

COMPLETE
COURSE GUIDE

Microsoft Access 2010



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Introduction:-

What Is DBMS?

Data is one of the most important assets of a company. It is very important to make sure data is stored and maintained accurately and quickly. DBMS (Database Management System) is a system that is used to store and manage data.

A DBMS is a set of programs that is used to store and manipulation data. Manipulation of data include the following:

- Adding new data, for example adding details of new student.
- Deleting unwanted data, for example deleting the details of students who have completed course.
- Changing existing data, for example modifying the fee paid by the student.

A DBMS provides various functions like data security, data integrity, data sharing, data concurrence, data independence, data recovery etc. However, all database management systems that are now available in the market like Sybase, Oracle, and MS-Access do not provide the same set of functions, though all are meant for data management.

Data Security

While DBMS allowing data to be shared, it also ensures that data is only accessed by authorized users. DBMS provides features needed to implement security at the enterprise level. By default, the data of a user cannot be accessed by other users unless the owner gives explicit permissions to other users to do so.

Data Integrity

Maintaining integrity of the data is an import process. If data loses integrity, it becomes unusable and garbage. DBMS provides means to implement rules to maintain integrity of the data. Once we specify which rules are to be implemented, then DBMS can make sure that these rules are implemented always.

Three integrity rules (discussed later in this chapter) - domain, entity and referential are always supported by DBMS.

Entity and Attribute

An entity is any object that is stored in the database. Each entity is associated with a collection of attributes. For example, if you take a data of a training institute, student is an entity as we store information about each student in the database. Each student is associated with certain values such as roll number, name, course etc., which are called as attributes of the entity.

Data Models

Data model is a way of storing and retrieving the data. There are three different data models. Data models differ in the way they allow users to view and manipulate relationships between entities. Each has its own way of storing the data. The following are the three different data models:

- Hierarchical
- Network
- Relational

Relational Database Management System (RDBMS)

A DBMS that is based on relational model is called as RDBMS. Relation model is most successful mode of all three models. Designed by E.F. Codd, relational model is based on the theory of sets and relations of mathematics.

Relational model represents data in the form a table. A table is a two dimensional array containing rows and columns. Each row contains data related to an entity such as a student. Each column contains the data related to a single attribute of the entity such as student name.

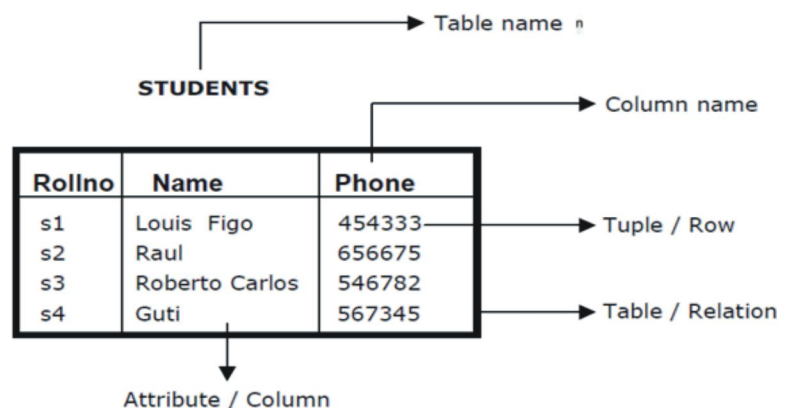


Figure 1

Tuple / Row

A single row in the table is called as tuple. Each row represents the data of a single entity.

Attribute / Column

A column stores an attribute of the entity. For example, if details of students are stored then student name is an attribute; course is another attribute and so on.

Column Name

Each column in the table is given a name. This name is used to refer to value in the column.

Table Name

Each table is given a name. This is used to refer to the table. The name depicts the content of the table.

Creating a Database

In Microsoft Access a database consists of one single file. The file contains all the tables of the database, the relationships (the crow's feet), queries (computed tables), forms (user windows), and many other things.

