UNIT 8

DATABASE DEVELOPMENT

After the completion of Unit - 8, the Students will be able to:

- identify various relational database management systems.
- (MS Access, Open Office Base, SQL Server).
- select any suitable DBMS as an application for creating and maintaining databases.
- explain the steps involved in creating and saving a database.
- explain database toolbar, database window and Objects (Tables, Queries, Forms and Reports).
- explain different ways of creating, saving and editing a table in database.
- identify data types, create primary and foreign keys, create and edit relationship among tables, navigate through records in a table and add, modify and delete records.
- explain different ways of creating, saving and editing a form in database.
- know different form views, Use navigation buttons, add, modify and delete records.
- use form controls.
- explain different ways of creating, saving and editing a query in database.
- use the queries on database (Select, Update, Delete, Insert, Alter).
- use the report wizard to generate a report.
- use various report layouts/styles to produce reports.
- set the sort order of records that will appear on the report.
- customize reports using queries (macros and arithmetic expression).
- save, view and print the report.

8.1 INTRODUCTION

Database development is the creation, organization, management and manipulation of database systems for organizations. DBMS (Database Management System) is used to develop a database. A database management system is a set of software programs that allows users to create, edit and update data in database files, and store and retrieve data from those database files. Data in a database can be added, deleted, changed, sorted or searched using a DBMS.

8.1.1 Different Types of Relational Database Management Systems

There are three common types of relational database management systems (RDBMS).

a. Microsoft Access
b. SQL Server
c. Open Office Base

a. Microsoft Access

Microsoft Access, also known as Microsoft Office Access, is a database management system. Figure 8.1 shows MS Access 2007 main screen. An Access database is a collection of database objects i.e. tables, queries, forms, reports, macros, and modules. Users can design new objects or open existing ones to work with their databases. Unlike many database programs, an Access database can contain all of the objects that make up a database application in a single file with the .mdb file name extension. For this reason, an Access database file is sometimes called a database container.

b. SQL Server

Microsoft SQL Server is a relational database management system developed by Microsoft. Its primary function is to store and retrieve data as requested by other software applications. SQL Server offers a variety of tools for database development, maintenance and administration. It has different versions suitable from small applications for a number of users to big applications for thousands of users. It is also used to create and manage Web-based databases.

c. OpenOffice Base

OpenOffice Base is the database module of OpenOffice Suite. It is an open source application program. OpenOffice Base is a fully featured database management system. It has wizards to help new users to create database design, that is, to create tables, queries, forms and reports. It allows users to create interactive databases where they can manage data related to payroll, inventory, assets, budgets, customers, sales orders and invoices, etc.

8.1.2 MS ACCESS 2007

Microsoft Access 2007 is the common and best suited DBMS for developing and managing databases. Microsoft Access 2007 provides a powerful set of tools that help users to quickly start tracking, reporting, and sharing information. Users can rapidly create attractive and functional tracking applications by customizing one of several predefined templates, converting an existing database, or creating a new database. By using Access 2007, it is easy to adapt database applications and reports to changing business needs. The enhanced support for Windows SharePoint Services 3.0 in Access 2007 helps users to share, manage, edit, and back up data easily.

a. Opening Access

The following steps are used to open Access.

- Click the **Start** button.
- Click **All Programs** on the Start menu.
- Click **Microsoft Office** on the All Programs submenu.
- Click **Microsoft Office Access 2007** to open Access 2007 and display the Getting Started with Microsoft Office Access screen.
- This is the starting point from which user can create a new database or open an existing database.

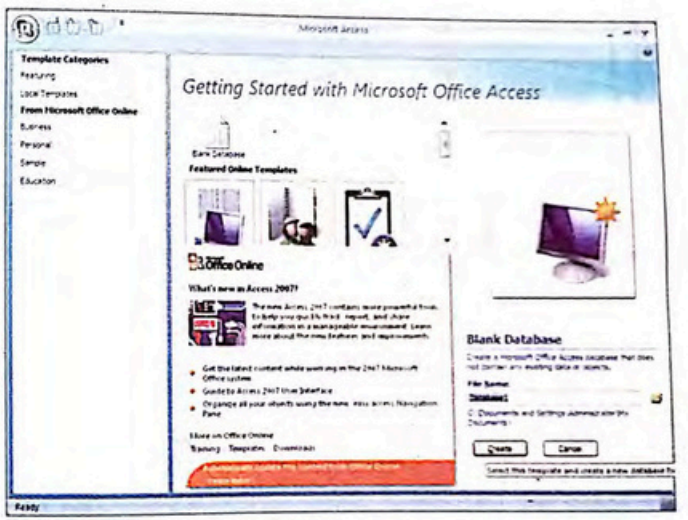


Figure 8.1 Getting Started with Microsoft Office Access

- By pressing Create button, user can create a blank database.

b. Access Window

Figure 8.2 shows important components of Access 2007 window.

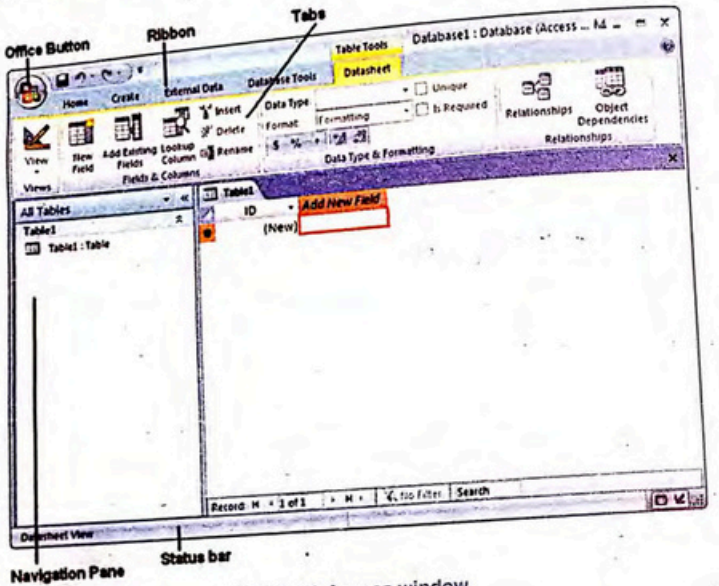


Figure 8.2 Access window

Office Button provides commands such as **Open, New, Print, Save, Manage, E-mail, Publish.**

Ribbon contains a series of command tabs; **Home, Create, External Data, Database Tools and Datasheet.** Additional tabs such as **Design** can appear depending on the context of the task chosen. Each tab contains groups of related commands.

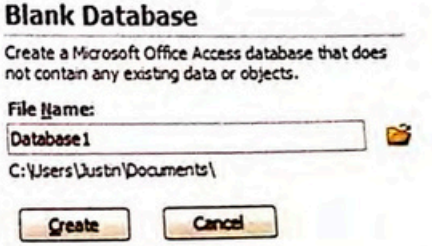
Navigation Pane displays objects such as **Tables, Queries and Forms.**

A **Status Bar** is used to display information regarding current object.

8.1.3 Creating and Saving an Access Database

The following steps are used to create and save a new database.

- First step in creating an Access database is to create a blank database file. This is done from the **Getting Started Window** when user runs the Access program. As shown in Figure 8.1.
- Click the **Blank Database icon** to bring the Blank Database side bar on the right side of the screen as shown in Figure 8.1.
- Enter a file name for database file in **File Name** bar. For example Student.
- Click the **folder** icon and browse for selecting a location for saving the database.
- Click the **Create** button to create and save the database. The database the user just created will open for work on.



8.1.4 Database Objects

The following are the main objects of Access database.

- Tables
- Queries
- Forms
- Reports

Tables: In Access 2007, data is stored in tables. A table is a set of columns and rows, with each column referred to as a field and each row of a table is referred to as a record.

Queries: Queries are used to retrieve specific data from database and to answer questions about the data. For example, a user can use a query to find the names of the employees in the database who are in grade 18.

Forms: Forms give the ability to choose the format and arrangement of fields to enter and view Data. User can use a form to enter, edit, display, modify and define data from the database.

Reports: Reports organize or summarize the data so that the user can print it or view it on the screen. Users often use reports when they want to analyze the data or present it in different styles.

8.2 WORKING WITH TABLES

A **Table** is an Access database object that is used to store information that relates to one entity. In RDBMS it is called a **Relation** and consists of **Rows** and **Columns**.

8.2.1 Creating a Table in Access

When user creates a new database in Access, the new database opens with one table named as **Table1** by default in both the **Navigation Pane**, and the **Table** tab itself. As shown in Figure 8.3

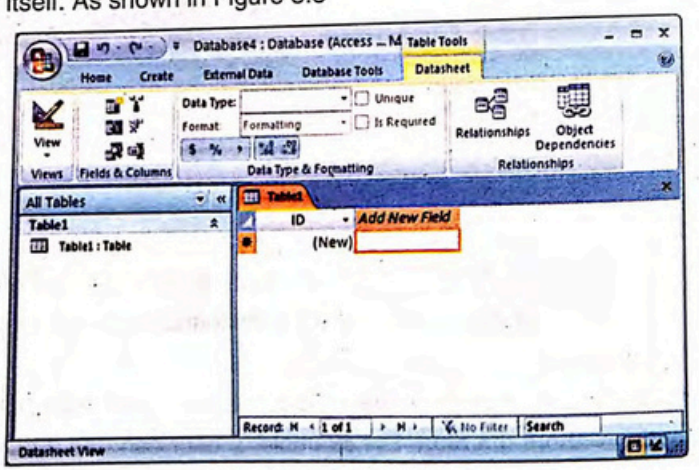


Figure 8.3 Default Table Name

a. Naming a Table

The following steps are used to give the table a unique name.

- Click on the **Office Button**.
- Select **Save** from the menu. The **Save As** dialog box will appear, as shown in Figure 8.4. Give appropriate name to the table.
- Click OK button.

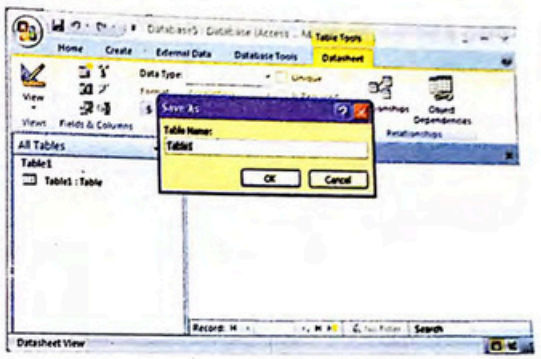


Figure 8.4 Save As Dialog Box

The new table name appears in both the **Navigation Pane** and the **Table** tab, as shown in Figure 8.5.

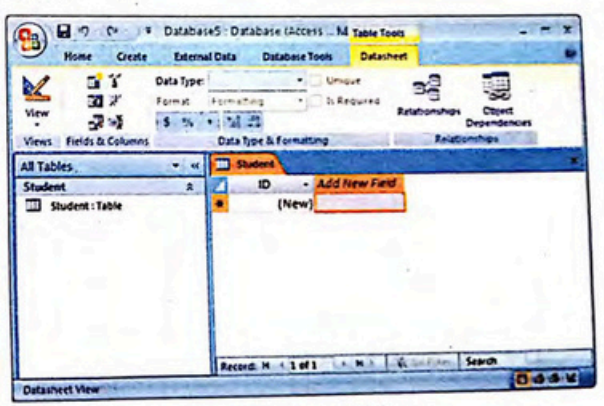


Figure 8.5 New Table Name

b. Adding Fields to a Table

Access offers two ways to add fields to a Table.

- Working in **Datasheet View**, which looks like a spreadsheet
- Working in **Design View**, where users are able to set more controls for the fields.

i. Adding Fields in Datasheet View

- By default, **Access** creates one field in each new table, the **ID** field, which can be renamed as required by the user.

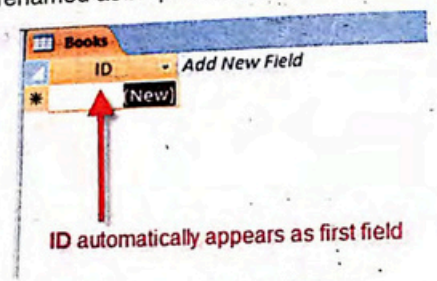


Figure 8.6 Automatic ID Field

- To add more fields to a table in **Datasheet View**, double click on the **Add New Field** header. As shown in Figure 8.7

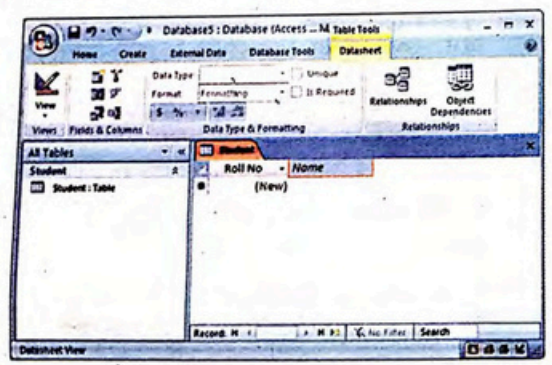


Figure 8.7 Add New Field

- The **Add New Field** text will disappear from the header. **Name the field** by typing the name directly into the header.
- Press the **tab** key on the keyboard to move to the next field.

ii. Adding Fields in Design View

In **Design View**, the field names are along the left-hand column instead of across the top like in Datasheet View, as shown in Figure 8.8.

