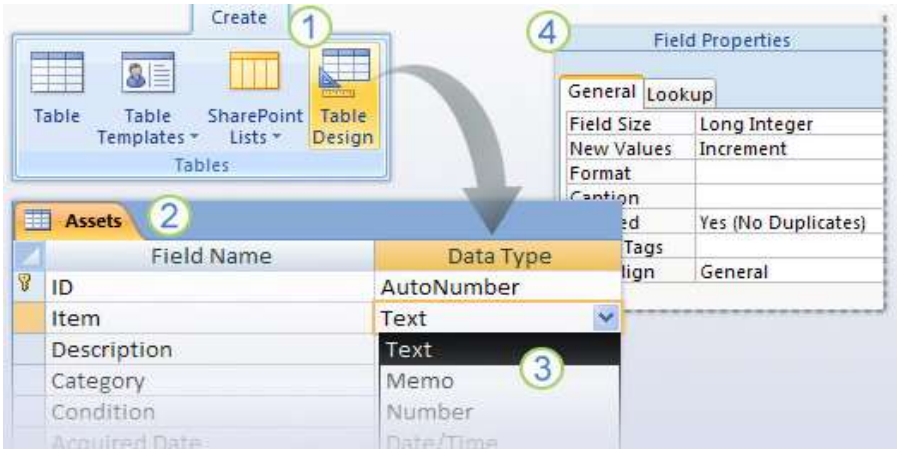
   When we create a table, Access automatically creates a **primary key field** - a field or set of fields with a unique value for each record stored in the table. We can use the primary key to identify and refer to each record. Alternatively we can set a table's primary key by opening the table in **Design view** as seen in the figure below.



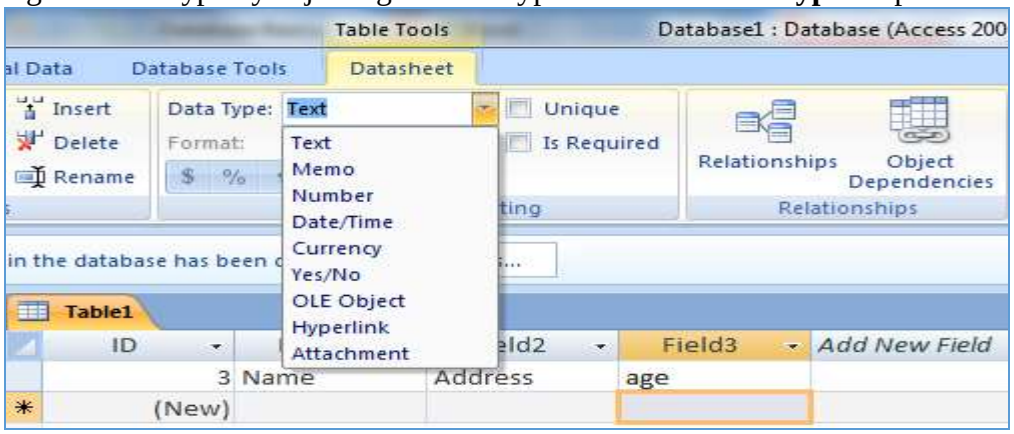
b. **Table templates** are pre-made tables that meet several common business needs. For example, the Assets table template contains many of the fields, such as Item and Purchase Date etc.



c. **Design view** controls every field and property in the table. We can open existing tables in Design view and add, remove, or change fields. Optionally, we can use the **Field Properties** pane to set properties for individual fields.

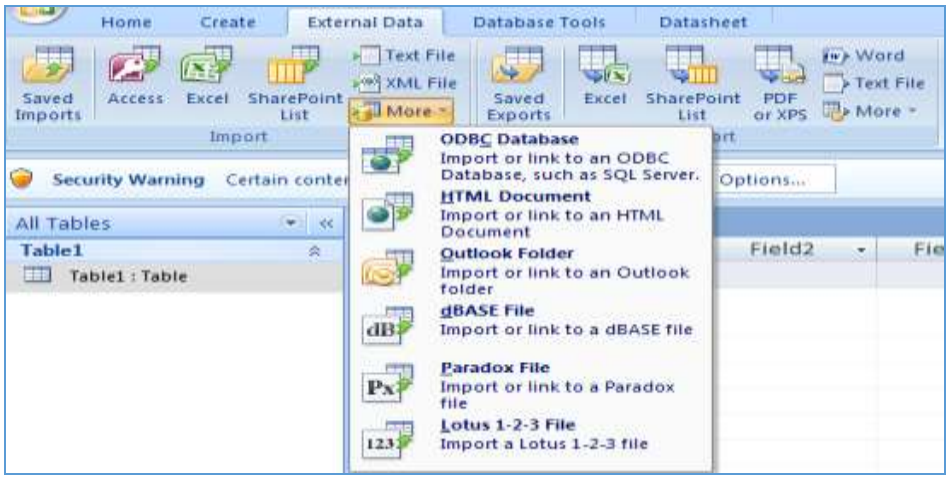


After entering field names, restricting the data type for each column is very important, it helps us to maintain data integrity. Access automatically sets new fields to the **Text** data type, but we can easily change the data type by adjusting the data type under the **Data Type** dropdown menu.



4.3 Adding Data in Microsoft Access

In Microsoft Access, there are many ways to add data to a database. It depends largely on how much data we need to add and whether the data already exists outside of Access. To do this, Click on **External Data**, in the **Import groups**, click on **More** drop down menu, we can find number of external file formats to be imported into the Access database tables for immediate effect.

