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MS Access

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Microsoft Access is a Database Management System (DBMS) from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software development tools. It is a member of the Microsoft Office suite of applications, included in the professional and higher editions. Microsoft Access stores data in its own format based on the Access Database Engine (formerly Jet Database Engine). It can also import or link directly to data stored in other applications and databases.

- Microsoft Access is just one part of Microsoft's overall data management product strategy.
- It stores data in its own format based on the Access Jet Database Engine.
- Like relational databases, Microsoft Access also allows you to link related information easily. For example, customer and order data. However, Access 2013 also complements other database products because it has several powerful connectivity features.
- It can also import or link directly to data stored in other applications and databases.
- As its name implies, Access can work directly with data from other sources, including many popular PC database programs, with many SQL (Structured Query Language) databases on the desktop, on servers, on minicomputers, or on mainframes, and with data stored on Internet or intranet web servers.
- Access can also understand and use a wide variety of other data formats, including many other database file structures.
- You can export data to and import data from word processing files, spreadsheets, or database files directly.
- Access can work with most popular databases that support the Open Database Connectivity (ODBC) standard, including SQL Server, Oracle, and DB2.
- Software developers can use Microsoft Access to develop application software.

Microsoft Access stores information which is called a database. To use MS Access, you will need to follow these **four steps** –

- **Database Creation** – Create your Microsoft Access database and specify what kind of data you will be storing.
- **Data Input** – After your database is created, the data of every business day can be entered into the Access database.
- **Query** – This is a fancy term to basically describe the process of retrieving information from the database.
- **Report** (optional) – Information from the database is organized in a nice presentation that can be printed in an Access Report.

Architecture

- Access calls anything that can have a name an object. Within an Access desktop database, the main objects are tables, queries, forms, reports, macros, data macros, and modules.
- If you have worked with other database systems on desktop computers, you might have seen the term database used to refer to only those files in which you store data.

- But, in Access, a desktop database (.accdb) also includes all the major objects related to the stored data, including objects you define to automate the use of your data.

Microsoft Access has the look and feel of other Microsoft Office products as far as its layout and navigational aspects are concerned, but MS Access is a database and, more specifically, a relational database.

- Before MS Access 2007, the file extension was ***.mdb**, but in MS Access 2007 the extension has been changed to ***.accdb** extension.
- Early versions of Access cannot read accdb extensions but MS Access 2007 and later versions can read and change earlier versions of Access.
- An Access desktop database (.accdb or .mdb) is a fully functional RDBMS.
- It provides all the data definition, data manipulation, and data control features that you need to manage large volumes of data.
- You can use an Access desktop database (.accdb or .mdb) either as a standalone RDBMS on a single workstation or in a shared client/server mode across a network.
- A desktop database can also act as the data source for data displayed on webpages on your company intranet.
- When you build an application with an Access desktop database, Access is the RDBMS.

Data Definition

Let us now understand what Data Definition is –

- In document or a spreadsheet, you generally have complete freedom to define the contents of the document or each cell in the spreadsheet.
- In a document, you can include paragraphs of text, a table, a chart, or multiple columns of data displayed with multiple fonts.
- In spreadsheet, you can have text data at the top to define a column header for printing or display, and you might have various numeric formats within the same column, depending on the function of the row.
- An RDBMS allows you to define the kind of data you have and how the data should be stored.
- You can also usually define rules that the RDBMS can use to ensure the integrity of your data.
- For example, a validation rule might ensure that the user can't accidentally store alphabetic characters in a field that should contain a number.

Data Manipulation

Working with data in RDBMS is very different from working with data in a word processing or spreadsheet program.

- In a word processing document, you can include tabular data and perform a limited set of functions on the data in the document.
 - You can also search for text strings in the original document and, with ActiveX controls, include tables, charts, or pictures from other applications.
 - In a spreadsheet, some cells contain functions that determine the result you want, and in other cells, you enter the data that provides the source information for the functions.
- An RDBMS provides you many ways to work with your data. For example,
- You can search a single table for information or request a complex search across several related tables.
 - You can update a single field or many records with a single command.
 - You can write programs that use RDBMS commands to fetch data that you want to display and allow the user to update the data.

Access uses the powerful SQL database language to process data in your tables. Using SQL, you can define the set of information that you need to solve a particular problem, including data from perhaps many tables.

Data Control

Spreadsheets and word processing documents are great for solving single-user problems, but they are difficult to use when more than one person needs to share the data.