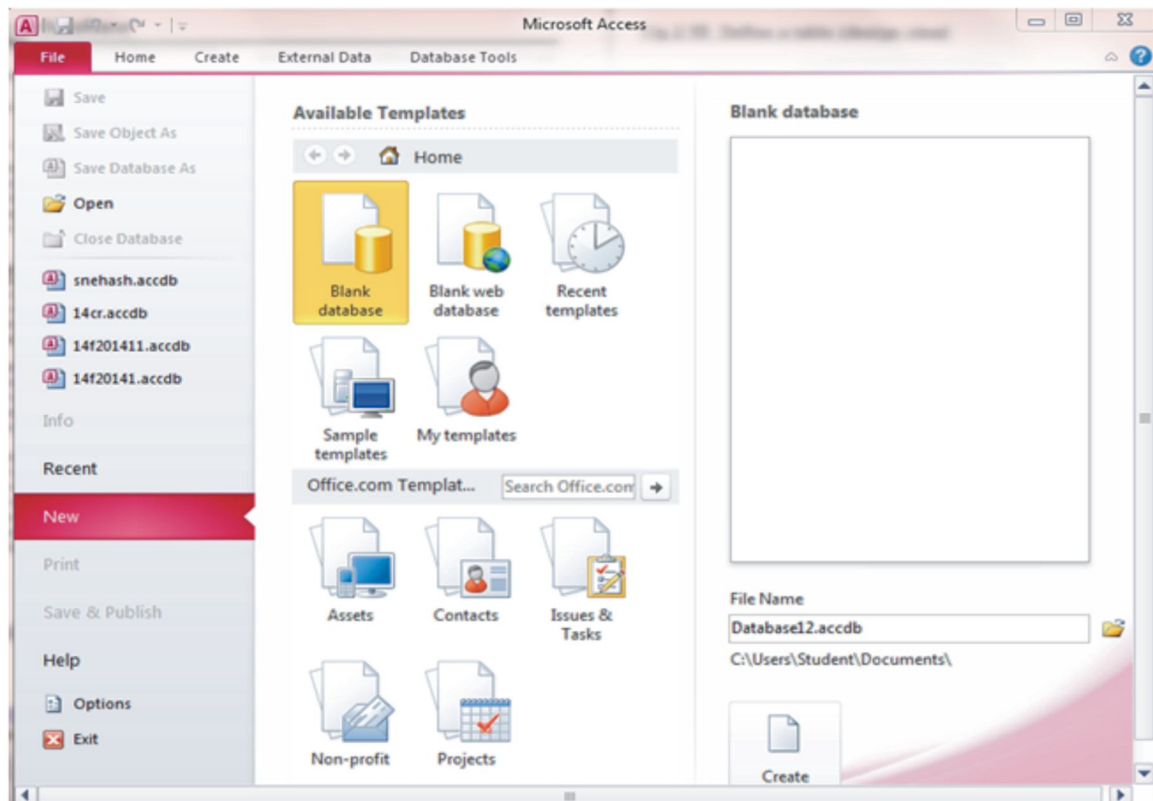


Figure 2

Steps for creation of Database

1. Locate the Access program. Depending on the way the system is set up, you may find it under Pro-grams -> Microsoft Access or Programs -> Micro-soft Office -> Microsoft Access.
2. Open Access. Then click Blank database
3. Access now asks where to store the new database. Select the folder you want and give the database the name
4. The screen now shows the database window

Define a Table(Design View)

After creation of database a table design view window will be open automatically looks the following figure.

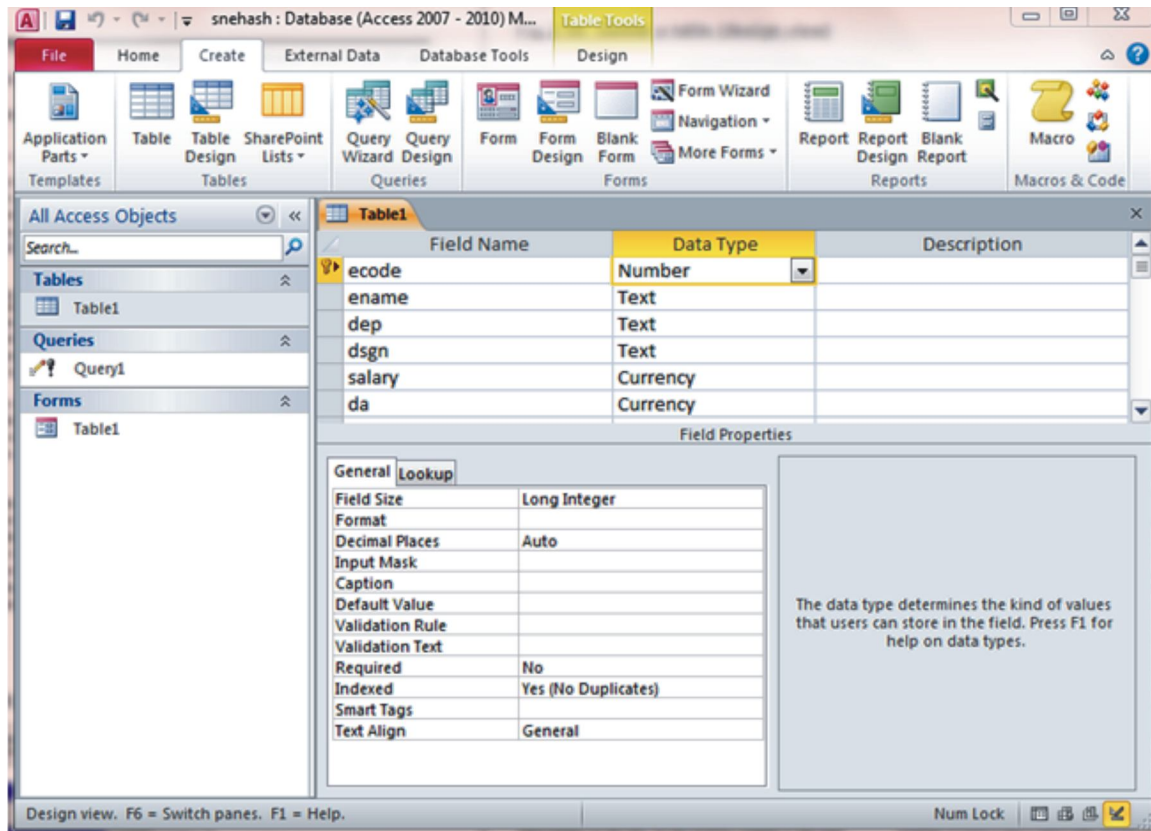


Figure 3

You see the field names to the left. In the middle column is the type of the field - Data Type. The figure shows all the possible types as a combo box. The most important data types are Text, Number, Date/Time, and AutoNumber. An AutoNumber is a counter that Access increases for each new record, so that it serves as a unique key. The value is a Long Integer (32-bit integer). Lookup Wizard is not a field type. If you select Lookup Wizard, it makes the field into a combo box where the user can select a value instead of typing it into the field.

Data type

- **Integer.** A small integer. It must be in the range -32,768 to +32,767 (a 16-bit integer).
- **Long Integer.** It must be in the range from around -2,140 million to +2,140 million (a 32-bit integer).
- **Single.** A decimal number in the range from -3.4×10^{38} to $+3.4 \times 10^{38}$ with an accuracy of 6 or 7 significant digits (a 32-bit floating point number).
- **Double.** A decimal number in the range from -1.8×10^{308} to $+1.8 \times 10^{308}$ with 14 significant digits (a 64-bit floating point number).
- **Decimal.** A very long integer with a decimal point placed somewhere. Intended for monetary calculations where rounding must be strictly controlled. In the book we use Single or Double instead.
- **Date/Time.** The field gives a point in time. In the computer it is stored as the number of days since 30/12-1899 at 0:00. It is really a Double number, so the number of days may include a fraction of a day. In this way the field specifies the date as well as the time with high precision. As an example, the number 1 corresponds to 31/12-1899 at 0:00, the number 1.75 to 31/12-1899 at 18:00 (6 PM).
- **Yes/No.** The field contains a Boolean value shown either as Yes/No, True/False, or On/Off. The format property specifies this.
- **AutoNumber.** The field is a long integer (32 bits) that Access generates itself as a unique number in the table. Access numbers the records 1, 2, . . . as you enter the records. However, you cannot trust that the sequence is unbroken. For instance when you add a record and undo the addition before having completed it, Access uses the next number in the sequence anyway.

