

**GE-161L**

**Introduction to Information and Communication Technologies**

**Laboratory 09**

**Introduction to Microsoft ® Access - I**

**Version: 1.0.0**

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**Department of Information Technology**

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## Learning Objectives:

- Familiarization with Microsoft ® Access Environment
- Creating Database in Microsoft ® Access
- Creating Tables in Microsoft ® Access
- Creating Forms in Microsoft ® Access
- Creating Reports in Microsoft ® Access

## Resources Required:

- Computer / Laptop
- Microsoft ® Access

## General Instructions:

- This is an individual lab, you are **NOT** allowed to discuss your solution with your colleagues, not even allowed to ask how is he/she doing, this may result into negative marking. You can **ONLY** discuss with your TAs or with course instructor.
- Your TAs will be available in the lab for your help. Alternatively, you can send your queries via email.

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## **Background and Overview:**

### **What Is a Database?**

People often need to retrieve specific data rapidly while on the job. For example, a customer service representative may need to locate a customer's order status quickly while the customer is on the telephone. The registrar at a university may have to look up a student's grade point average or rapidly determine if the student has any outstanding fees before processing his or her class registration. A librarian may need to determine if a particular book is available to check out and, if not, when it is scheduled to be returned. The type of software used for such tasks is a database management system. Computer-based database management systems are rapidly replacing the paper-based filing systems that people used in the past to find information. The most common type of database used with personal computers today is a relational database. The basic features and concepts of this type of database software are discussed next.

A database is a collection of related data that is stored on a computer and organized in a manner that enables information to be retrieved as needed. A database management system (DBMS)—also called database software—is the type of program used to create, maintain, and organize data in a database, as well as to retrieve information from it. Typically data in a database is organized into fields, records, and files. A field (today more commonly called a column) is a single type of data, such as last name or telephone number, to be stored in a database. A record (today more commonly called a row) is a collection of related fields, for example, the ID number, name, and address.

### **What is Microsoft ® Access?**

Microsoft ® Access is a database management system from Microsoft Corporation that combines the relational Access Database Engine with a graphical user interface and software-development tools.

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.

## Activities:

### Pre-Lab Activities:

#### Open Microsoft ® Access:

- Type “Access” in the search bar

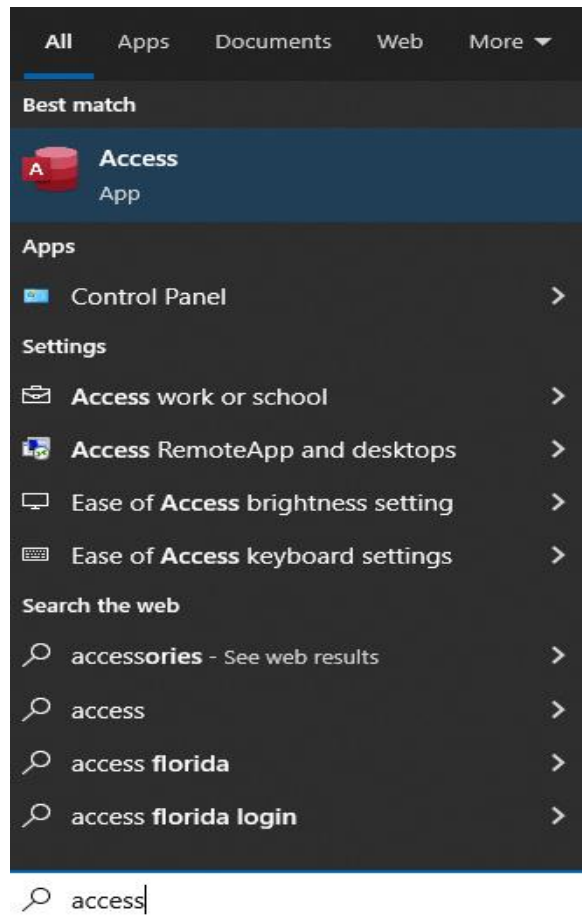


Fig. 1 (Searching Microsoft ® Access)

- Select “Access” application
- Select a Blank database

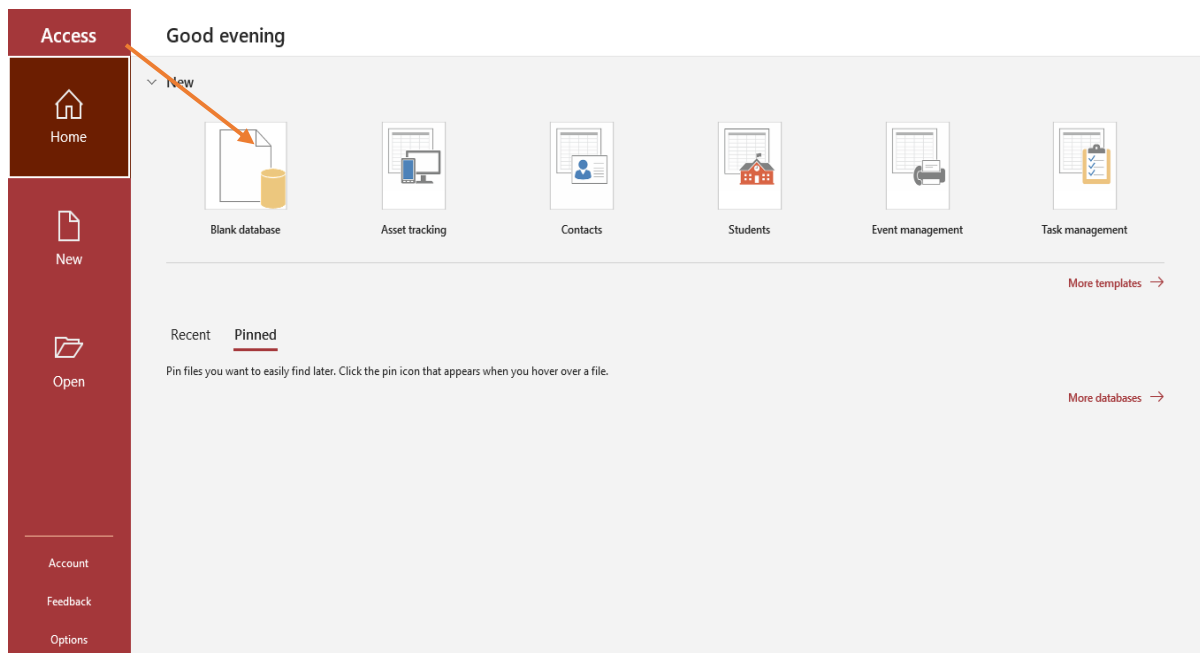


Fig. 2 (Open Blank Database)