- When you need to share your information with others, RDBMS gives you the flexibility to allow multiple users to read or update your data.
- An RDBMS that is designed to allow data sharing also provides features to ensure that no two people can change the same data at the same time.
- The best systems also allow you to group changes (which is also known as transaction) so that either all the changes or none of the changes appear in your data.
- You might also want to be sure that no one else can view any part of the order until you have entered all of it.
- Because you can share your Access data with other users, you might need to set some restrictions on what various users are allowed to see or update.

MS Access uses "objects" to help the user list and organize information, as well as prepare specially designed reports. When you create a database, Access offers you Tables, Queries, Forms, Reports, Macros, and Modules. Databases in Access are composed of many objects but the following are the major objects –

- Tables
- Queries
- Forms
- Reports

Together, these objects allow you to enter, store, analyze, and compile your data. Here is a summary of the major objects in an Access database;

Table

Table is an object that is used to define and store data. When you create a new table, Access asks you to define fields which is also known as column headings.

- Each field must have a unique name, and data type.
- Tables contain fields or columns that store different kinds of data, such as a name or an address, and records or rows that collect all the information about a particular instance of the subject, such as all the information about a customer or employee etc.
- You can define a primary key, one or more fields that have a unique value for each record, and one or more indexes on each table to help retrieve your data more quickly.

Query

An object that provides a custom view of data from one or more tables. 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 your database.

- When you build a query in Access, you are defining specific search conditions to find exactly the data you want.
- In Access, you can use the graphical query by example facility or you can write Structured Query Language (SQL) statements to create your queries.
- You can define queries to Select, Update, Insert, or Delete data.
- You can also define queries that create new tables from data in one or more existing tables.

Form

Form is an object in a desktop database designed primarily for data input or display or for control of application execution. You use forms to customize the presentation of data that your application extracts from queries or tables.

- Forms are used for entering, modifying, and viewing records.
- The reason forms are used so often is that they are an easy way to guide people toward entering data correctly.
- When you enter information into a form in Access, the data goes exactly where the database designer wants it to go in one or more related tables.

Report

Report is an object in desktop databases designed for formatting, calculating, printing, and summarizing selected data.

- You can view a report on your screen before you print it.
- If forms are for input purposes, then reports are for output.
- Anything you plan to print deserves a report, whether it is a list of names and addresses, a financial summary for a period, or a set of mailing labels.
- Reports are useful because they allow you to present components of your database in an easy-to-read format.
- You can even customize a report's appearance to make it visually appealing.
- Access offers you the ability to create a report from any table or query.

Other MS Access Objects

Let us now take a look at other MS Access objects.

Macro

This object is a structured definition of one or more actions that you want Access to perform in response to a defined event. An Access Macro is a script for doing some job. For example, to create a button which opens a report, you could use a macro which will fire OpenReport action.

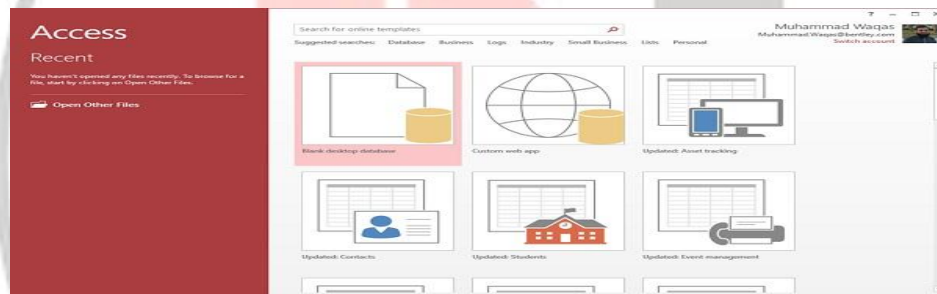
- You can include simple conditions in macros to specify when one or more actions in the macro should be performed or skipped.
- You can use macros to open and execute queries, to open tables, or to print or view reports.
- You can also run other macros or Visual Basic procedures from within a macro.
- Data macros can be attached directly to table events such as inserting new records, editing existing records, or deleting records.

- Data macros in web apps can also be stand-alone objects that can be called from other data macros or macro objects.

Module

Module is an object in desktop databases containing custom procedures that you code using Visual Basic. Modules provide a more discrete flow of actions and allow you to trap errors.

