# COMPUTER SCIENCE
# 12

## (MS Access and C)

## CHAPTER 6: Table and Query

# Topics

- Table
- Characteristics of Table
- Table views
- Creating Table in MS Access
- Data Types
- Field Name, Data Type and Description
- Field Properties
- Types of Formats
- Input Masks
- Creating Table using Wizard
- Methods of modifying Table

# Topics

- Freezing & Hiding Columns
- Finding & Replace Data
- Relationship
- Referential Integrity
- Sorting
- Types of Filters
- Specifying Criteria in Query
- Join
- Query Wizard
- Calculations in Query

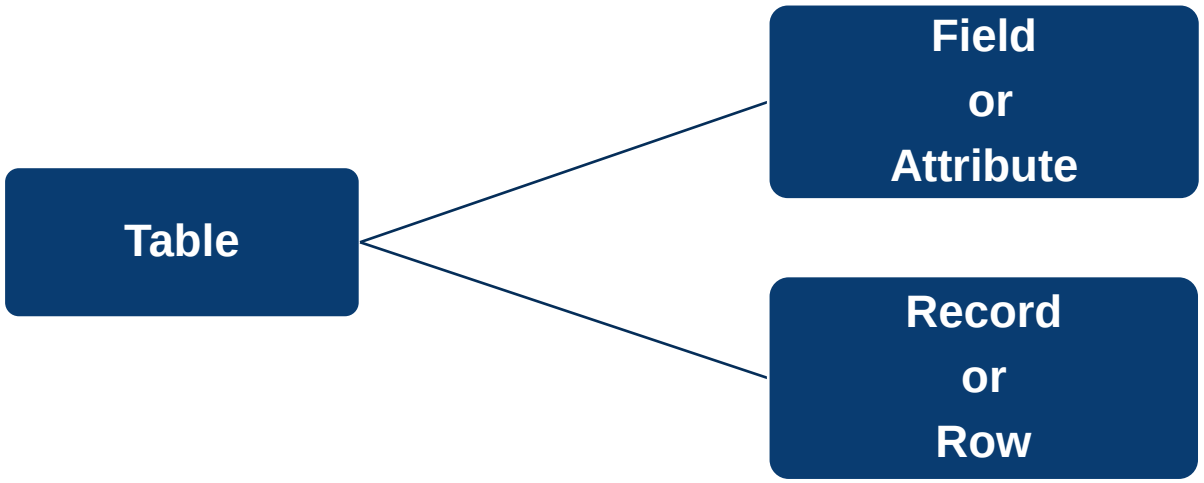
# Table

- Most important object of database
- Table is also called relation
- Central concept in relational database
- All data in a relational database is stored in tables

**Example**

| RegNo | Name | Class |
|---|---|---|
| 10 | Nadeem Khalil | MSc |
| 20 | Muhammad Usman | BSc |
| 30 | Noman Qadir | FSc |

# Parts of Table




| RegNo | Name | Class |
|---|---|---|
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| | | |
|---|---|---|
| 10 | Nadeem Khalil | MSc |
| 20 | Muhammad Usman | BSc |

# Characteristics of Table / Relation

- Each field of the table contains only one value
- Each column has a distinct name
- The order of columns is insignificant
- The order of rows is insignificant
- Each row represents a record
- Each row is distinct

**Degree of relation**

Number of fields or attributes in a relation

**Cardinality of a relation**

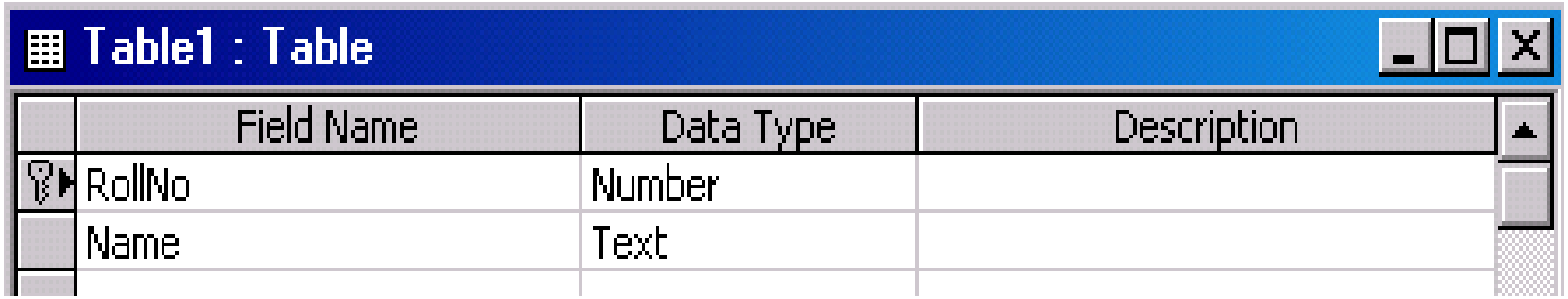
Number of records or tuples in a relation

# Table Views

- Way of looking at the table
- MS Access provides two table views that are design view and datasheet view

## Design View

- Used to design the structure of a table
- It specify the name, data types and description of fields
- Primary key is specified in this view
- Structure of an existing table can be changed in design view



# Table Views (cont.)

## Data Sheet View

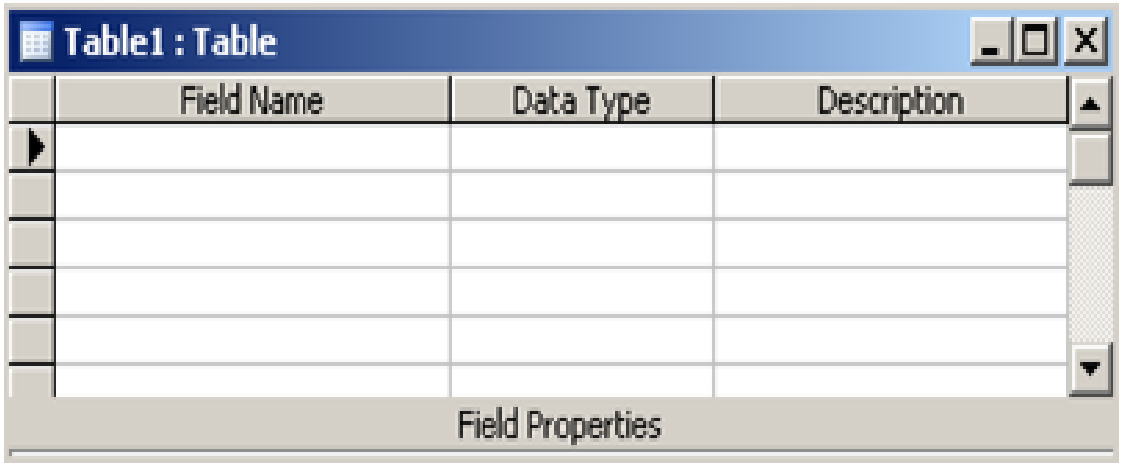
- Used to enter data, delete or modify data in table
- Table in this view is displayed in rows and columns
- Name of field displayed on top of column as header
- Each row contains a complete record
- Query is opened to perform different operations on data
- Operations include adding, deleting, updating, searching

# Creating a Table

- Creating table in Design view
- Creating a table by wizards
- Creating a table by Entering data

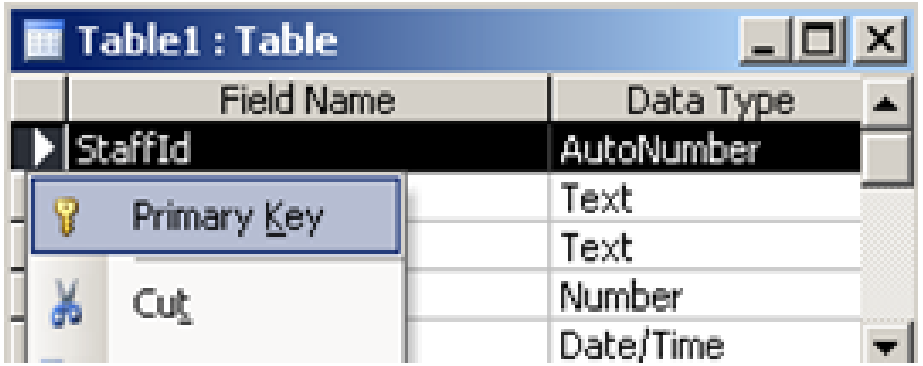
# Creating Table in Design View

1. Create a **new blank database**
2. Double click **Create table** in design view
3. Type the name of the first field in field name column
4. Select required data type for the field
5. Press **Tab** key to move to description column
6. Repeated the above steps for entering data