### Using Navigation Pane:

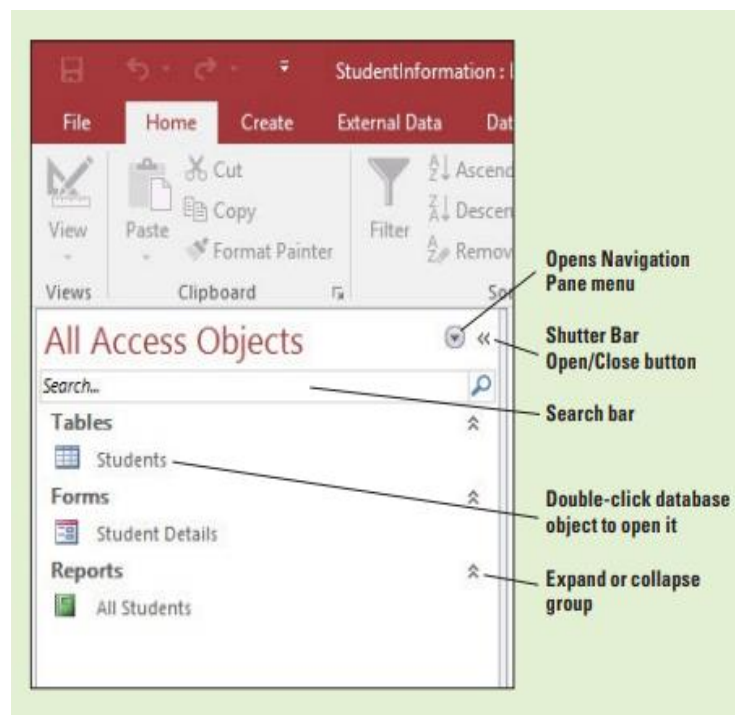


Fig. 3 (Navigation Pane)

**Change Views:**

- On the “**Home**” tab, in the “**Views**” group, click the down arrow on the “**View**” button
- Click “**Design View**”. The table is displayed in Design View

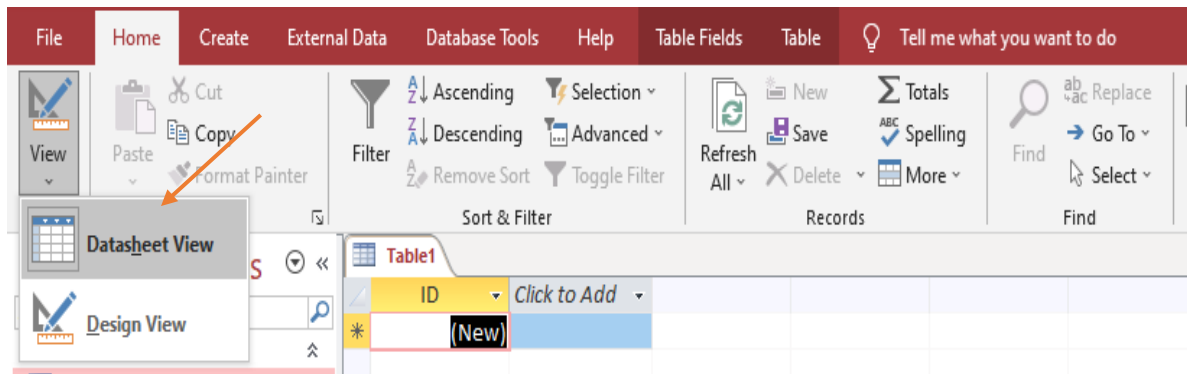


Fig. 4 (Change View)

The Design tab is now displayed on the Ribbon.

**Creating a Database using a Template :**

- On the top of the startup screen window, in the “**Search for online templates**” search box, type “**personal**”, and then press “**Enter**”

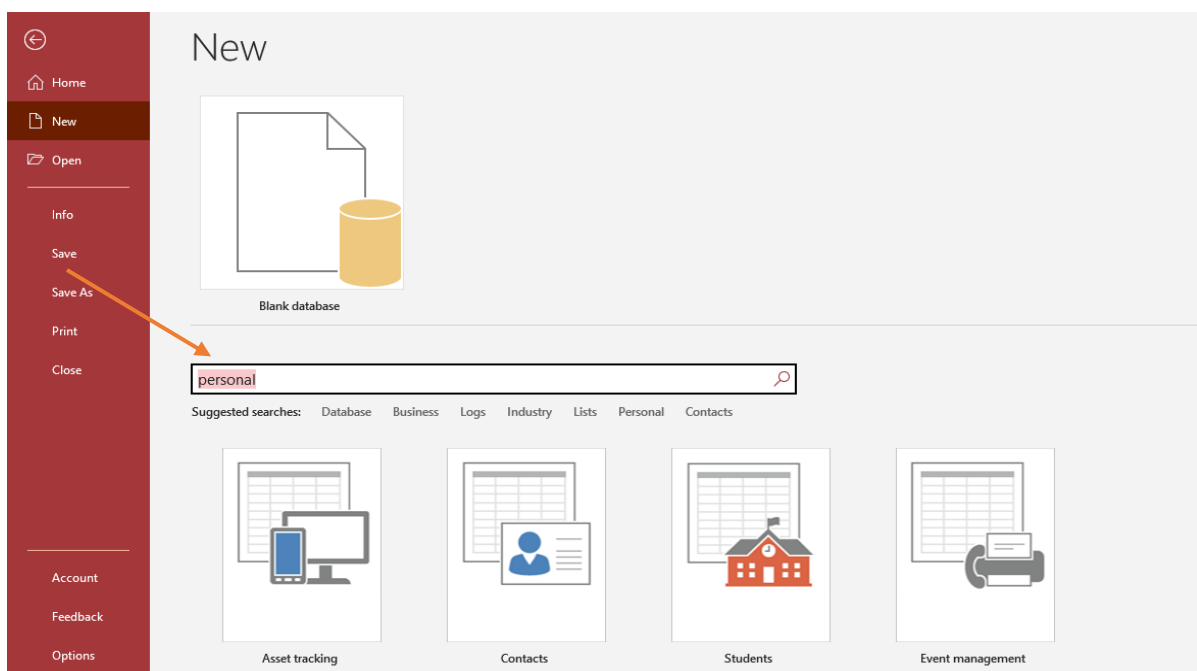


Fig. 5 (Searching template)

