ALLIED COURSE II

PC PACKAGES II (with practical)

Unit I:

MS Access – Introduction – Parts of Access Window, Creating a Database, Relationships, Creating Table through Design View – Relationship – Query – Forms – reports - macros.

UNIT - I

1. Introduction to Microsoft Access

Microsoft Access is a type of database software that is used to store information for reporting, referencing and analysis. Microsoft Access can analyze large amounts of data faster and more efficiently than with Excel or other types of spreadsheets.

All Ms Access databases files are saved with extension **.mdb**

A database should have a separate table for every major subject, such as *pedigree records*, *Production data* or *Treatment information*. Data should not be duplicated in multiple tables.

Microsoft Access Versions:

Microsoft Access Version	Version No	MS Office version
Access 1.0	1.0	
Access 1.1	1.1	
Access 2.0	2.0	Office 4.3
Access for Windows 95	7.0	Office 95
Access 97	8.0	Office 97
Access 2000	9.0	Office 2000
Access 2002	10.0	Office XP
Access 2003	11.0	Office 2003
Access 2007	12.0	Office 2007
Access 2010	14.0	Office 2010
Access 2013	15.0	Office 2013
Access 2016	16.0	Office 2016
Access 2019	16.0	Office 2019

2. Create a database

Microsoft Access provides three methods to create a database

➤ **Database Wizard**

Though easy, the wizard offers limited options to customize the database

➤ Using a **template**

This method works best if one can find and use a template that closely matches the specific requirements

➤ **Creating a database directly**

This is the most flexible method, but it requires one to define each database element separately.

➤ **A template from Office.com,** The templates that come with Access, you can find many more templates on Office.com.

Adding to a database

Once you are working in a database, you can add fields, tables or application parts. Application parts are a feature that let you use several related database objects together as if they were one.

For example, an application part might consist of a table and a form that is based on the table. You can add the table and the form at the same time by using the application part. You can also create queries, forms, reports, macros - all the database

objects that you are used to working with.

3. Tools of MS Access

Ms Access is a database management tool that enables one to have good command of data collected. The program enables one to **retrieve, sort, summarize and report** results speedily and effectively. It can combine data from various files through creating relationships, and can make data entry more efficient and accurate.

Microsoft Access enables one to manage all important information from a single database file. Tools are,

• **Tables** to store your data.

• **Queries** to find and retrieve specific data of interest.

• **Forms** to view, add, and update data in tables.

• **Reports** to analyze or print data in a specific layout.

• **Data access pages** to view or update, the data.

In MS Access, data is stored once in one table, but can be viewed from multiple locations. When the data is updated in a Table, Query or Form, it is automatically updated everywhere it appears

Access is most popular for its tables, forms and queries. The database tables are similar to spreadsheets, so you shouldn't have much trouble using the basic functions of the program.

4. Creating a table

Tables are the *data storage facilities* in Ms Access. Each table contains **rows called records** and columns called fields.

A record is a collection of facts about a particular event. Each record in a table should be unique. To distinguish one record from another, tables can contain a **primary key** field.

A field is a single kind of fact that may apply to each event. For example, date of birth is a field in table information. The fields in a database have **settings** that determine the - type of data they can store, - how the data is displayed, - what can be done with the data.

The fields in a database have **settings** that determine the

> ➢ type of data they can store,
> ➢ how the data is displayed,
> ➢ What can be done with the data.

One important setting for fields is the **data type**, which could be *a number, text, currency, and date/time*. The data type limits and describes the kind of information in the field. The data type also determines the actions one can perform on a field and how much memory the data will use.

Fields also have **properties** that control the details of information inside them, including a *character length, a default value, and a validation rule* that makes sure the data meets certain criteria.

Tables may be created by three ways:

> ➢ Table wizard,
> ➢ Design view
> ➢ Entering data in a spreadsheet.

Creating Tables using design view

Creation of a table by design view is *a user customized way* of making data storage tables. Each field in the design view of a table corresponds to a column in the datasheet view of a table.

Designing a table involves:

1. *Field name*
2. **Data type**
3. **Field properties**

➤ Entering unique names of the columns of the table in the "***field name"*** column of the design view. Names of fields and objects in Microsoft Access can be up to 64 characters long. They ***can include*** any combination of letters, numbers, spaces, and special characters except a period (.), an exclamation point (!), an accent grave (`), and brackets ([ ]). They also can't begin with leading spaces.

➤ In the **Data Type** column, declare the type of data that will be entered in that column. The default is

Text; or click in the **Data Type** column, click the arrow, and select the data type.

➤ In the lower portion of the window **Field properties,** can be further specified.

Create a Table, Starting in Design View

In Design view, you first create the table structure. You then switch to Datasheet view to enter data, or enter data by using some other method, such as pasting, or importing.

I. On the **Create** tab, in the **Tables** group, click **Table Design**.

II. For each field in your table, type a name in the **Field Name** column, and then select a data type from the **Data Type** list.

III. If you want, you can type a description for each field in the **Description** column.

IV. After you have added all of your fields, save the table: On the **File** tab, click **Save**.

V. You can begin typing data in the table at any time by switching to Datasheet view and clicking in the first empty cell.

Set Field Properties in Design View

Some properties are available in Datasheet view; some properties can only be set in Design view. To switch to Design view, right-click the table in the Navigation Pane and then click **Design View**. To see a field's properties, click the field in the design grid. The properties are displayed below the design grid, under **Field Properties**.

Design View can make it easier to set up a table. It provides a different view of the table to Datasheet View, and is typically used to configure the table.

You can use Design View to create a tables, set up data types for each field, specify default values, specify how data should be entered and displayed, and more.
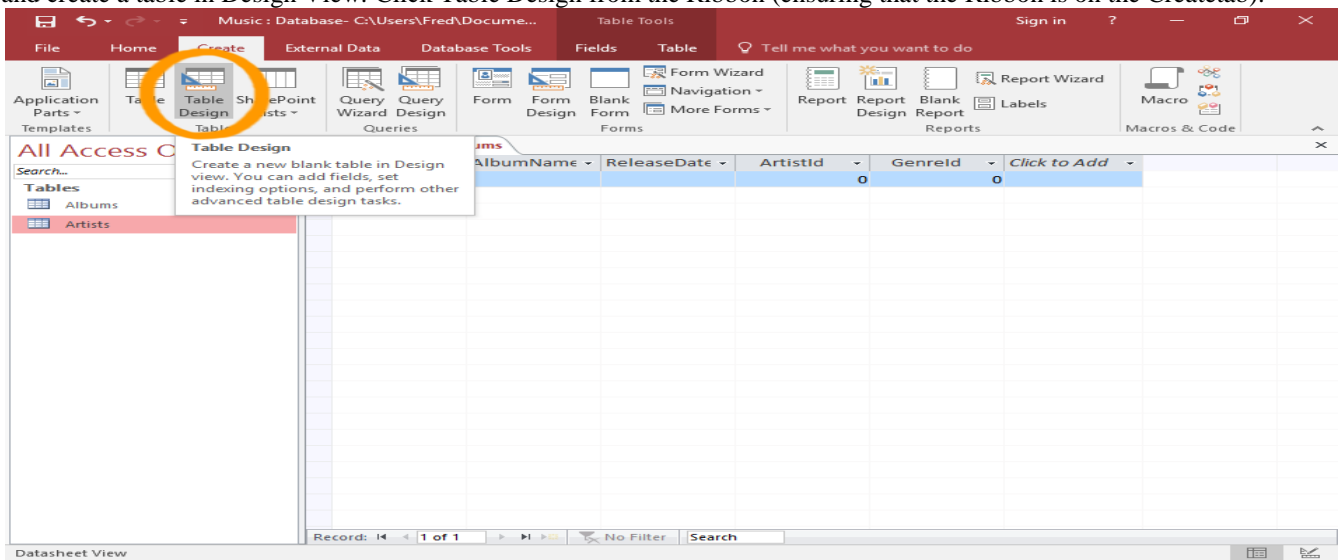
Design View

I. Design View doesn't display any data. Therefore, there's more space available to display other settings.

II. In Design View, the fields are listed vertically. They are listed above and below each other as opposed to side-by-side.