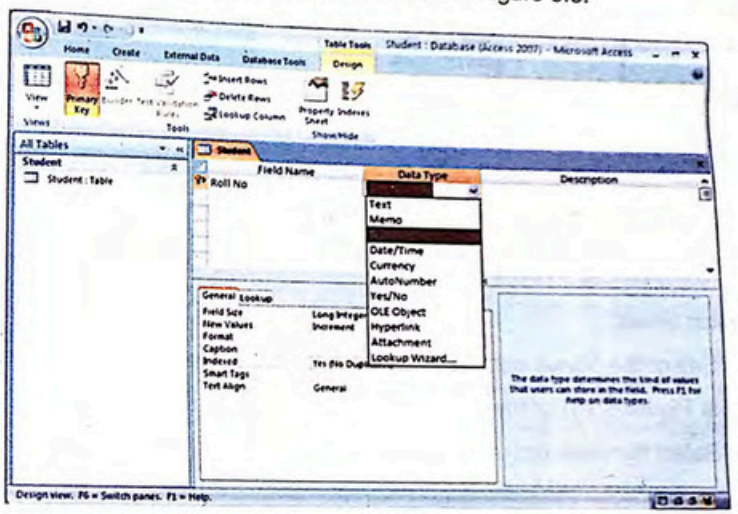


Figure 8.8 Fields in Design View

To add a new field in a table in **Design View**:

- **Click** in the cell where the user want the new field and **type the field name.**
- Press **Tab key** on the keyboard to move from one column to the other.
- Give appropriate **data type** and **description** if required. As shown in Figure 8.9.

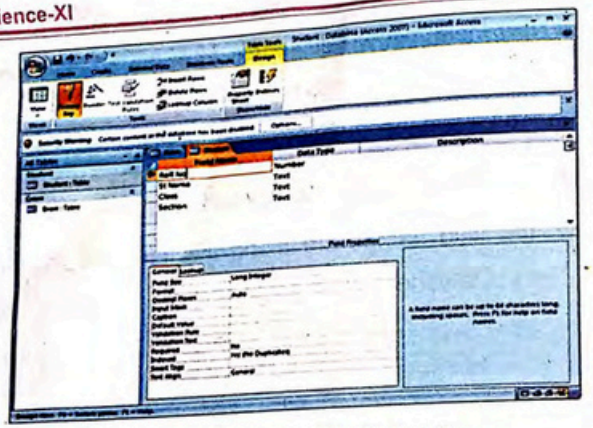


Figure 8.9 Design view of Added Field

In Design View, there are many field property options that users can set to ensure that data can only be entered in certain formats.

c. Switching Views

To switch views:

- Select the **Views** command group from either the **Home** tab (As shown in Figure 8.10) or the **Datasheet** tab on the **Ribbon**.
- Select the view option from the menu.

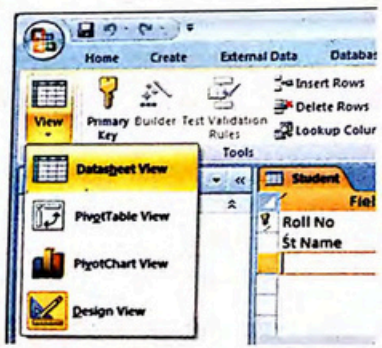


Figure 8.10 Switching Views

d. To Close a Table

There are several ways to close an active table.

- Users can **right click** on the **Table** tab and choose **Close** from the menu. OR
- A more common method is to click [X] that appears in the upper right hand corner of the active database object window.

e. To Open a Table

To open a table:

- **Right click** the Table name of the table to open in the **Navigation Pane**. Then, choose **Open** from the menu. OR
- **Double click** the table name in the **Navigation Pane**. The selected table will open in the active database object window.

f. Adding More Tables to the Database

By default, Access starts out with one table. To add more tables to the database:

- Click on the **Create** tab on the **Ribbon**, as shown in Figure 8.11
- Select **Table** from the **Tables command group**. A new table will open in the active database object window.

Figure 8.11 Create New Table

- Figure 8.12 shows Exam table created in Student database.

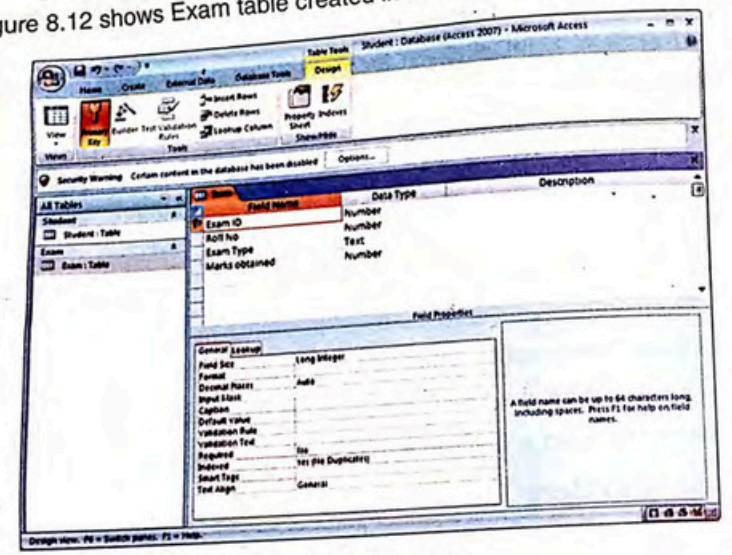


Figure 8.12 Exam Table

8.2.2 Data Types in MS-Access 2007

There are nine types of field data types which are used in Access 2007.

1. Text: Access assigns Text as the default data type to all fields. The maximum size of text field is 255 characters. All types of characters i.e. alphabets, numbers and special characters are allowed in text data type.

2. Memo: Memo data type allows as many as 63999 characters to fields. Users use them to provide descriptive text comments. Access displays the contents of Memo fields in a Datasheet view. A memo field cannot be a Primary key field.

3. Number: Number data type is assigned to numeric fields. Various numeric data subtypes are available in the **Field Properties** pane of Table Design

window. Users specify how to display the number by setting its **Format** property to one of the formats.

4. AutoNumber: An AutoNumber field is a numeric (Long Integer) value that Access automatically fills in for each new record that a user enters to a table. Access can increment the AutoNumber field by 1 for each new record or fill in the field with a randomly generated number, depending on the **New Values** property setting, that a user select.

5. Yes/No: Logical fields in Access use 1 for Yes (True) and 0 for No (False). Users use the Format property to display Yes/No fields as Yes or No.

6. Currency: Currency is a special fixed format Number with decimal places designed to store currency value.

7. Date/Time: Date and time are stored in a special fixed format. User controls how Access displays dates by selecting one of the Date/Time Format properties.

8. OLE Object: It is used for OLE (Object Linking and Embedding) objects (such as Microsoft Word documents, Microsoft Excel spreadsheets, pictures, sounds, or other binary data) that were created in other programs using the OLE protocol.

9. Hyperlink: It is used for hyperlinks. A hyperlink can be a path of another document or a Web address.

Field Properties

Properties can be specified in the **Field Properties box** which are displayed in the bottom left hand corner of the Table Window. Figure 8.13 shows the properties for a field with data type **Number**.

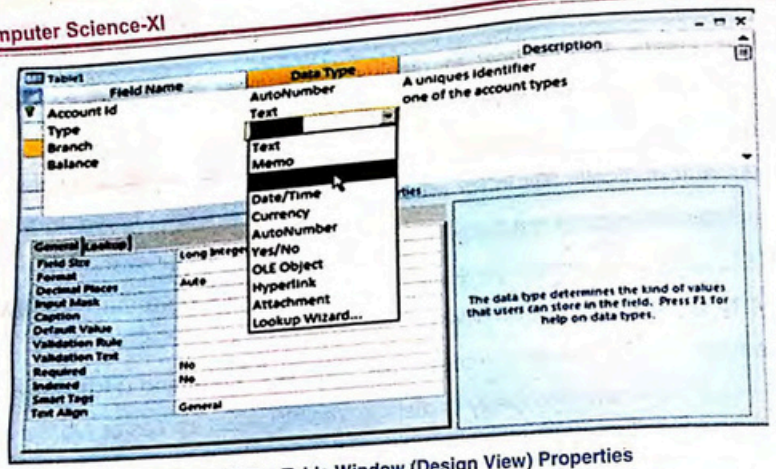


Figure 8.13 The Table Window (Design View) Properties

Field properties determine how data will be entered, stored and displayed.

- **Format** determines how the data is formatted for display — a number of options are provided together with the ability to specify custom formats for some data types.
- **Decimal Places** applies to *Number* or *Currency* fields and determines the number of digits after the decimal point.
- **Input Mask** defines a pattern to which input data must conform.
- **Caption** determines the label used with the field on forms and reports, and what appears at the top of a column in queries (the default is the *Field Name*).
- **Default Value** determines a default value for a field when new records are created.
- **Validation Rule** can be used to specify a condition or conditions that data must satisfy.
- **Validation Text** is displayed on the *Message Box* when data entered violates the *Validation Rule*.
- **Required** means that the field must be filled with valid non-null data before a record can be inserted (or updated).

- **Indexed** determines whether an index is built for the table to search and sort the data.

8.2.3 Creating Primary Key and Foreign Key in the Tables

a. Primary key

Primary key is a unique field in a table. After defining all the field names and their data types in Design View, create a primary key for the table as shown in Figure 8.14.

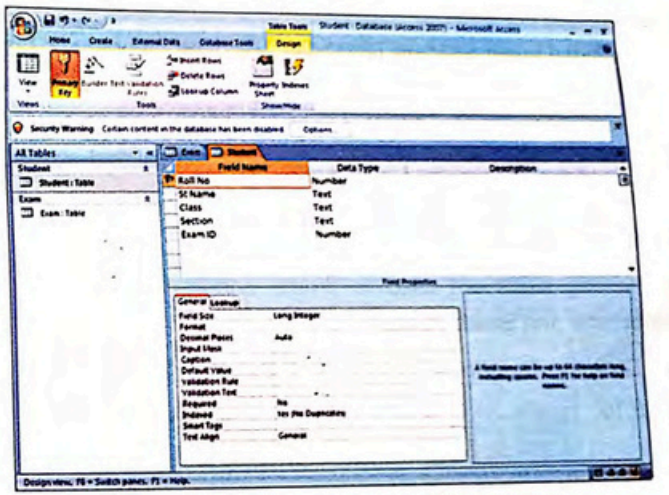


Figure 8.14 Creating primary key for STUDENT table

The following steps are used to create a primary key.

- Select the field name **Roll No** by clicking the selection box on the left side of the field name.
- Click the primary key icon on the **Tools group** of **Design tab**. OR
- **Right click** on the field name and select **Primary Key** option from the menu.

b. Foreign Key

Foreign key is a key which is used as primary key in one table and secondary key in the other. It is used to create relationship between entities. In our project of Student Database, we will take **Roll No** field the foreign key when we create relationship between the **Student table** and the **Exam table**.

8.2.4 Creating and Editing Relationships between Tables

Relationships are links that associate a field in one table with a field in another. For example, in our **Student Database,** we have created two tables, **Student table** for storing students' basic information and the **Exam table** for storing their examination data for different examinations.

Relationships also allow creating queries, forms and reports to display information from several tables.

a. Creating Relationship

The following steps are used to create one-to-many relationship between **Student** table and **Exam** Table.

- Click the **Relationship** icon in **Database Tools** as shown in Figure 8.15.

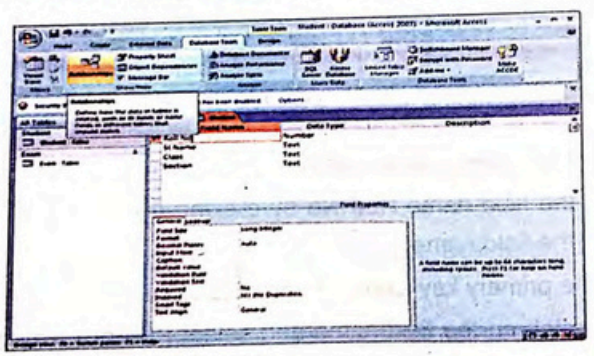


Figure 8.15 Creating Relationship

- Click the **Student table** and click the **Add button** shown in Figure 8.16.
- Click the **Exam table** and click the **Add button**.
- Click the **Close** button to close the dialog box.