# Setting a Primary Key & Save Table

1. Select field for **Primary key**
2. Click **primary key** on table Design Toolbar




Click **Save** on table design toolbar

Enter a table name and click **OK**

# Data Types in MS Access

| | |
|---|---|
| Text | • Used to store alphabets, numbers and special characters<br>• It can store up to 255 characters<br>• Default length is 50 characters |
| Memo | • Used to store lengthy text<br>• Normally used to store comments<br>• Can store more than 64,000 characters |
| Number | • Used to store Numeric data<br>• Used in mathematical calculation |
| Date / Time | • Used to store date and time<br>• Standard date format is mm/dd/yy |

# Data Types in MS Access

| | |
|---|---|
| Currency | • Used to represent currency<br>• Value is rounded to two decimal<br>• Negative currency displayed in bracket<br>• The values automatically include a Dollar sign ($) |
| AutoNumber | • Used to generate unique number automatically when new record is added<br>• Value starts from 1 and is incremented by 1 |
| Yes / No | • Used to store Boolean values<br>• Possible values are True/False or Yes/No |
| OLE Object | • OLE Stands for Object Linking and Embedding<br>• Used to enter objects from other applications such as Excel |
| Hyper Link | • Used to store URL address of a website or links to other files in a field |

# Field Name, Data Type and Description

## Field Name

- Field Name is the name of Column
- Represent the contents of the field
- Name cannot be exceed 64 characters
- Use of space in field name is not good practice

## Data Type

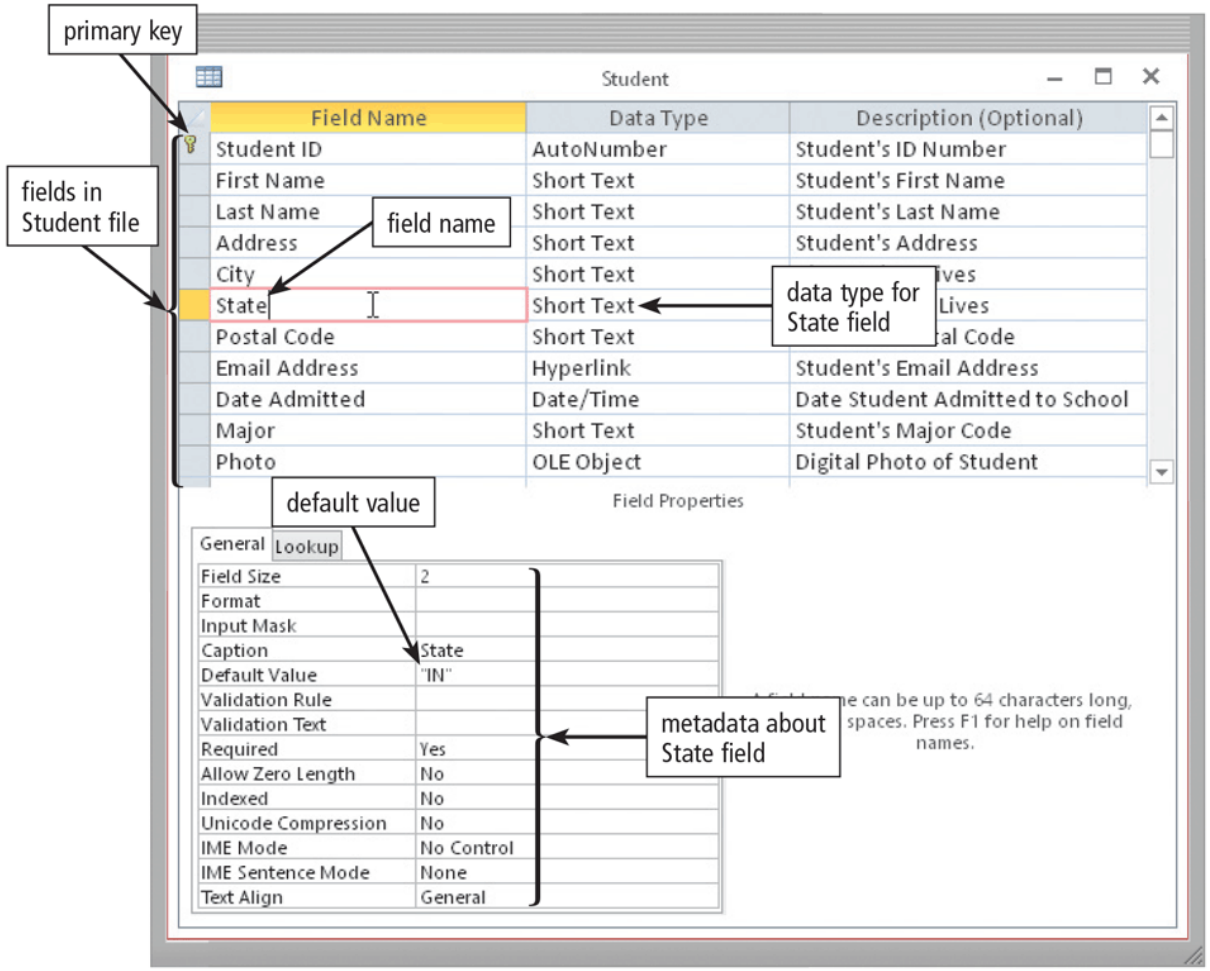
- Each field must be assigned a particular data type
- Data type specifies the type of data
- Common data types are number and text

## Description

- Description is brief comments about the field
- Use of this property is optional

# Field Properties

- ✓ Field property is used to define how data will be entered, stored and displayed
- ✓ Properties can be set in design view
- ✓ Properties window is divided into two parts
  - ❑ Top pane is used for entering field name, data type and description
  - ❑ Bottom pane is used for specifying the field properties



# Field Properties

## Field Size

- Set the number of characters required in text or number field
- Default size for the text type is 50 characters
- Can be limited to save disk space
- Field size is set in exact characters for Text type
- Different options for numbers are:

| Data Type | Values | Size in bytes |
|---|---|---|
| Byte | 0 to 255 | 1 |
| Integer | -32,768 to 32,767 | 2 |
| Long Integer | -2,147,483,648 to 2,147,483,647 | 4 |
| Single | $-3.14 \times 10^{38}$ to $3.14 \times 10^{38}$ | 4 |
| Double | $-1797 \times 10^{308}$ to $1797 \times 10^{308}$ | 8 |

# Field Properties

## Format

- Used to specify the format of data as it is displayed in the field
- It has two parts for text and memo fields that are separated by semicolon
  - First part is used to apply to the  field
  - Second part applies to empty field

## Default Value

- Default value already appears in the field when user enters data
- User does not need to type the same value again and again
- The property **Set the Default Value** is used to set default value for a field

# Field Properties (cont.)

**Indexes**

- Indexes are created to obtain and sort records faster
- **Yes(Duplicates OK)** is selected if multiple entries of same data
- **Yes(No Duplicates**) option prevents duplicate values

**Field Validation Rule**

- Specify the criteria for the data entered in the field
- Message will displays if data violates set of rules
- **Examples**
  - Validation rule ??? indicates data consist only three characters
  - Validation rule  < >0 indicates that zero cannot be entered

**Validation Text**

- Used to specify message to be displayed to the user when validation rule is violated

# Field Properties (cont.)

**Input Mask**

- It controls the value of records and set it in specific formats
- It displays format on datasheet before data is entered
- Example of phone number can be (048)123-4567
- The blank field will look like (___) ___-____
- It helps user in entering value in specific format

**Caption**

- Used to display a label to field
- It works as an alternate heading of field
- It appears at the top of columns in table datasheet view

**Required**

- It specifies whether field is mandatory or not
- If this is set to **YES**, user has to enter data for the field to save the record
- If this is set to **NO**, the user can leave the field blank

# Field Formats

## Text and Memo

Different formats for text and memo are:

| Symbol | Explanation |
|---|---|
| @ | It indicates a required character or space |
| & | It indicates an optional character or space |
| < | It converts characters to lowercase |
| > | It converts characters to uppercase |
| \ | It adds characters to the end |
| @;"XYZ" | It displays the text inside double quotes if the user enters no value. |

## Examples

| Format | Datasheet Entry | Display |
|---|---|---|
| @@@-@@@@ | 1234567 | 123-4567 |
| @@@-@@@& | 123456 | 123-456 |
| < | HELLO | hello |
| > | Hello | HELLO |
| @\! | Hello | Hello! |
| @;"No Data Entered" | (blank) | No Data Entered |

# Field Formats

## Number

Different formats for text and memo are:

| Format | Explanation |
|---|---|
| 0 | 0 is a placeholder that displays a digit or 0 if there is none. |
| # | # is a placeholder that displays a digit or nothing if there is none. |
| % | % multiplies the number by 100 and added a percent sign |