III. In Design View, you can see the data type listed next to each field.

IV. The way Design View works is, when you click on a field (in the top frame), the bottom frame displays the properties for that field. You can then change these properties as required.

V. We will now use Design View to do two things:

VI. Create a new table

VII. Set field properties for our existing table
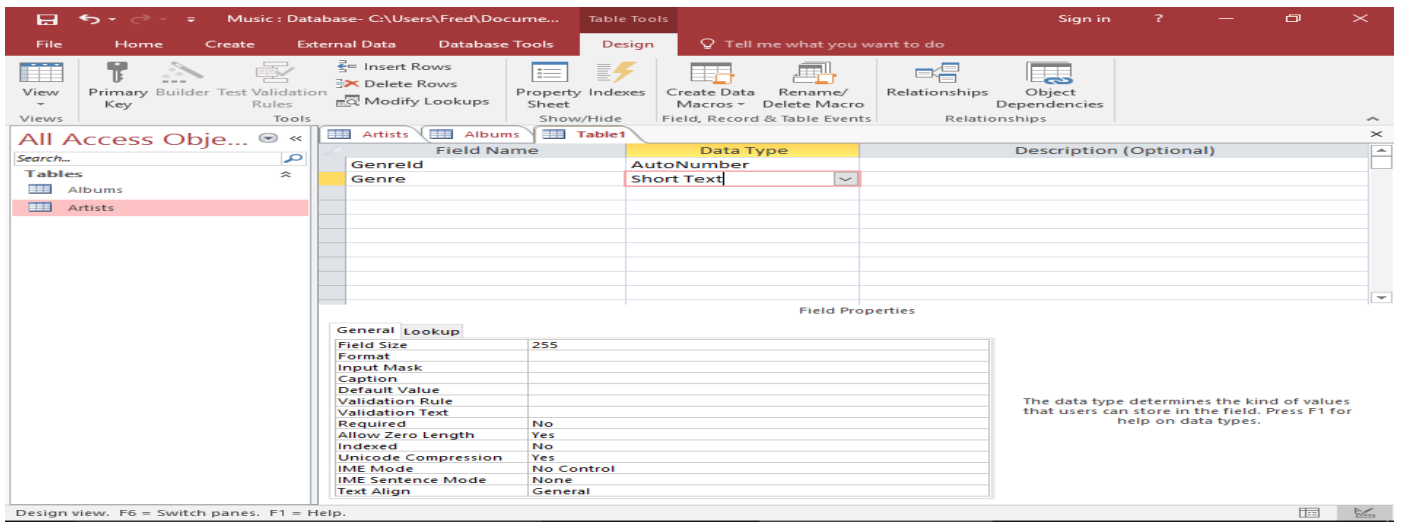
Create a new Table in Design View

So now that we've established that Design View and Datasheet View are just two ways of looking at the same table, let's go ahead and create a table in Design View. Click Table Design from the Ribbon (ensuring that the Ribbon is on the Createtab).
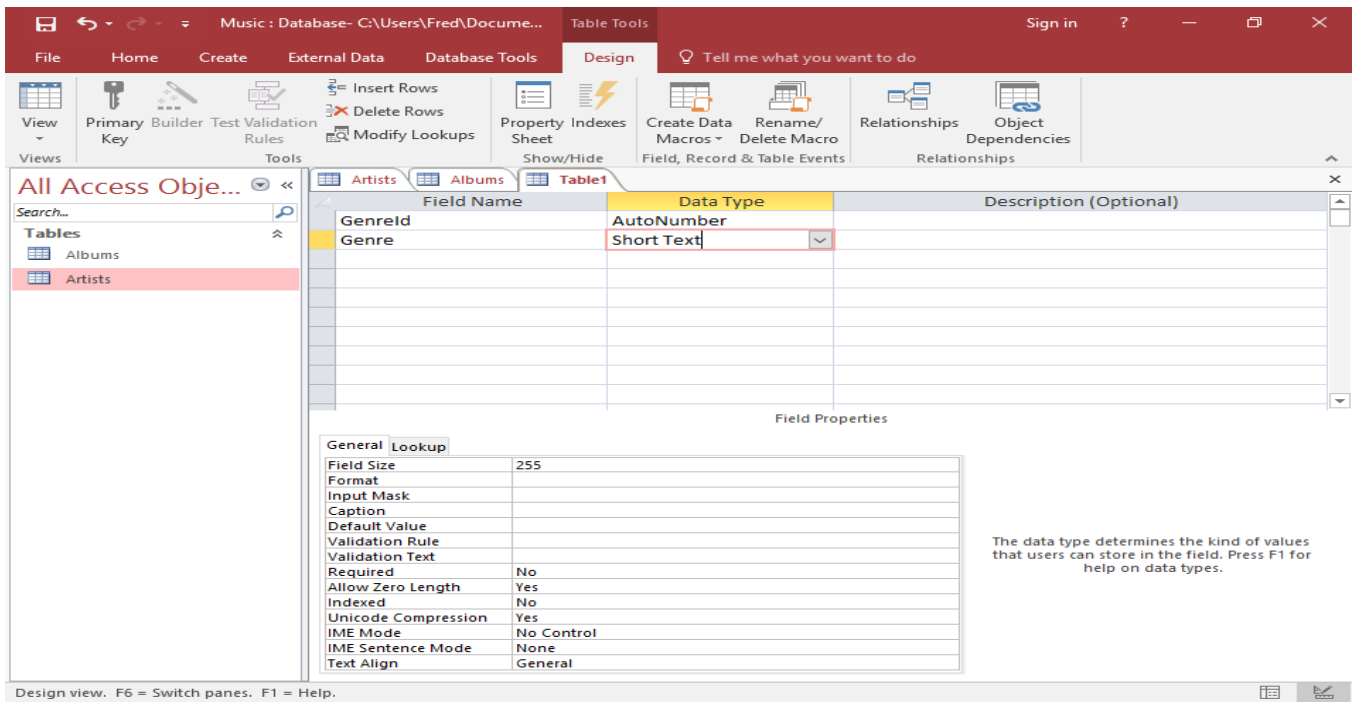