Key fields

Primary Key

Often you have to define a key field so that other tables can refer to this one. In our case, ecode must be the key field:

1. Right-click somewhere in the ecode line. Then select Primary Key. Access now shows that the field is the key. No duplicate value will be enter in this primary key field.
2. If you have not defined a primary key, Access will warn you and suggest that it makes one for you.

Close and reopen the database table

1. Close the design view window
2. Double click on the table

Composite Primary Key

In some tables a single column cannot be used to uniquely identify entities (rows). In that case we have to use two or more columns to uniquely identify rows of the table.

When a primary key contains two or more columns it is called as composite primary key.

PAYMENTS

ROLLNO	DP	AMOUNT
s1	12-may-2001	1000
s2	12-may-2001	2500
s1	23-may-2001	1000
s3	26-may-2001	1500

Figure 4.

Composite Primary Key

Foreign key

A foreign key is a field (or several fields) that refer to something unique in another table - usually the primary key. Be careful here. The foreign key and the primary key must have the same type. However, when the primary key is an AutoNumber, the foreign key must be a long integer.

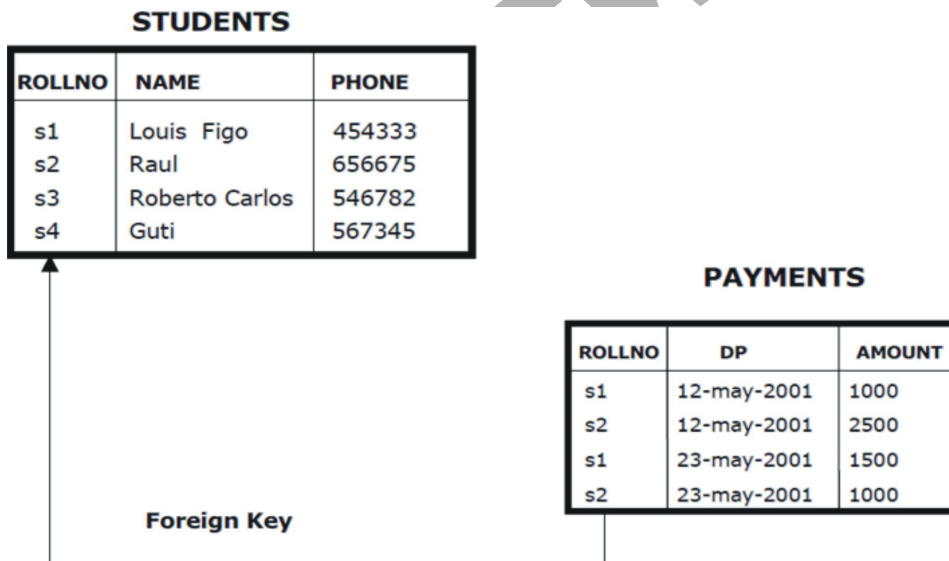


Figure 5

Enter data in user mode(datasheet view)

In database window:
Select table -> Open (or Enter)

AutoNumber: You get 1, 2, 3, 4. Don't worry that it is different from the figure.

Record selector

Add record

F2 to select entire field

Shift+F2 to see field in a separate window

Edit indicator

Esc to undo.
First Esc: Undo field change
Second: Undo record changes

guestID	name	address1	address2	address3	phone	passport
1	John Simpson	55 Westbank Tce	Richmond, Victoria 3121	Australia	(03) 9421 3700	
2	Lise B. Hansen	Nordtøftvej 12	2960 Søborg	Denmark	+45 3955 1712	A1021035
3	Cle Brondum	Dyresgaardsvej 12	2900 Hellerup	Denmark	+45 1244 2900	A3052201
4	Yun Chen	Kirschgasse 7	90482 Nurnberg	Germany	+49 970 715 94	
5	Andrew Bunting	50 Buffalo Drive	Lalor, Vict 3075	Australia	(03) 1533 1217	
6	Ahmed Ismail	80 Eiskhe Road	Emerald, Vict 3785	Australia	03 5767 3390	

Figure 6

Create Relationships

When we have several tables, we can make relationships. The relationships allow Access to help us retrieve data across tables, check referential integrity, etc.

You define the relationships in this way

1. Start in the database window and right-click somewhere.
2. Choose Relationships.

Now you see an empty Relationship Window. You have to tell Access which tables to show here. Some-times a Show Table window pops up by itself. Other-wise you have to invoke it with a right-click in the relationship window. In the Show Table window, select the tables you want to include. In the hotel system it is all the tables.

3. Click Add and close the window. Now the tables should be in the relationship window.
4. Create the relationship between tblGuest and tblStay by dragging guestID from one table to guestID in the other.
5. An edit-relationship window pops up. If not, right-click on the relationship connector and choose the edit window.
6. In our case, all stays must point to a guest, so mark the connector enforce referential integrity. (If Access refuses this, it is most likely because you have not defined the foreign key as a long integer.)
7. Close the relationship window. The relationship connector now appears in the window between the foreign key and its target

The referential integrity makes Access show the connector as 1-∞ (1:m). Based on referential integrity and whether the connected fields are primary keys, Access may also decide that it is a 1:1 relationship. It is not important what Access decides in these matters. You can later tell it otherwise when you want to use the connector.