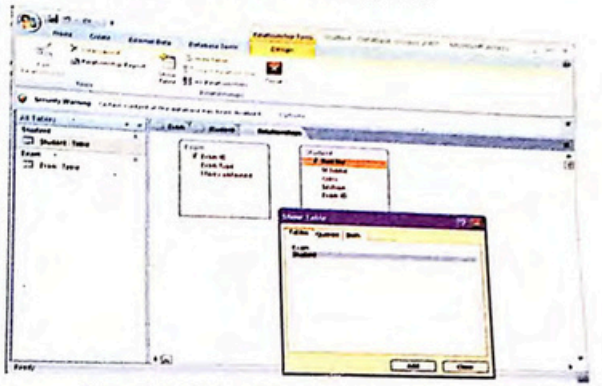


Figure 8.16 Adding tables for Creating Relationship

- Move the mouse pointer to the primary key **Roll No** in **Student table** and drag it to the foreign key **Roll No** in the **Exam table**. **Edit Relationship dialog box** will appear when mouse button is released, as shown in Figure 8.17.

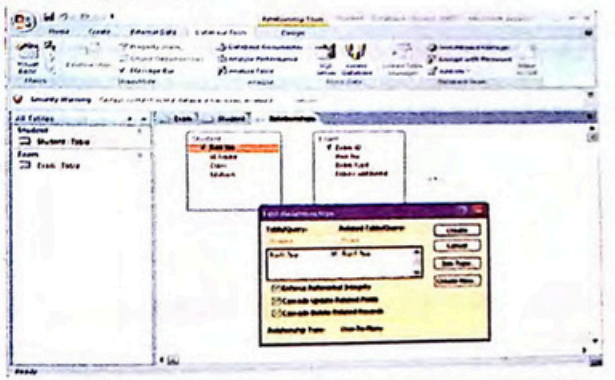


Figure 8.17 Edit Relationship dialog box for creating relationship

- Check the Enforce Referential Integrity, Cascade Update Related Fields and Cascade Delete Related Records check boxes.
- Click the Create button to create the relationship (one-to-many) between tables, as shown in Figure 8.18:

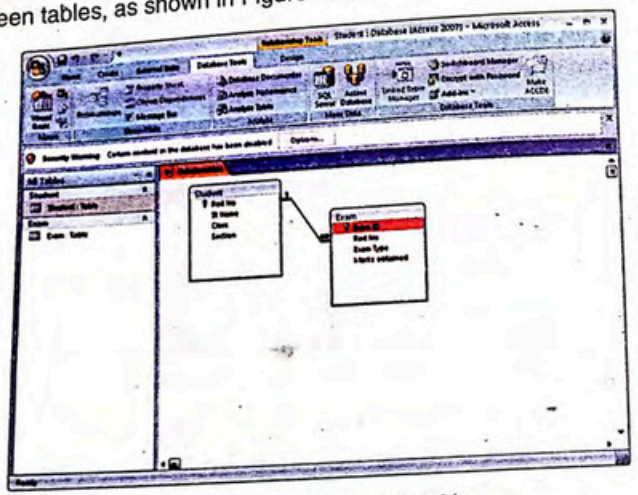


Figure 8.18 One-to-many relationship

Joining line from one table to the other shows the type of relationship from one table to the other. For example "1" to "Infinity sign" indicates the one-to-many relationship.

b. Editing Relationship

The following steps are used to edit relationship between tables.

- Click Relationship in the Database Tools tab.
- Click the join line that connects the fields.
- **Right-click** on the line and select **Edit Relationship** option, as shown in Figure 8.19.
- Recreate the relationship by using the procedure described earlier.

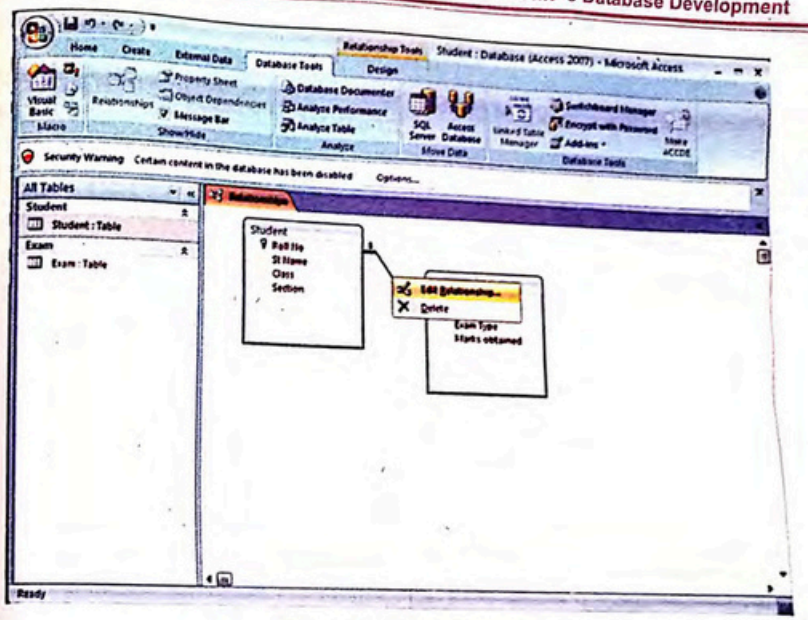


Figure 8.19 Edit Relationship

8.2.5 Using Navigation buttons in a Table

Navigation buttons are used to navigate records in a table. These buttons lie at the bottom left corner, as shown in Figure 8.20. When users click at any field of a record, they can see the record number and the total number of records in the table. The button to the left of the record number will move to the previous or the first record and the button to the right will move to the next or the last record in the table. The last button on the right side will allow entering a new record. Users can also enter a new record by clicking the **New** icon in the **Records** group on the **Home** tab.

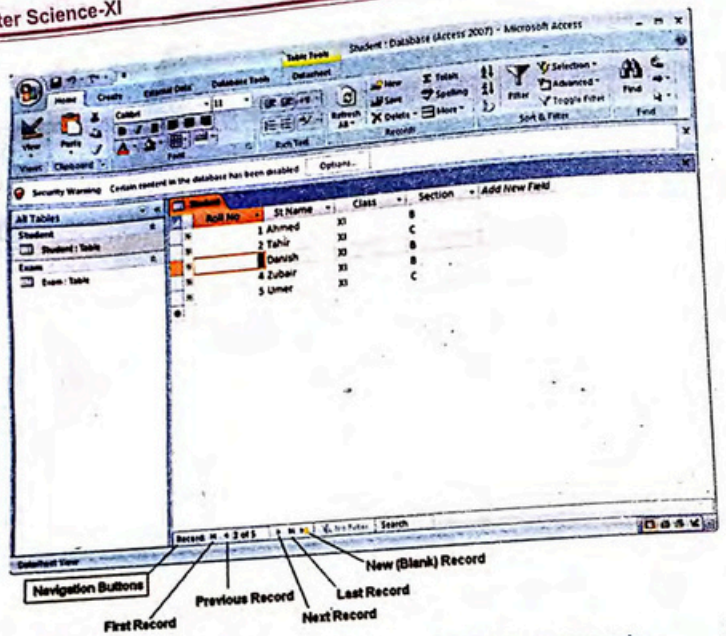


Figure 8.20 Using Navigation buttons to navigate through records

8.2.6 Adding, Modifying and Deleting Records

a. Adding Records in a Table

The following steps are used to add new records in a table.

- Right click on the table in the **Navigation Pane** in which to add new record and select **Open** option or double click it.
- Click the **New button** in the **Records group** in **Home tab** or click the new record button in the navigation bar at the bottom left of the screen. This will move the pointer to the first blank row after the last record.
- Enter the data for the new record.

b. Adding Records in a Related Table

The following steps are used to add records in related table. For example **Exam table** which is related to the **Student table** in **Student database**.

- Open the **Student table** by double clicking it in the Navigation Pane.
- Click the "+" symbol at the left end of the first row in **Student table**.
- Add records in the related **Exam table** as shown in Figure 8.21.

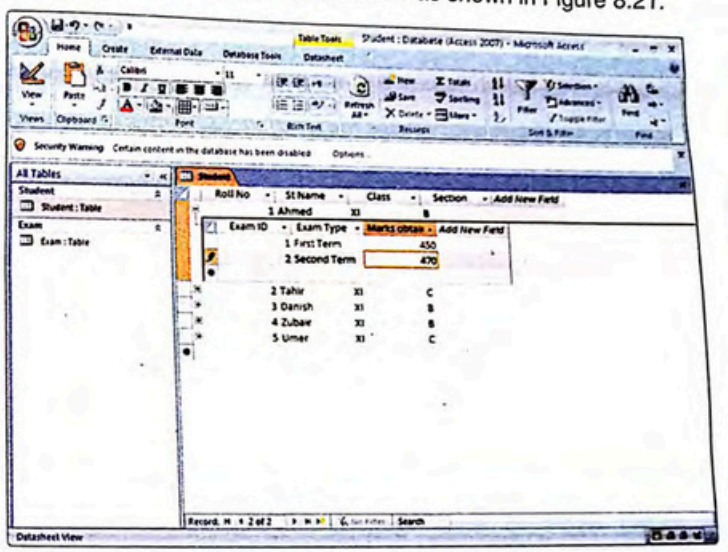


Figure 8.21 Adding record in a related table

When User clicks the "+" symbol it changes to "-" symbol and if click it again, will return to the primary table and the "-" symbol will change to "+" symbol again.

c. Modifying Records in a Table

The following steps are used to modify any information in a record.

- Click the field containing the data to change.

- Change the record as required.

d. Deleting Records from a Table

The following steps are used to delete records from a table.

- Select the record to be deleted by clicking its row selector box which is on the left end of the row.
- Press the **Delete** key or choose Delete from the **Records** option on the **Home** tab
- Click the **Yes** button to proceed with the deletion in the dialog box that appears.

8.3 WORKING WITH FORMS

A **Form** in Access is a database object used to display, edit and enter data from a data source such as a query or table. It also may contain controls that provide the user with needed functionality or enhancements.

A **Form** generally serves three purposes:

- It allows users to perform data entry. Data can be inserted, updated, or deleted from a table using a Form object.
- It allows users to enter custom information, and based on that information a task is performed. For example, a system may want to ask for parameters before running a report.
- It allows users a method of navigating through the system. For example, one may create a form where a user can select a report to run.

User can also add certain control components to a **Form**, like buttons, combo box, list box, drop down menus and sub-forms.

8.3.1 Creating Access Form

Access 2007 has several automatic tools for creating forms. These tools are located in the **Forms** group on the **Create** tab in the **Ribbon**.

The Access 2007 forms tools include:

- The **Form** command makes a basic form, showing a single record at a time.
- The **Split Form** command creates a form showing one record on top, and includes the datasheet view of entire source table on the bottom.
- The **Multiple Items** command creates a form that shows all the records at once, which looks very similar to the source table in datasheet view.
- The **Form Wizard** is hidden under the **More Forms** command. It takes users through the process of creating more customized forms.

a. To Create a Form using the Form Command

The basic **Form** command is the one that allows the person entering data to see just one record at a time. It also includes all the fields in the source table and the user can modify the layout of the basic form to hide fields or add controls.

The following steps are used to create a form using this command.

- Highlight the table to use as a source table.
- With the source table highlighted, select the **Form** command from the **Forms** command group in the **Create** tab on the **Ribbon**.
- The new form is created and opens in the object pane. Figure 8.22 shows a form created for Student table.

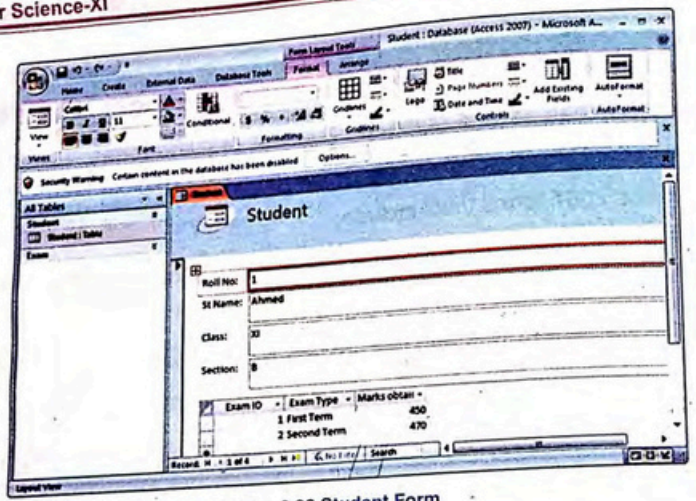


Figure 8.22 Student Form

The newly created form has the same name as the source table by default. User can give the form a new name while saving the form.

b. To Navigate through Form

Users can navigate the records using **Navigation Buttons** located at the bottom left of the form. Record navigation works the same way for forms as it does for tables.

c. To Add a Record using a Form

The following steps are used to add a record to the database using a form.

- Navigate to a new record, either by using the **New Record** navigation button, or the **New** command in the **Records** group on the **Ribbon**.
- Add the new data.
- **Save** the record.

d. To Edit Records using a Form

The following steps are used to edit/change a record using a form.

- **Open** the form to edit.
- Navigate to the required record to edit.
- **Click** in the particular field and make the changes.
- **Save** the record.

e. To Delete Record using a Form

The following steps are used to delete a record using a form.

- **Open** the form.
- Navigate to the required record to delete.
- Select the **Delete Record** option in the **Forms group**.
- Click **Yes** button to confirm deletion.
- **Save** the database.