## Examples

| Format | Datasheet Entry | Display |
|---|---|---|
| ###,##0.00 | 123456.78 | 123,456.78 |
| $###,##0.00 | 0 | $0.00 |
| ###.00% | .123 | 12.3% |

# Field Formats (cont.)

## Currency

- Currency format consists of four parts separated by semicolons
- These formats for positive numbers; negative numbers; zero ; Null values

| Format | Explanation |
|---|---|
| $##0.00;($##0.00)[Red];$0.00;"none" | Positive values will be normal currency format, negative numbers will be red in parentheses, zero is entered for zero values, and "none" will be written for Null values. |

## Yes / NO

- Yes/No fields are displayed as check boxes
- It can be changed to textbox using Lookup tab
- Format is designated in three sections
  - Nothing ; Yes /No ; No

| Format | Explanation |
|---|---|
| ;"Yes"[green];"No"[red] | Prints "Yes" in green or "No" in red |

# Field Formats (cont.)

## Date

- Easiest way to apply a format to select from drop down list
- User can also format the data according to his particular requirements.
- Different formats are as follows

| | |
|---|---|
| General Date | 06/19/94 5:34:23 PM |
| Long Date | June 19, 1994 |
| Medium Date | 19-Jun-94 |
| Short Date | 06/19/94 |
| Long Time | 5:34:23 PM |
| Medium Time | 5:34 PM |
| Short Time | 17:34 |

| Format | Explanation |
|---|---|
| d | It displays 1 or 2 characters for day. Its value can be from 1 to 31. |
| dd | It displays 2 characters for day. Its value can be from 01 to 31 such as 01. |
| m or mm | It displays month as a number. Its value can be from 1 to 12. |
| mmm | It displays month using three characters such as Jan, Feb etc. |
| mmmm | It displays full name of the month such as January, March etc. |
| /- | It displays separator character. |
| h | It displays hours. |
| n | It displays minutes. |
| s | It displayed seconds. |

## Examples

| Format | Display |
|---|---|
| dddd","mmmm d","yyyy | Monday, January 1, 2001 |
| ddd","mmm ". " d", '"yy | Mon, Jan. 1, '01 |
| "Today is " dddd | Today is Monday |
| h:n:s: AM/PM | 12:00:00 AM |

# Input Mask Symbols

- Input mask controls the value of a record and sets it in a specific format
- Similar to Format property but it displays the format on datasheet before data is entered
- A phone number field can be formatted with input mask to accept as "(555) 123-4567"
- The blank field will look like (___) ___-____.
- Following symbols can be used to create an input mask

| Symbol | Explanation |
|---|---|
| A | Letter or digit |
| 0 | A digit 0 to 9 without a + or - sign and with blanks displayed as zeros |
| 9 | Same as 0 with blanks displayed as spaces |
| # | Same as 9 with +/- signs |
| ? | Letter |
| L | Letter A through Z |
| C or & | Character or space |
| < | Convert letters to lower case |
| > | Convert letters to upper case |

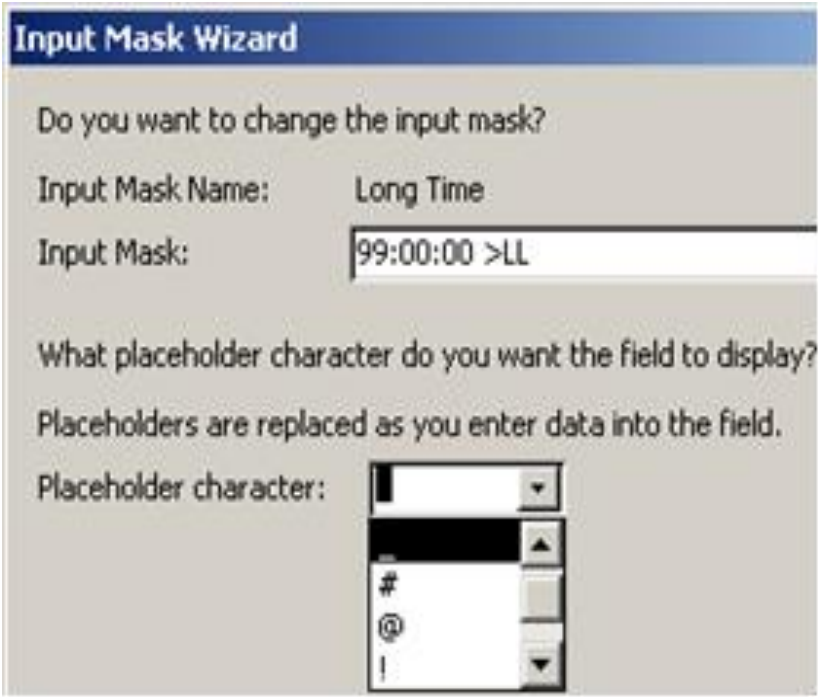
# Input Mask Symbols (cont.)

1. Open the table in design view
2. Place the cursor in the field on which the input mask will be applied
3. Click in white space following input mask under general tab


4. Click "…" button. Input mask wizard will appear

# Input Mask Symbols (cont.)

5. Select the required input mask
6. Click **Next** button



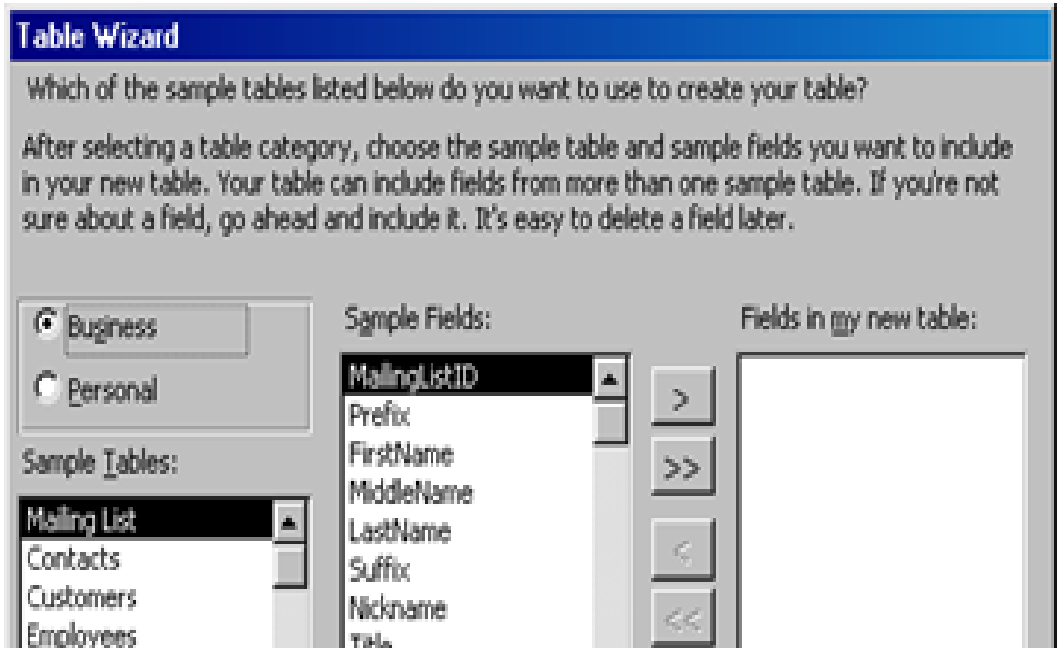

7. Select the required placed holder character
8. Click **Next** button
9. Click **Finish** button

# Creating Table using Wizard

- Provides an easy way to create tables
- Provides various templates to create business and personal tables
- Wizard helps the user to create common types of tables to mange
  - Mailing lists
  - Receipts
  - Video Collection etc.