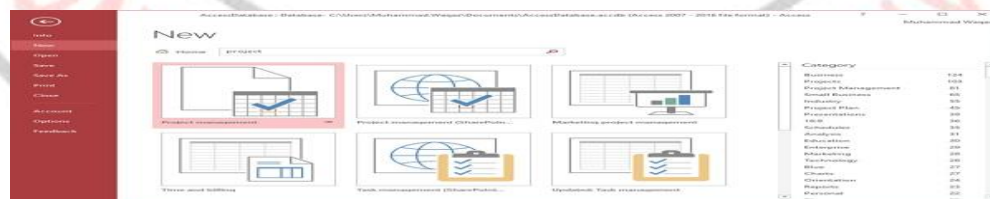
- Everything that can be done in a macro can also be done in a module, but you don't get the macro interface that prompts you what is needed for each action.
- Modules are far more powerful, and are essential if you plan to write code for a multi-user environment, because macros cannot include error handling.
- Modules can be standalone objects containing functions that can be called from anywhere in your application, or they can be directly associated with a form or a report to respond to events on the associated form or report.
- In this chapter, we will be covering the basic process of starting Access and creating a database. This chapter will also explain how to create a desktop database by using a template and how to build a database from scratch.
- To create a database from a template, we first need to open MS Access and you will see the following screen in which different Access database templates are displayed.



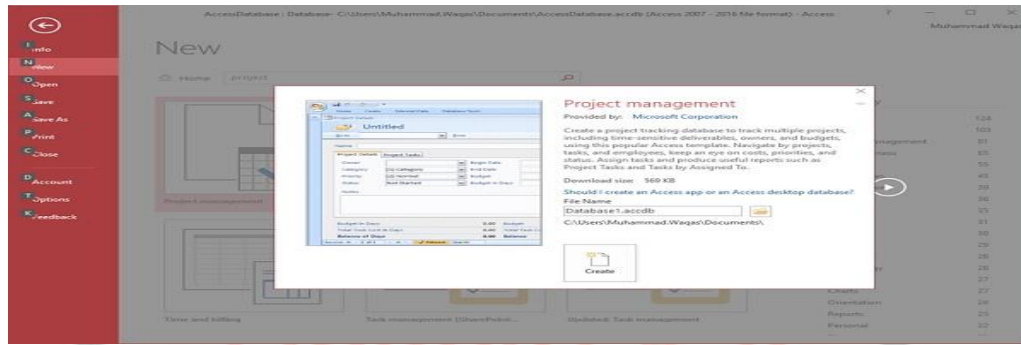
Create Database

To view the all the possible databases, you can scroll down or you can also use the search box.

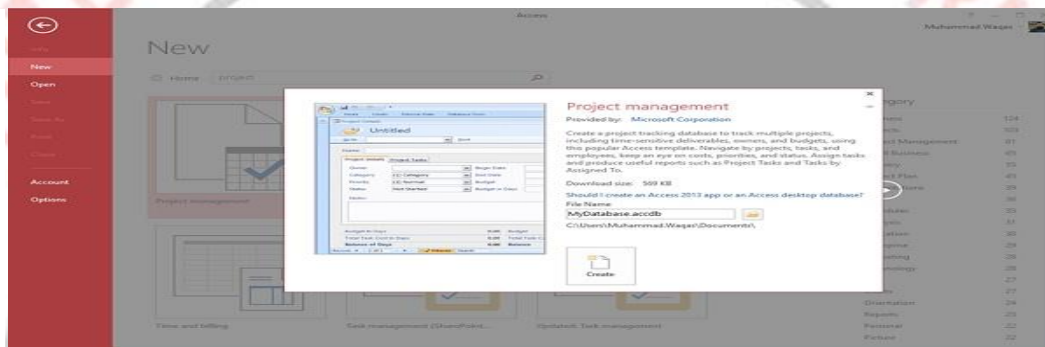
Let us enter project in the search box and press Enter. You will see the database templates related to project management.



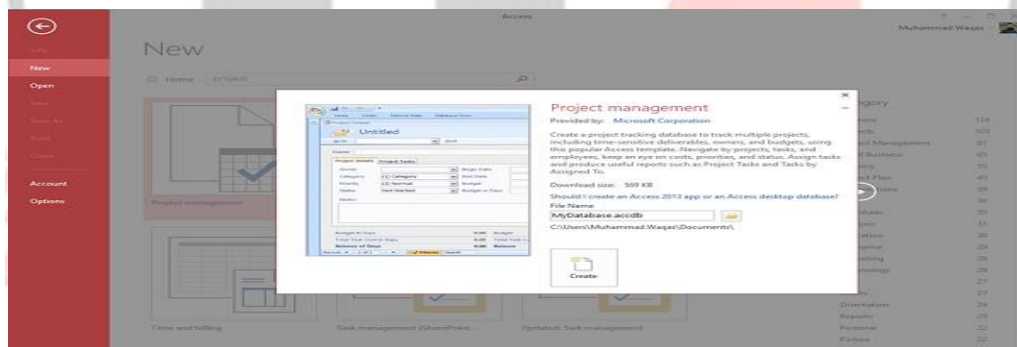
Select the first template. You will see more information related to this template.