8.3.2 Using Form Controls

A control in Access 2007 is an object on a form that passes information between the user and the form. Common control types include labels, boxes and buttons. Adding a control to a form is common task and most forms in Access contain many controls. The following steps will show how to add controls to a form in Access 2007.

- Start Access 2007 and open a database file that already has a form created. Look in the **Navigation Pane** for the form where to add a control and **Right-click** on **Form** icon to bring up the menu.
- Select **Design View** from the menu and select the **Design tab**. Look in the **Controls group** for the control to add and click on that control. Notice how the mouse cursor in Access changes to show a crosshair and an icon representing that control.
- Move the crosshair of the mouse cursor to the location on the form where to create that control and press the left button of mouse. The control will appear on the form.

- **Customize** the properties of the control just added. Move the cursor over the control and click on the right mouse button to bring up its context menu. Select **Properties** to display the **Properties screen** for that control.
- Use a text box as an example. Select the **Data** tab of the **Properties screen** of a text box. The first item on this panel is the **control source** that specifies the data that will appear in the text box.

a. Creating Command Buttons

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 user to take a specific action. These command buttons are grouped into the following categories of actions, including:

- **Record Navigation** command buttons allow users move among the records in the database.
- **Record Operation** command buttons let users do a task like save or print a record.
- **Form Operation** command buttons give the ability to quickly open or close a form, print the current form, and other actions.
- **Report Operation** command buttons offer the user a quick way to do a task such as preview or mail a report.

To Add a Command Button to a Form

The following steps are used to add a command button to a form.

1. Click the **Button** command in the **Controls** group on the **Ribbon**, as shown in Figure 8.23.

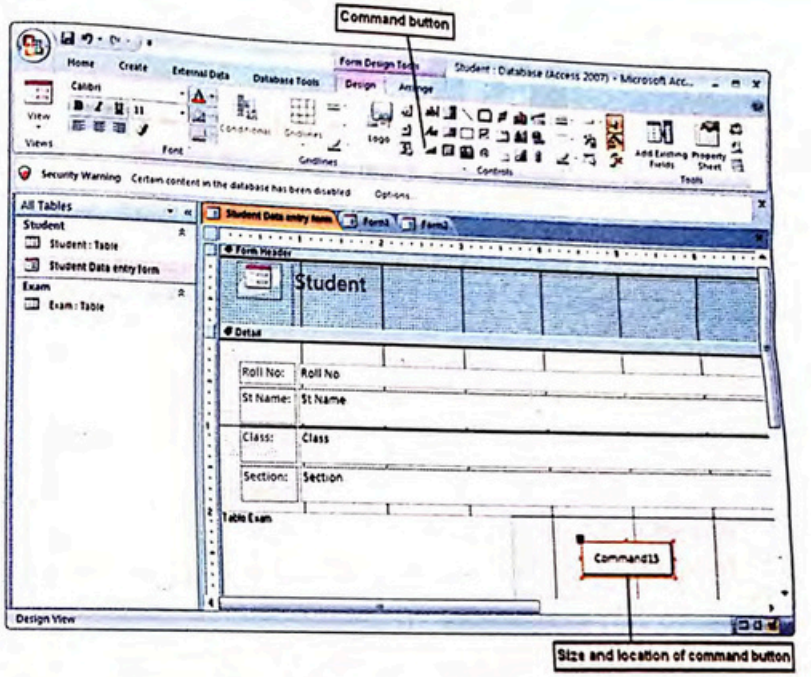


Figure 8.23 Button Command in Controls Group

2. Move the mouse pointer to the required location and click to add button. The **Command Button Wizard** opens, as shown in Figure 8.24.
   - Select the type of command from the **Categories** list. (For example **Record Navigation**)
   - Select the specific action the command button to perform from the **Actions** list. (For example **Find Next**)
   - Click **Next**.

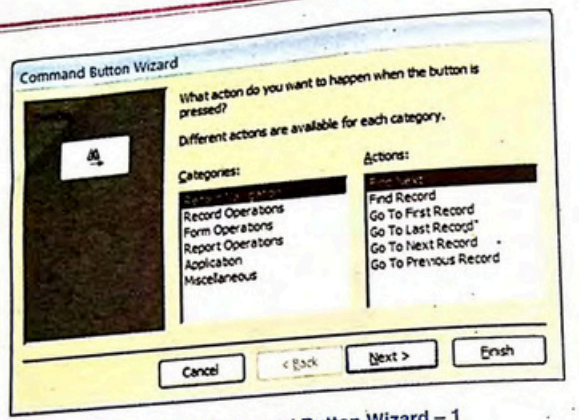


Figure 8.24 Command Button Wizard – 1

3. In the next step, as shown in Figure 8.25.
   - ➢ If user wants text to appear on the button, enter it in the **Text** box.
   - ➢ If user wants a picture to appear on the button, select one using the **Browse** button.
   - ➢ Click **Next**.

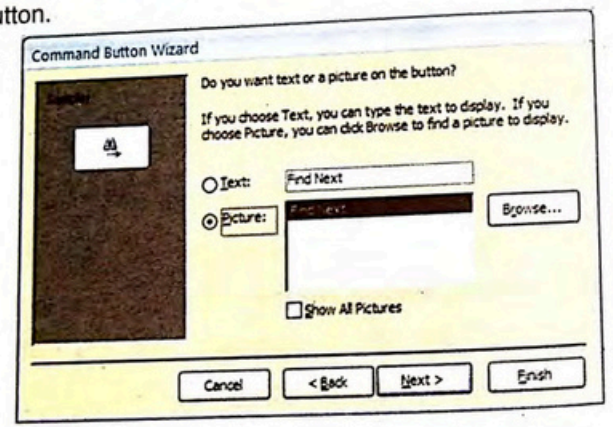


Figure 8.25 Command Button Wizard – 2

4. In this step, as shown in Figure 8.26.
   - ➢ Give the button a meaningful name.

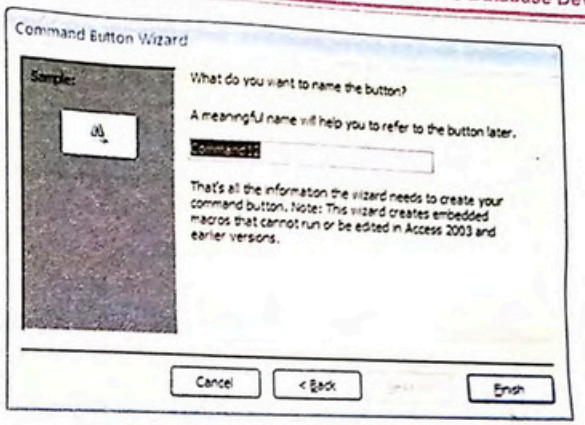


Figure 8.26 Command Button Wizard – 3

   - ➢ Access will give your button a default name. Renaming it with a more useful name will help you later.

5. Click **Finish**, the command button appears as shown in Figure 8.27.

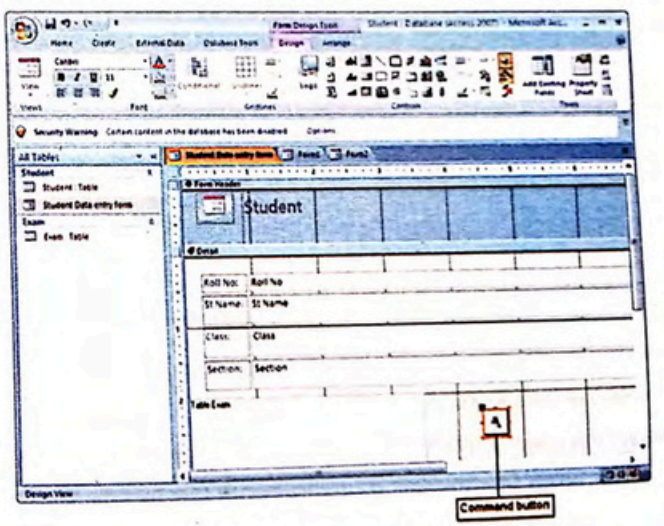


Figure 8.27 Command button

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

b. Adding a Logo

Access automatically puts a form icon, like the one shown in Figure 8.28, in the header area of every form that you create.

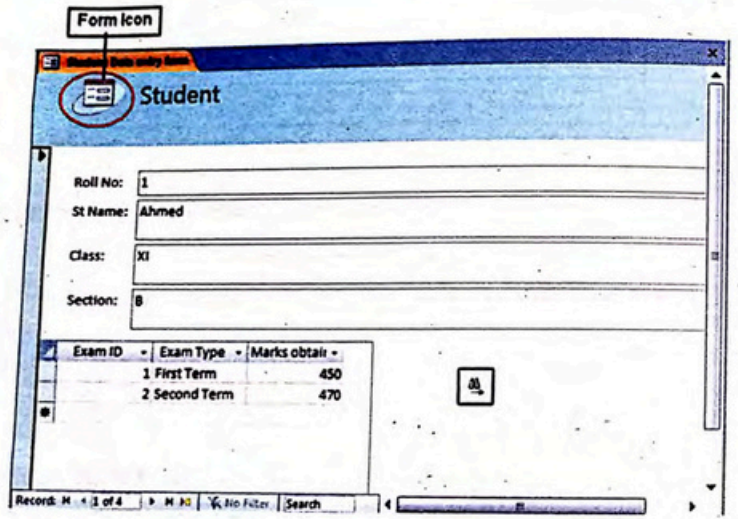


Figure 8.28 Form Icon

One way to customize the look of forms is to remove that icon and replace it with a logo. This is very easy to do using the **Logo** command.

The following steps are used to replace the form icon with a logo of choice.

- Delete the form icon.
- Select the **Logo** command from the **Controls** group on the Ribbon.
- Use the **Insert Picture** dialog box to locate the picture file to use as the logo. Then, click **Ok**. The new logo should appear.

User can move and re-size the logo, as well. Moving and re-sizing objects on a form is covered later in this lesson.

c. Applying a Style with AutoFormat

Another simple way to dramatically change the way the form looks is to apply a style with the **AutoFormat command**. User can modify the color for each part of the form, but Microsoft Access has already combined colors in several attractive styles. These styles are available under the **AutoFormat command**. To apply a pre-set format to the form:

- Click on the **AutoFormat** command on the **Format** Ribbon, as shown in Figure 8.29
- Select the desired format. The changes will appear when the mouse button is released.

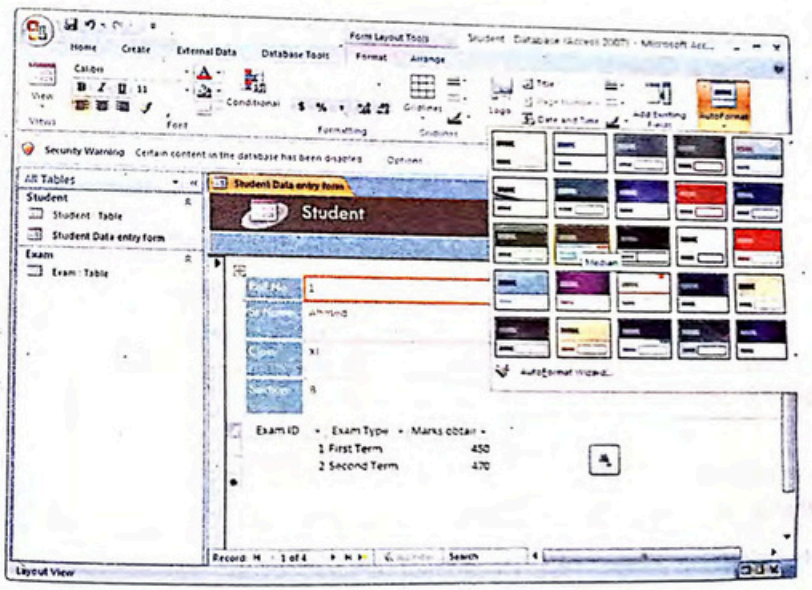


Figure 8.29 AutoFormat Options

8.4 WORKING WITH QUERIES

Queries are a way of **searching** for and **compiling** data from one or more tables. Running a query is like asking a detailed **question** of the database. When users build a query in Access, they are **defining specific search conditions** to find exactly the data they want.

Queries are far more powerful than the simple searches or filters user might use to find data within a table. This is because queries can draw their information from **multiple** tables based on a set of search conditions they define. A well-designed query can give information that users might not be able to find out just by examining the data in tables.

The real power of an Access 2007 database is its ability to pull data for quick analysis, which is what happens when a user runs a query. Access will display results in a table that can be analyzed and manipulated further.

Planning a Query

There are three questions users need to answer when they are planning a query:

- **What do you want the results to look like?** Identify every field or bit of information that user wants to include in the results.
- **Where is the information stored in the database?** List which tables (and/or queries) hold the information that user wants to see.
- **What conditions do you want the data to meet?** This helps to determine how to set the criteria so that Access can search the records properly.

Example: In Student database, a query might be:
What is the list of students with their marks, studying in Class XI and Section B?

Planning:
Let us use the three-question process to plan this query.