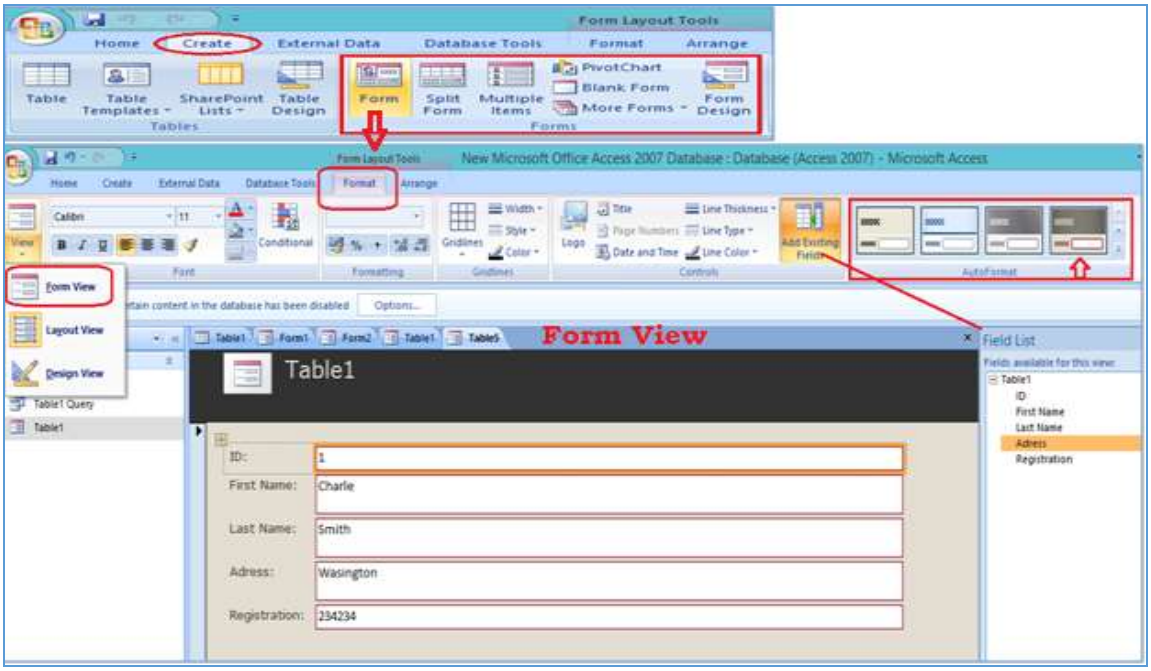


4.4 Create a Form

Forms in Access make it easier to insert data across multiple tables. It allows us to enter custom information, and based on that information perform a task. The data entered in forms will automatically insert in the table. Moving to a new record saves the most recently entered record. However, it may be necessary to refresh the table in **Datasheet view** to see the newest record.

To create a Forms and it layouts, do the followings.

- Click on **Form,** in **Form group** under **Create** tab, the **Form View** screen will pop up on the screen(under Format ribbon), where we can customize the form, **add existing fields** from the right side pane etc as shown in the figure.
  Steps: Create→ Form→ Format→ Form View



4.4.1 Edit records using a Form

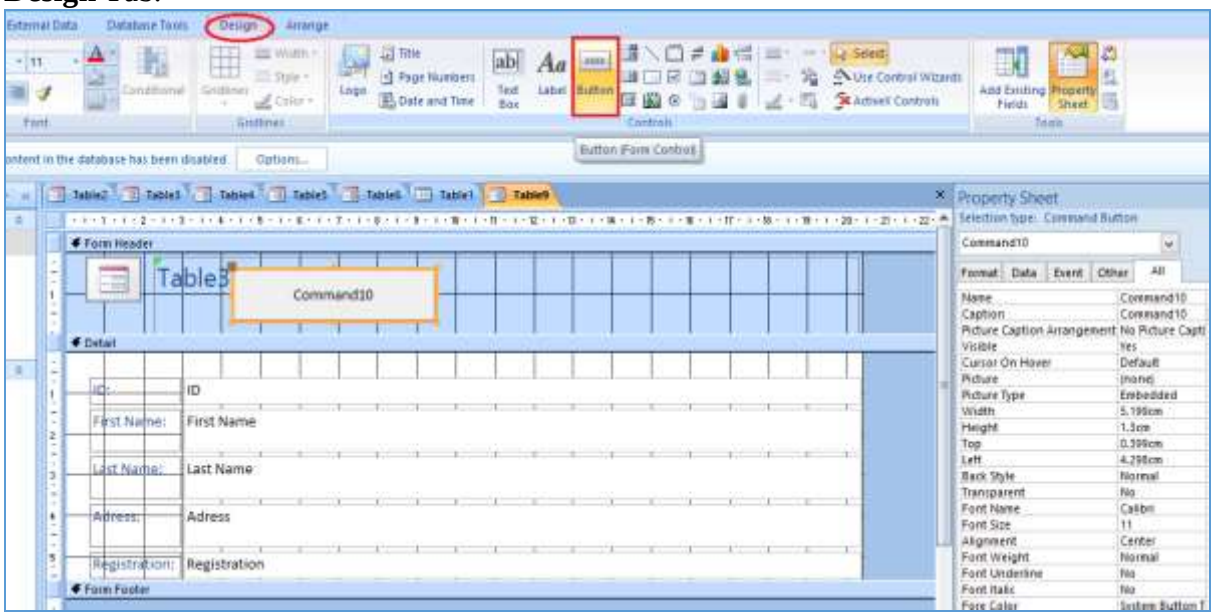
Just like in a table, we can edit records from a form using the **Find and Replace** command. This command works exactly the same way in a form as it does in a table.

4.4.2 To add Command buttons to a Form

Another way to make a form more user friendly is by adding **command buttons** to the form. Command buttons are a quick way for form users to take a specific action. These command buttons are grouped in a categories of actions, including:

- **Record Navigation** command buttons, which easily allow us to move among the records in the database.
- **Record Operation** command buttons, which let us do things like save and print records.
- **For m Operation** command buttons, which let us quickly open or close a form, print the current form, and perform other actions.
- **Report Operation** command buttons, which offer a quick way to do things such as preview or mail a report.

To add Command buttons to a Form, click the **Button** command in the **Controls** group under the **Design** Tab.