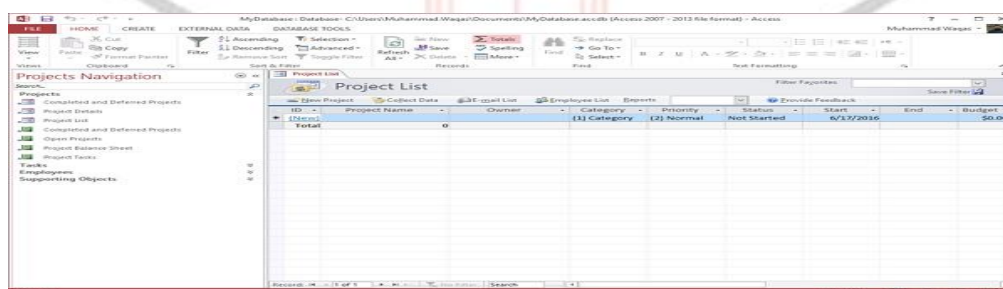
After selecting a template related to your requirements, enter a name in the **File name** field and you can also specify another location for your file if you want.



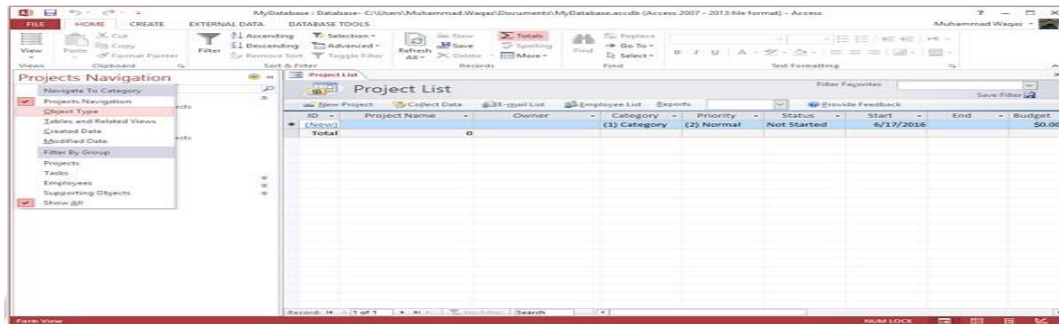
Now, press the Create option. Access will download that database template and open a new blank database as shown in the following screenshot.



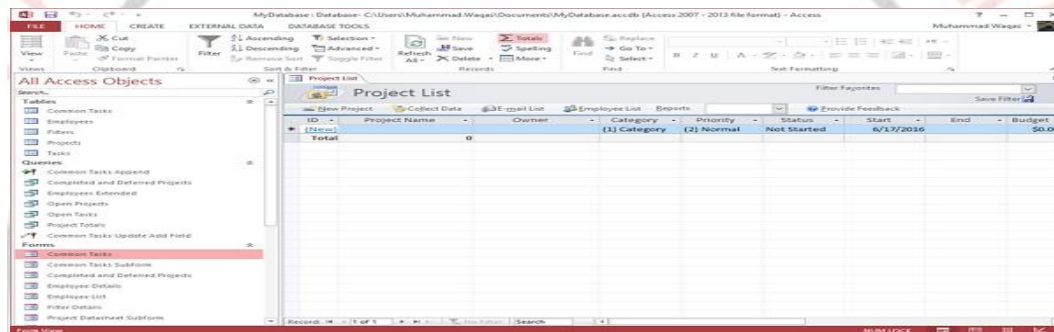
Now, click the Navigation pane on the left side and you will see all the other objects that come with this database.



Click the Projects Navigation and select the Object Type in the menu.