- **What fields do we want to see in the results?**
  Roll No, Student Name, Class, Section, Marks
- **In which tables is the information stored?**
  Student table - to get the Students' roll numbers, names, classes and sections
  Exam table - to get students' marks
- **What is the condition we want the data to meet?**
  We want to look for the marks of students where the section is B.

8.4.1 Creating the Query

Once users have planned out their query, they can build and run it using Access query tools.

a. To Build a Query using the Query Design Command

The following steps are used to build and run a query using the **Query Design** command.

- Select the **Query Design** command from the **Create** tab on the Ribbon. **Show Table** dialog box appears.
- Use the **Show Table** dialog box to select which tables (and/or queries) to include in the query. According to our query and plan, we will select both the tables.
- Click **Close** button.

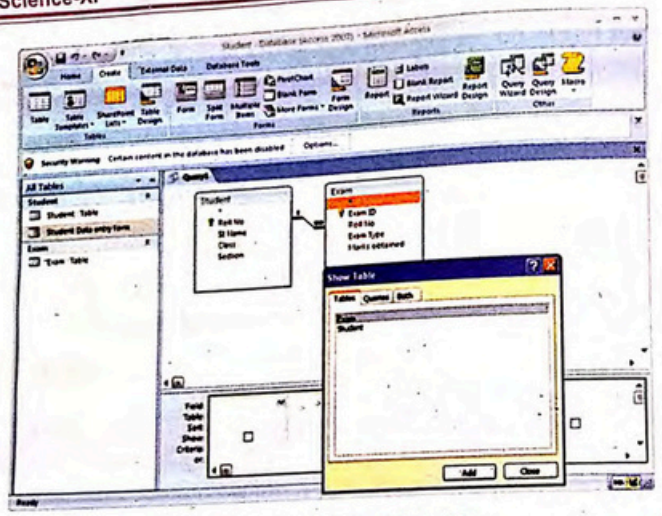


Figure 8.30 Show Table Dialog Box

- Drag and drop the fields to see in the results to the bottom portion of the query design screen. As shown in Figure 8.31.

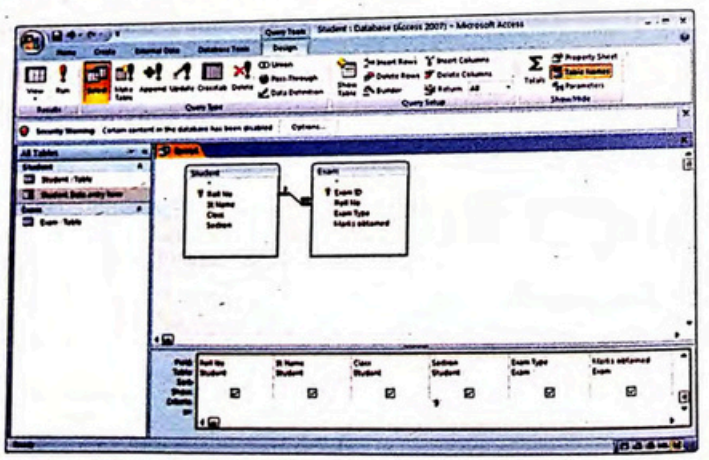


Figure 8.31 Add Fields to Query Design Screen

- Enter the condition in the **Criteria** row for the condition field. For our query, we will type **"B"** in the cell labeled **Criteria** for the **Section** field.
- Once the condition is set, click **Run!** in the **Results group** on the Ribbon.
- View the results to determine if they match the desired results. As shown in Figure 8.32.

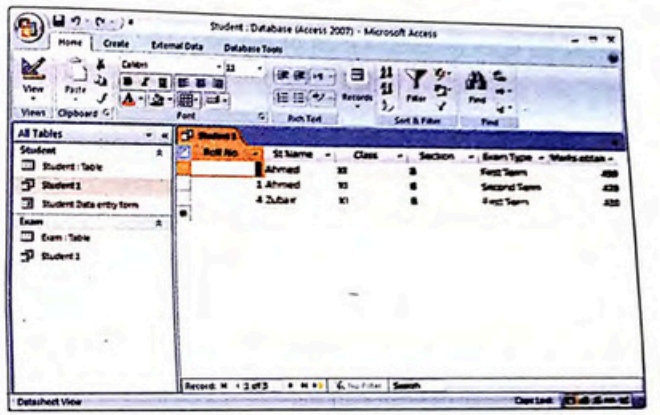


Figure 8.32 Students Query Results

b. Saving the Query

The following steps are used to save the query for later use.

- Right click on the query tab.
- When the **Save As** dialog box opens, give query a meaningful name.
- Click **OK**.
- The query will now be listed in the object list on the left side of the Access window.

8.4.2 Types of Queries in Access

The following are some common types of queries in Access.

- Select
- Update
- Delete

a. Select Query

A select query is a type of database object that shows information in Datasheet view. A query can get its data from one or more tables, from existing queries, or from a combination of the two. The tables or queries from which a query gets its data are referred to as its record-source.

Basic steps to create a select query:

User can create a select query by using the **Query Wizard** or by working in **Design view**. Some design elements are not available when users use the wizard, but user can add these elements later by using Design view. Although the two methods are somewhat different from each other, the basic steps are essentially the same.

- Choose the tables or queries that to use as sources of data.
- Specify the fields that user wants to include from the data sources.
- Optionally, specify criteria to limit the records that the query returns.
- After user has created a select query, it can be run to see the results.

b. Update Query

An Update Query is an action query (SQL statement) that changes a set of records according to criteria (search conditions) user specify. It is a very powerful feature and a fundamental part of relational databases since the user can modify a huge number of records at one time. Understanding and using Update Queries improves the performance of applications (versus doing the same changes manually or in code), and makes them easier to maintain.

Figure 8.33 Update Query Option

Update Queries let users modify the values of a field or fields in a table. You can specify the records to modify by applying a filter (WHERE clause) and linking the table to other tables and queries.

The updated value can be:

- The same value for all records.
- A value from another field in that table (updates the field based on a field's value in its own record).
- A value from a field in a linked table.
- An expression based on values in the table or linked tables (multiple fields can be used to calculate the new value).
- A function value which can include field values as its parameters
- User defined function that may or may not include field values as parameters.

Example: In Students' database let us create an update query to change the Section of all students to "G".

- Create a new query using the **Student** table. Include the fields that are going to be used to update the records.
- Select **Update** from **Query Type**, as shown in Figure 8.34.
- Type "G" for **Section** field in **Update To** row, as shown in Figure 8.34.

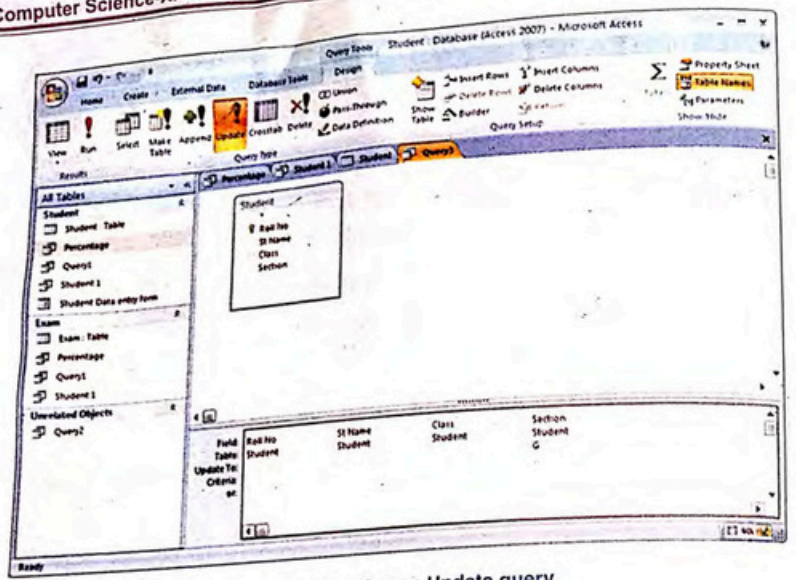


Figure 8.34 Creating an Update query

- Run the query, using the **Run button**  to update the data in **Student table** that meets the criteria that is applied. The warning dialog box indicates the number of records that will be updated, click **Yes** to accept.

Remember that the update query will permanently update records from the specified table(s), Therefore it is very important that the user has backed up the table(s) or database before running this object.

- Check the Update Query Results by running the Student table as shown in Figure 8.35.

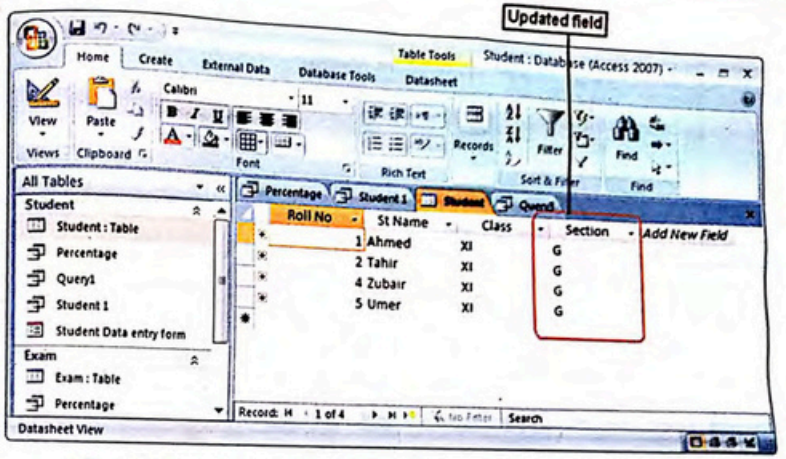


Figure 8.35 Student table after updating Section field through update query

c. Delete Query

Delete query is used to delete records from a single database table or multiple tables. Delete query removes records from tables permanently. As with the other types of action queries, the delete query works with a group of records that meet specified criteria that user apply. User can use the delete query to remove all records or only records that meet the defined criteria.

Example: In Students database let us create a Delete query to remove the records of students of Section "B" in Student table.

- Create a new query using the **Student** table. Include those fields that are going to be used to delete the records.
- In the query design view, click on the drop-down arrow to the right of the **Query Type** button and choose **Delete Query.**
- Type "B" for **Section** field in **Criteria** row, as shown in Figure 8.36.

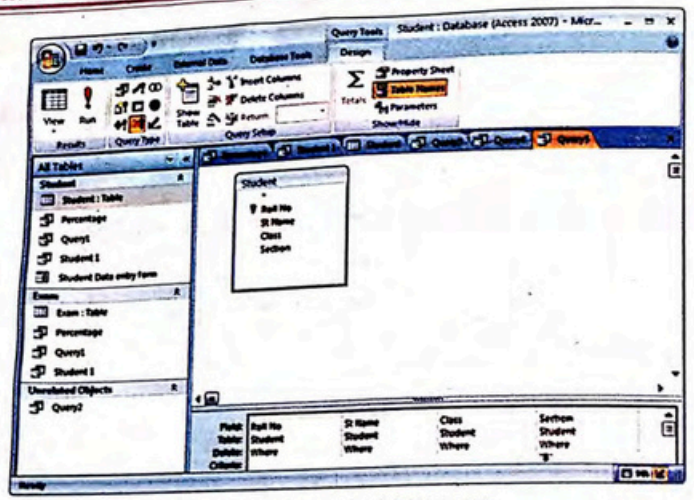


Figure 8.36 Creating a Delete query

- Run the query, using the **Run button** to delete the data in **Student table** that meets the criteria that is applied. The warning dialog box indicates the number of records that will be deleted, click **Yes** to accept.

Remember that the query will permanently delete records from the specified table(s), Therefore it is very important that the user has backed up the table(s) or database before running this object.

- Check the Delete Query Results by running the Student table.
- Close the query, saving if required

8.5 GENERATING REPORTS

A **report** is an Access object. It is used to display data in an organized manner so that users can print it. A **report** is an effective way to present data using an attractive layout.

Access offers tools that allow users to create and format a report. The **Report Wizard** takes users through the steps of creating a report. The **Report command**, however, is much easier to use, and all of the formatting options are still available in Layout View once the report is created. With these tools, user can create a report based on a table or a query.

8.5.1 Using the Report Wizard to generate a Report

The following steps are used to generate a report using Report Wizard.

- Select the **Create** tab on the **Ribbon**. Then click **Report Wizard** from the **Reports group** to open the pop up window. As shown in Figure 8.37.

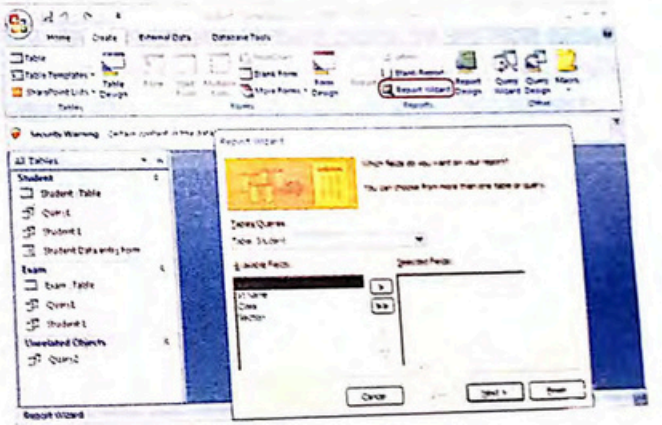


Figure 8.37 Report Wizard

- Select data for Report from **Tables/Queries** drop down menu and then select the required **Fields**. Click **Next**.
- Next step is for **Grouping Levels,** where user can add grouping levels if required. We do not need it for this particular example. Click **Next**.