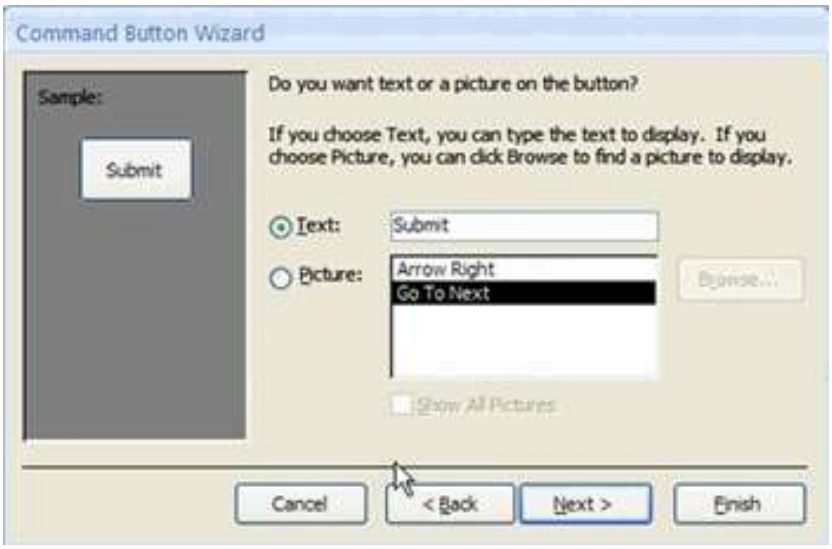


On clicking the Button command, the **Command Button Wizard** pop up on the screen:

- Select the type of command from the **Categories** list.
- Select the specific action that the command button to perform from the **Actions** list, and then click **Next**.

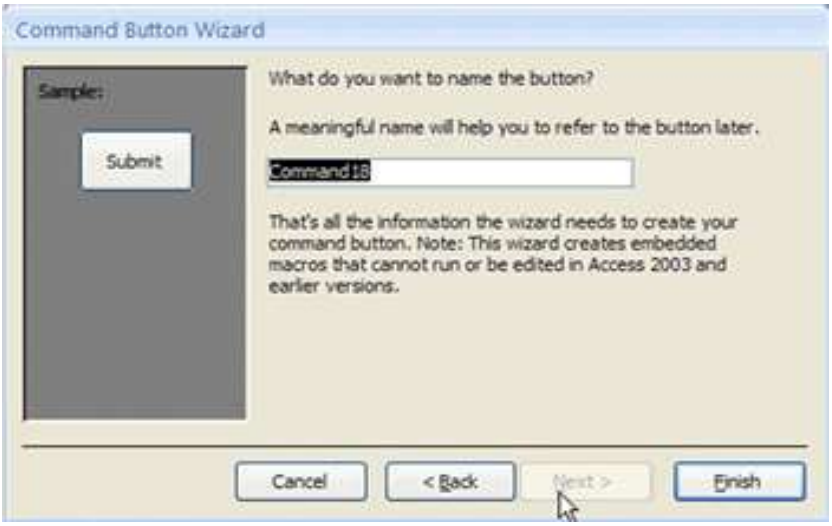
In the next **wizard** step:

- If we want text to appear on the button, enter it in the **Text** box, OR
- If we want a picture to appear on the button, select one using the **Browse** button, then click **Next**.



In the next **wizard** step:

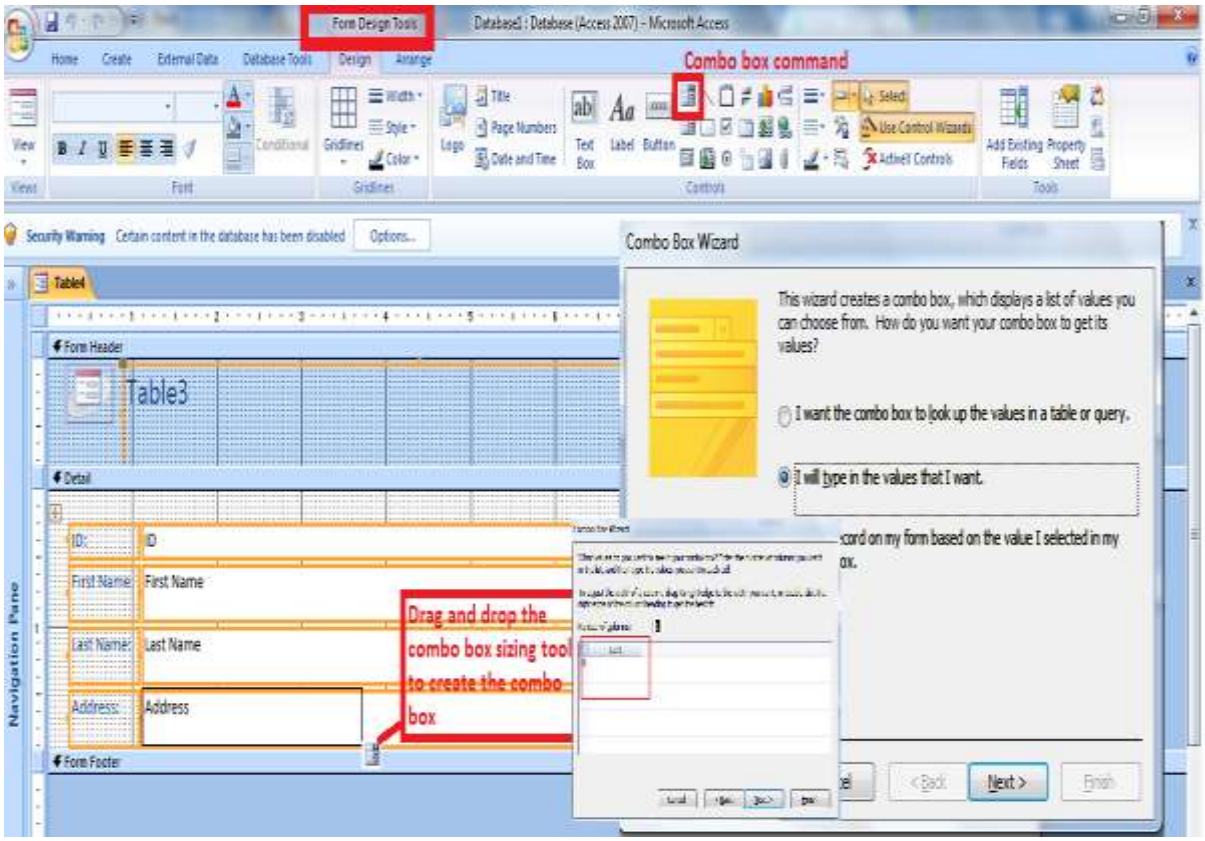
- Give the button a meaningful name. **Note:** Access will give our button a default name. Renaming it with a more useful name may help later if we have several buttons on a form and want to change the properties of one, and then click **Finish.**



The command button should be operational and appear on the form in **Form view**.