- In the list of Personal templates that appears in the middle of the startup screen results pane, click **“Home inventory”**

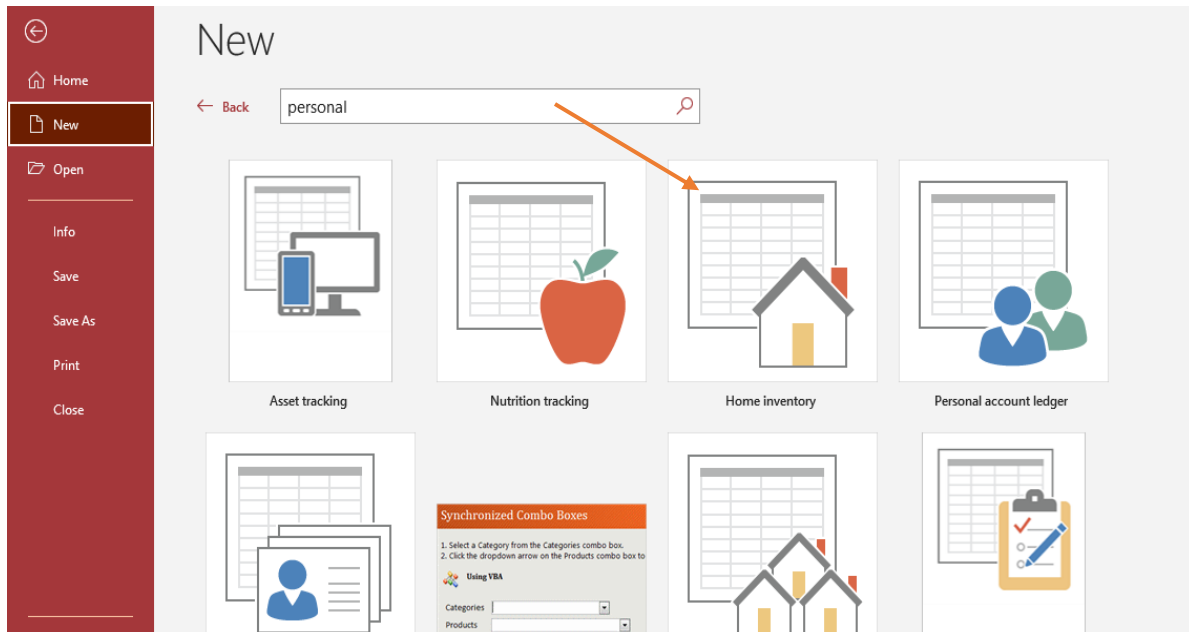


Fig. 6 (Database Templates)

- Click the **“Create button”** at the bottom of the preview pane

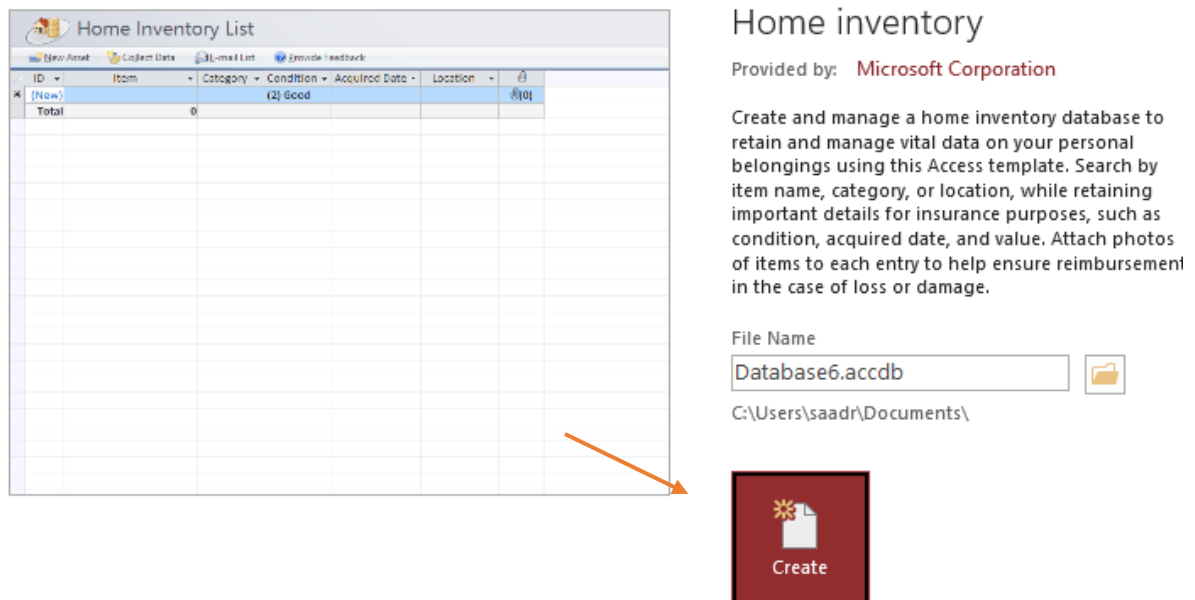


Fig. 7 (Home Inventory)



### Create a blank Database:

- In the “**templates section**” of the new screen, click the “**Blank database**” icon