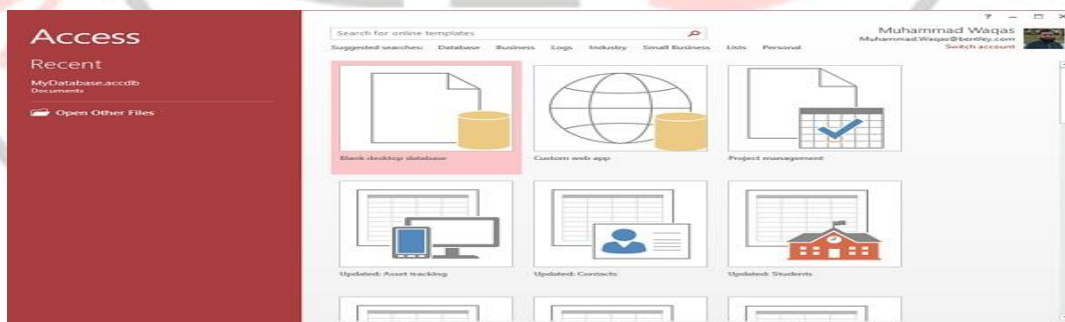
You will now see all the objects types — tables, queries, etc.



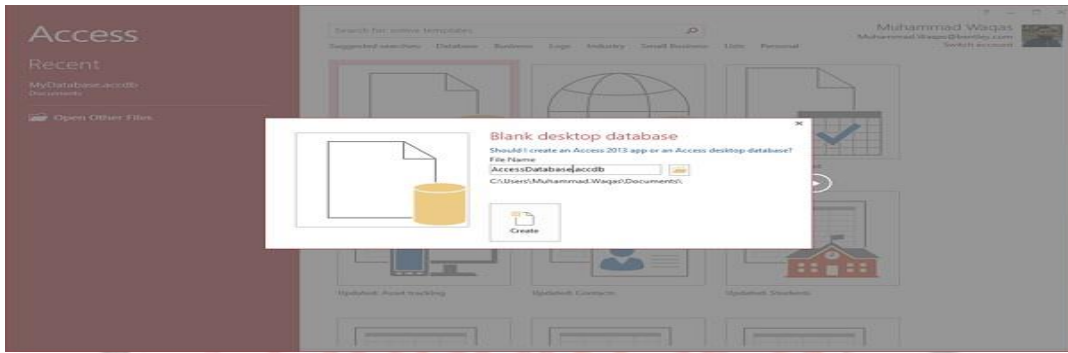
Create Blank Database

Sometimes database requirements can be so specific that using and modifying the existing templates requires more work than just creating a database from scratch. In such case, we make use of blank database.

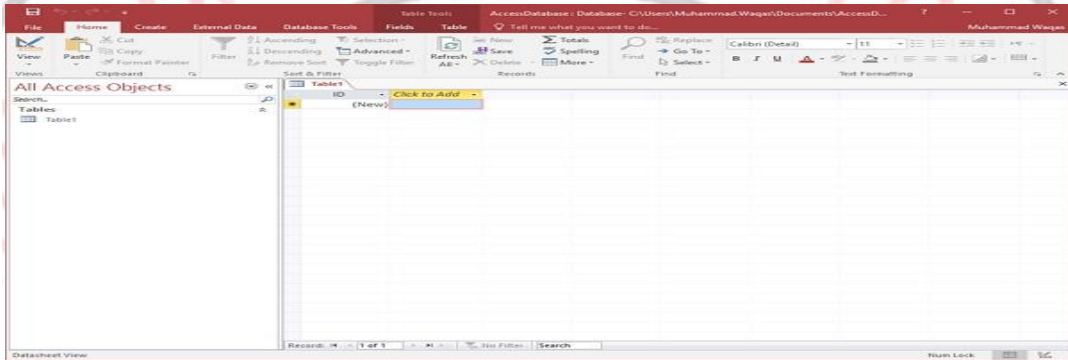
Step 1 – Let us now start by opening MS Access.



Step 2 – Select Blank desktop database. Enter the name and click the Create button.



Step 3 – Access will create a new blank database and will open up the table which is also completely blank.



Create Table

When you create a database, you store your data in tables. Because other database objects depend so heavily on tables, you should always start your design of a database by creating all of its tables and then creating any other object. Before you create tables, carefully consider your requirements and determine all the tables that you need.