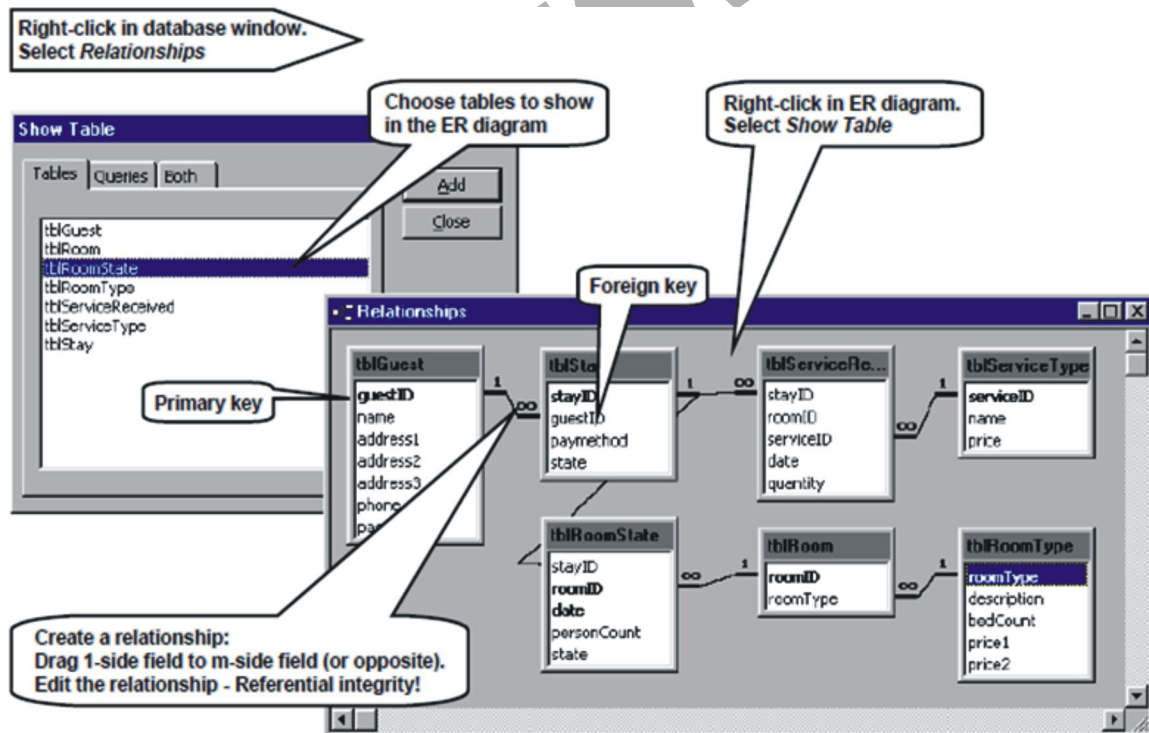


Figure - 7

Forms and Controls

In the Access world, the window consists of a Form with various Controls on it. A control may be a simple field such as Last name, a button such as Find guest, an area for a list of records such as the list of stays, and several other things. Let us get started:

1. Start in the database window, click the Forms tab, and select Create form in Design view. You now get an empty form in design mode, looking somewhat like the one at the bottom of the figure. We will put some of the controls on this form in a moment.

In order to align the controls nicely, it is best to show a visible grid of dots on the form:

2. The property box for the form should be open. If not, double click on the anonymous little square on the form - where the rulers meet.
3. **Set the grid dots.** The form has a grid of lines. They may be spaced as on the figure - a one-cm grid. Or with larger cells - a one-inch grid. We also want to see the grid dots. Look at the Format tab and find the Grid X and Grid Y properties. (They are far down the list - you may have to scroll down to them).
4. The screen should show a toolbox window where you can choose between various controls (bottom left on the figure). If it doesn't, use View -> Toolbox to see it.
5. Click the Text Box tool that looks like ab| and then draw the white part of the field Last name. Draw it so that it is two grid units high and about ten units wide. At this stage, don't worry if your controls are not properly aligned and sized. We explain about these details below. To delete a control, select it and click Del. Or use Esc to undo the last thing you made.
6. Access has automatically added a label part to the left of the field. Click it and change the label for the control to Last name:
7. Draw the two next text boxes as shown on the figure (Street and Phone). If you double click the text box icon in the toolbox, the draw tool remains selected so that you can draw many text boxes. (Click Esc to get rid of it.)
8. Also draw a spare text box for later experiments (Text 6 on the figure).
9. Now make sure the Wizard button is off at the top of the toolbox.
10. Select the Command Button tool and draw the New guest button. Make it three grid units high to allow space for the text on the button.

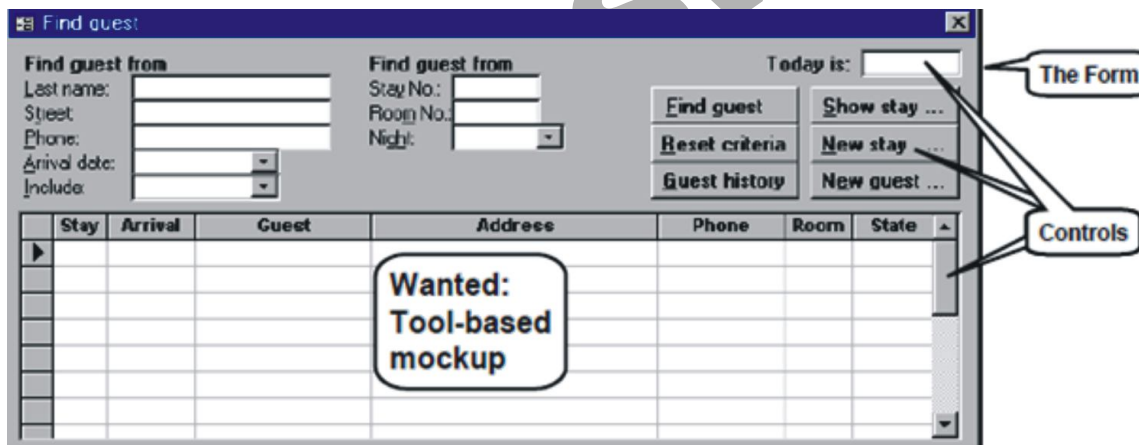


Figure - 8.