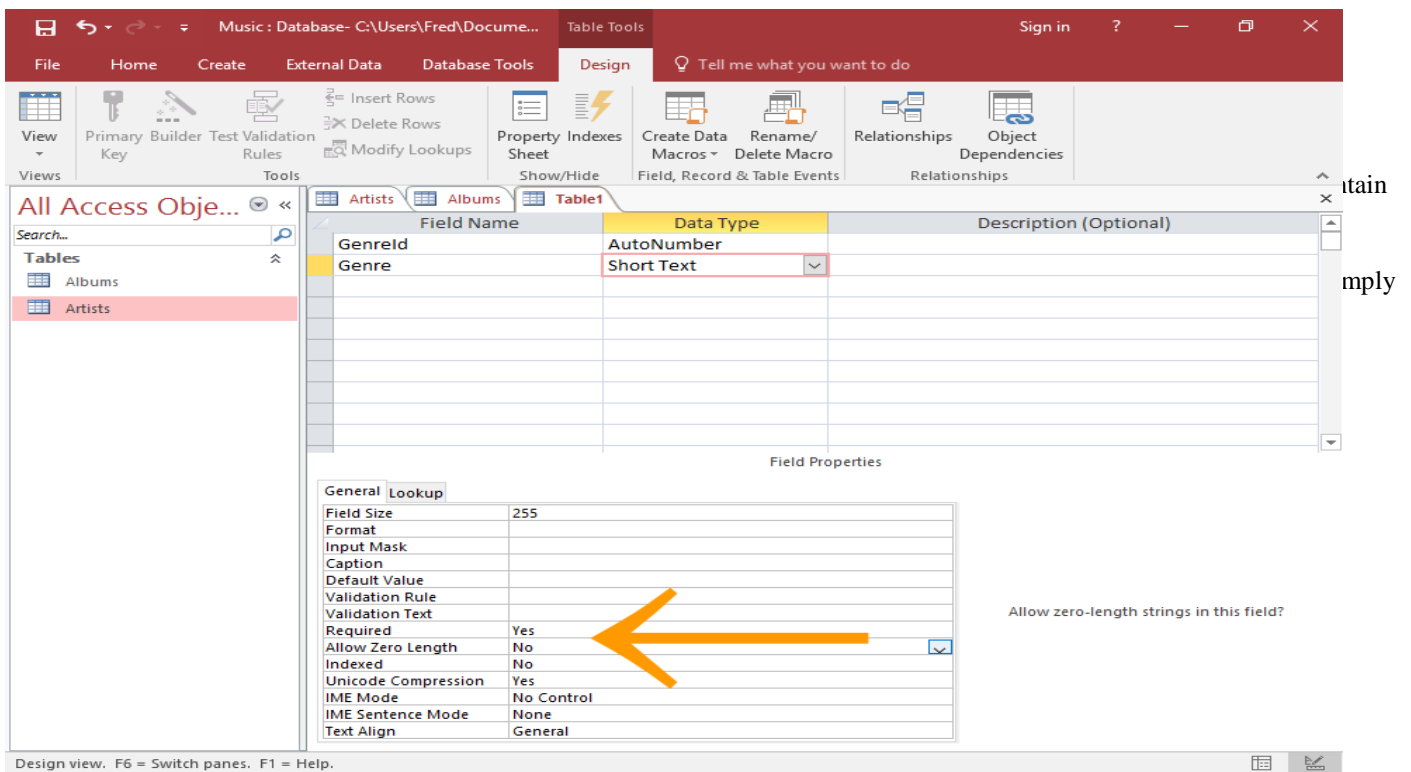A blank table called Table1 will be displayed in Design View.
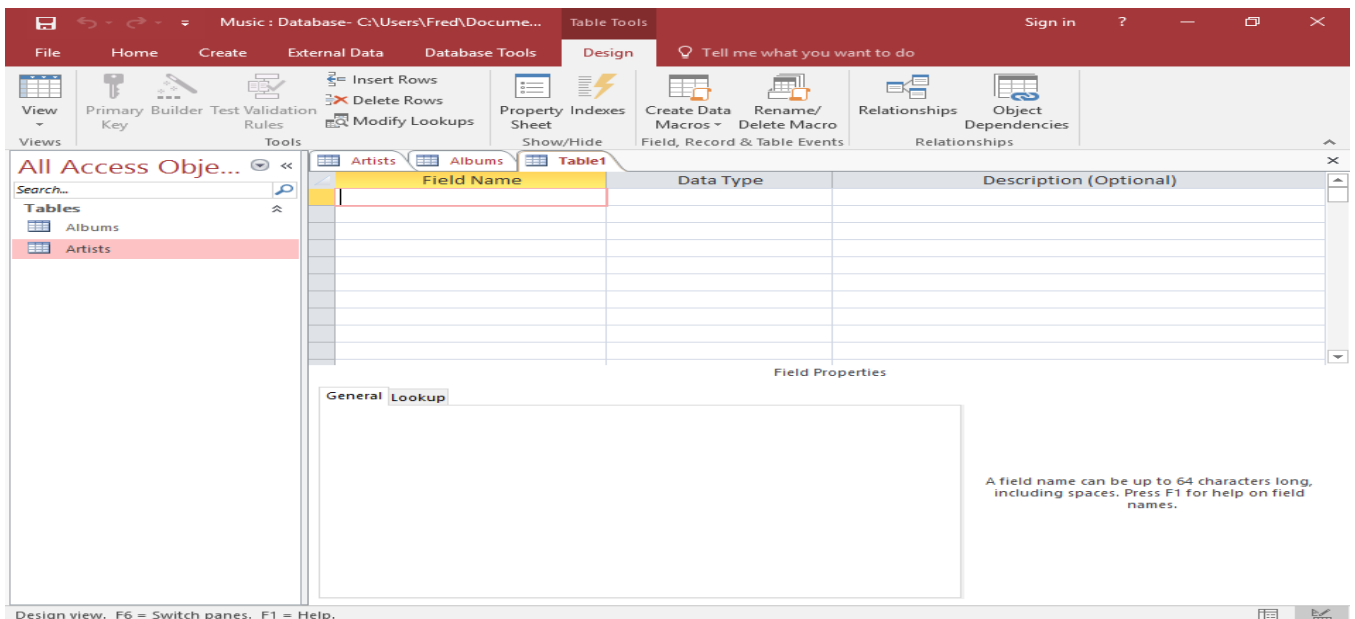
Add Fields to the Table

❖ Now we will enter each field and select their data type.

❖ In the first cell under Field Name add a field called GenreId. Select Autonumber as its data type.

❖ Under that field, create a new one called Genre and select Short Text for its data type.

**Change the Genre Field Properties**

Set a Primary Key

➢ Right-click on the GenreId field and select Primary Key from the drop down list.

➢ This makes the field a primary key field. Once you've done this, you'll see a little key icon to the left of GenreId.

➢ A primary key is the unique identifier for the table. Each value in this field will be unique — no two records in the table can have the same value in the primary key field.

➢ This is why we set it to Autonumber. Access will automatically generate a number each time a new record is created.
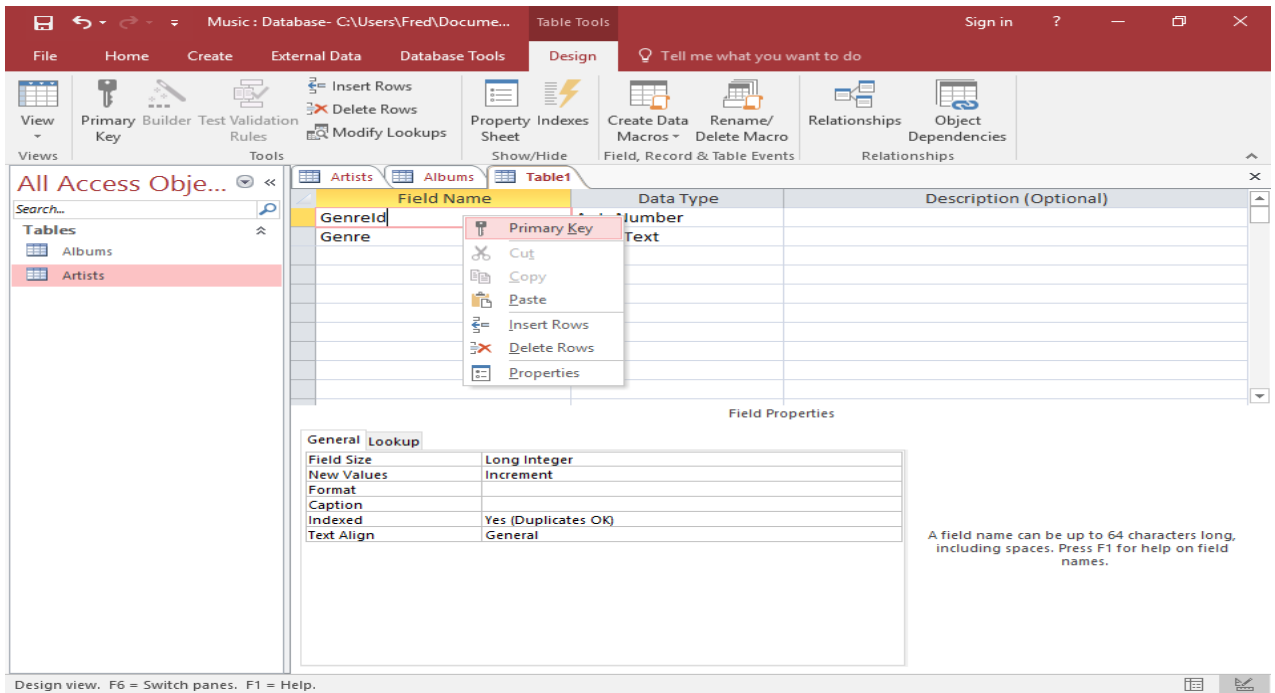
Note that a **table can only have one primary key.**