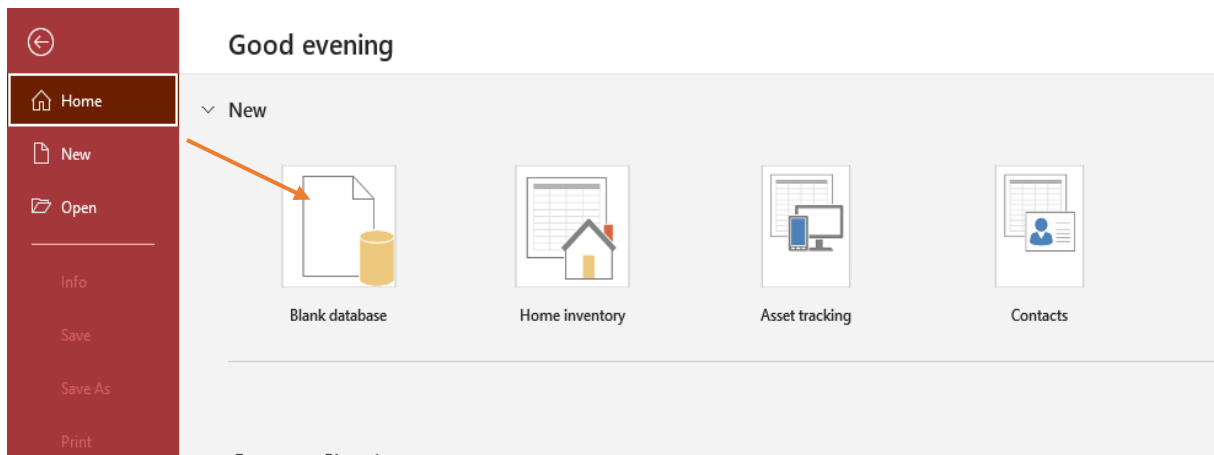


Fig. 8 (Blank Database)

- In the “**File Name**” box, type “**Database**”
- If you want to save the file in a location other than the one shown beneath the File Name box, click the “**folder icon**” to the right of the File Name box and browse to a different location
- Click “**Create button**” to create the blank database. Access creates the database and then opens an empty table named “**Table1**” in “**Datasheet view**”



Fig. 9 (Blank Database)

### Creating a Table:

- On the “**Create**” tab in the “**Templates**” group, click the “**Application Parts**” button to display the gallery
- In the “**Quick Start**” section of the gallery, click “**Comments**”

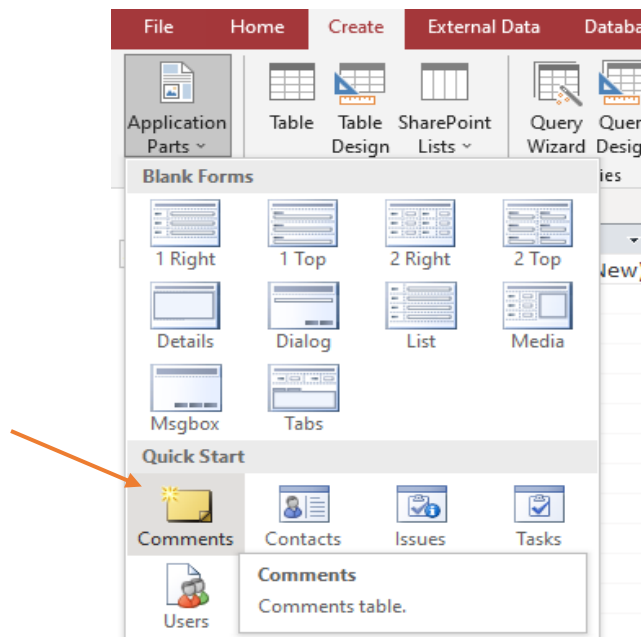


Fig. 10 (Creating Table)

- If you are prompted to close all open objects before instantiating this application part, click **“Yes”** in the dialog box that appears
- Open the **“Application Parts”** menu and then click **“Comments”**

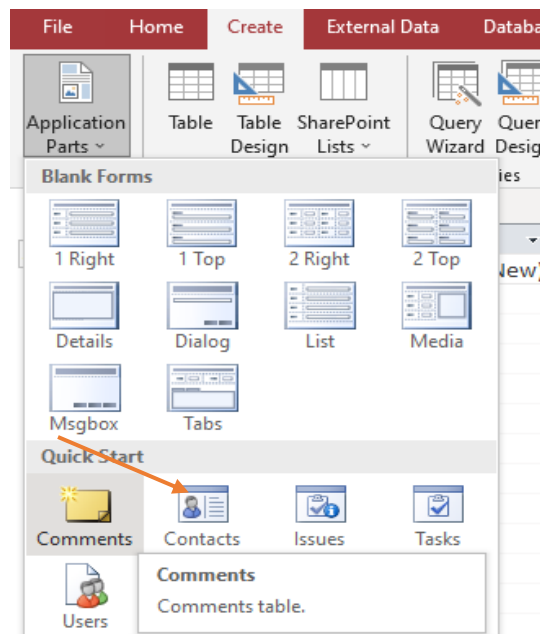


Fig. 11 (Creating Table)

- In the **“Create Relationship”** dialog box that appears, select the **“There is no relationship”** option button
- Click **“Create”**