## Procedure

1. Open Database window
2. Click Tables in object bar
3. Double click **Create table by using wizard**



# Creating Table using Wizard (cont.)

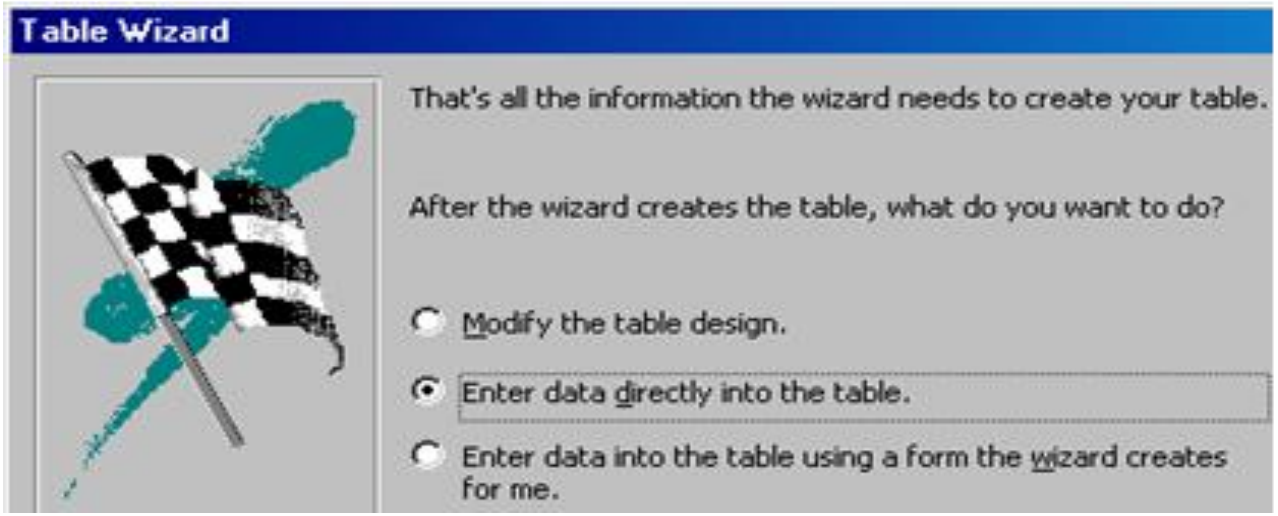
1. Select appropriate category and type of table be created
2. Select appropriate fields for the table.

| Button | Description |
|---|---|
| > | It moves the highlighted field into **Fields in my new table** list box. |
| >> | It moves all fields into the Fields in my new table list box. |
| < | It moves a selected field into the Sample Fields list box. |
| << | It moves all fields into the Sample Fields list box. |

3. Select the field to **rename**
4. Click on **Rename** field button. Rename field dialog box will appear
5. Enter new name of the field and click **OK**
6. Select the appropriate fields and click **Next >**
7. Default name “ first sample table” appear, rename it
8. Wizard also ask to select a **primary key** for table

# Creating Table using Wizard (cont.)

9. Click Next >




10. Create a form to use to enter data
11. Choose option **Entering or Modifying** data
12. Select any option
13. Click **Finish**

# Different Methods of Modifying table

**Adding Record**

- User can add new records to table in datasheet view
- New data is typed in the record that has an asterisk (*) on left side indicates the new record
- User can also click new record button at the bottom of datasheet view to move to the last empty record to add new record

**Editing Records**

- User can edit records by placing the cursor in the record

**Deleting Records**

- Placing cursor in any field of the record to be deleted.
- Select Edit > Delete Record from menu bar

**Inserting and Deleting Fields**

- Highlight column before which column is to be added
- Select **Insert > Column** from the menu bar
- Select the column to be deleted
- Select **Edit > Delete** Column from the menu bar

**Resizing Rows and Columns**

- Height of rows on a datasheet can be changed
- **Format > Row Height**
- Column width can be changed
- **Format > Column width**

# Freezing & Hiding Columns

## Freezing Columns

- User can freeze the columns on an Access Table
- Freezing columns is helpful if datasheet has many columns and some required columns are not visible
- **Procedure to freeze a column**
  - Place the cursor in any record in the column to be freezed
  - Select **Format>Freeze Columns** from the menu bar
- **Procedure to unfreeze a column**
  - Option **Format > Unfreeze** can be used to unfreeze a single column

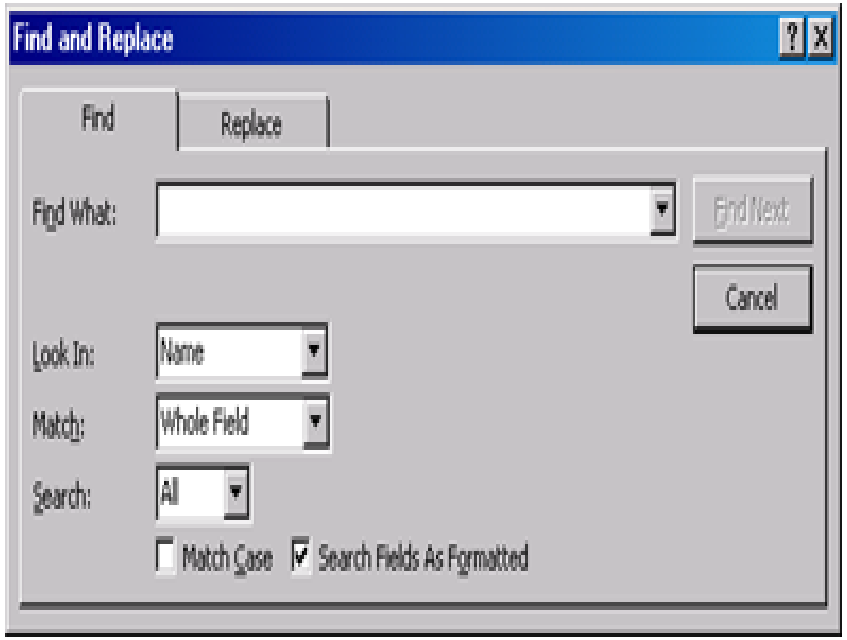
## Hiding columns

- Columns can be hidden from datasheet temporarily
- Hidden columns are not deleted from the database
- **Procedure to hide a column**
- Place the cursor in any record in the column to be hidden
- Select **Format > Hide Column** from the menu bar

# Finding Data

- MS Access provides facility to find the required data easily

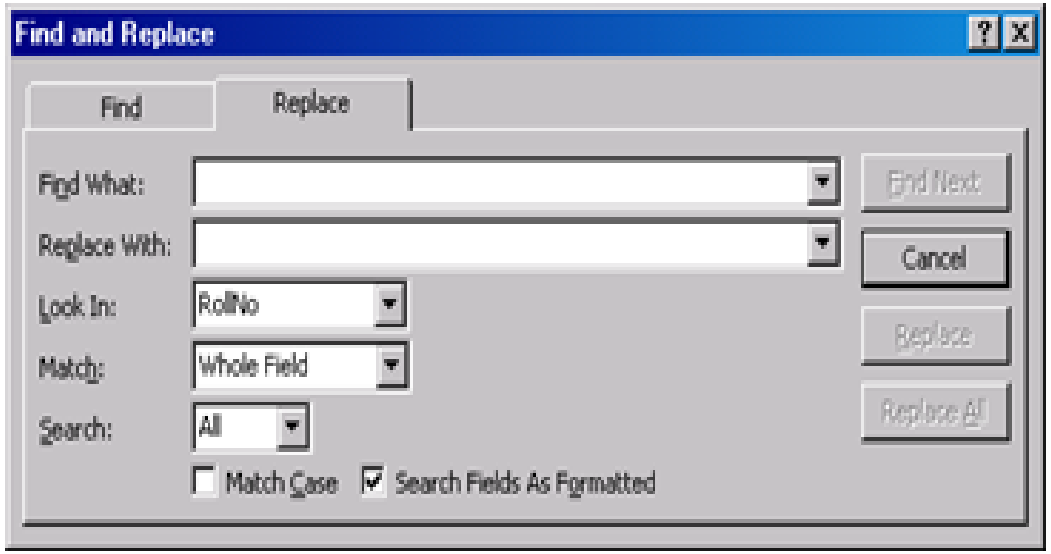
1. Open the table in datasheet view
2. Place the cursor in a field to **find data**
3. Choose **Find** from **Edit** menu
4. Enter the data to find in **Find What** text box
5. Select any option from **Match** list box
6. Click **Find Next** button, the cursor will move to record. If the data is not found, a message will appear showing that the data is not found



# Replacing Data

**MS Access** provides facility to **find and replace** data easily

Following procedure is used for replacing data




1. Open the table in datasheet view
2. Place the cursor in a field to find data
3. Choose **Replace** from **Edit** menu
4. Enter the data to find in **Find What** textbox
5. Select any option from **Match list box**
6. Enter the data to replace in **Replace with** textbox
7. Click **Find** next button
8. Click on the **Replace** button to replace the search string

   OR click on **Replace All** button to replace all matching data

# Option in Find and Replace dialog Box

- **Find and Replace** dialog box is used to find and replace data in tables
- It searches data by using different criteria given by user

## Find What

- Text box is used to enter data that is to be searched
- User can enter any text including alphabetic, numbers and special characters

## Look In

- List box is used to specify area in which search will be performed
- It contains selected field name and table name
- If user select field name, search is done in selected field only
- If user select table name, search is done in the whole fields

## Match case

- Option is used to specify the case sensitive of the search
- If check box is selected, search is case  sensitive
- If checkbox is not selected, the search is not case sensitive

# Option in Find and Replace dialog Box (cont.)

## Match

Match list box is used to specify the way the given data will be matched with the values in the field