Save the Table

Right-click on the Table1 tab and select Save from the drop down list.
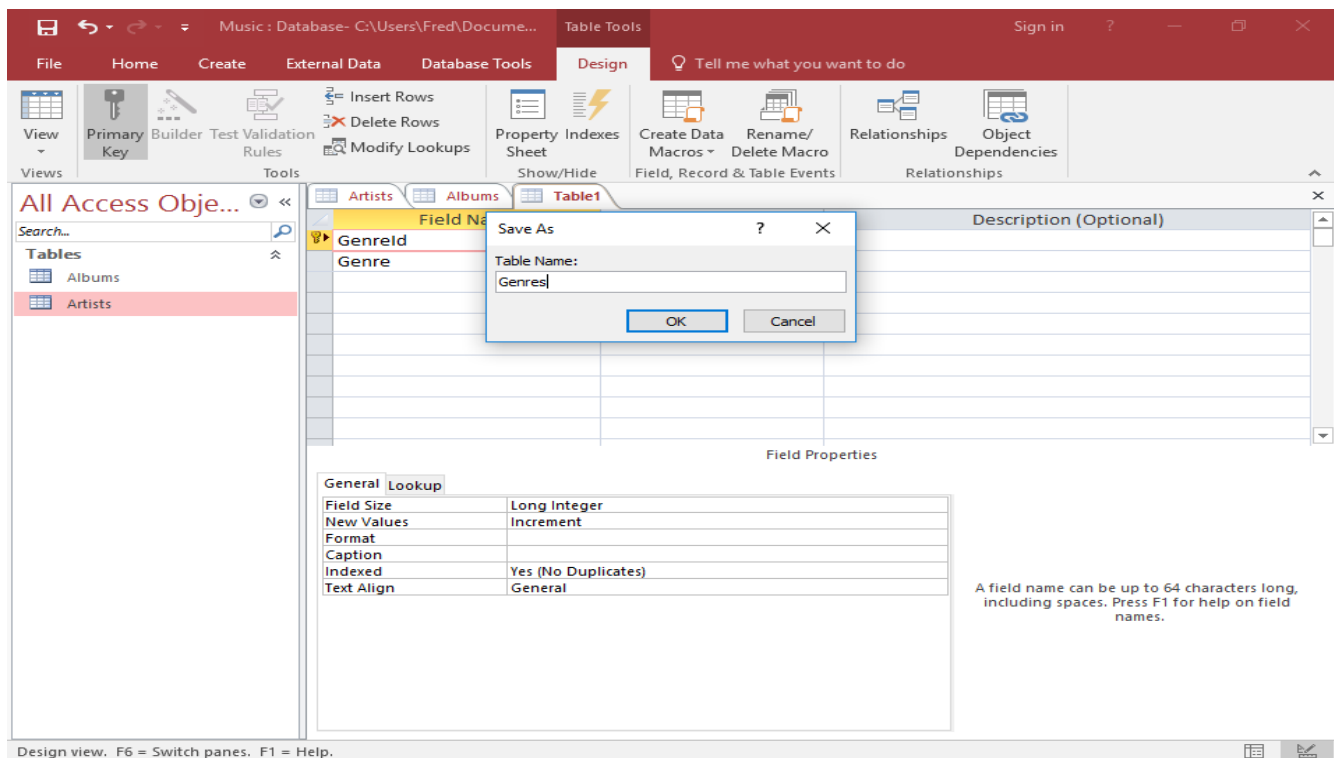
5. MS Access Datatypes:

MS Access common data types are listed below:

Type of Data	Description	Size
Short Text	Text, including numbers which does not need calculation. (e.g., Mobile numbers).	Up to 255 characters.
Long Text	This data type is used for lengthy text or alphanumeric data.	Maximum 63, 999 characters.
Number	Numeric data type used for storing mathematical calculations.	1, 2, 4, 8, and 16 bytes.
Date/Time	Store Date/time for the years 100 through 9999.	8 bytes.
Currency	It allows you to store currency values and numeric data with one to four decimal places.	8 bytes.
Auto Number	Assign a unique number or assigned by Microsoft Access when any new record is created. Usually used as the primary key	Four bytes (16 bytes if it is set as a Replication ID).
Yes/No	It only stores logical values Yes and No.	1 bit
Attachment	It stores files, such as digital photos. Multiple files can be attached per record.	Up to 2 GB Data can be stored.
OLE objects	OLE objects can store audio, video, other Binary Large Objects.	Up to 2 GB data can be stored.
Hyperlink	Text or combinations of text and numbers stored. That text is used as hyperlink address.	Each part of a Hyperlink data type allows you to store a maximum 2048 characters.
Calculated	Helps you to create an expression that uses data from one or more fields.	You can create an expression which uses data from one or more fields.

2. Application of Microsoft Access:

- Maintain all information for each client or customer, including addresses, invoices, payment and order information.
- Track financial data without needing a separate software program. If you have the full Microsoft Office Suite, you may even set payment reminders.
- Manage marketing and sales and Send out flyers, emails and coupons and track how customers respond.
- Track production and inventory by entering data on shipments and also knowing when it's time to order more of a particular product.
- Run reports and analyses using the reports and charts. You can basically run a report on anything within a matter of minutes, such as customers who are behind on payment.

7. Disadvantages of MS-ACCESS

Here, are the disadvantages for using MS Access

- Microsoft Access is useful for small-to-medium business sectors. However, it is not useful for large-sized organizations
- Lacks robustness compared to DBMS systems like MS SQL Server or Oracle

- All the information from your database is saved into one file. This can slow down reports, queries, and forms

- Technical limit is 255 concurrent users. However, the real-world limit is only 10 to 80

- It requires a lot more learning and training compares with other Microsoft programs

8. THE MAIN ACCESS WINDOW

When you open Microsoft Access, many items you see are standard in most Microsoft software programs like Word, Excel, and PowerPoint.
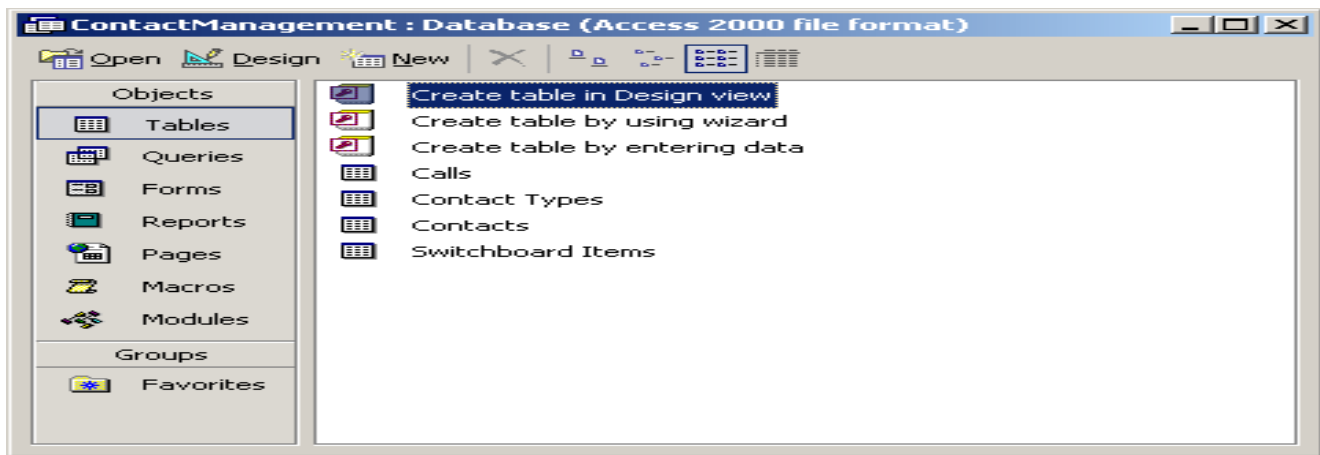
MENU BAR



The menu bar displays all menus available for use in Access. The contents of any menu can be displayed by double-clicking the menu.