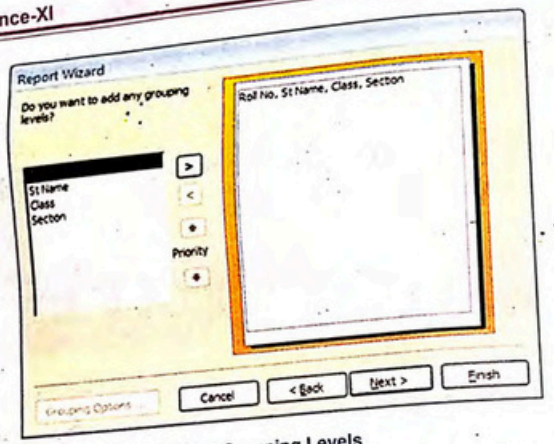


Figure 8.38 Grouping Levels

- This step of the Report Wizard is used to select the **Sort Order** for the report. For example we might want to display records in **Ascending** order of **Roll No** field as shown in Figure 8.39. Click **Next**

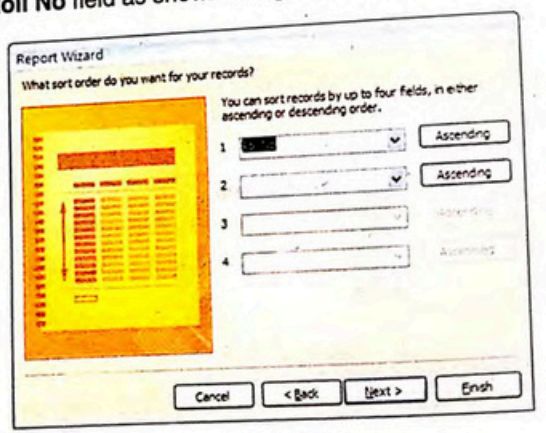


Figure 8.39 Sort Order

- Here user selects the **Lay Out** of the report. There are various lay out options, but in our case we will keep to the default setting. Click **Next**.

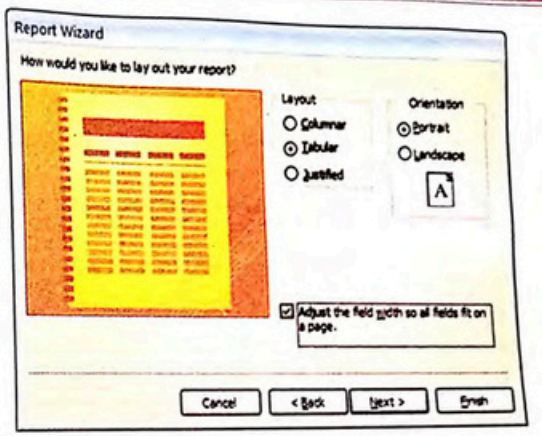


Figure 8.40 Lay out

- Select the **Style** for the report. As shown in Figure 8.41. Click **Next**.

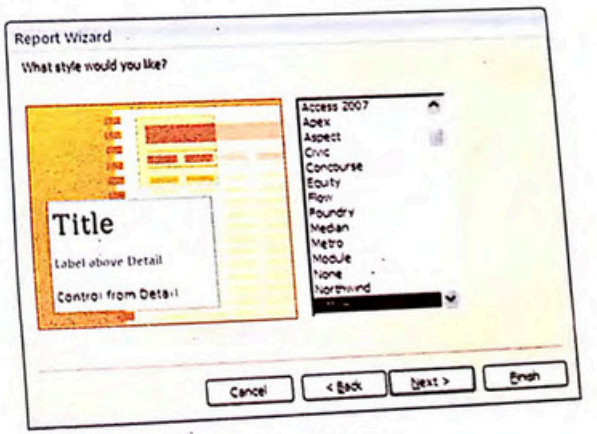


Figure 8.41 Lay out

- Give **Title** to the report (like Student) and then click **Finish**, as shown in Figure 8.42.

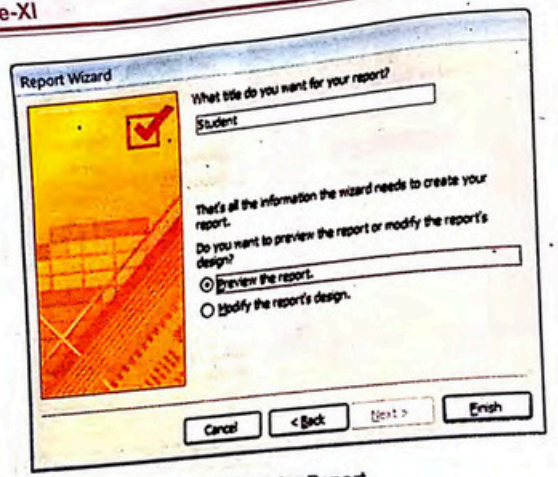


Figure 8.42 Title for Report

- The Access Report will now be previewed on the screen, and should look something like shown in Figure 8.43.

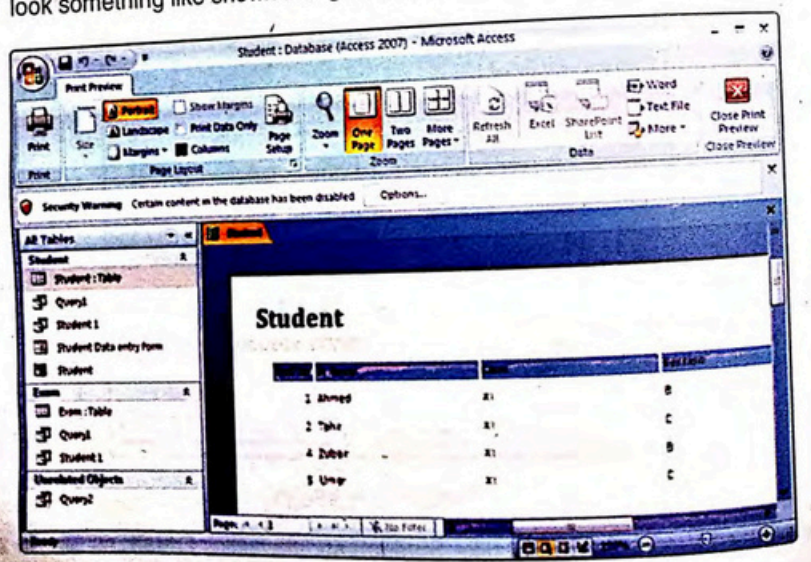


Figure 8.43 Student Report preview

8.5.2 Saving and Printing a Report

a. Saving a Report

The following steps are used to **Save** the report.

- Right click on the report tab.
- Choose Save from the list that appears.
- When the Save as dialog box opens, give the report a suitable name.
- Click **OK**.

b. Printing a Report

Click on the **Print** command in the Print group, as shown in Figure 8.44.

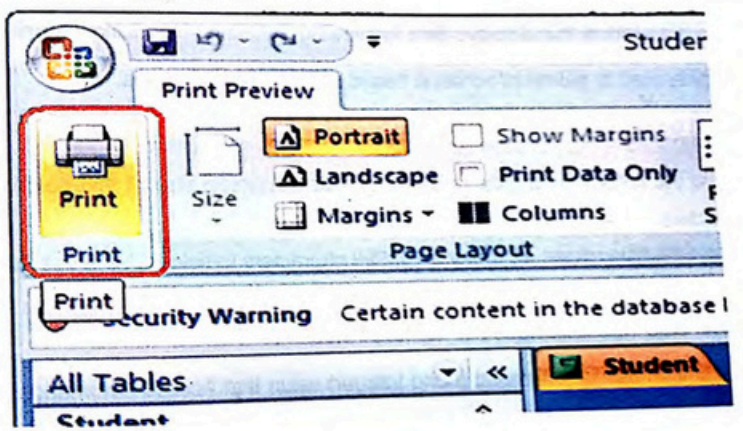


Figure 8.44 Printing Report

SUMMARY

- Database development is the creation, organization, management and manipulation of database systems for organizations.
- Microsoft Access is a database management system.
- Microsoft SQL Server is a relational database management system used to store and retrieve data as requested by other software applications.
- OpenOffice Base is the database module of OpenOffice. It is a fully featured database management system.
- A table is a set of columns and rows, with each column referred to as a field and each row of a table is referred to as a record.
- Form is a window that displays data for viewing, entering and editing information.
- Query is used to gather information based on one or more criteria.
- Report is used for printing information from database.
- Text is the default data type to all fields. The maximum size of text field is 255 characters.
- Memo data type allows as many as 63999 characters to fields. Users use them to provide descriptive comments.
- Number data type is assigned to numeric fields.
- AutoNumber field is a numeric (Long Integer) value that Access automatically fills in for each new record that is added to a table.
- Yes/No is logical data type which uses 1 for Yes (True) and 0 for No (False).
- Date/Time data type is used to assign special fixed format for date/time data.

- OLE Object is used for OLE (Object Linking and Embedding) objects (such as Microsoft Word documents, Microsoft Excel spreadsheets, pictures, sounds, or other binary data) that were created in other programs using the OLE protocol.
- Hyperlink data type is used for hyperlinks. A hyperlink can be a path of a document or a Web address.
- Select Query is a type of database object that shows information in Datasheet view. A query can get its data from one or more tables, from existing queries, or from a combination of both.
- Update Query is an action query (SQL statement) that changes a set of records according to criteria user specify.
- Delete Query is used to delete records from a single database table or multiple tables.

EXERCISE

Q1. Select the best choice for the following MCQs.

i. Which of the following is used to store data in a database?
A. Table B. Form
C. Query D. Report

ii. _____ is a window that displays data for viewing, entering and editing information.
A. Table B. Form
C. Query D. Report

iii. Which of the following is logical data type?
A. Text B. Memo
C. Autonumber D. Yes/No

iv. _____ is an open source application program.
A. MS Access B. OpenOffice Base
C. SQL Server D. MS Word

v. What is the maximum size of text field data type?
A. 253 B. 254
C. 255 D. 256

vi. _____ Key is a unique key field in a table.
A. Secondary B. Foreign
C. Composite D. Primary

vii. Which key is used to create one-to-many relationship between tables?
A. Secondary B. Foreign
C. Composite D. Primary

viii. _____is used to display data in an organized manner so that users can print it.
A. Table B. Form
C. Query D. Report

Q2. Give short answers of the following questions.

i. Name different types of database management systems.
ii. What is OpenOffice Base?
iii. How forms are useful in database?
iv. Name common Access database objects.
v. How primary key is assigned in a table?
vi. What is a report?
vii. How relationship can be edited in Access.
viii. Name different navigation buttons in a form.

Q3. Give detailed answers of the following questions.

i. Explain the following database objects.
a) Tables b) Forms
c) Queries d) Reports

ii. Explain different data types used in Access.
iii. Describe two ways of creating a table in Access.
iv. Explain the process of creating forms in Access.
v. Write the steps for creating relationships between tables.
vi. Explain different types of queries used in Access.
vii. How can one-to-many relationship can be created between two tables? Give example.
viii. What is a query? How query is created using wizard option in Access 2007?

ANSWERS TO MCQs

Unit 1 OVERVIEW OF COMPUTER SYSTEM

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	C	C	C	D	B	A	A	D	C

xi	xii	xiii	xiv	xv
B	B	C	A	D

Unit 2 COMPUTER MEMORY

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	C	C	A	D	A	C	B	B	C

Unit 3 CENTRAL PROCESSING UNIT

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
A	B	C	B	C	A	A	C	A	B

xi	xii	xiii	xiv	xv
B	B	A	A	D

Unit 4 INSIDE SYSTEM UNIT

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	D	D	A	D	C	B	A	C	C

Unit 5 NETWORK COMMUNICATION AND PROTOCOLS

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	C	A	D	B	C	D	B	A	C

xi	xii	xiii	xiv	xv
D	D	C	D	C

Unit 6 WIRELESS COMMUNICATIONS

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
A	B	B	A	D	D	C	B	A	D

Unit 7 DATABASE FUNDAMENTALS

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii	ix	x
A	C	A	C	C	A	B	C	C	B

Unit 8 DATABASE DEVELOPMENT

Q.1 Multiple Choice Questions.

i	ii	iii	iv	v	vi	vii	viii
A	B	D	B	C	D	D	D

GLOSSARY

A

Abacus
The abacus, which emerged about 5,000 years ago in Asia and is still in use today, may be considered the first computer.

Accelerated Graphics Port (AGP)
The Accelerated Graphics Port (AGP) is a high-speed point-to-point channel (pathway), primarily used for 3D computer graphics.