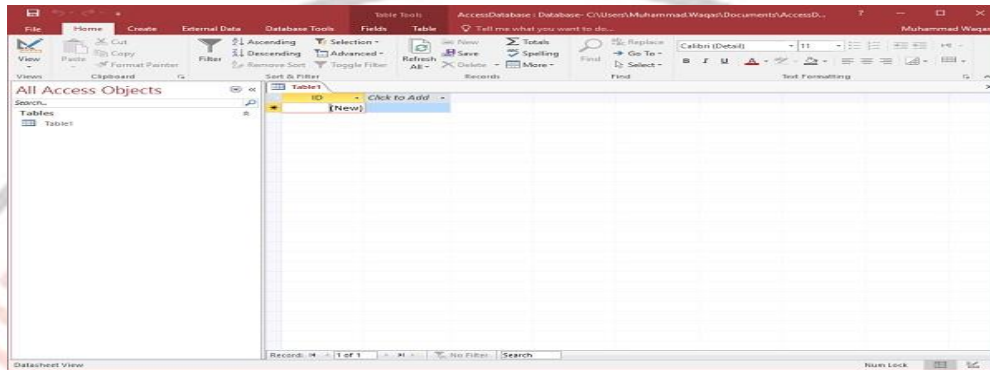
Let us try and create the first table that will store the basic contact information concerning the employees as shown in the following table –

Field Name	Data Type
EmployeeID	AutoNumber
FirstName	Short Text
LastName	Short Text
Address1	Short Text
Address2	Short Text
City	Short Text
State	Short Text
Zip	Short Text

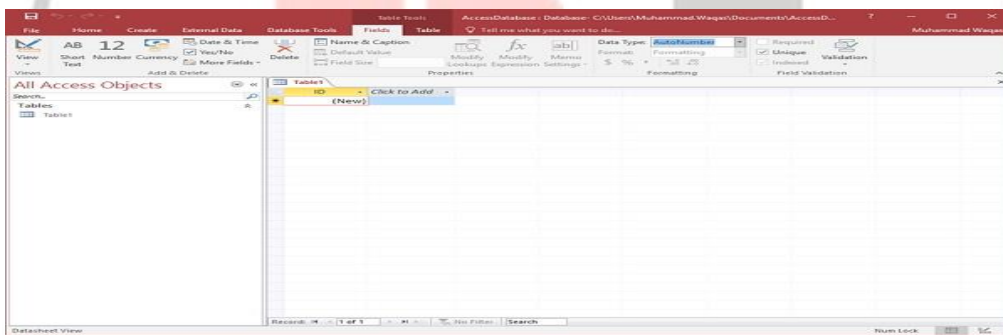
Phone
Phone Type

Short Text
Short Text

Let us now have short text as the data type for all these fields and open a blank database in Access.

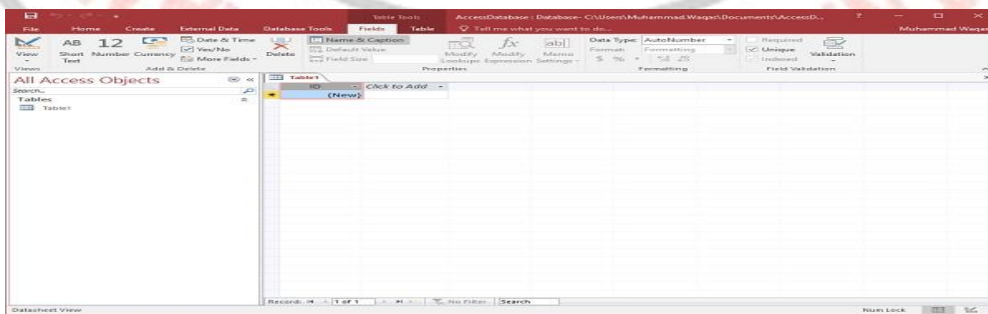


This is where we left things off. We created the database and then Access automatically opened up this table-one-datasheet view for a table.



Let us now go to the Field tab and you will see that it is also automatically created. The ID which is an AutoNumber field acts as our unique identifier and is the primary key for this table.

The ID field has already been created and we now want to rename it to suit our conditions. This is an Employee table and this will be the unique identifier for our employees.



Click on the **Name & Caption** option in the Ribbon and you will see the following dialog box.

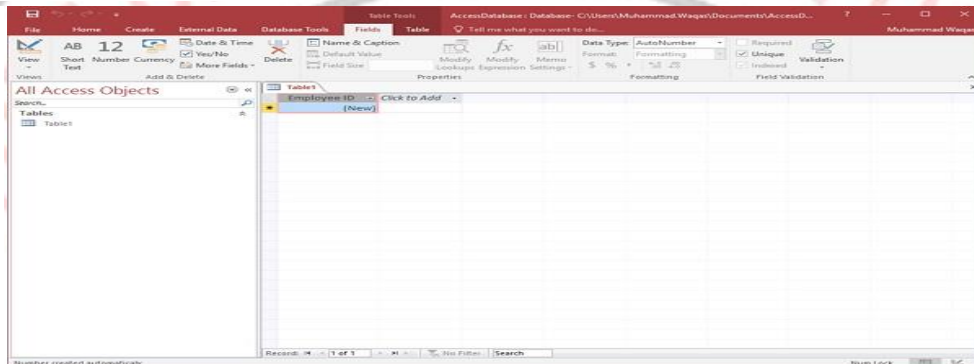
Enter Field Properties

Name:

Caption:

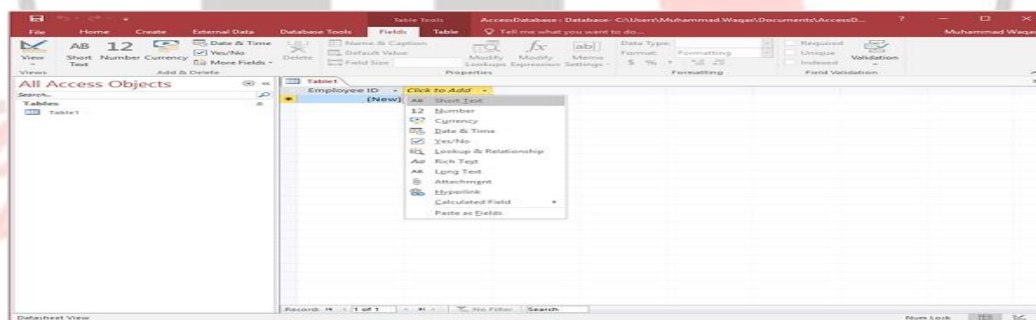
Description:

Change the name of this field to **EmployeeID** to make it more specific to this table. Enter the other optional information if you want and click Ok.

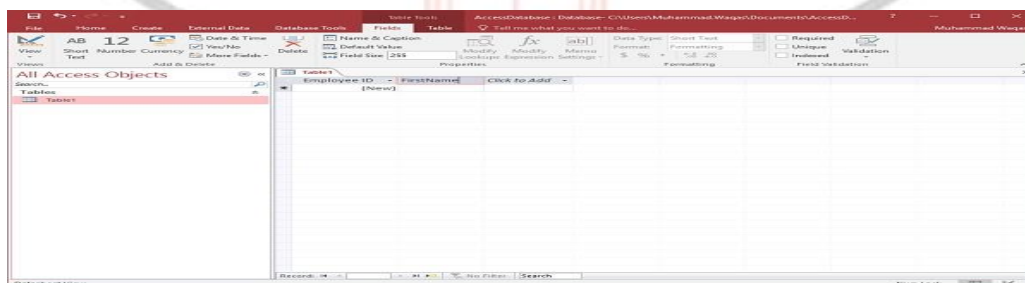


We now have our employee ID field with the caption Employee ID. This is automatically set to auto number so we don't really need to change the data type.

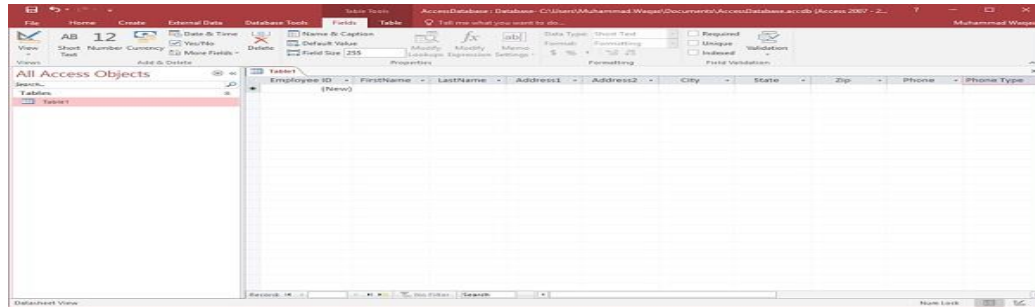
Let us now add some more fields by clicking on **click to add**.



Choose **Short Text** as the field. When you choose short text, Access will then highlight that field name automatically and all you have to do is type the field name.

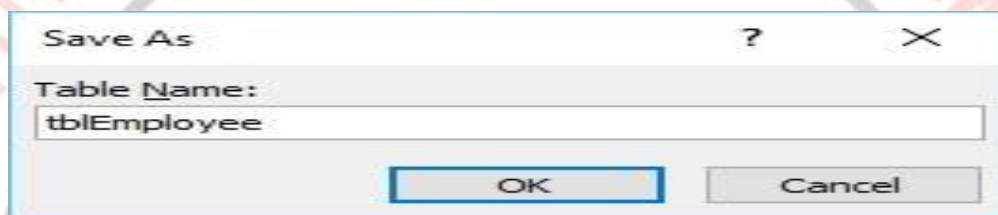


Type **First Name** as the field name. Similarly, add all the required fields as shown in the following screenshot.