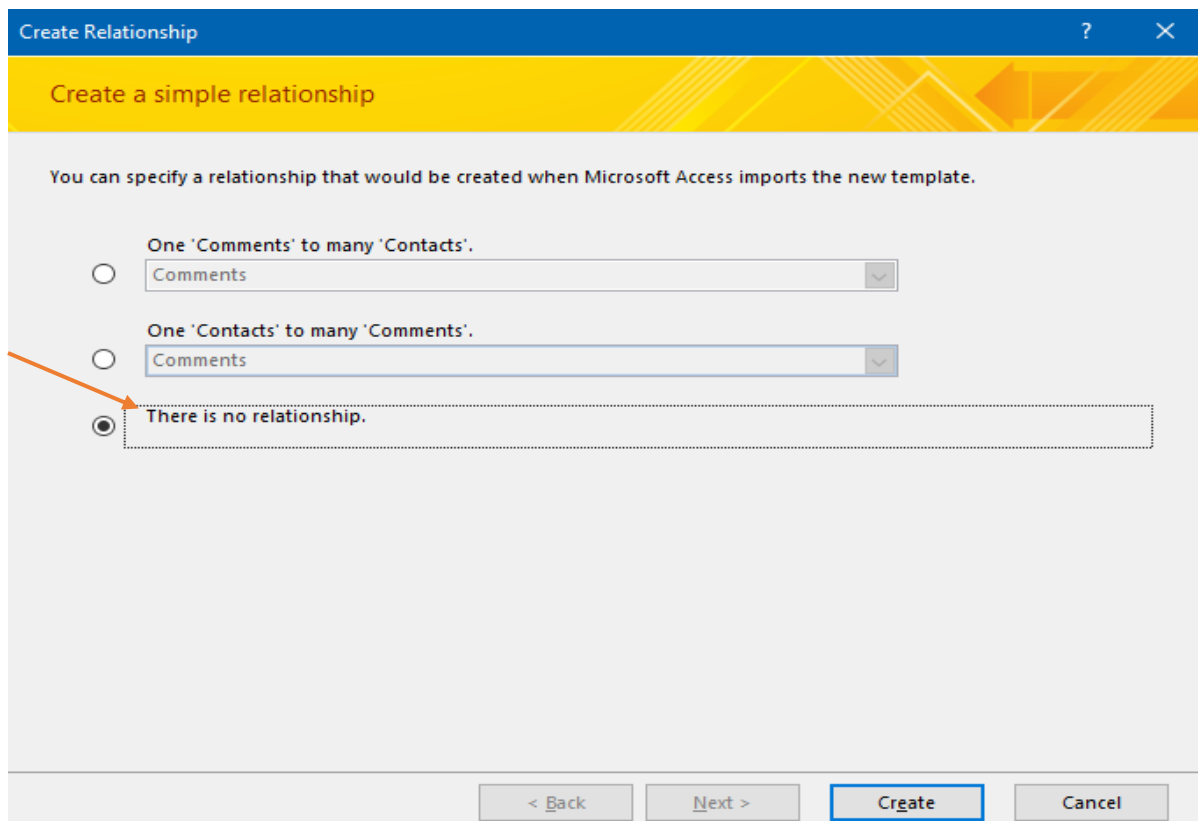


Fig. 12 (Create Relationship dialog)

A new table is created along with supporting forms and report objects.

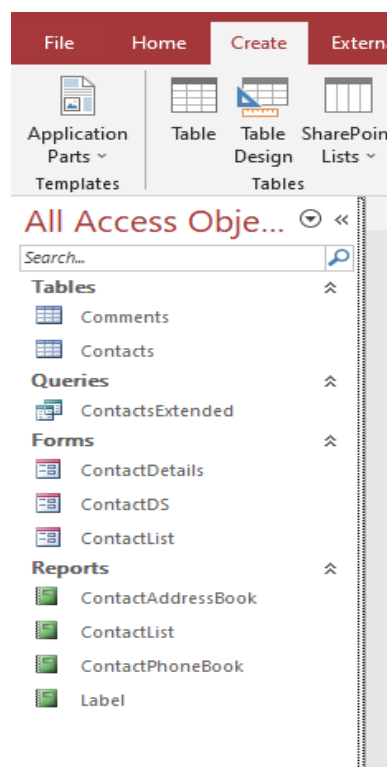


Fig. 13 (Creating Table)

**Navigating using Keyboard:**

Keys	Movement
Tab or Right Arrow Key	Moves cursor to the next field
End	Moves cursor to the last field in the current record
Shift + Tab or Left Arrow Key	Moves cursor to the previous field
Home	Moves cursor to the first field in the current record
Down Arrow	Moves cursor to the current field in the next record
Ctrl + Down Arrow	Moves cursor to the current field in the last record
Ctrl + End	Moves cursor to the last field in the last record
Up Arrow	Moves cursor to the current field in the previous record
Ctrl + Up	Arrow Moves cursor to the current field in the first record
Ctrl + Home	Moves cursor to the first field in the first record

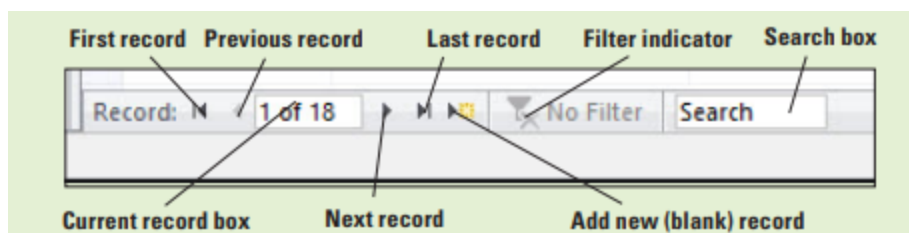
**Record Navigation Buttons:**

Fig. 14 (Navigation buttons)

- Click the **“First record”** button. The selection moves to the first record
- Click the **“Next record”** button. The selection moves to the next record
- Click the **“Last record”** button. The selection moves to the last record
- Click the **“Previous record”** button. The selection moves to the previous record
- Click the **“Search box”** to position the insertion point
- **“Current record box”** shows the position of current record

**Task 01: Adding Tables to Database****[Estimated 15 minutes / 15 marks]**

You are a student and you want to keep track of your grades. So, you decided to make a database as follows:

- Create a blank database and Create a Table for each subject
- Mention your grades of every sessional activity in each table and
- Save the document named **“Your Roll No”**

Email the document named with your roll no like **“BSEF19M021”** to the respective TA. The subject of your email should be **“Your RollNo\_Pre-Lab09”**.

**In-Lab activities:****Add Record:**

The insertion point should be positioned in the first field of the new, blank row at the bottom of the datasheet. Notice the **“asterisk”** in the Record Selector box, which indicates that this is a new record

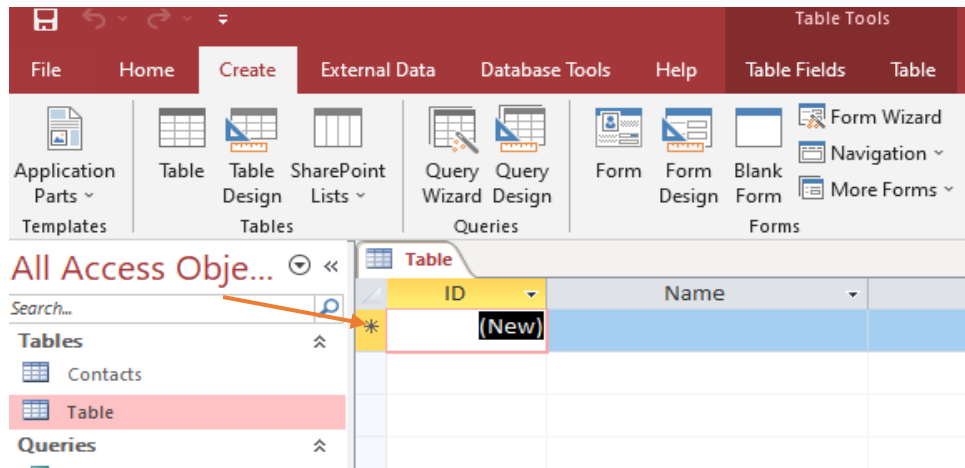


Fig. 15 (Add Record)

- Type **“0”** and then press **“Tab”**. Notice that the asterisk has changed to a **“pencil icon”**
- Type **“Saad”** and press **“Tab”**

Similarly Add Record in the second row.