4.4.3 Creating a drop-down list

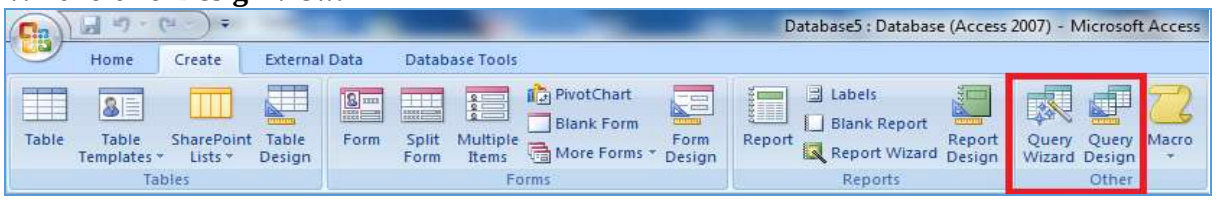
Using a drop-down list on a form can increase the integrity of the data in the database because drop-down lists force to select one of the preset options in the list to populate the field. These types of **form controls** are relatively easy to set up using the **Combo Box Wizard,** which is found under the Design view in the Access database.



4.5 Create Access Query

Queries are the second structure in Access. Tables hold the information, queries contain stored questions. As tables grow in size they can have hundreds of thousands of records, which makes it impossible for us to pick out specific records from that table. Queries were designed to combat this problem. With a query we can apply a filter to the table's data, so that we only get the information that we want.

Access gives several ways to create select queries. The easiest and fastest ways are the **Query Wizard and Design view.**



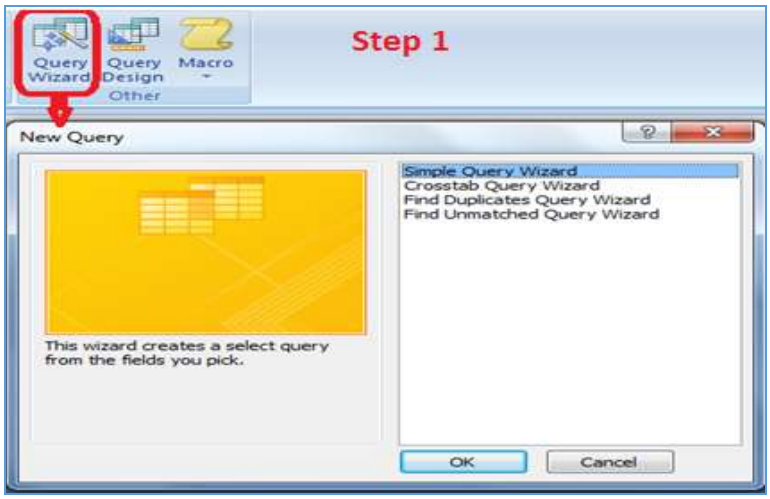
A. The **Query Wizard** automates the process of setting up our query's structure. We select a record source, choose sorting and filtering options, and the wizard does the rest. We can also use the wizard to create other types of queries, such as crosstab and action queries.

B. **Design View** gives us more control over our queries. After selecting the record source, we drag the fields that we want to a grid. We can also enter any selection criteria for filtering the data, and formulas for performing calculations.

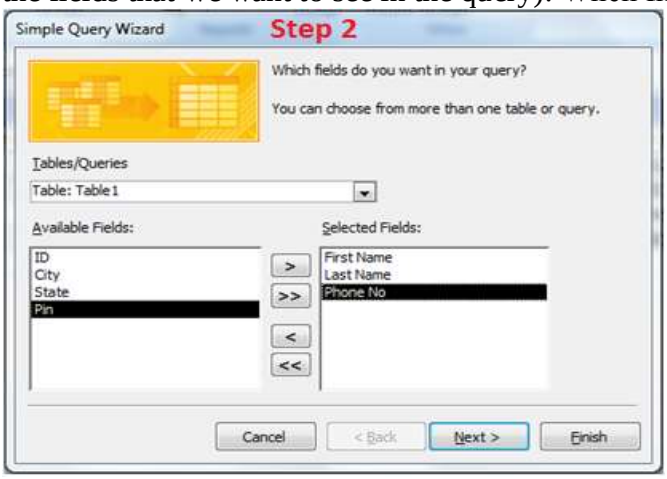
A. Query Wizard

Access 2007 used 4 types **Query Wizard**: Simple Query Wizard, Crosstab Query Wizard, Find Duplicates Query and Find Unmatched Query. On selecting one of type, Access asks to choose the field's more than one table.

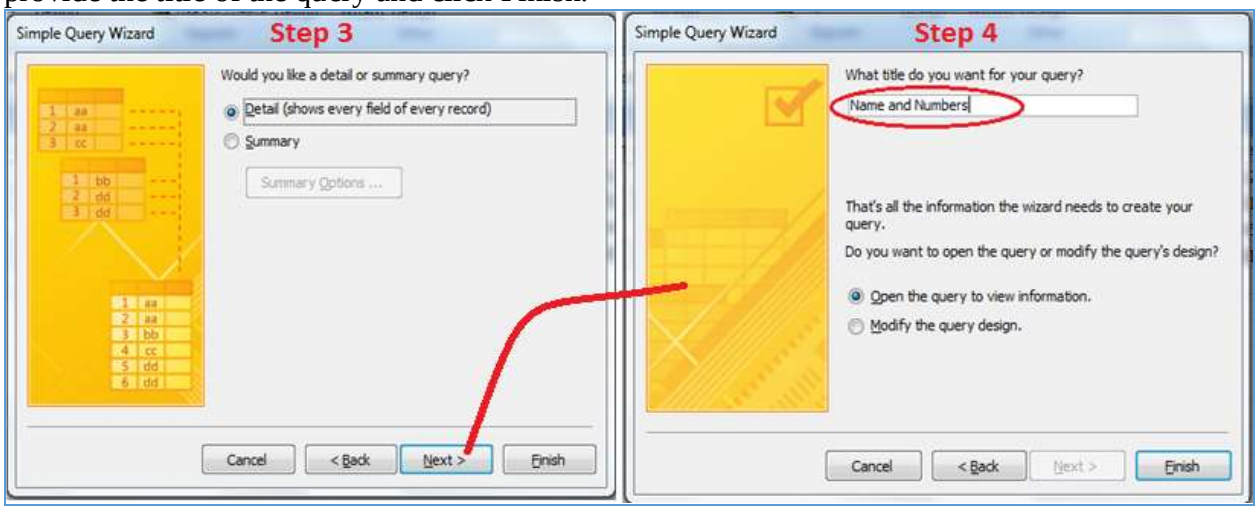
Step 1: To create a simple query using the wizard, click the **Query Wizard** button in the **Queries group** on the **Create** tab in the Ribbon. A **New Query dialog box** appears on the Access window.