Accumulator
Accumulator is a general purpose register and is used by CPU for performing arithmetic and logic operations and to hold the result of those operations.

Address bus
Address bus carries addresses not data.

Application layer
Application layer serves as the user interface for users and application processes to access network services.

Application software
Application software are computer software, designed to help the user to perform singular or multiple related specific tasks.

Asynchronous transmission
In asynchronous transmission, data is transmitted one byte at a 'time'.

B

Base Register
The Base Register can perform arithmetic and data movement and it has some special addressing abilities.

Basic Input Output System (BIOS)
Basic Input Output System (BIOS) also known as the System BIOS or simply BIOS is the firmware built into the computer system.

Bit
Bit or binary digit is the basic unit of information in computing. A bit is the smallest amount of memory a computer can recognize. A bit can hold only one of two values, either '0' or '1'.

Bluetooth
Bluetooth is a high-speed, low-power microwave wireless link technology, designed to connect phones, laptops, PDAs and other portable equipment together.

Blu-ray disk
Blu-ray is an optical disk format designed to display high definition video and store large amounts of data.

Bus
Computer Bus is an electrical pathway or channel though which the processor communicates with internal and external device attached to the computer.

Bus topology
In the bus topology, each node (computer, server, peripheral) attaches to a common cable.

Byte
Byte is a unit of storage that is eight bits long. A byte is the unit most computers use to represent a character such as an alphabet, a number, or a special symbol.

C

Cache memory
Cache (pronounced as cash) memory is extremely fast Static RAM (SRAM) that is built into a computer's central processing unit (CPU), or located next to it on a separate chip.

Cardinality
Cardinality refers to the maximum number of times an instance in one entity can be associated with instances in the related entity.

Cellular technology
Cellular technology is the underlying technology for mobile telephones, personal communication system, wireless Internet and wireless web applications.

Chip
Chip or microchip is a small piece of semi-conducting material (usually silicon).

Circuit switching network
Circuit switching is a scheme in which the network sets up a dedicated point-to-point connection between nodes and terminals before the communication starts, just like the nodes were already connected.

Client
Client is a network device that participates in a client/server relationship by requesting a service from a server.

Communication media
Communication media are the links that provide paths for communication devices.

Communication Standards
Communication Standards provide guidelines (also called rules or protocols) to manufacturers, vendors, government agencies, and other service providers to ensure the kind of interconnectivity of networks for communication.

Compact disk (CD)
A compact disk (CD) is a plastic-fabricated, circular medium for recording, storing, and playing back audio, video, and computer data.

Complex Instruction Set Computer (CISC)
Complex Instruction Set Computer (CISC) is processor architecture. The

instructions which the processor could execute were built into the chip. CISC have a large amount of different and complex instructions.

Computer

A Computer is an electronic device that accepts input data with the help of input devices, stores it until needed, processes it and then displays the output as a result with the help of output devices.

Computer case

A computer case also known as computer chassis, cabinet, box, tower, enclosure, housing, system unit or simply case is the enclosure that contains most of the components of computer system.

Computing Device

The term "Computing Device" is used for all such machines that can perform calculations.

Control bus

The control bus is used by the CPU to direct and monitor the actions of the other functional areas of the computer.

Cooling system

Cooling system is used to maintain proper temperature inside the system unit.

Counter register

The Counter register acts as a counter for repeating or looping instructions.

CPU (Central Processing Unit)

CPU is the main hardware of every computer system. It consists of two parts i.e. the Control unit (CU) and Arithmetic Logic Unit (ALU).

D

Data

Data is a collection of facts and figures that can be organized and processed.

Data bus

Data bus is the bidirectional bus. It can communicate in two ways, but in one direction at a time.

Data Control Language (DCL)

Data Control Language is a database language used to control access to the data in a database.

Data definition language (DDL)

Data definition language (DDL) is a database language that defines the structure in which data are stored.

Data link layer

Data link layer provides reliable transmission of data across a physical link.

Data manipulation language (DML)

Data manipulation language (DML) is a language that enables users to access or manipulate data.

Data Modeling

Data Modeling is a logical representation of data in an

organization.

Data Register

Data Register has a special role in multiply and divide operations. It works like a buffer and holds anything that is copied from the memory ready for the processor to use it.

Data type

Data type is the classification of a particular type of information.

Database

Database is a shared collection of logically related data (and a description of this data i.e. metadata), designed to meet the information needs of multiple users in an organization.

Database management system (DBMS)

A database management system (DBMS) is a set of programs that allow users to create a database, edit and update data in database files, store and retrieve data from those database files.

Database model

A database model is a set of rules or specifications which state that how data can be stored, organized and manipulated in a database system.

DDR SDRAM

DDR SDRAM (Double Data rate SDRAM) is twice the bandwidth of a single data rate (SDR) SDRAM.

Delete Query

Delete Query is used to delete records from a single database table or multiple tables.

Device driver

A device driver is a program that controls a particular type of device that is attached to the computer.

DIMM

DIMM (Dual in-line memory module) is the upgraded form of SIMM.

Direct access storage

Direct access, also called Random access is a storage system where the data is stored and read directly from storage devices.

Disk controller

Disk controller is the circuit which enables the CPU to communicate with disk drives.

E

Entity

An entity is a person, place, object, event or concept in user environment about which the organization wishes to maintain data.

Entity Relationship model

Entity Relationship model is expressed in terms of entities, the relationships (or associations) among those entities, and the attribute (or

properties) of both the entities and their relationships in the business environment.

F

Field/Attribute/Column
Field/Attribute/Column is a property or characteristic of an entity that is of interest to the organization.

File Management system
File Management system also known as Conventional file system or simply file system is a method of storing and organizing collection of data in the form of files on the secondary storage devices.

Fire wire
Fire wire is a high speed port which is used to connect video devices such as video Cameras, Camcorders, to the computer system.

Firmware
Firmware is a term often used for the fixed, small programs that control various electronic devices.

Foreign key
Foreign key is generally a primary key from one table that appears as a field in another where the first table has relationship to the second.

Form
Form is a window that displays data for viewing, entering and editing information.

Full-duplex mode
In Full-duplex mode, both stations can send and receive the data simultaneously.

G

Gateway
A gateway is a hardware device or a computer running software that allows communication between networks with dissimilar network protocols or architectures.

General purpose registers
General purpose registers are used to store data as well as addresses.

General-purpose applications software
General-purpose applications software are programs that perform common information processing jobs for end users.

Geostationary Earth Orbit (GEO)
Geostationary Earth Orbit (GEO) is a satellite system used in wireless telecommunications.

Global Positioning System (GPS)
The Global Positioning System (GPS) is a satellite-based navigation system. The GPS system consists of 24 satellites, constructed and operated by the U.S. Department of Defense.

Guided media
Guided media are the physical links in

which signals are confined along a narrow path,

H

Half-duplex mode
In half-duplex mode, each station can transmit and receive data, but not at the same time.

Hard disk drive (HDD)
A hard disk drive (HDD) is a non-volatile, random access storage device for digital data. It contains rotating platters on a motor-driven spindle within a protective enclosure.

Hardware
Computer hardware refers to the physical parts or components of a computer such as monitor, keyboard, Computer data storage, hard disk, mouse, CPU, memory, motherboard and chips.

Hierarchal Database Model
Hierarchal Database Model is a type of model in which data is organized into a tree-like structure. There is a hierarchy of parent and child segments.

I

Information
When facts, figures or data are processed and converted into meaningful form that can be used for decision making or any other useful activity, it is called Information.

Infrared
Infrared is similar to visible light, but with a longer wavelength. Infrared signals can be used for short-range communication in a closed area using line-of-sight propagation.

Input devices
Input devices are the external hardware components that are used to enter or accept data and instructions into computer memory for processing.

Input Operation
Input Operation is the process of capturing or accepting data or information, by using input devices. Input can take a variety of forms, from commands we enter by the keyboard to data from another computer or device.

Instruction
An instruction (or instruction code) is a group of bits that tells the computer to perform a specific operation.

Instruction cycle
Instruction cycle (sometimes called fetch-and-execute cycle, fetch-decode-execute cycle, or FDX) is the basic operation cycle of a computer.

Instruction format
An instruction format defines the layout of the bits of an instruction. An instruction format must include an Op-

code (Operation-Code) and zero or more Operands.

Instruction register

Instruction register is a part of Control Unit, which stores the instructions currently being executed.

Internet Protocol address (IP address)

An Internet Protocol address (IP address) is a number that is used to identify a device, for example a computer, a printer, on the network.

K

Key

Key is a unique identifier which is required to track and analyze data effectively.

L

LAN (Local Area Network)

LAN (Local Area Network) is a network that connects computers and devices in a limited geographical area like home, school, and office building, etc.

Language processor

Language processor or translator is a type of system software that translates a source program (other than machine language) into object program (Machine language).

Licensed or Proprietary Software

Licensed or Proprietary Software is a computer software that is licensed, giving the right to use the software under certain conditions, but restricted from other uses, such as modification, further distribution and re-building under exclusive legal right of the copyright holder.

Line of Sight communication

Line of Sight communication is a type of wireless data transfer that requires "visual contact" with the two devices/antennas.

Low Earth Orbit (LEO)

Low Earth Orbit (LEO) satellite operates at heights of between 500 and 2,000 km above the Earth's surface.

M

Magnetic core memory

Magnetic core memory was the most widely used form of digital computer memory based on a very simple idea. A core, a ring of magnetic material, stores one bit by the direction of its magnetization. A magnetic core is a ring of ferrite material.

Magnetic Storage

Magnetic storage refers to the storage of data on a magnetized medium.

Magnetic Tape

Magnetic Tape is a sequential access storage device used for data collection, backup and archiving.

Mainframe computers

Mainframe computers are the second powerful and expensive computers than supercomputers. Mainframes are used mainly by large organizations for critical applications, typically bulk data processing such as census, industry and consumer statistics, enterprise resource planning, and financial transaction processing.

MAN (Metropolitan Area Network)

A metropolitan area network is a computer network that usually spans a city or in a large metropolitan area.

Medium

Medium is the physical path that message uses to travel from source to destination.

Middle Earth Orbit (MEO)

Medium or Middle Earth Orbit (MEO) is a satellite system used in telecommunications. MEO satellites orbit the earth between 1,000 and 22,300 miles above the earth's surface.

Memory

Computer memory is a semiconductor hardware device used to store data or programs for use in computers either on permanent or temporary basis.

Memory Address Register

Memory Address Register holds the memory address, the memory address from which data will be provided to the CPU or will have the address to which data will be sent and then stored.

Memory Buffer Register

Memory Buffer Register holds the contents of the memory which are to be moved from memory to other components or from components to the memory.

Memory slot

A computer memory slot is a socket or opening in computer main board in which the main memory is installed.

Memory Word

A Memory Word is a unit that a computer processor is designed to handle efficiently.

Mesh topology

In a mesh network topology, each of the network node, computer and other devices, are interconnected with one another.

Message

Message is the data or information that is to be communicated.

Micro wave transmission

Micro wave is a wireless transmission technology that travels at high frequency than radio waves and provide throughput as a wireless network media.

Glossary

Microcomputers
Microcomputers are more commonly known as personal computers (PCs). The microcomputer is generally the smallest and least expensive of the computer family.

Mobile Computing
Mobile Computing is a technology that allows transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link.

Modality
Modality refers to the minimum number of times an instance in one entity can be associated with an instance in the related entity.

Motherboard
Motherboard or main board is the main circuit board in computer system that hold main component of the system unit.

N

Network
A network is a collection of independent computers or nodes that communicate with each other on a shared network medium.

Network database model
A network database model is similar to a hierarchical database except that each child can have more than one parent record.

Network interface card (NIC)
A network interface card also known as network interface controller, network adapter and LAN adapter is computer hardware component that connect a computer to a computer network.

Network layer
Network layer allows the data called packets or datagram to go from one physical network to another.

Network Topology
Network Topology refers to the physical layout and connectivity of computers in a network.

Non-volatile memory
Non-volatile memory is a permanent memory that can retain the stored information even when not powered.

Normalization
Normalization is the process of organizing data in relational database in order to minimize duplication of information (data) and to safeguard the database against certain anomalies.

O

Object relational database model
Object relational database model add new object storage capabilities to the relational database systems at the core of modern information systems.

Object-Oriented database Model
Object-Oriented database Model is a database model in which information is represented in the form of objects as used in object-oriented programming.

Open Source Software
Open Source Software is computer software of which source code is also available to the user.

Operating system
Operating system is a set of programs that manages and coordinates the hardware of a computer and provides services to application software, programmers and users of computer.

Optical disk
Optical disk is a flat, usually circular disc which encodes binary data in the form of pits.

OSI model
OSI model defines a networking framework for implementing protocols in seven different layers.

Output devices
Output devices are used to display results of processing to the user.

Output Operation
Output Operation is the result, which comes from the transformation process or it is the outcome of the process.

P

Packet switching network
Packet switching is a network communication method in which the data get transmitted in blocks, regardless of type and content, called packets based on the destination address in each packet.