TOOL BAR

The pictured buttons in the toolbar are quick and easy shortcuts to specific actions. For example, if you want to save a spreadsheet using the menus, you would click **File** and then **Save**. Using the toolbar to perform this save operation actually saves you a click. Click the **Save** button once to save the spreadsheet.

Some commands in the menus have pictures or icons associated with them. These pictures may also appear as shortcuts in the toolbar.
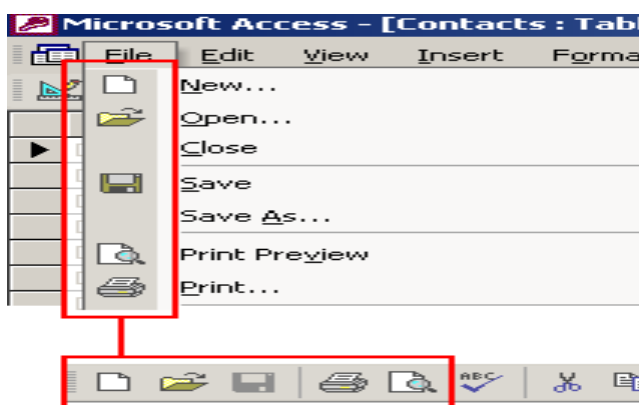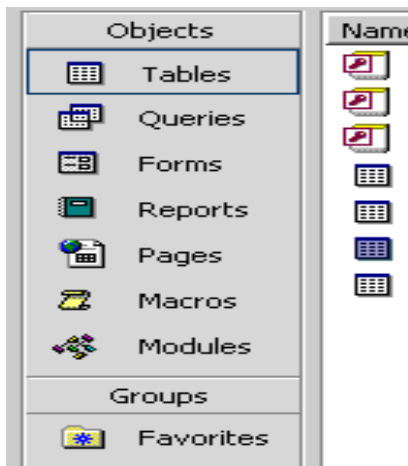

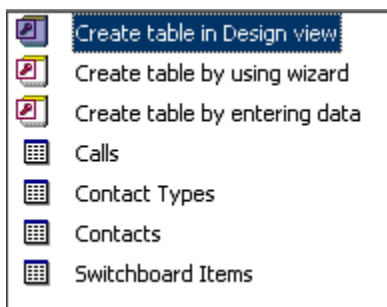**The database window - Database toolbar**

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The database toolbar presents operations that can be performed against different database objects, including buttons to open, design, delete, and create a new object.

Left pane

Database objects are created and opened by choosing any of the buttons listed in the left pane of the database window.

Right pane

Any of the first four options—tables, queries, forms, and reports—open additional choices related to the selection in the right pane.

Choosing the **Tables** button, for example, displays at least three options in the right pane: **Create table in Design view**, **Create table by using wizard**, and **Create table by entering data**. It also shows any objects you created in the database.

9. Relationship

A relationship helps you combine data from two different tables. In an Access desktop database, you can create a relationship in the **Relationships** window.

CREATE A RELATIONSHIP IN AN ACCESS DESKTOP DATABASE

On the **Database Tools** tab, in the **Relationships** group, click **Relationships**.
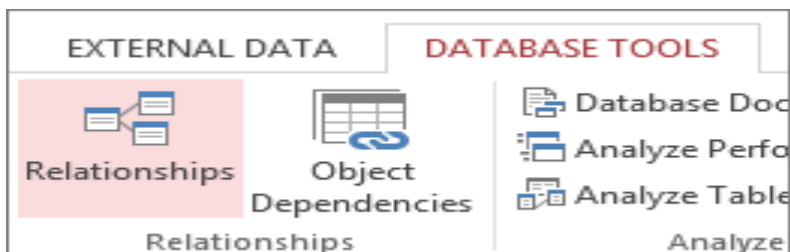

If you haven't yet defined any relationships, the **Show Table** dialog box automatically appears. If it doesn't appear, on the **Design** tab, in the **Relationships** group, click **Show Table**.

The **Show Table** dialog box displays all of the tables and queries in the database. To see only tables, click **Tables**. Select one or more tables, and then click **Add**. After you have finished adding tables, click **Close**.

Drag a field (typically the primary key) from one table to the common field (the foreign key) in the other table. To drag multiple fields, press the Ctrl key, click each field, and then drag them.

The **Edit Relationships** dialog box appears.
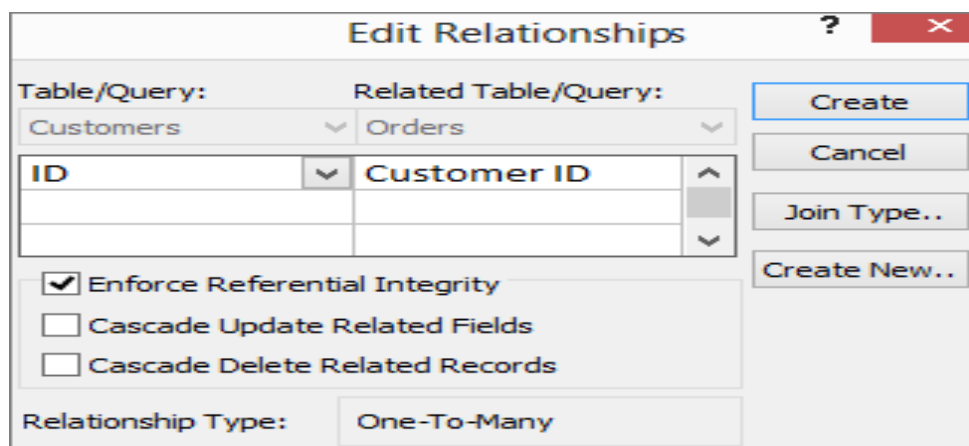
Verify that the field names shown are the common fields for the relationship. If a field name is incorrect, click on the field name and select the appropriate field from the list.

To enforce referential integrity for this relationship, select the **Enforce Referential Integrity** box. Click **Create**. When you are finished in the Relationships window, click **Save** to save your relationship layout changes.

Access draws a relationship line between the two tables. If you selected the **Enforce Referential Integrity** check box, the line appears thicker at each end. In addition, again only if you selected the **Enforce Referential Integrity** check box, the number **1** appears over the thick portion on one side of the relationship line, and the infinity symbol (∞) appears over the thick portion on the on the other side of the line.

To create a one-to-one relationship Both of the common fields (typically the primary key and foreign key fields) must have a unique index. This means that the Indexed property for these fields should be set to Yes (No Duplicates). If both fields have a unique index, Access creates a one-to-one relationship.

To create a one-to-many relationship The field on the one side (typically the primary key) of the relationship must have a unique index. This means that the Indexed property for this field should be set to Yes (No Duplicates). The field on the many side should *not* have a unique index. It can have an index, but it must allow duplicates. This means that the Indexed property for this field should be set to either No or Yes (Duplicates OK). When one field has a unique index, and the other does not, Access creates a one-to-many relationship.

10. QUERIES

A **query** is a derived item in the database meant to answer specific questions that relate to the information in the database. Queries are handy during data processing. To *find and retrieve just the data that meets conditions* that you specify, including data from multiple tables, **create a query**.

A query can also update or delete multiple records at the same time, and perform predefined or custom calculations on your data. **A query requests data from the database**. At its simplest, a query merely fetches all data from a single table.

Queries can also be used to execute mathematical and logical functions to obtain certain information in the database. Queries are **derived from and linked to tables or other queries**.

There are various types of queries for different uses:

❖ **Select queries**- used for extracting specific information from a large multi-information table.

They can also be helpful in merging related information from different tables.

❖ **Make-Table queries-** used for making sub tables from the main table(s) and queries.