You may wonder why Access writes unbound inside all the boxes. It means that the box is not bound to any record in the database. The user may enter something but it is not automatically stored in the database. Try this:

11. Close the form. Access asks for its name. Call it frmFindStay. (We use the prefix frm for forms.)
12. Open it again in user mode. It should now look like the bottom of Figure 3.1B. This is how the user would see the form.
13. Try to enter something in the fields. It stays on the screen, but is it persistent data?
14. Close the form and open it again (in user mode). All the fields are blank - no data was saved. It was just dialog data - not persistent data. Click the command button - nothing happens. It is just a mockup we have made. (In the next chapters we will add real data and functionality.)

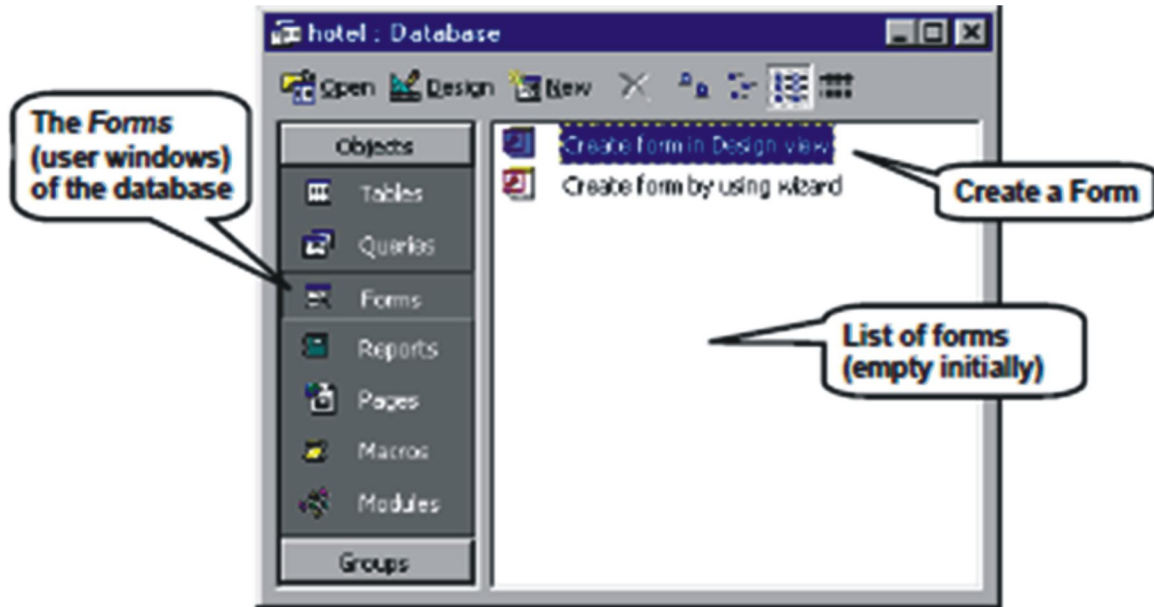


Figure - 9.

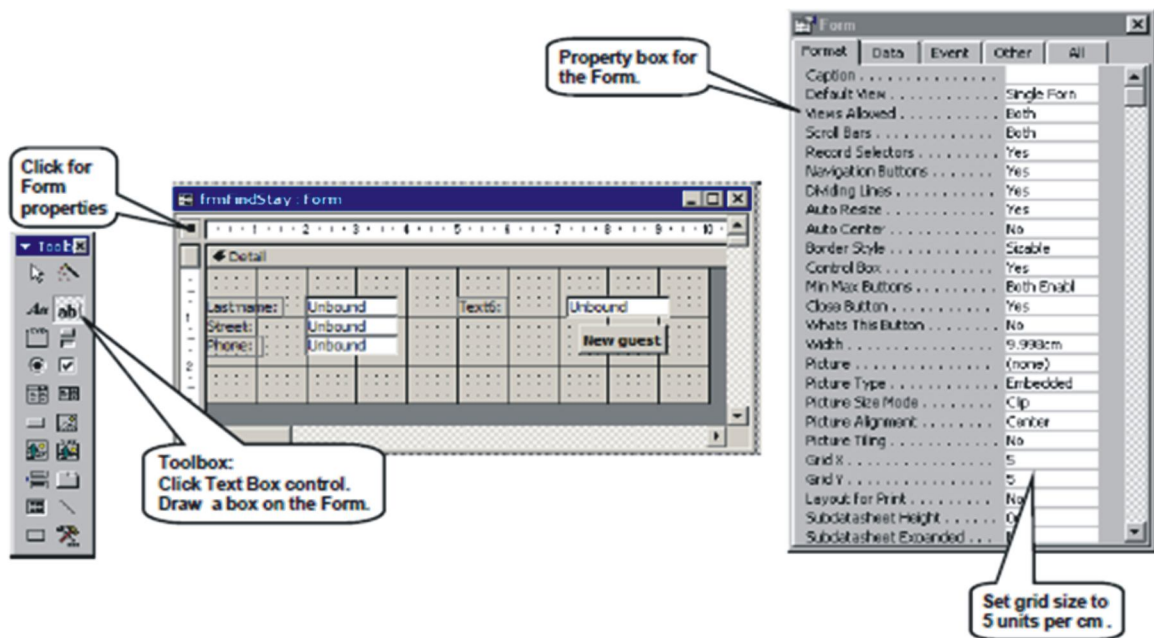


Figure - 10.