Parallel port
A parallel port is a parallel communication physical interface.

Peer-to-Peer network
In peer-to-peer networking there are no dedicated servers or hierarchy among the computers.

Peripheral Component Interconnect (PCI) port
The Peripheral Component Interconnect (PCI) is a computer bus (an electric pathway) for attaching hardware device in a computer.

Physical layer
Physical layer is concerned with the transmission and reception of the unstructured raw bit stream over a physical medium.

Plotters
Plotters are hardcopy output devices. They are mainly used by architects, engineers, and others who need to generate high-precision graphical output of large sizes on papers.

Port
A port is a piece of equipment to which a plug or cable is connected.

Power supply
A power supply unit is the component

that supplies power to the other components of a computer system.

Presentation layer
Presentation layer converts incoming and outgoing data from one presentation format to another (for example, from a text stream into a popup window with the newly arrived text).

Primary or Main memory
Primary or Main memory holds instructions and data when a program is executing.

Printers
Printers are output devices which are used to produce output on physical media such as paper.

Processing Operation
Processing Operation is the transformation process to convert the input into output.

Productivity software
The productivity software is a type of application software that are used to produce documents, presentations, databases, charts and graphs etc.

Program Counter Register
Program Counter is also known as Instruction Pointer, it is a processor register that holds either the address of the instruction being executed or the address of the next instruction to be executed.

Protocol
A protocol is a set of rules that governs data communications.

Q

Query
Query is used to gather information based on one or more criteria.

R

Radio signals
Radio signals are electromagnetic waves which are used as a medium in wireless communication.

Radio transceiver
Radio transceiver is a wireless communication device which is used to send as well as receive data through radio signals.

Radio wave transmission
Radio wave wireless transmission distributes radio signals through the air over long distances such as between cities, regions, and countries, and short distances such as within an office or home.

Random Access Memory (RAM)
Random Access Memory (RAM) is the common type of computer memory. It is the Read and Write (R/W) memory of a computer.

Receiver
Receiver is the device which receives

transmitted message.

Record/Tuple/Row
Record/Tuple/Row is a collection of related fields treated as a single unit.

Reduced Instruction Set Computer (RISC)
Reduced Instruction Set Computer (RISC) is a microprocessor that is designed to perform a smaller number of types of computer instructions.

Registers
Registers are small memory units. There are a large number of registers inside the processor.

Relational Database Model
Relational Database Model uses a collection of tables to represent both data and the relationship among those data. Each table has multiple columns and each column has a unique name.

Relational database schema
Relational database schema is the tables, columns and relationships that make up a relational database.

Report
Report is used for printing information from database.

Ribbon cable
A ribbon cable also known as multi-wire planar cable is a cable with many conducting wires running parallel to each other on the same plat plane.

Ring topology
In a ring topology, every node is logically connected to two other nodes, forming a ring. Traffic flows through the entire ring until it reaches its destination.

ROM (Read only memory)
ROM (Read only memory) is non volatile memory, i.e., the information stored in it, is not lost even if the power supply goes off.

Router
Router is a device that forwards data packets across different networks.

S

SATA (Serial Advanced Technology Attachment)
SATA (Serial Advanced Technology Attachment) is a new technology cable for connecting storage drives to computer.

Scanner
Scanner is an input device. It is an electronic device that scans printed or handwritten text documents, images, or a particular object to convert them into a digital file format.

SDRAM
SDRAM (Single Data rate RAM) is a high speed semiconductor memory.

Secondary key
Secondary key is an attribute or combination of attributes that is not a

primary key and can have duplicate data. In other worlds secondary key is used after the identification of the primary key.

Secondary memory

Secondary memory (also called auxiliary memory) holds data and programs that may not currently in use and provides long-term storage.

Select Query

Select Query is a type of database object that shows information in datasheet view.

Sender

Sender or Transmitter is a device that sends the message.

Sequential access storage

Sequential access is a storage system where the data is stored and read in a fixed or linear order.

Serial port

A serial port is a serial communication physical interface through which information transfers in or out one bit at a time.

Server

Server is a powerful computer that provides centralized administration of the network and serves up the resources that are available on the network, such as printers and files.

Session layer

Session layer sets up, coordinates, and terminates conversations, exchanges, and dialogues between the applications running on different stations.

Shareware

Shareware is also called trail-ware and refers to licensed software that is delivered to the user without payment for trial uses with limited functionality and for a specific period after which it expires.

SIMM

A SIMM or single in-line memory module is type of old RAM.

Simplex mode

In Simplex mode, the communication takes place in only one direction.

Slot

It is an opening or socket in a computer main board where a circuit board or expansion card can be inserted to add new functionalities to the computer.

Software

Computer software is a step by step set of instructions that directs the computer what to do and how to do. It turns the data into information - that makes a computer useful.

Sound card

Sound card also known as an audio card is an internal expansion card that facilitates the input and output of audio

signals to and from a computer.

Special purpose application software

The software that is designed to perform a specific task is known as special purpose application software.

Special Purpose Registers

Special Purpose Registers are used to hold the state of a program. They include program counter, instruction register, memory address register and memory buffer registers.

SQL (Structured Query Language)

SQL (Structured Query Language) is the standard language for relational database systems.

Star topology

In a star topology all the nodes (server, workstations, peripherals, etc.) on the network are connected directly to a centralized connectivity device called a hub, switch, or router.

Storage Operation

Storage Operation is the process of storing the data, information and instructions, so that the user can retain and retrieve it whenever required.

Subnet Mask

Subnet Mask indicates the network portion of an IP address.

Supercomputers

Supercomputers are the most powerful and the most expensive computers designed or scientific, engineering, and business applications. These computers can process billions to trillions of instructions per second.

Switch or Hub

A network switch or hub is a device that connects network nodes to a central location.

Synchronous transmission

In synchronous transmission, large volumes of information can be transmitted block-by-block or word-by-word simultaneously.

System software

System software are set of programs that operate and control the computer system.

System Unit

The System Unit is core of a computer system. Usually it is a rectangular box with many electronic components that make the entire system.

T

Table

A table is a set of columns and rows, with each column referred to as a field and each row of a table is referred to as a record.

TCP/IP

TCP/IP is an industry standard suite of protocols designed for local and wide area networks.

Transistor
By 1948, the invention of the transistor greatly changed the computer's development.

Transport layer
Transport layer handles the transparent transport of data segments between network devices.

U

Unguided media
Unguided media also called Wireless media transports signals without using any physical conductor between the two devices communicating.

Update Query
Update Query is an action query (SQL statement) that changes a set of records according to criteria that user specify.

USB (Universal Serial Bus)
USB (Universal Serial Bus) is a serial port which provides a fast serial transmission between devices and computers.

Utility software
Utility software is a kind of system software designed to analyze, configure, optimize and maintain the computer.

V

Video card
A video card also known as video adapter, graphics accelerator card, display card or graphics card is an expansion card whose function is to generate output images to a display unit.

Volatile memory
Volatile memory is computer memory that requires power (electricity) to maintain the stored information.

VPN (Virtual Private Network
A virtual private network (VPN) is a network that uses a public telecommunication infrastructure to provide remote offices or individual users with secure access to their organization's network.

W

WAN (Wide Area Network)
WAN (Wide Area Network) covers large distance for communication between computers.

Web Service Protocol stack
Web Service Protocol stack is a protocol stack (a stack of computer networking protocols) that is used to define, locate, implement, and make Web services interact with each other.

Wi-Fi
Wi-Fi is short for "wireless fidelity. It is a popular wireless networking technology which uses radio waves to provide wireless high-speed Internet and network connections.

WiMAX
WiMAX is an acronym for "Worldwide Interoperability for Microwave Access". Wimax technology is a standard based wireless technology which is used to provide Internet access and multimedia services at very high speed to the end user.

Wireless Access Point
Wireless Access Point is a device that both transmits and receives data (sometimes referred to as a transceiver).

Wireless Application Protocol (WAP)
The Wireless Application Protocol (WAP) is an open standard protocol which provides Internet access to mobile users of wireless phones and other wireless devices such as pagers and personal digital assistants (PDAs).

Wireless communication
Wireless communication is a term used to describe communications between two or more devices without any physical connection.

Wireless Markup Language
Wireless Markup Language is a markup language created for devices that implement the Wireless Application Protocol (WAP), such as mobile phones.

Wireless network
Wireless network is a network set up by using radio signal frequency to communicate among computers and other network devices.

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ABOUT AUTHOR

Mohammad Khalid is Head of Computer Science Department at OPF Boys College, Islamabad. Through out his educational career he has got first-class first division. He did his M.Sc in Computer Science from the University of Peshawar and earned his B.Ed degree in Science from Institute of Education and Research, University of Peshawar. He has been an instructor and a teacher in Computer Science for the last fifteen years. He has vast teaching experience from Secondary to Masters Level. He has attended many national and international level seminars and meetings for the promotion of teaching Computer Science at different levels.

He has been member of the National Curriculum development team since 2007. He has contributed a great deal in writing the Curriculum of Computer Education from Grades VI-VIII and Curriculum of Computer Science from Grades IX-XII.

As an author he has written a textbook of Computer Science for grade IX for KPK Textbook board and a textbook of Computer Studies for grade VII for National Books Foundation.

Keeping in view his experience and expertise in the subject, this book will prove to be an asset both for the students and the teachers.

مومن تو آپس میں بھائی بھائی ہیں۔
پس اپنے دو بھائیوں میں صلح کرادیا کرو
اور اللہ تعالیٰ سے ڈرتے رہو۔
تاکہ تم پر رحم کی جائے۔

(سورۃ الحجرات:10)

رشوت لینے والا اور دینے والا
دونوں جہنمی ہیں۔

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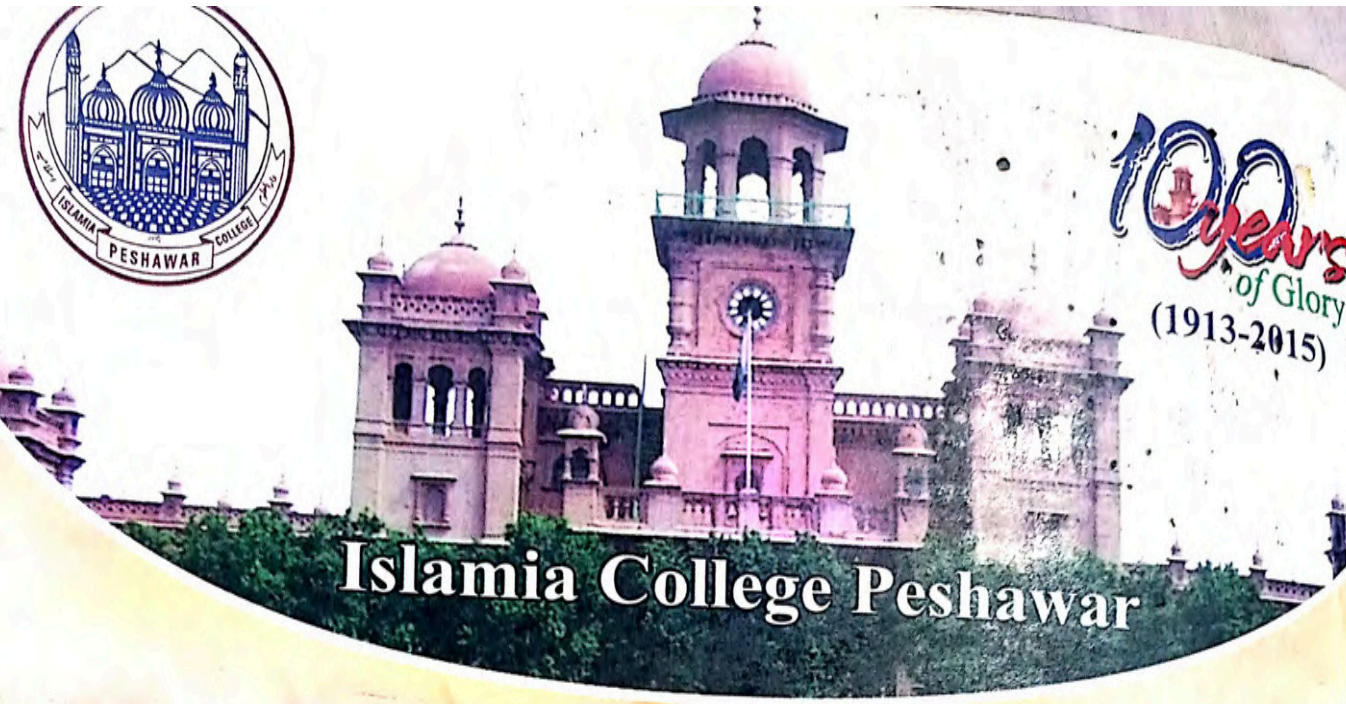

قومی ترانہ

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کشورِ حسین شاد باد
تو نشانِ عزم عالی شان
ارضِ پاکستان!
مرکزِ یقین شاد باد

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قوتِ اخوتِ عوام
قوم، ملک، سلطنت
پائندہ تابندہ باد
شاد باد منزلِ مُراد

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