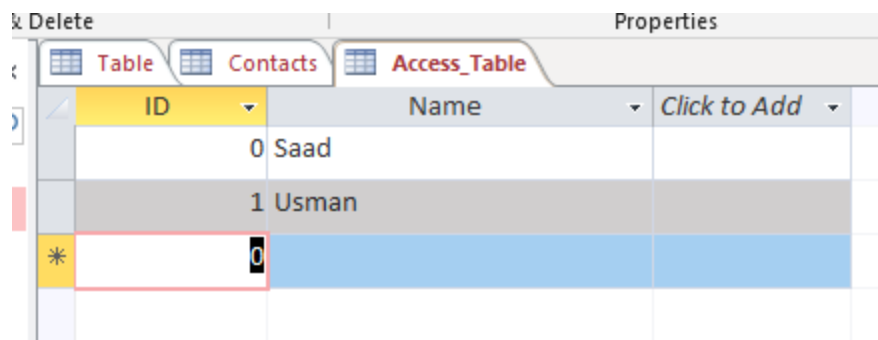


Fig. 16 (Add Record)

**Delete Record:**

- Click the **“Record Selector box”** to the left of the **“ID”** field of the first record **“0”**

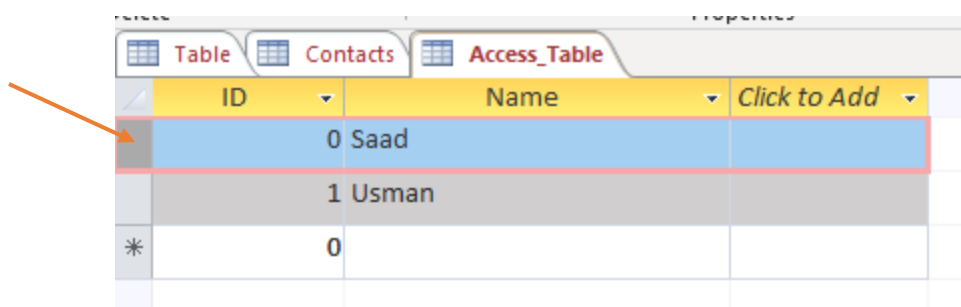


Fig. 17 (Delete Record)

- On the **“Home”** tab, in the **“Records”** group, click the **“Delete”** button drop-down arrow
- Click **“Delete Record”**

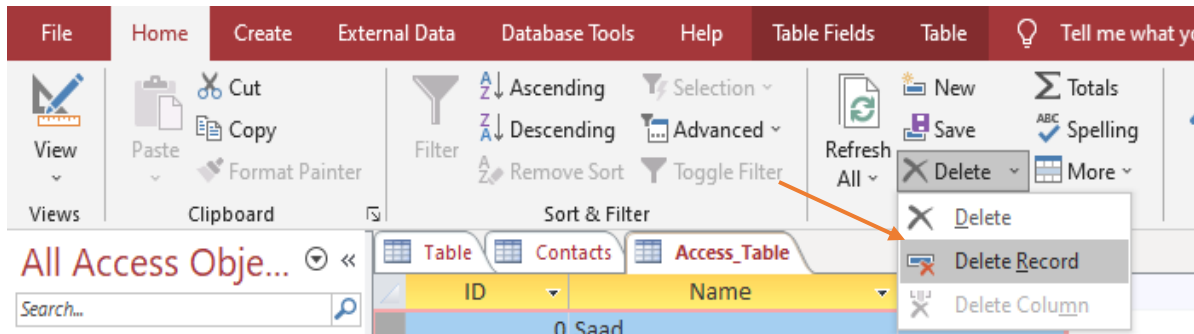


Fig. 18 (Delete Record)

### Define a Primary Key:

A primary key is a column that uniquely identifies a record or row in a table. Customer IDs, serial numbers, or product IDs usually make good primary keys. Each table should have a primary key, and some tables might have two or more. When you divide information into separate tables, the primary keys help Access bring the information back together again.

- On the **“Home”** tab, in the **“Views”** group, click the bottom half of the **“View”** button
- Select **“Design View”**

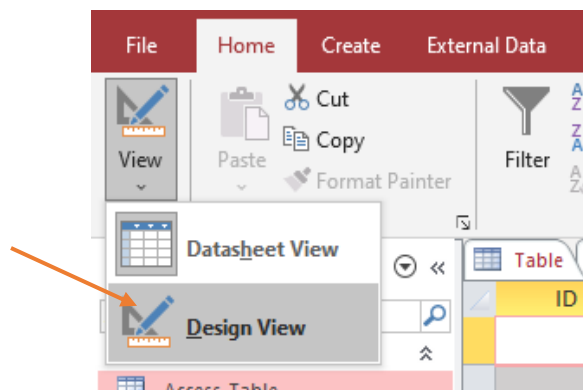


Fig. 19 (Change View)

- Click the **“Row Selector”** box beside the **“ID”** row to select the row

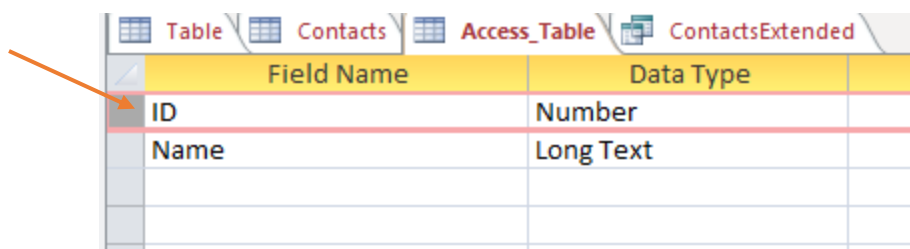


Fig. 20 (Row Selector)

- On the **“Design”** tab, in the **“Tools”** group, click the **“Primary Key”** button.