❖ **Update queries**- important in adding information in the fields of a Table.

❖ **Append queries**- used to copy records from one table/ query to another.

❖ **Delete query-** to **PERMANENTLY** remove unwanted content from the table.

Queries allow you to "search the database". Query allows you to specify exactly which fields you want returned, and from which tables.

A query is a request for data results, and for action on data. You can use a query to answer a simple question, to perform calculations, to combine data from different tables, or even to add, change, or delete table data.

As tables grow in size they can have hundreds of thousands of records, which makes it impossible for the user to pick out specific records from that table. With a query you can apply a filter to the table's data, so that you only get the information that you want.

Queries that you use to retrieve data from a table or to make calculations are called select queries. Queries that add, change, or delete data are called action queries. You can also use a query to supply data for a form or report.

In a well-designed database, the data that you want to present by using a form or report is often located in several different tables. The tricky part of queries is that you must understand how to construct one before you can actually use them.

Create Select Query

If you want to review data from only certain fields in a table, or review data from multiple tables simultaneously or maybe just see the database on certain criteria, you can use the **Select** query. A simple example in which we will create a simple query which will retrieve information from **tblEmployees** table. Open the database and click on the **Create** tab.

11. CREATE A FORM

Creating data entry forms

A **form** is a type of a database object that is primarily used to enter or display data in a database. Most forms are bound to one or more **tables** and **queries** in the database. A form's record source refers to the *fields in the underlying tables and queries*.

A form:

❖ Focuses on one record at a time

❖ Can display fields from more than one table

❖ Can also display pictures and other objects

❖ Can contain a button that prints, opens other objects, or otherwise automates tasks Data entry forms can be created either using a form wizard or in the design view. Once a table with fields is available, it is *easy to create a form using the wizard*:

➢ Click on the forms tab

➢ Double click on the create form by using a wizard.

➢ This will lead you through a series of steps until you finish creating the form.

The form created is linked to the table and information entered in the fields of the form is stored in the table. A form

need not contain all the fields from each of the tables or queries that it is based on.

When you open a form, Microsoft Access **retrieves the data from one or more tables**, and displays it on the screen with the chosen layout in the Form Wizard, or with the layout that you created on your own in design view.

Now let's create a form. We'll make it a form that enables users to enter new customers. So when a user enters data into the form, that data will be inserted into the Customers table.

Access makes it easy to create forms like this. If you select a table or query, Access will automatically create a form based on the selected object. So to create a form based on the Customers table, all you need to do is select that table before creating the form.

So, ensuring that the Customers table is selected (in the left navigation frame), click the Form button from the CREATE tab on the Ribbon:
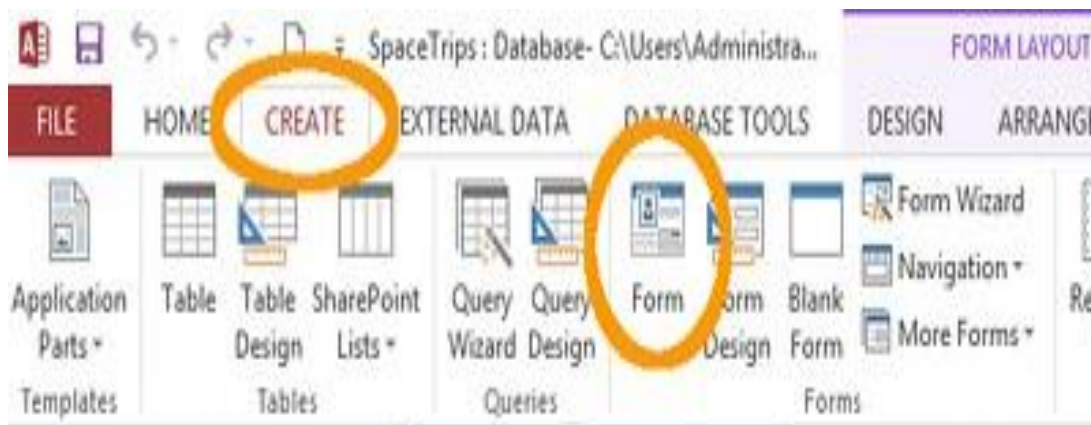
The "Form" button on the Ribbon – under the "CREATE" tab. Clicking this button will create a form based on the selected table or query.

This creates a form based on the selected object (in this case, the Customers table). The Form in Layout View

The form is initially displayed in Layout view. Layout view allows you to set up your form while it is populated with real data. You can even enter data while in this view:
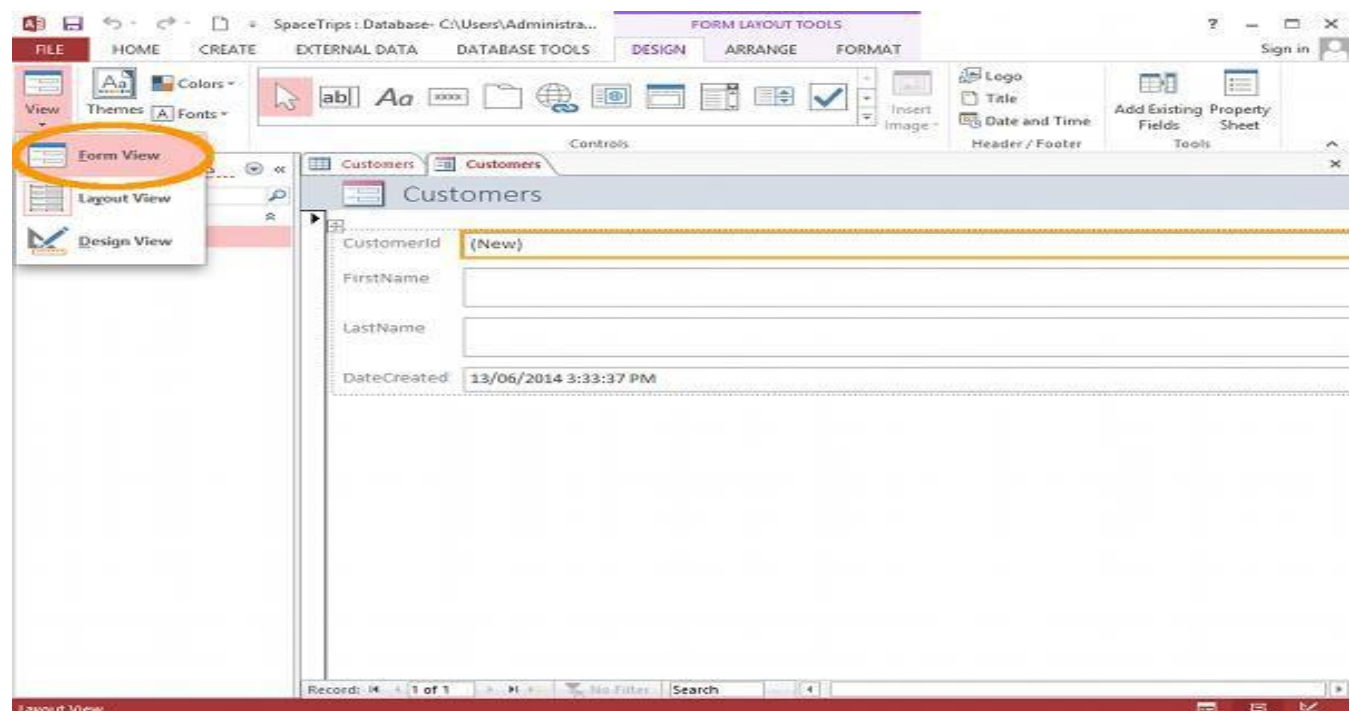

After clicking the "Form" button, Access generates a form in Layout view. Clicking "Form View" (highlighted) will display the form as the user will see it.

Go ahead and click Form View from the View button/menu. If prompted to save the form, call it Customer Form and click **OK**. The Form in Form View. This will display the form as the user will see it.

This form is in Form View. This is how the user will see the form.