Provides three options:

- **Whole Field:** Used to find only those fields that exactly match the search string
- **Any part of field:** Used to find the fields that contain the search string in any part of the field
  - **Example** – If the user enters 12 in Find What text box, it will match any string like 1234,121, 512
- **Start of field:** Used to find the fields that begin with the search string
  - The search string 12 will match 1234,124, 12 but not 312

## Search

This option is used to specify the direction of search. It provides following option

- **Up:** Search from current record and moves to the beginning
- **Down:** Search from current record and moves to the end
- **All:** Search is performed on all records from the beginning to the end

# Spell Cheker and AutoCorrect

Spell checker can be used to indicate spelling errors in text and menu fields in datasheet

Select **Tools > Spellings** from menu bar to activate spell checker

**AutoCorrect**

This feature can automatically correct common spelling errors

- Two initial capital such as HELLO WOrld
- Capitalizing the first letter of the first word of the sentence
- Anything option defined by the user

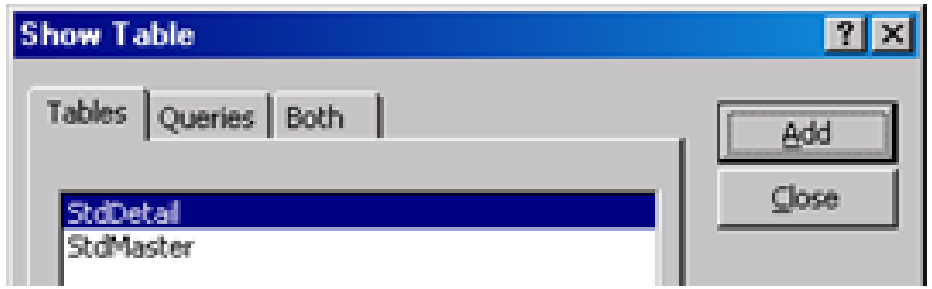
It can be activated from **Tools>Autocorrect** option

# Relationship in MS Access

- Relationship is logical connection between different tables
- A relationship is established on the basis of interaction among these tables
- Relationship is established by connecting one or more fields of two tables
- Fields used to connect two tables normally have same name, data type and size

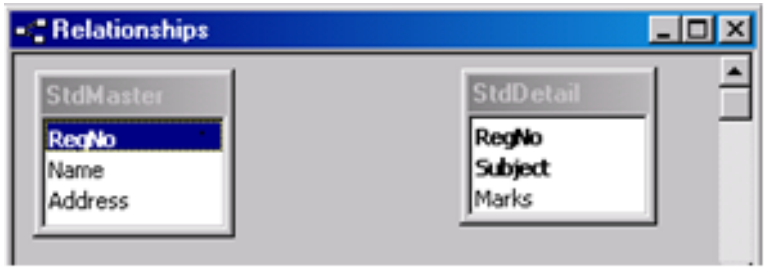
## Defining a Relationship

1. Open the database file
2. Click the **Relationship** icon on the **tool bar**, **Relationship** window will appear

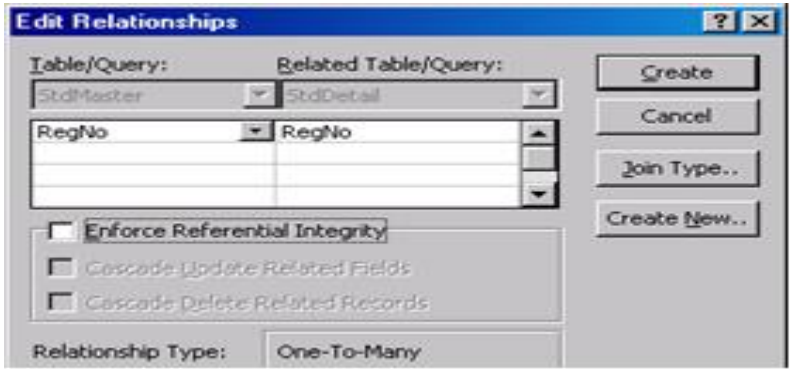


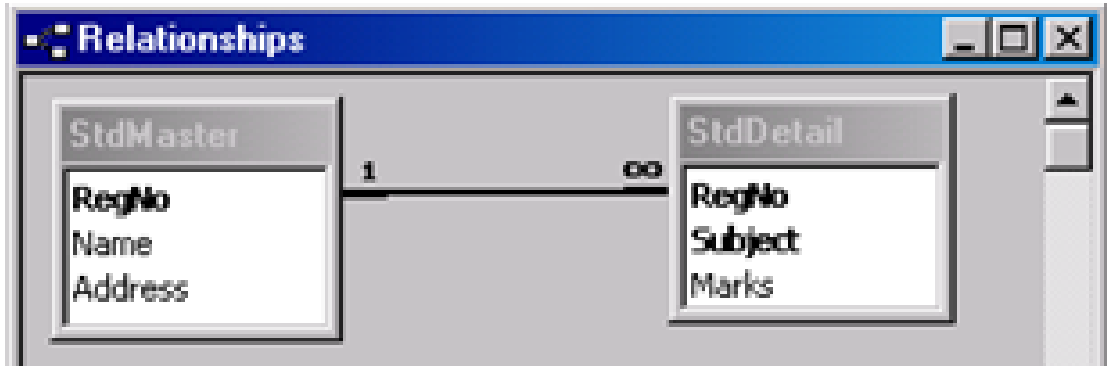

3. Click the name of the table to be added to the relationship
4. Click **Add** button

# Relationship in MS Access (Cont.)




5. Click Close button after adding all required table
6. Click and drag a **primary key** field from one table to the corresponding field in the other table.
7. Release the mouse button. The Edit relationship window will appear
8. Select enforce Referential integrity checkbox




9. Click **create** button. The relationship will be created.

A line between the related field will appear in **Relationship** window

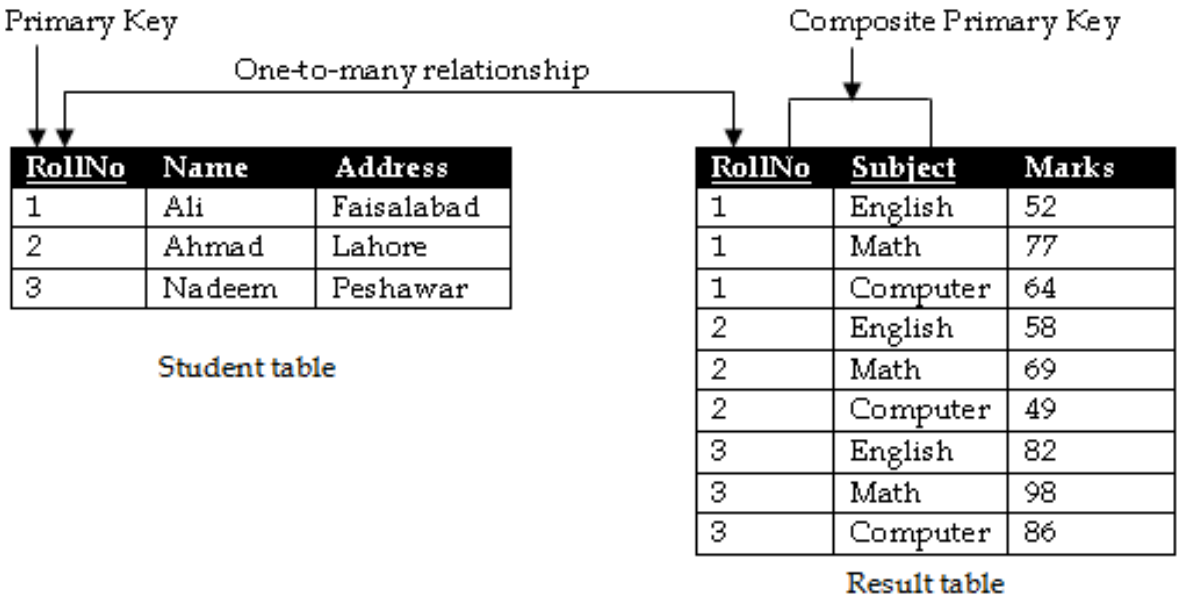
# Referential Integrity

Referential Integrity means that the user cannot enter a value in a foreign key field that does not have a corresponding value in the primary key field of the related table.