Form design by Form Wizard

Form can be design by click on 'create' tab then click on 'Form Wizard' then select necessary fields from available fields to selected fields then click on the next button. Select any layout again click on the next button. Then select any style and click on the next button. Type a title for Form and click on Finish button.

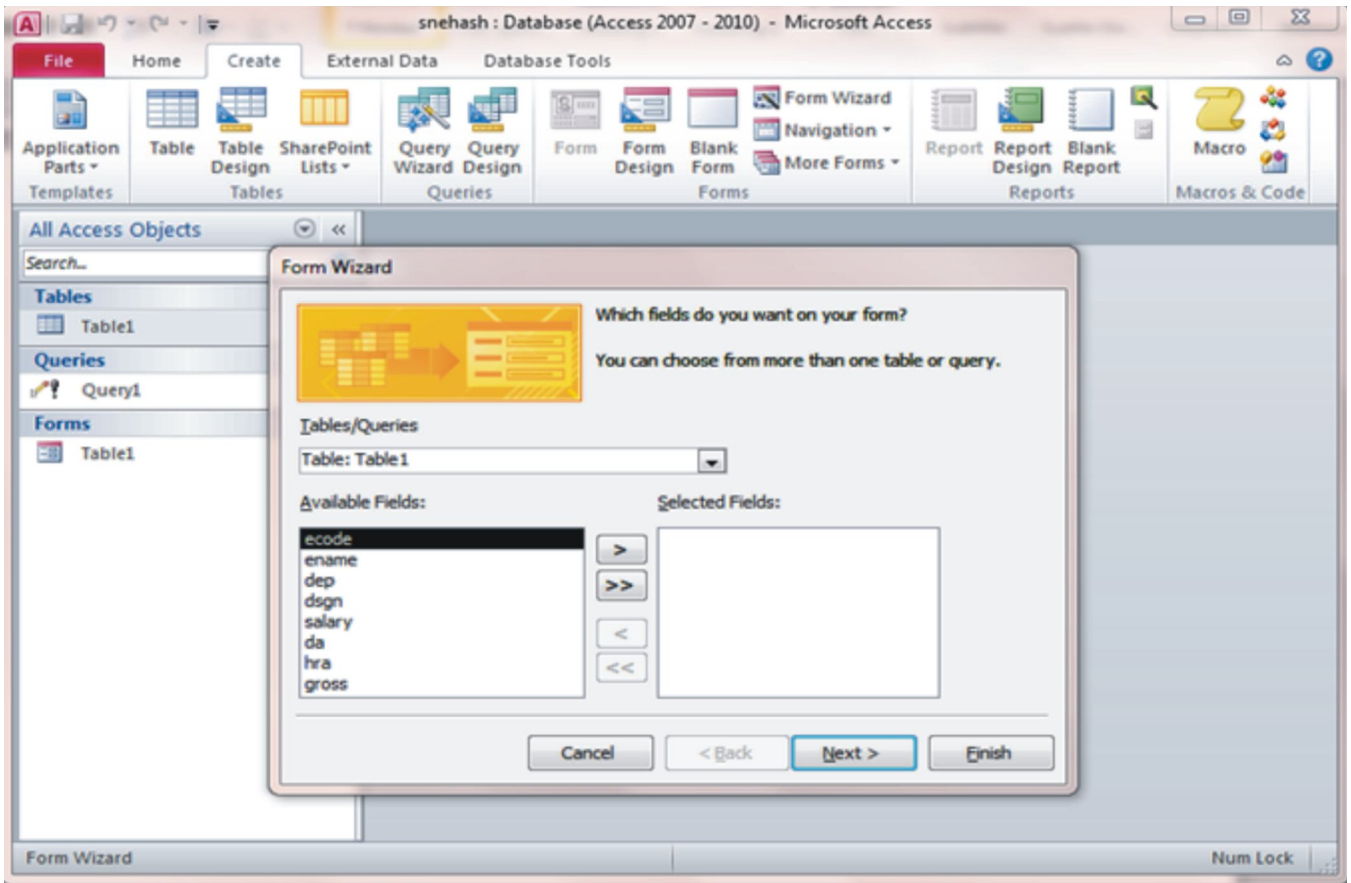


Figure 11.

Query

There are six type of query in Ms-Access 2010. These are

- Select Query
- Update Query
- Make Table Query
- Crosstab Query
- Append Query
- Delete Query

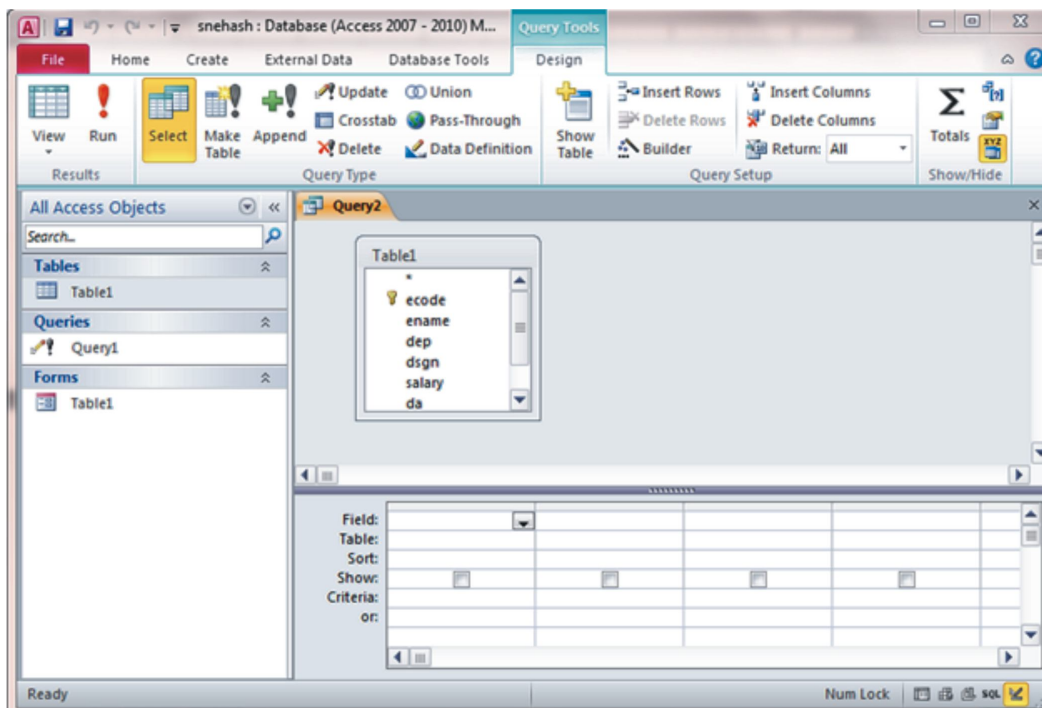


Figure 12.