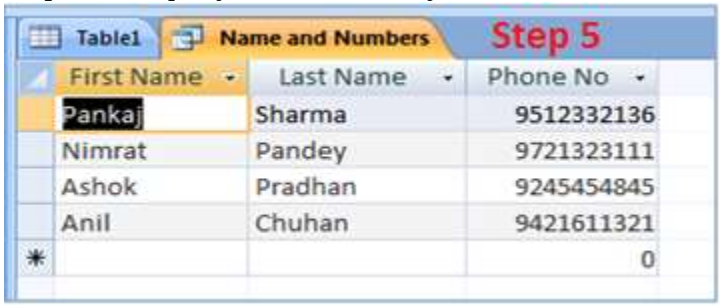
Step 2: Select on the **Simple Query Wizard** and click **OK.** In the second Screen of the wizard, add selected fields from the table into the query: select its name from the "Available fields" list and click the ">" button to move it into the "Selected fields" list (Repeat this as needed; selecting the fields that we want to see in the query). When finished, click "Next " to continue.



Step 3 & 4: Select the either the Detail or Summary as per the requirement. The next step is to provide the title of the query and click Finish.

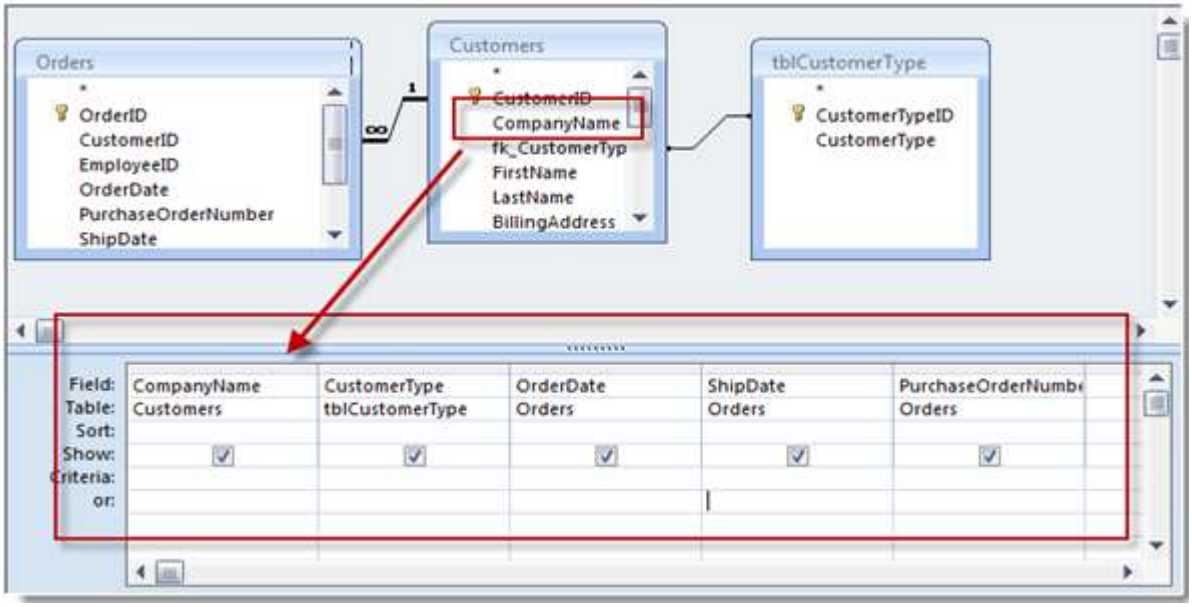


Step 5: The query is automatically saved and executed. It will look like this:



B. Query Design

Access provides simple query wizard which we can use to initially create queries. However, at some point we may inevitably have to create a query that is more complex than this tool allows. For advanced/complex queries, Access also provides another toll called **query design** view which gives us more control over our queries. We must learn how to create a query in query design view, versus using the wizard to create them. The power and flexibility of query design is the entire reason for which we use database programs. We can quickly access, calculate, and summarize the records, by pulling data records from the various tables, as seen in the figure, for example.

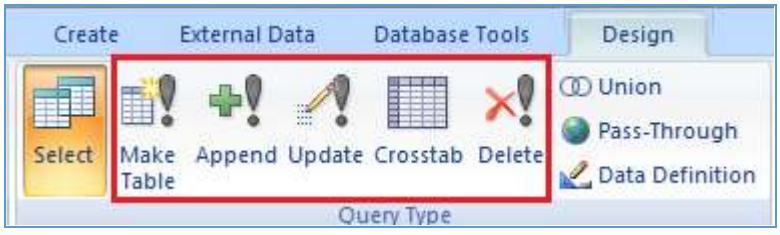


Note: No results are made until we click the ***Run*** button.

4.6.1 Action Quires

Action queries are used when we want to perform tasks such as inserting, updating, or deleting records. We can convert an existing select query to an action query by changing its query type.

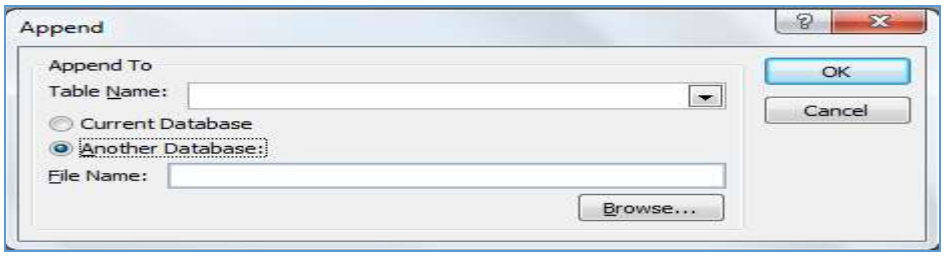
An action query is a query that makes changes to or moves many records in just one operation. There are four types of action queries: delete, update, append, and make-table.