The Primary Key button is highlighted. A key icon appears on the **“ID”** row to designate the field as a primary key.

Two or more primary keys in a table are called the **“composite key”**.

### Find & Replace Data:

- On the **“Home”** tab, in the **“Find”** group, click the **“Find”** button. The **“Find and Replace”** dialog box appears with the **“Find”** tab displayed

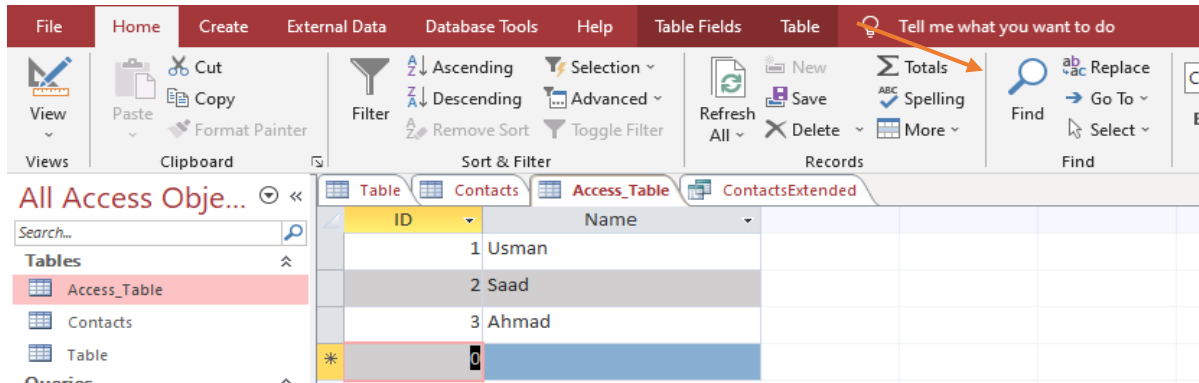


Fig. 21 (Find & Replace)

- Click the **“Replace”** tab in the **“Find and Replace”** dialog box
- Type **“Ahmad”** into **“Find What”** box
- Type **“Ali”** into **“Replace With”** box
- Click the down arrow beside the **“Look In”** menu, and then select **“Current document”** if it is not already selected
- Click the down arrow beside the **“Match”** menu and then select **“Any Part of Field”** if it already is not selected

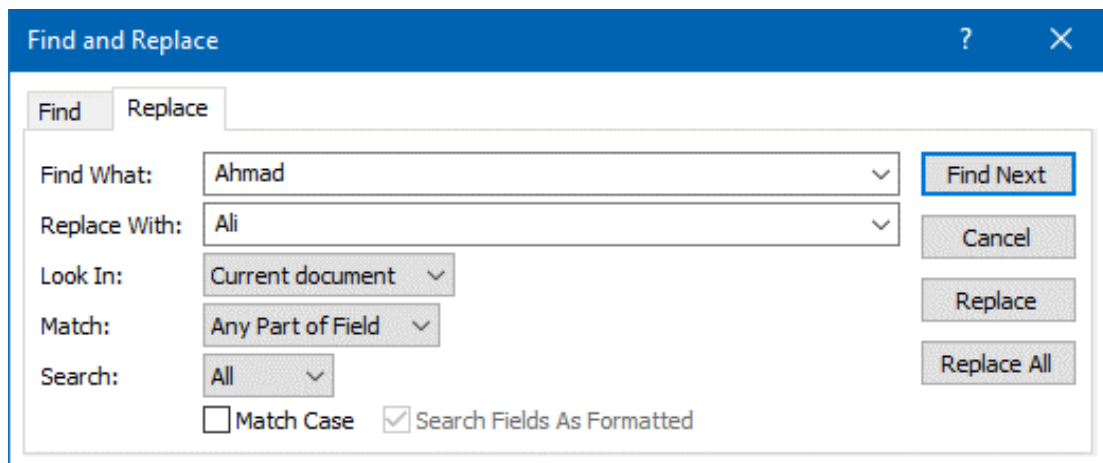


Fig. 22 (Find & Replace dialog)

- Click the **“Find Next”** button
- Click **“Replace”** button
- Click **“Cancel”** to close the **“Find and Replace”** dialog box

ID	Name
1	Usman
2	Saad
3	Ali
*	0

Fig. 23 (Find &amp; Replace)

**Sort Data within a Table :**

- Click the header row of the “ID” field to select it
- On the “Home” tab, in the “Sort & Filter” group, click the “Descending” button. The data is sorted from largest to smallest
- Select “View Macros” from the drop-down list

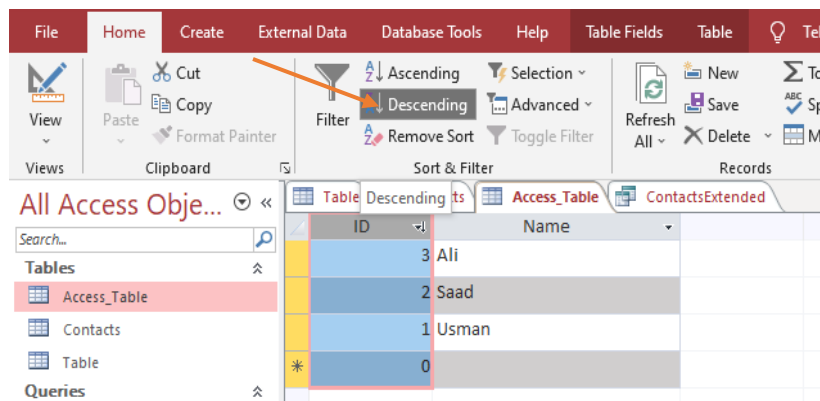


Fig. 24 (Sort data)

**Filter Data:**

- Select the “Name” field
- “Right click” and select “text filters” from shortcut menu
- Click “Begins With...”