## Example

Following figure shows two tables. The master table **student** contains **RollNo**, **Name** and **Address** of students. Child table **Result** contains **RollNo**, **subject** and **marks** of students

Both tables are connected with **RollNo**




| RollNo | Name | Address |
|---|---|---|
| 1 | Ali | Faisalabad |
| 2 | Ahmad | Lahore |
| 3 | Nadeem | Peshawar |

Student table

| RollNo | Subject | Marks |
|---|---|---|
| 1 | English | 52 |
| 1 | Math | 77 |
| 1 | Computer | 64 |
| 2 | English | 58 |
| 2 | Math | 69 |
| 2 | Computer | 49 |
| 3 | English | 82 |
| 3 | Math | 98 |
| 3 | Computer | 86 |

Result table

# Cascade Update and Cascade Delete

## Cascade Update Related Fields

The **Cascade Update Related Field** means that if the value of primary key field of any record is changed in parent table, MS Access automatically updates the corresponding values to the new value in all related records.

### Example

Suppose there are two tables Student and Result. Student is the parent table and Result is the child table. If the record of RollNo 3 is updated in the Student table, all related records of Roll No 3 are automatically updated in Result table.

## Cascade Delete Related Fields

The **Cascade Delete Related Field** means that if a record is deleted from the Parent table, MS Access automatically deletes all corresponding records in the child tables.

### Example

Suppose there are two tables Student and Result. Student is the parent table and Result is the child table. If the record of RollNo 3 is deleted from Student table, all related records of Roll No 3 are automatically deleted from Result table.

# Sorting

- Process of arranging data or records in a sequence is known as sorting
- Data can be sorted in two ways

## Ascending Sort

- The smallest data is placed at first position and largest at last position

## Descending Sort

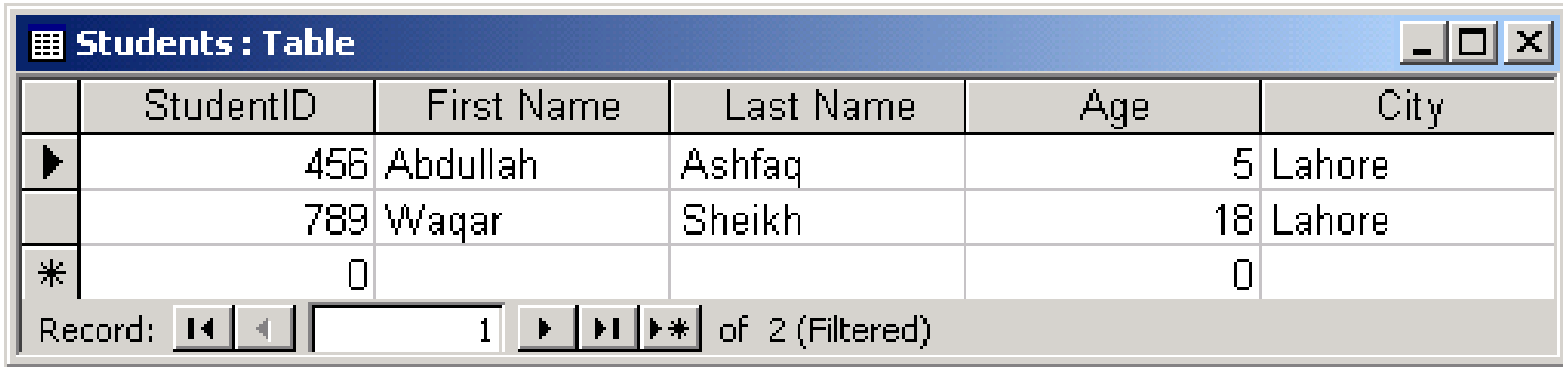
- The largest data is placed at first position and the smallest data is placed at last position
- There are two ways to sort in MS Access
  - Using menu
  - Using toolbar

# Filter

- Filter is used to extract the records that match a set of criteria
- Filters are used with opened tables
- There are two types of filters

## Filters by Selection

- Used to filter  records that contains identical data values in a given field
- Place  the cursor in the field according to which the filter is to be applied
- Click Filter by Selection button on toolbar or select Records > Filter > Filter By Selection fro menu bar



# Filter (Cont.)

## Filter by Form

- Filter by Form is useful if the table is large and it is difficult for the user to find the record that contains the value according to which the filter is to be applied
- This method creates a blank version of the table with drop-down menus
- Each field contains the values found in the records of that field

## Procedure

- Click the field to enter the **filter criteria** under default Look for tab of Filter by Form window
- Click or tab at the bottom of window to specify an alternate criteria if records may contain one of two specified values
- Select **another criteria** from drop-down menu
- Click **Apply Filter** button on toolbar after selecting all criteria to filter

| Filter by Form | |
|---|---|
| **Format** | **Explanation** |
| **Like "*Street"** | Selects all records that end with "Street" |
| **<="G"** | Selects all records that begin with the letters A through G |
| **>1/1/00** | Selects all dates since 1/1/00 |
| **<> 0** | Selects all records not equal to zero |

# Query

- Query is a statement that extracts specific information from database
- A query is created by specifying fields to display from a table or another query
- It can also specify criteria on one or more fields for extracting data
- The queries can select records from one or more tables in a database
- Resulting collection of records is called **dynaset (dynamic subset)**

## Uses of Query

- A query can be used for the following purposes
- Extract records according to the specified criteria
- Choose the fields to display in the result
- Sort the records in a specific order
- Calculate fields and summarize data

# Advantages of Query

**Flexibility**

- Flexible way of manipulating data in databases
- Facility to add, delete, modify & search data easily

**Joining**

- Can be executed against multiple table
- Can join multiple tables for extracting data

**Ease of use**

- Easy to use
- Can execute queries easily to perform different operations on database

# Types of Queries

**Select Queries**

- Extract data from table based on specified criteria
- May retrieve data from one or more tables
- Can be used to group records and calculate sums, Avg type of totals

**Action Queries**

- Used to make changes in specified records on an existing table
- **Delete Query** To delete groups of records from one or more tables
- **Update Query** Make changes to a group of records in one or more tables
- **Append Query** Used to add a group of records from one or more tables to the end of one or more tables
- **Make Table Query** Used to create a new table and copy selected records in it

**Cross Table Queries**

- Used to calculate and restructure data from easier analysis
- Calculates sum, average or other types of computation data

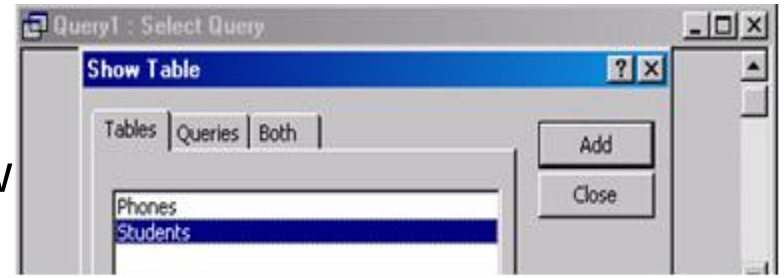
**Parametric Queries**

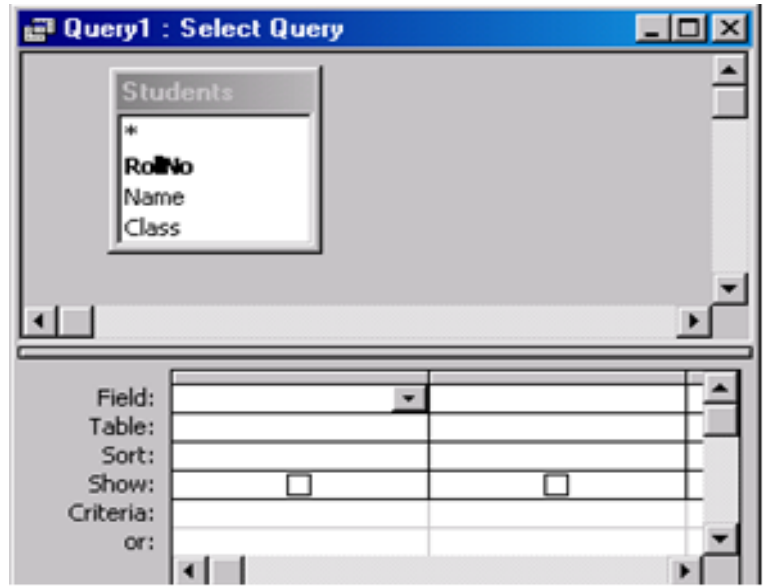
- Displays a dialog box when it is executed
- Gets some information from user as parameter
- These queries are used as basis for creating forms and reports