Delete - We can use a delete query to delete records from a single table, from multiple tables in a one-to-one relationship, or from multiple tables in a one-to-many relationship, if cascading deletes are enabled. A Delete query is extremely useful, but care needs to be taken with using it.

Update - An update query makes global changes to a group of records in one or more tables. For example, we can raise salaries by 5 percent for the people within a certain job category. With an update query, we can change data in existing tables.

Append - An append query adds a group of records from one or more tables to the end of one or more tables. For example, suppose we acquire some new customers and a database containing a table of information on those customers



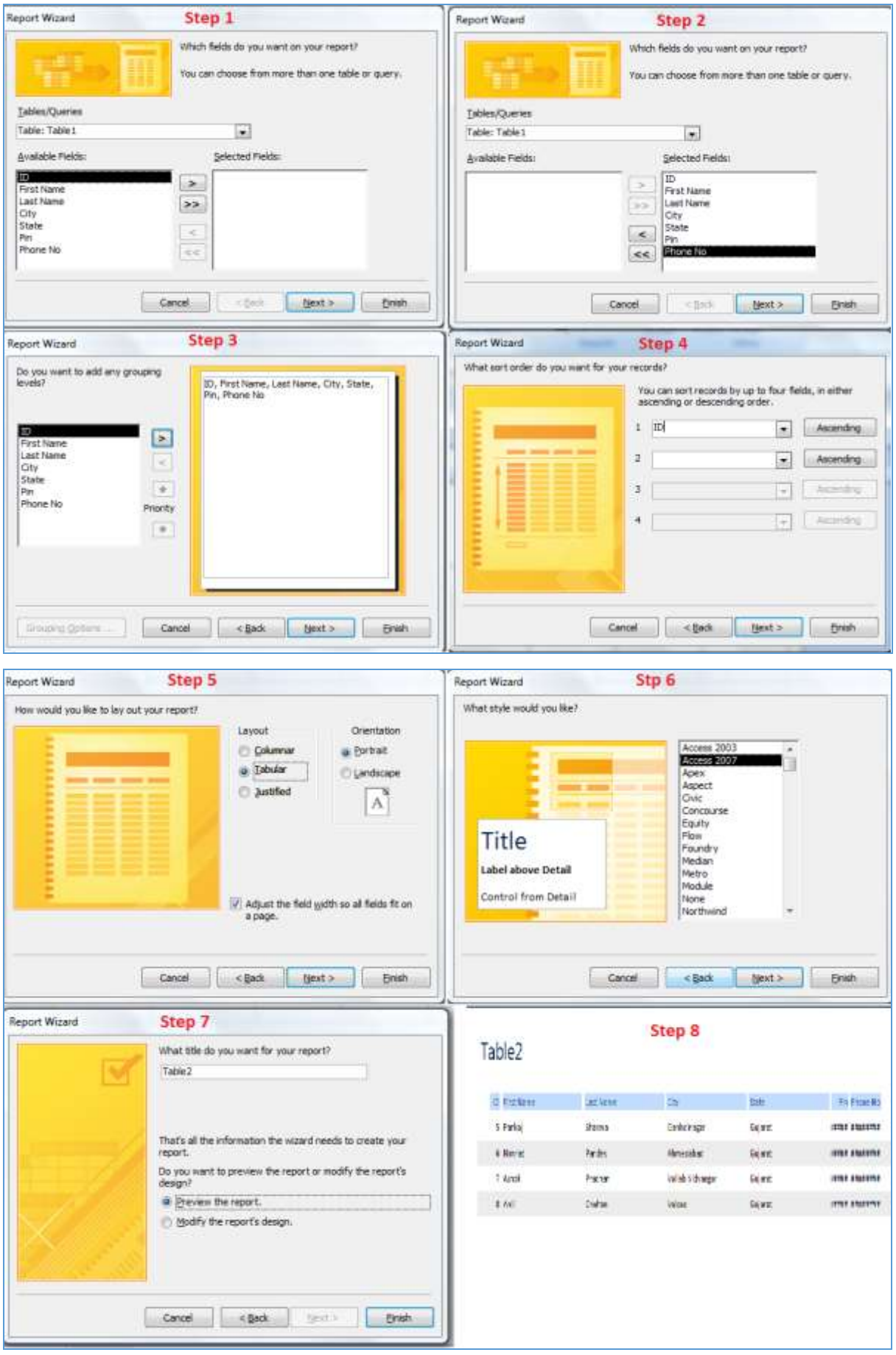
Make Table - A *Make Table* query works the same way as an Update, but puts the results in a new table. This is useful when we need to maintain both sets of data separately.

4.6 Create a report by using the Report Wizard

A report consists of information that is pulled from tables or queries, as well as information that is stored with the report design, such as labels, headings, and graphics. The tables or queries that provide the underlying data are also known as the report's record source. The report can be viewed, printed or sent as an email message.

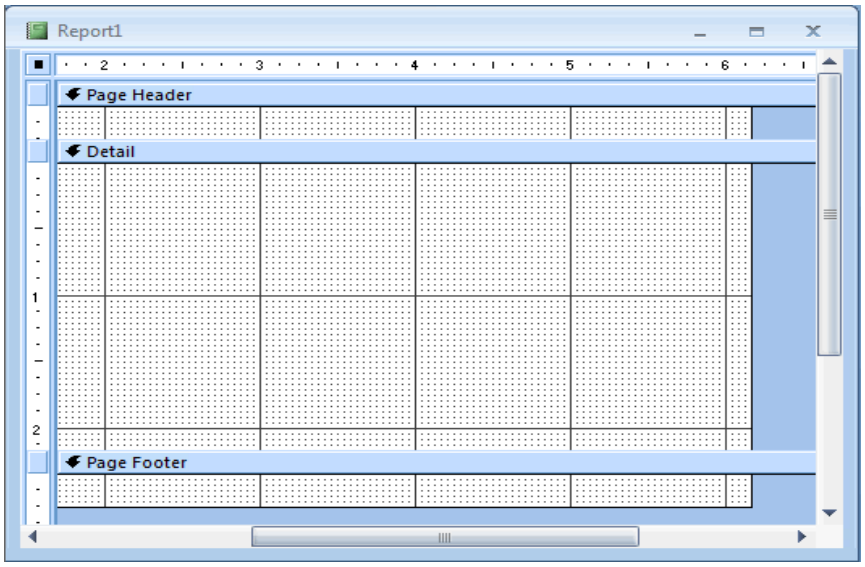
There are many ways to create a report in Access. We can use the Report Wizard to generate a report using Microsoft's step-by-step report wizard to create and format a report automatically. We don't have to drag and drop controls.