Once all the fields are added, click the Save icon.

You will now see the **Save as** dialog box, where you can enter a table name for the table.



Enter the name of your table in the Table Name field. Here the **tbl** prefix stands for table. Let us click Ok and you will see your table in the navigation pane.

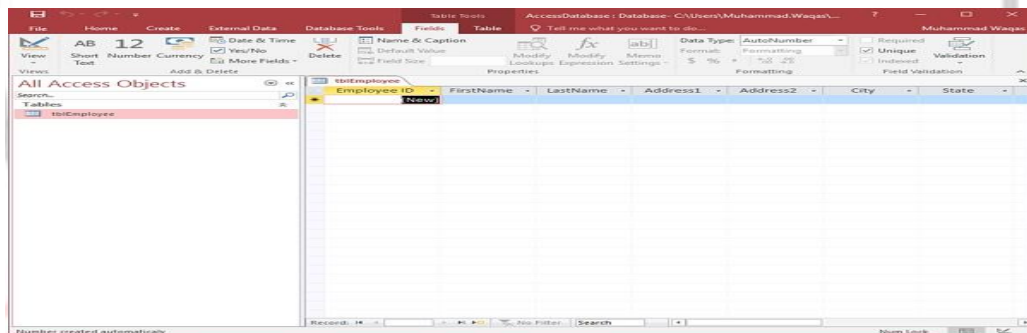


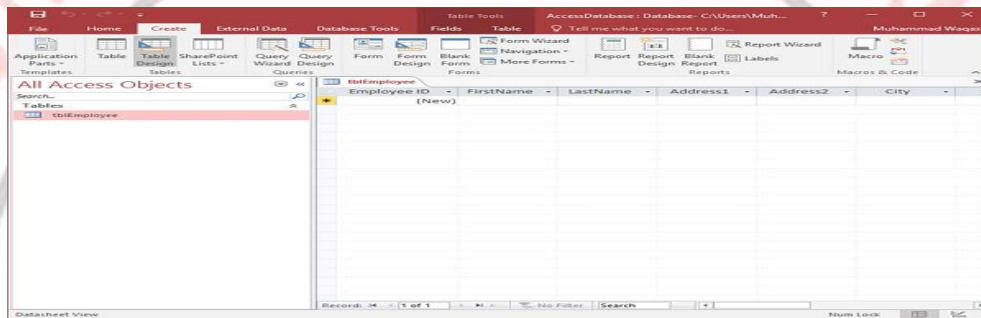
Table Design View

As we have already created one table using **Datasheet View**. We will now create another table using the **Table Design View**. We will be creating the following fields in this table. These tables will store some of the information for various book projects.

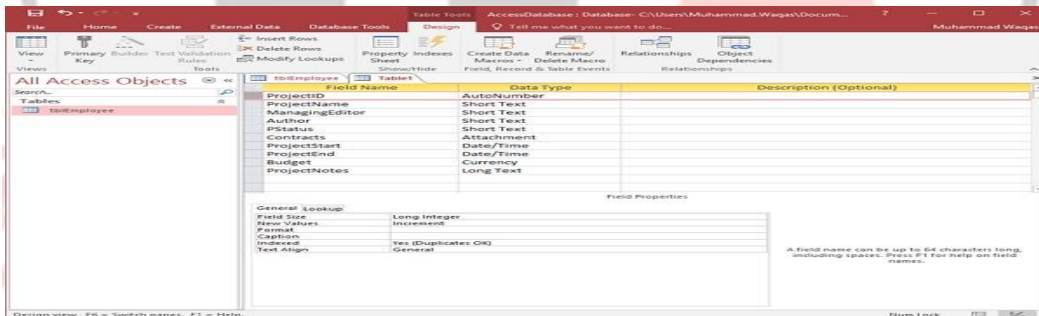
Field Name	Data Type
Project ID	AutoNumber
Project Name	Short Text
Managing Editor	Short Text
Author	Short Text

P Status	Short Text
Contracts	Attachment
Project Start	Date/Time
Project End	Date/Time
Budget	Currency
Project Notes	Long Text

Let us now go to the Create tab.



In the tables group, click on Table and you can see this looks completely different from the Datasheet View. In this view, you can see the **field name** and **data type** side by side.



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