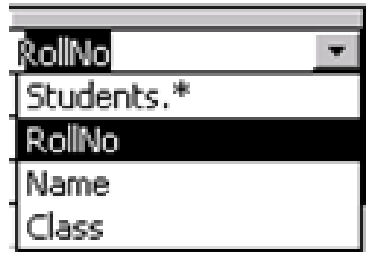
# Creating Simple Query

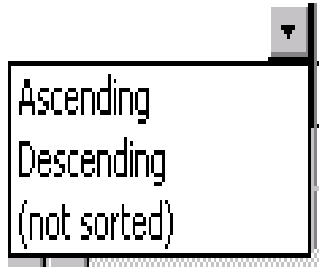
## Procedure

1. Open the database and click on **queries** button in main window
2. Double click **create query** in design view
3. Select the table for extracting data
4. Click **Add** button and then Click **Close** button
5. Select any field from Field list box
6. Add all other fields that are to be included in query
7. Select the sorting order from sort list box
8. Give any condition in **criteria** field if required
9. Click on **Save** button on toolbar to save the query
10. Type the name of query and Click **OK**
11. Select Run from Query menu to execute the query



# Criteria in Query

## Criteria

- A condition used to limit the number of rows extracted from database
- If a query contains any criteria, it retrieves only those records that match with the specified criteria

## Example

- Extract the records only those students who got more than 700 marks
- A query if the user want to view only those students who live in Faisalabad

## Specifying Criteria

- Criteria are specified with the help of wild cards
- Wild cards are special symbols that are used to extract particular records from the database

# Criteria in Query (Cont.)

## Wildcards

Some wildcards are used for specifying criteria are as follows

| Query Wildcards and Expression Operators | |
|---|---|
| **Wildcard / Operator** | **Explanation** |
| ? Street | The question mark wildcard takes the place of a single letter. |
| 43th * | The asterisk wildcard represents a number of characters. |
| <100 | Value less than 100 |
| >=1 | Value greater than or equal to 1 |
| <>"FL" | Not equal to (all states besides Florida) |
| Between 1 and 10 | Numbers between 1 and 10 |
| Is Null<br>Is Not Null | Finds records with no value<br>or all records that have a value |
| Like "a*" | All words beginning with "a" |
| >0 And <=10 | All numbers greater than 0 and less than 10 |
| "Bob" Or "Jane" | Values are Bob or Jane |

# Join & Relationship

- Query that extracts from multiple related table is called **Join**
- Join uses relationship of table for extracting data from tables

## Difference between Join and Relationship

### Relationship

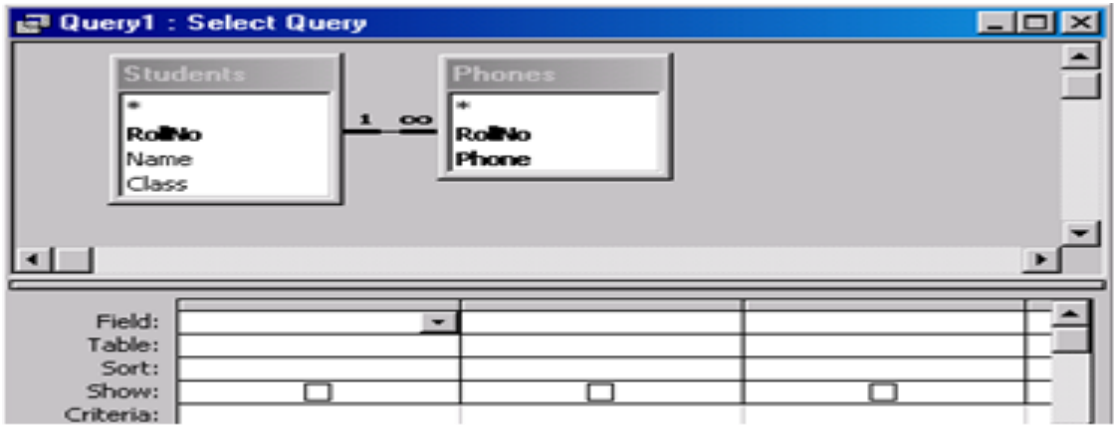
- Relationship is logical connection between different entities
- Relationship is established on the basis of interaction among entities

### Join

- Join is a query that extracts data from multiple related tables
- Join uses the relationship of the tables for extracting data from tables

# Extract Data from Multiple Tables

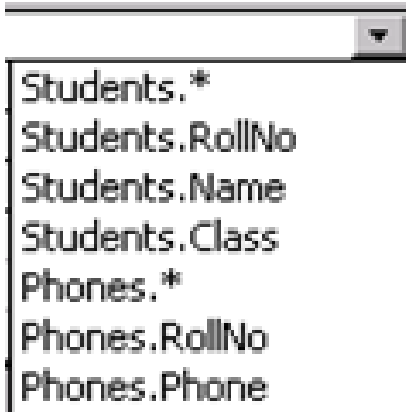
## Procedure

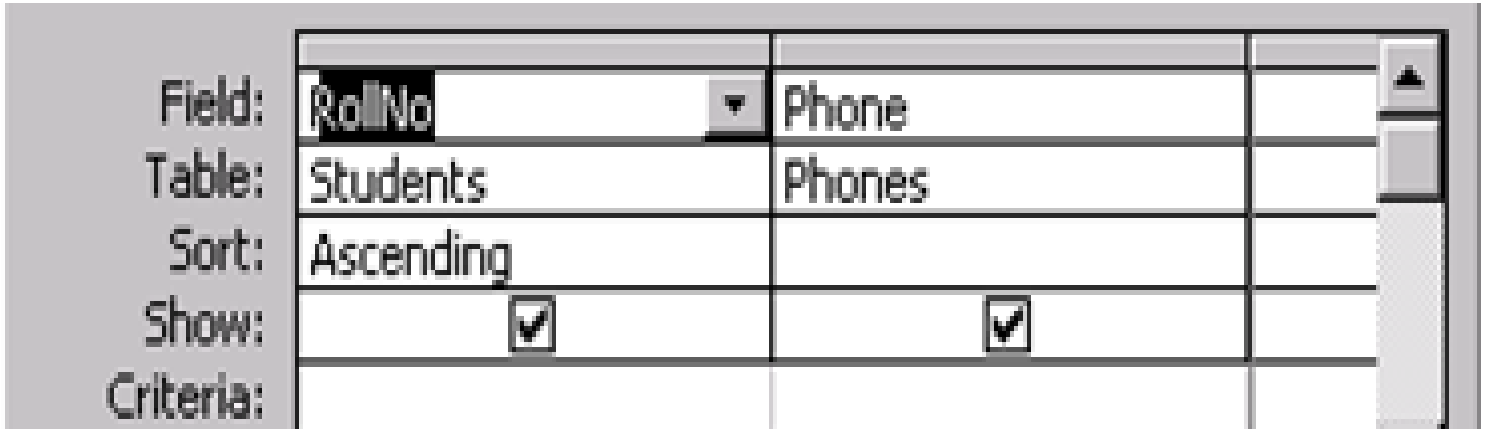



1. Open the **database**
2. Click on **Queries** button in main database window
3. Double click to **create query** in design view
4. Select query window will appear
5. Select the first table for extracting data and click Add button
6. Select the second table and click **Add** button
7. Click **close** button

# Extract Data from Multiple Tables (Cont.)

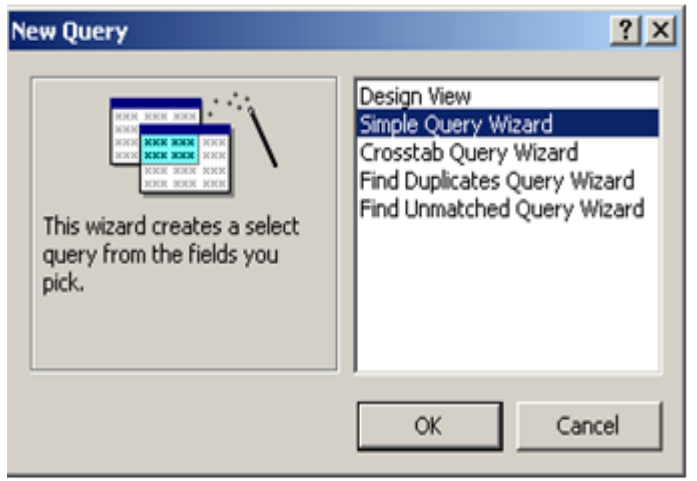
8. In the bottom part of the windows, Select any field from Field list box
9. Field list box will contain the fields both tables
10. Add all other fields that are to be included in query
11. Select the sorting order from Sort list box
12. To save the query and click on **Save**
13. Type the name of query Click **OK**
14. Select **Run** from Query menu to execute the query and view result