Click on the Report Wizard and select the fields (right) from the available fields (left) in the current table and click next button. Then, in the next dialog boxes, add the grouping levels, shorting records by ascending/descending order, set the layouts of report and style, and click Finish. The report will be generated and looking like this (Step 8).



A second way to create a report is to re-save an existing report and then make customizations to the new report.

A third way is to create a report "from scratch". To create a report, select the **Create tab** in the toolbar at the top of the screen. Then click on the ***Report Design*** button in the **Reports group**. This will allow creating a new report in Design View.

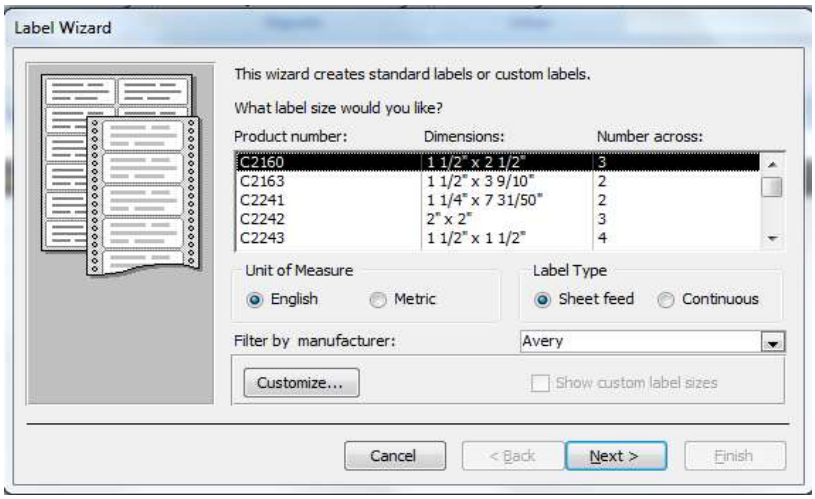


4.7 Create Mailing Labels

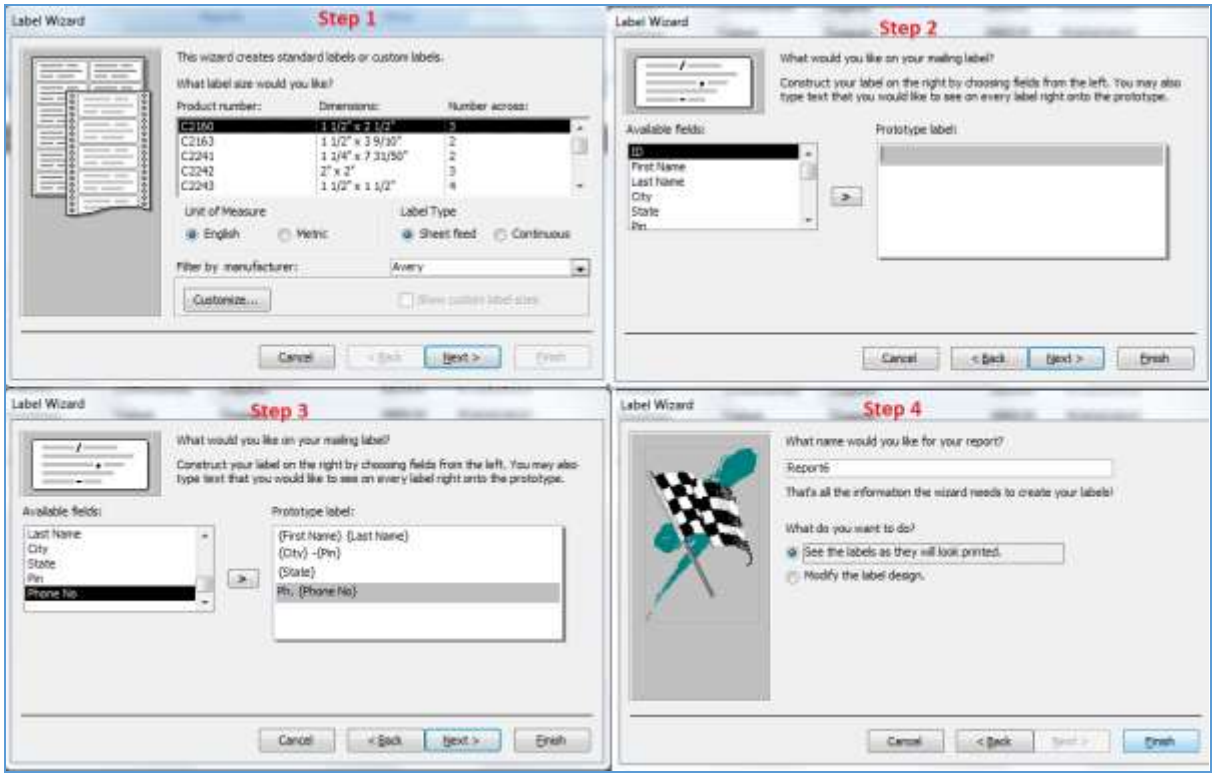
In Access, we create labels as a report that is formatted with a small page size to fit the desired label. The most common use of labels is for mailing, but any Access data can be printed in a label format for a variety of purposes. In the case of mailing labels, the report gets the address data from the tables or queries containing the addresses. Printing the report gives a single label for each address from the underlying record source.

The Label Wizard asks us a series of questions about our labels and the data we want to display on them. The wizard creates the report, which we can then customize, if needed.