Query in Design View

Select Query:- To select any record depending on any specific condition we use select query. To do that we have to click on Create tab then select the table from show table window and select the table and type the query in criteria area suppose type 'engineer' under the column/field dsgn(designation) to see the employee worked as an engineer in the organization.

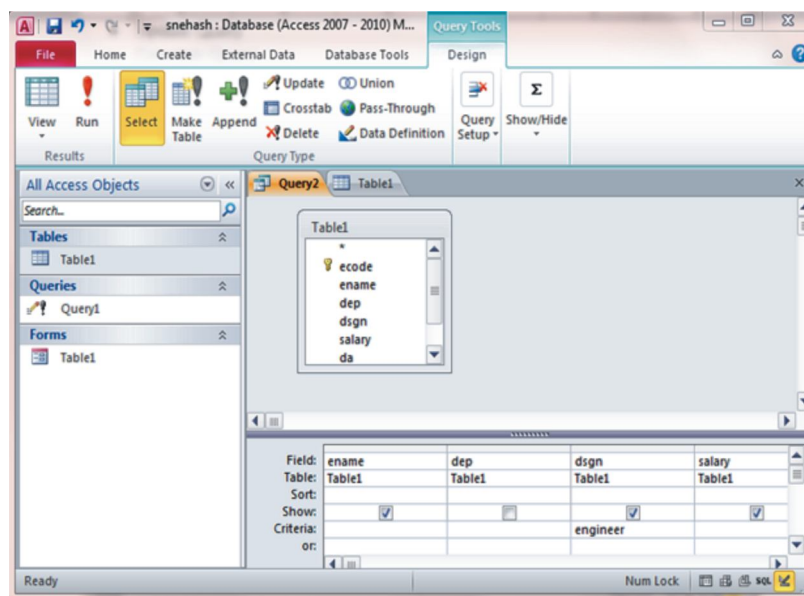


Figure 13.

Update Query:- To calculate any data value of a field we use Update query. Suppose here we calculate da (30% of salary) you have to type the desired formula as follows

At first, click on Create tab then click on 'query design' show table window will be open choose the table and click on 'Update' icon from 'Query Type' option. Select the field name (like da) in field section of grid area and have to type a formula in Update to line as $([salary]*30/100)$ and click on 'Run(!)' icon to display the query result.

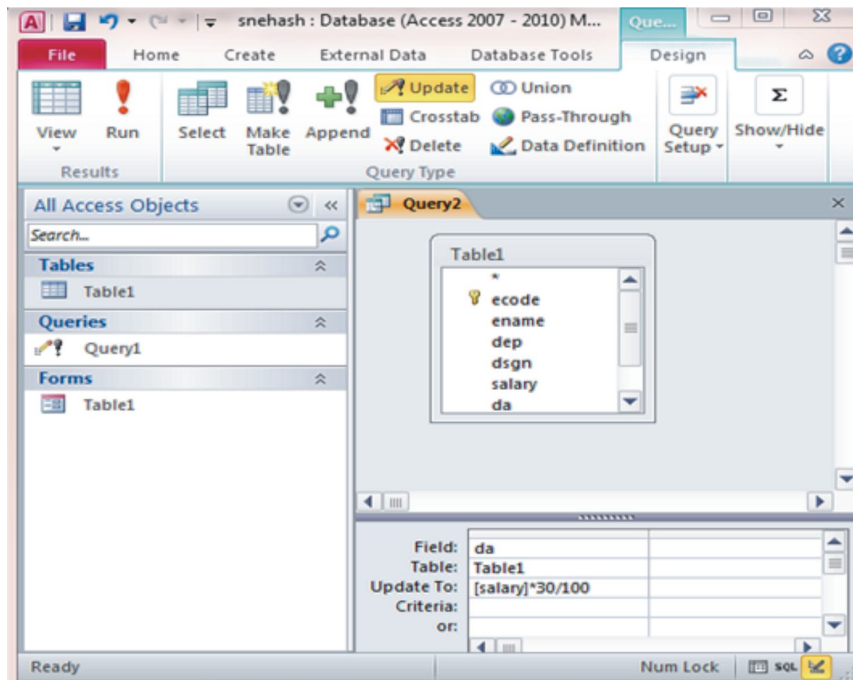


Figure 14.

Delete Query:- To delete any specific record from a table you have to use Delete Query. You have to specify a value that meets the value of the particular column/field in criteria zone. Suppose you want to delete the record that's ecode number is '101' you must enter this code number 101 in criteria under where clause. Finally click on the 'Run' button to display the result.