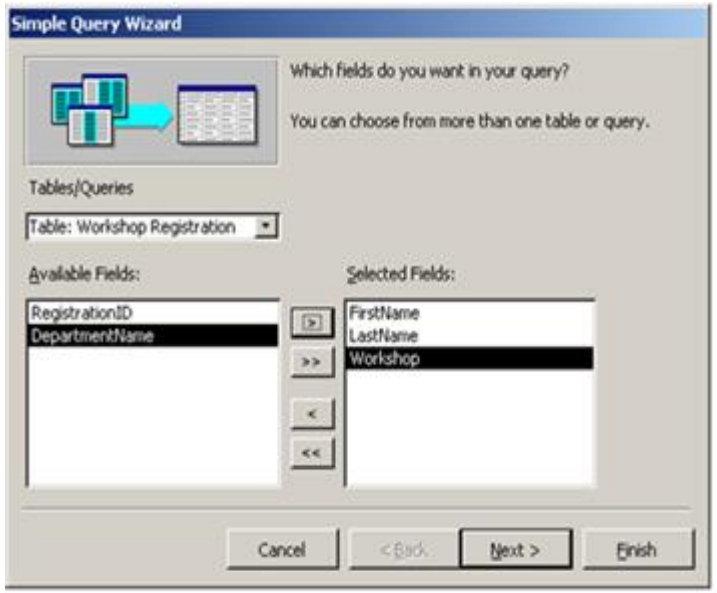


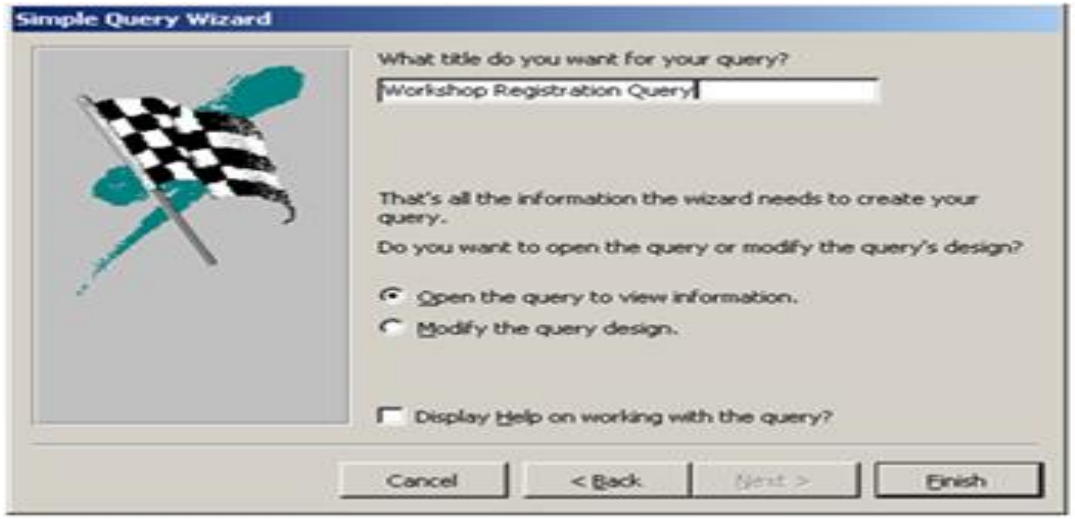



# Query Wizard

1. Open the database and click **Queries**
2. Click **create query** by using wizard icon in database
3. Select simple Query Wizard and click **OK**
4. Select the desired table from Table / Queries menu
5. Select the desired field in Available Field and **click >**
6. Repeat this process to include any fields from other table
7. Click **Next >.** Next windows will appear
8. Enter the name for the query

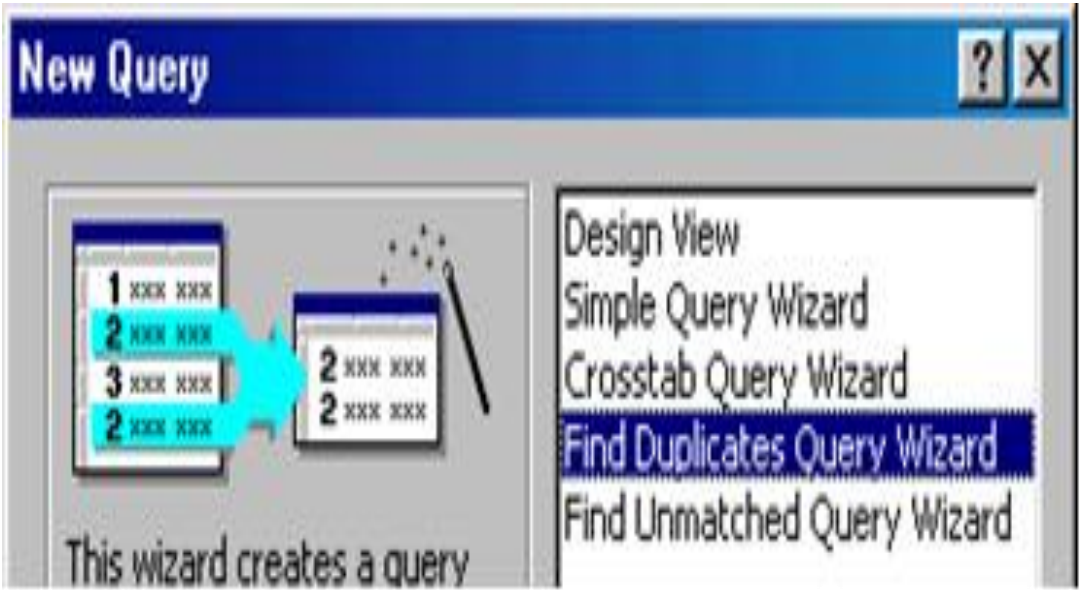


# Find Duplicate Query with Example

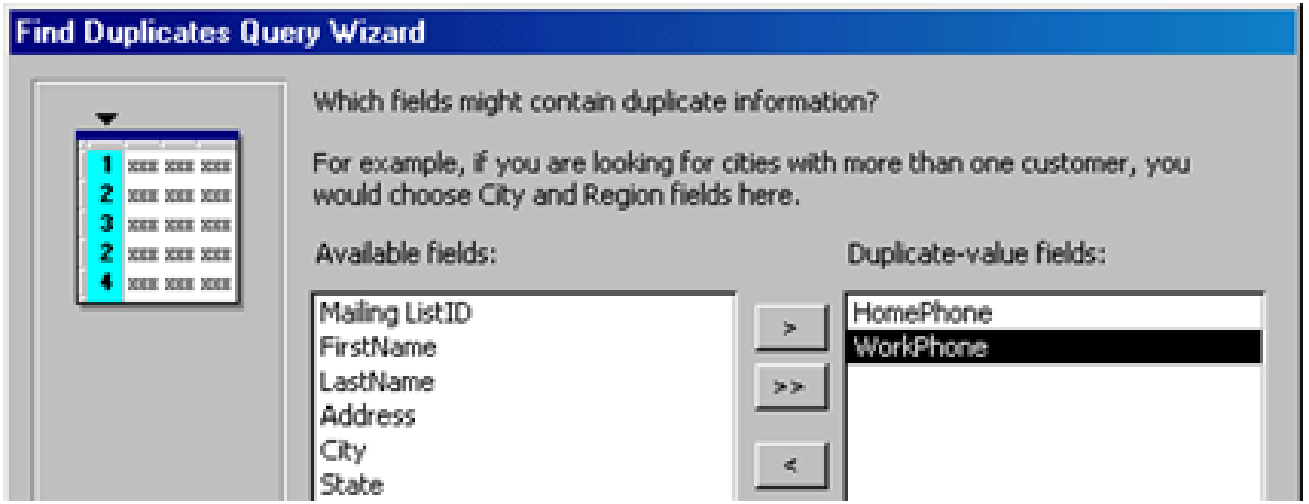
- **Find Duplicates Query** is used to filter out records in a single table that contains duplicate values




**Example**

1. Click **New** Button on Queries database windows
2. Select **Find Duplicates Query** Wizards from New Query window and click **OK**
3. Select table or query on which find duplicate query, apply and click NEXT
4. Highlight names in Available fields list and click > button
5. Selected will move to Duplicate Value Field
6. Click Next > when all fields have been selected

# Find Duplicate Query with Example




6. Select fields that should appear in New query along with the field selected on the previous screen and click **Next >**
7. Name the new query and **Finish**

# Calculations in a Query

- A query can be perform calculation on a group of records
- User can perform calculation by using predefined calculation in MS Access
- It provides the following types of calculation

| | |
|---|---|
| **Group By** | Identifies the group to calculate |
| **um** | Used to add different values |
| **Avg** | Used to calculate average |
| **Min** | Used to find minimum values |
| **Max** | Used to find maximum values |
| **Count** | Used to count number of values |
| **StDev** | Used to calculate the standard deviation of the values |
| **Var** | Used to calculate the variance of the values |
| **First** | Used to find the first field value |
| **Last** | Used to find the last field value |
| **Expression** | Used to create a calculate field through an expression |
| **Where** | Used to indicate criteria for a field not included in the query |

# Thank you!