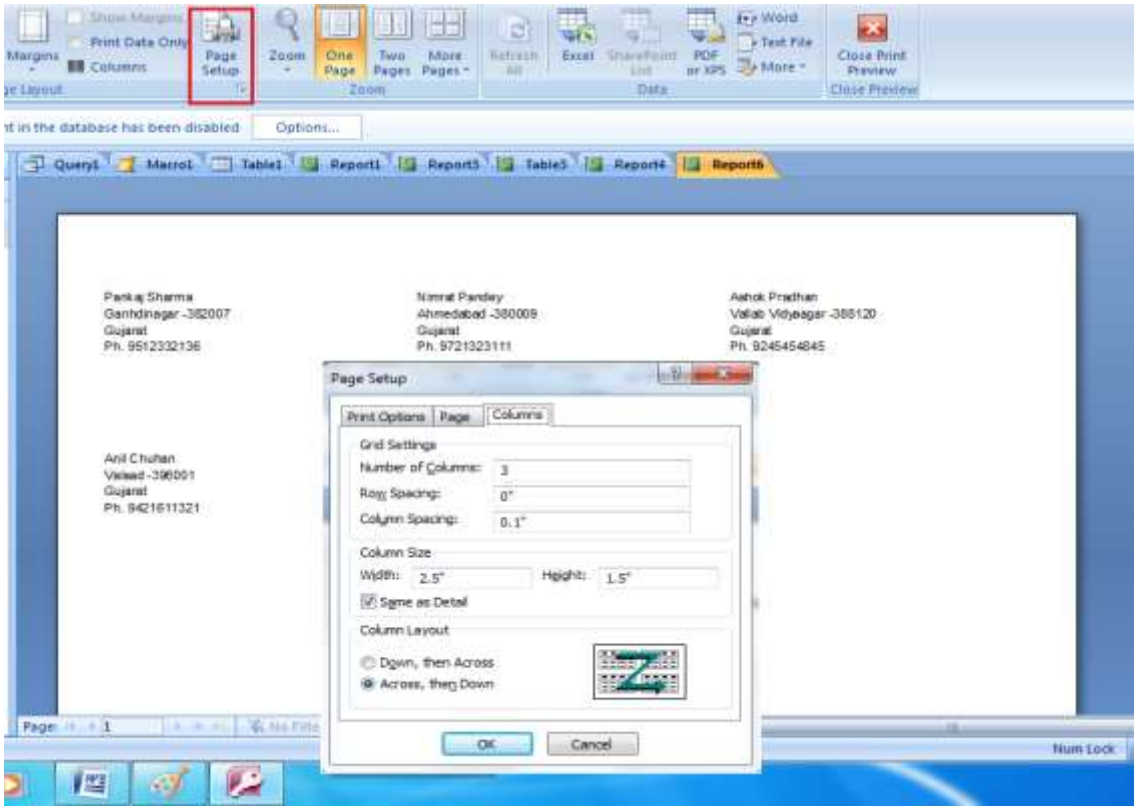
- In the Navigation Pane, select or open the table or query which will be the record source for our labels. Then, on the Create tab, in the Reports group, click Labels. Access will start the Label Wizard.



- Select the label size, font, colour, and provide the label name. Then in the next steps, choose the fields from left into the right prototype label, provide the name of the label and click Finish.



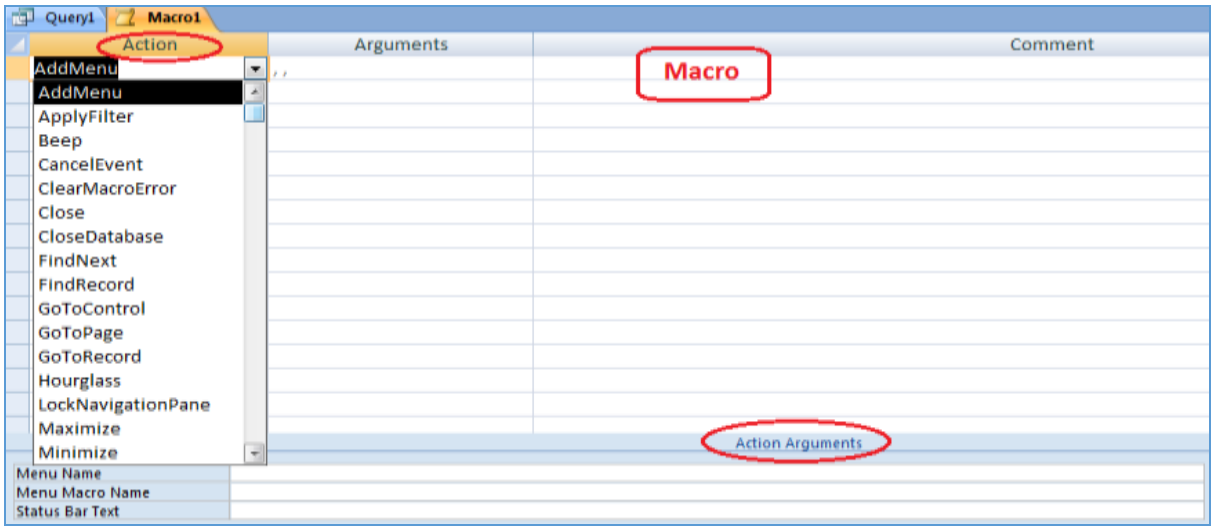
The label will be generated and we can directly take the printout. We can customize the layout by clicking the **Page Setup** tab and making the appearance the label.



4.8 Creating Macro

A macro is a stored series of commands that carry out an action. It is very useful for automating simple tasks, such as performing an action when we click a command button. It is not necessary to know how to program to use macros. Macros can perform a number of common tasks that can also use Visual Basic code to perform and can dramatically increase the productivity when working with a database. Macros allow us to easily chain commands together such as running queries, importing or exporting data, opening and closing forms, previewing and printing reports, etc.

In Access, there are several dozen actions to choose from. For example, if we select the "**OpenForm**" Action, the following Action Arguments appear in the lower part of the window for input.



Summary

In database basics, we have discussed various parts of Access database and tools and features such as creation of table, form, report, datasheet view, designing query and use macro and module. Access database provides a user-friendly forms interface that allows users to enter information in a graphical form and that information transparently passed to the database. Access is less intimidating for the data entry operator but requires a little more work on the part of the database administrator.