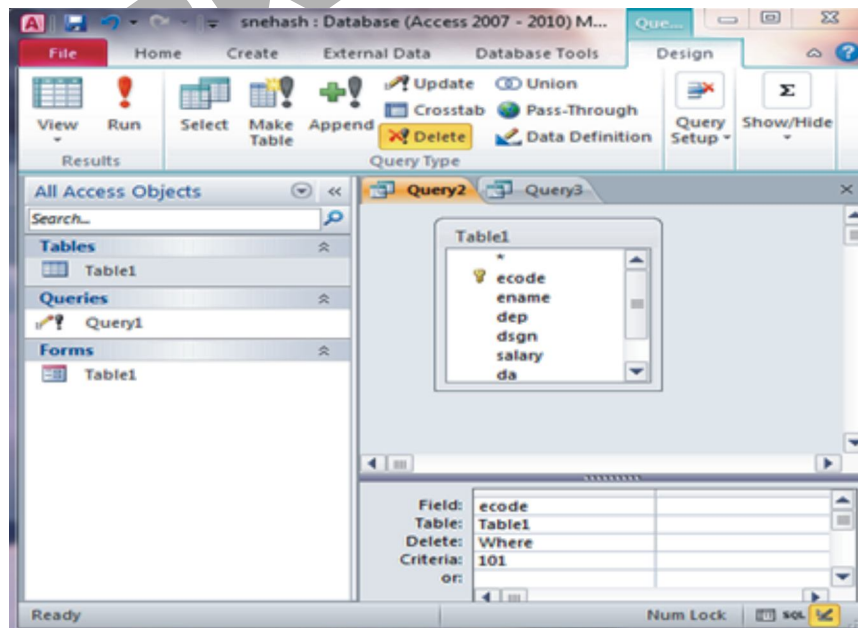


Figure 15.

Append Query:- To insert a record into the table in Access 2010 from another table you have to use Append Query. At first, click on the 'Create' tab then click on the 'Append' icon Append dialog box will be open. Select the table name where you insert record.

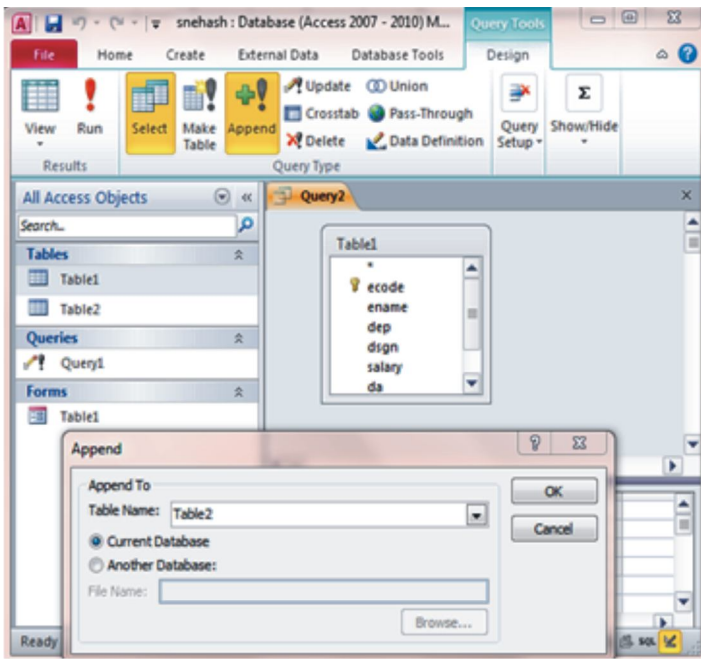


Figure 16.

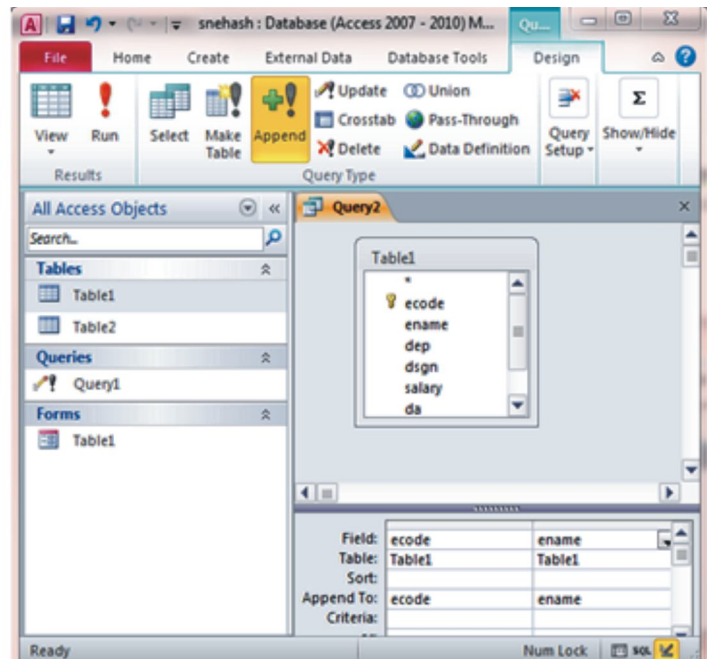


Figure 17.

Select the field names those value to be inserted into the new table. Click on the 'Run' button to display the result.

Query in SQL View

Insert Query:- Insert record by SQL command. Click on 'Create' tab. Click on 'SQL View' icon, write the following sql command.

```
INSERT INTO Table1(ecode,ename,dsgn,salary)
values(105,'Koustav','Accountant',50000);
```

Select Query:- Retrieve Record from the table by SQL command. Click on 'Create' tab. Click on 'SQL View' icon, write the following sql command.

```
To see all the records:- SELECT * FROM table1;
To see the record(s) depending on some conditions.
SELECT * FROM table1 WHERE dsgn="engineer";
```

Delete Query:- Delete any record from the table by SQL command. Click on 'Create' tab. Click on 'SQL View' icon, write the following sql command.

```
To delete record(s) from the table depending on some conditions.
DELETE FROM Table1 where dsgn='engineer';
```

Update Query:- To change or calculate the value of any field in the record by SQL command. Click on 'Create' tab. Click on 'SQL View' icon, write the following sql command.

```
UPDATE Table1 set da = salary*30/100 where ecode=105;
```

Bibliography

1. AccessTutorial.pdf
2. Rdbms_notes.pdf (www.srikanthtechnologies.com)

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