The Form in Design View

Now switch to Design View (using the same View menu as before). This displays the form in a more design-oriented way. You'll see a grid across the background, which helps align elements such as labels, and input controls. You will also notice that no data is displayed in the form. This allows you to make changes without data getting in the way.
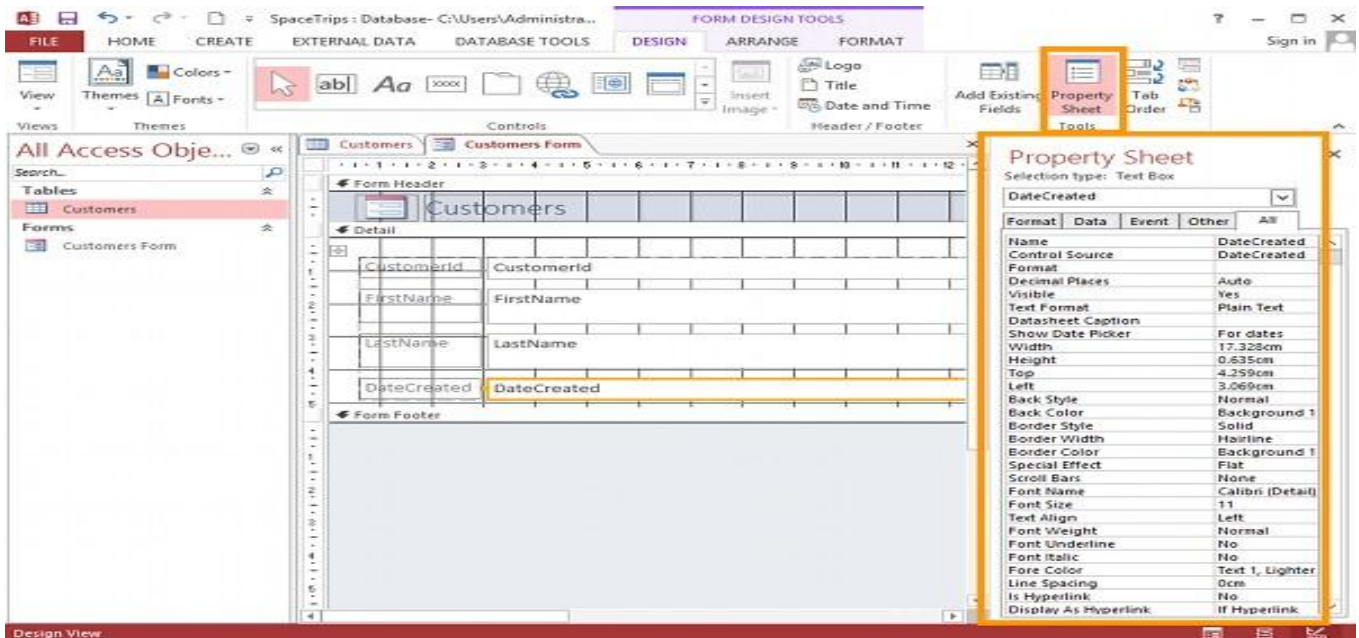
You can access the property sheet from the Property Sheet button on the Ribbon.

The above screenshot shows Design View with the Property Sheet open and highlighted. You can use this to make specific adjustments to the controls on your form.

Control Types

We can create different types of controls in Access as follows,
Text Box
- You can use these controls to interact with the data stored in your database.
- It is calculated on the fly and live just on that one form.

Labels
- Labels will always be text and unbound.
- Normally, labels are not connected to any source in your database.
- Labels are used to label other controls on your form such as text boxes.

Button
- These command buttons usually perform a macro or module.
- Buttons are usually used to interact with the data or objects within your database.

Tab Controls
- Tab controls give you a tabbed view of controls or other controls in your form.

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- Adding tabs to a form can make it more organized and easy to use, especially if the form contains many controls.

Hyperlink

- Hyperlink creates a hyperlink on your form to something else.

- It can either be a web page or even another object or place within your database.

12. REPORT

A **report** is an object in Microsoft Access that is used to display and print your data in an organized manner. Reports provide a means of organizing and summarizing data. Reports are often used to present an overview highlighting main points and trends. A report can be a simple list, a status report or a monthly production report. With reports, one can prepare:

- ❖ Mailing labels for various producers

- ❖ Produce a directory

- ❖ Prepare invoices

- ❖ Present data summaries.

A report is made from the data available. There are several ways of preparing a report:

• **Auto Report:** the quickest way to create a report, but gives least control over the report's structure and appearance. This automatically contains all the fields in its data source, whether table or query.

• **Report Wizard:** asks you questions and creates a report based on your answers. The Report Wizard asks which tables or queries the report will be based on, and which fields to use from those data sources. It also asks whether the data is to be grouped, and how it should be sorted and summarized.

• **Creating a Report in Design view:** Gives one control, right from the start. Design view provides you with a toolbox from which you drag selected controls and arrange them on a grid. To see the report as it will appear when printed, it should be viewed in Print Preview. Different properties may be set for a report, to change how it is viewed or printed.
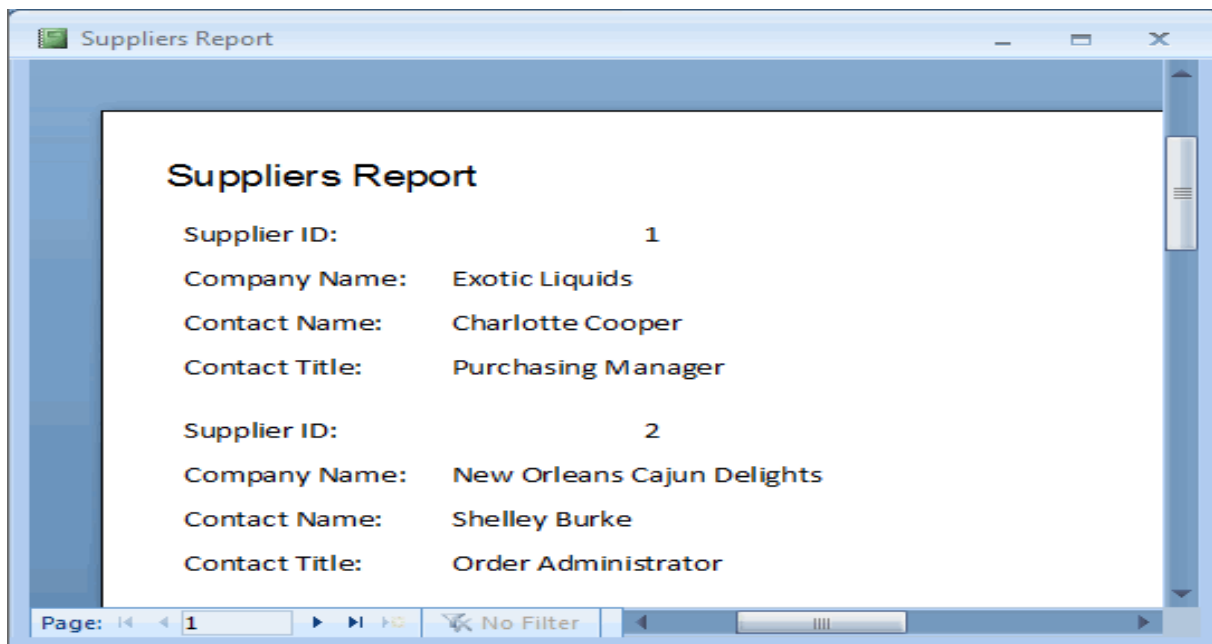

13. MACROS

A macro is a set of actions that can be run automatically. For example, can have a macro run whenever the user clicks a button, or you can have it run automatically when they open the database.

Macros are usually created to simplify common, repetitive tasks. For example, if you find yourself always opening the Customers Form every time you open the database, why not create a macro that opens it automatically? That will save you from having to find the form and double click on it every single time you open the database. So, using that example, let's go ahead and try it. Click Macro from the CREATE tab on the Ribbon.
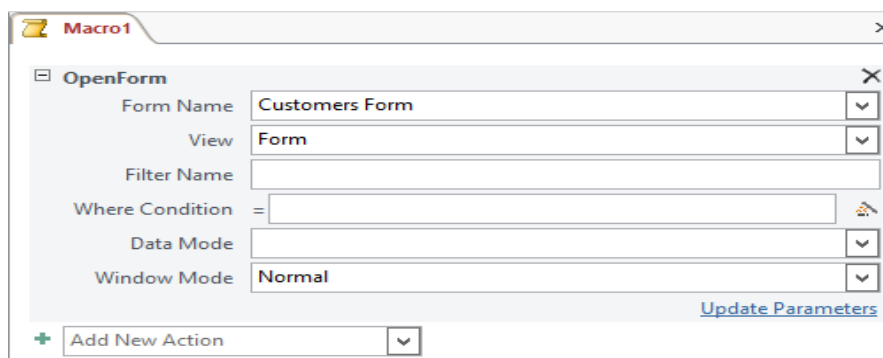
The "Macro" button on the Ribbon.

You will see a combo box. Select OpenForm from the combo box:
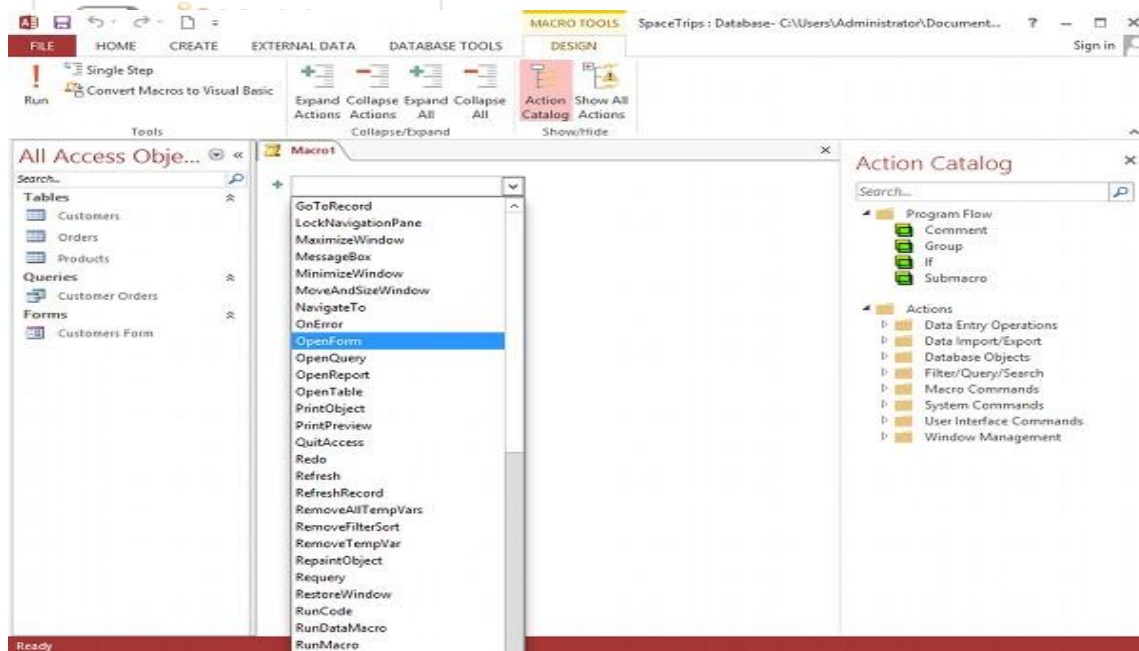

A combo box displaying a list of actions when creating a macro.

Here, we customise the OpenForm action (such as telling it which form to open, which view to open it in, etc). Use these settings:

The above dialog box is for configuring the OpenForm action. This allows you to add any parameters you require for the action.

Now select another action from the combo box. This time select GoToRecord. This will make the form open a new record every time the macro runs.
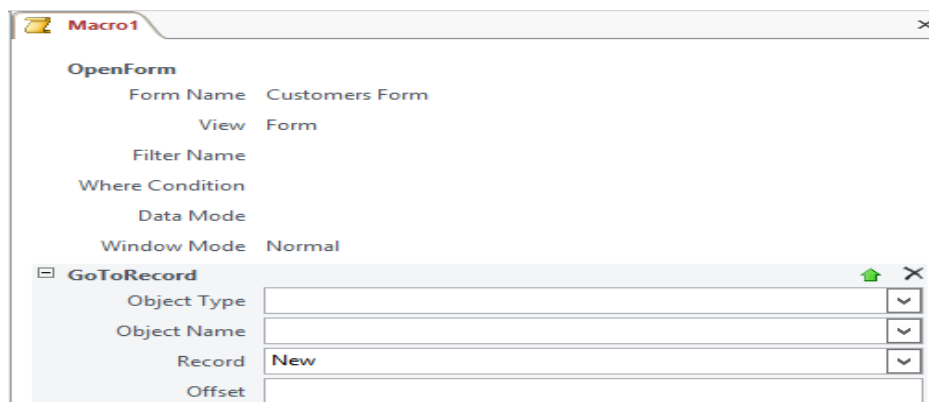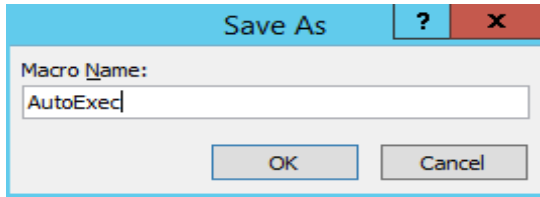

Adding another action – this time using the GoToRecord action. This example is setting the macro to open a new record

whenever it is run.

Now save the macro by clicking the Save icon. Be sure to name it AutoExec. This is a special name that causes the macro to run every time the database is opened.

Saving the macro as "AutoExec". By using this name, the macro will be run every time the user opens the database.

This macro should now run every time the database is opened. Test it out. Close the database, then open it again. You should see the Customers Form open at a new record, ready for a new customer to be entered. Clicking a Button to Run a Macro. You probably won't want all your macros running every time the database opens. You might not want *any* running every time the database opens.

14. Two Marks Terms

Action query:

A query that copies or changes data. Action queries include append, delete, make-table, and update queries. They are identified by an exclamation point (!) next to their names in the Database window.

Crosstab query:

A query that calculates a sum, average, count, or other type of total on records, and then groups the result by two types of information: one down the left side of the datasheet and the other across the top.

Database window: The window that appears when you open an Access database or an Access project. It displays shortcuts for creating new database objects and opening existing objects.

Datasheet view: A window that displays data from a table, form, query, view, or stored procedure in a row- and-column format. In Datasheet view, you can edit fields, add and delete data, and search for data.

Data type: The characteristic of a field that determines what type of data it can hold. Data types include Boolean, Integer, Long, Currency, Single, Double, Date, String, and Variant.

Design view: A window that shows the design of these database objects: Tables, queries, forms, reports, macros and data access pages. In design view one can create new database objects and modify the design of existing ones.

Field data type: A characteristic of a field that determines what kind of data it can store. For example, a field whose data type is Text can store data consisting of either text or number characters, but a Number field can store only numerical data.

Field properties are a set of characteristics that provide additional control over how the data in a field is stored, entered, or displayed. Which properties are available depends on a field's data type.

Foreign key: One or more table fields (columns) that refer to the primary key field or fields in another table. A foreign key indicates how the tables are related.

Primary key: One or more fields (columns) whose values *uniquely identify* each record in a table. A primary key *cannot allow Null values* and must always have a unique index. A primary key is used to relate a table to foreign keys in other tables.

Relationship: an association that is established between common fields (columns) in two tables or other components of a database.

Relationships window: A window in which you view, create, and modify relationships between tables and queries.

Referential integrity: Rules that you follow to preserve the defined relationships between tables when you enter or delete records.

Select query: A query that asks a question about the data stored in your tables and returns a result set in the form of a datasheet, without changing the data.