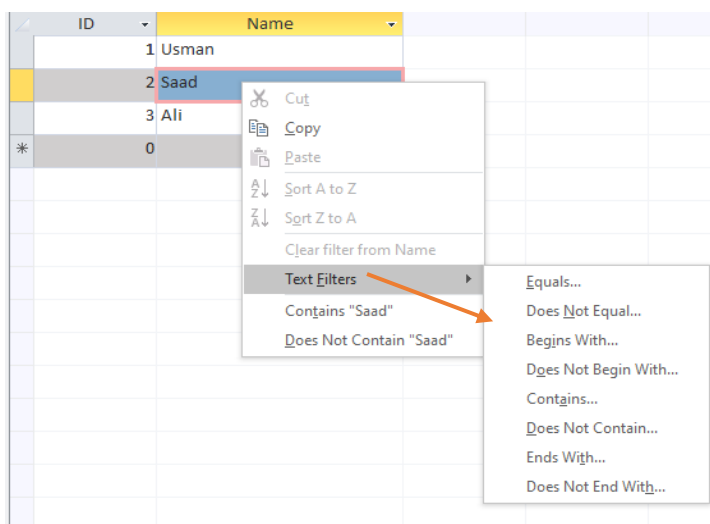


Fig. 25 (Filter data)



“Custom Filter” dialog box opens.

- Enter “S” in “Name begins with” field
- Click “OK”

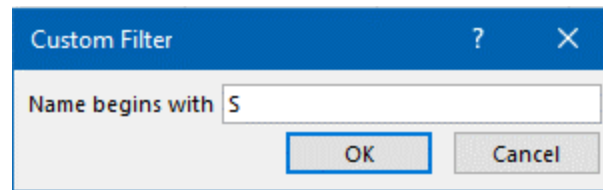


Fig. 26 (Custom Filter dialog)

Filtered Data will be shown.

Table		Contacts	Access_Table	ContactsExtended
ID	Name			
2	Saad			
0				

Fig. 27 (Filter data)

### Define Table Relationships:

You can create three types of relationships in Access tables: one-to-one, one-to-many, and many-to-many. In a one-to-one relationship, both tables have a common field with the same data. A one-to-many relationship is more common, because each record in the first table can have many records in the second table. In a many-to-many relationship, many records in the first table can have many records in the second table.

- On the “Database Tools” tab in the “Relationships” group, click the “Relationships” button

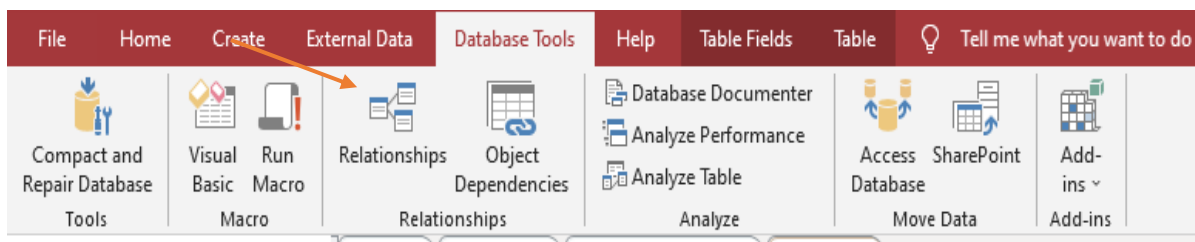


Fig. 28 (Table Relationships)

“Show Table” dialog appears.

- Select “Student”
- Click “Add”
- Select “Contacts”
- Click “Add”

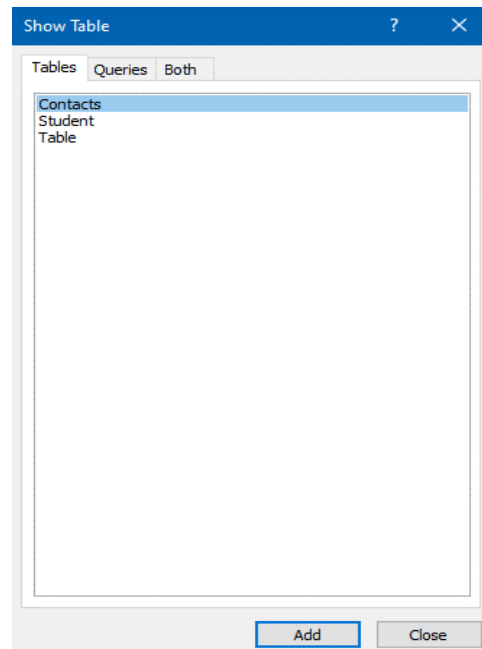


Fig. 29 (Show Table dialog)

- Click the **“ID”** primary key field in the **“Student”** table, drag it to the **“ID”** field of the **“Contacts”** table, and then release the mouse button. The **“ID”** field represents the common field between the two tables
- The **“Edit Relationships”** dialog box appears
- Select the **“Enforce Referential Integrity”**, **“Cascade Update Related Fields”**, and **“Cascade Delete Related Records”** check boxes

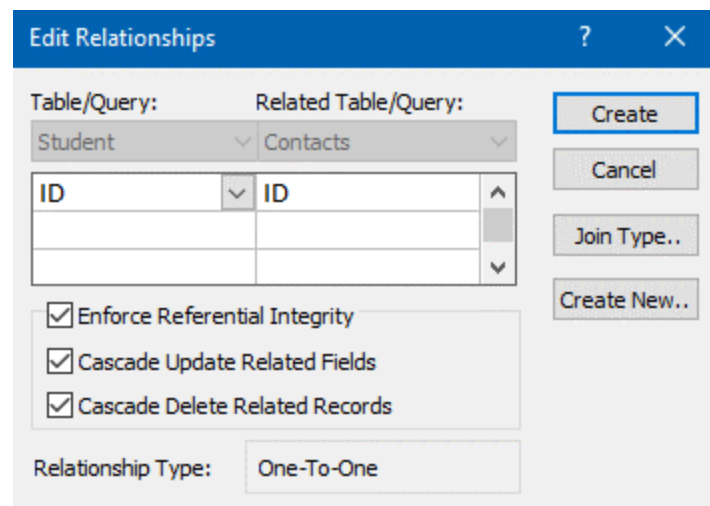


Fig. 30 (Edit Relationships dialog)

- Click **“Create”**

A relationship line representing the one-to-one table relationship of the Student and the Contacts tables is displayed

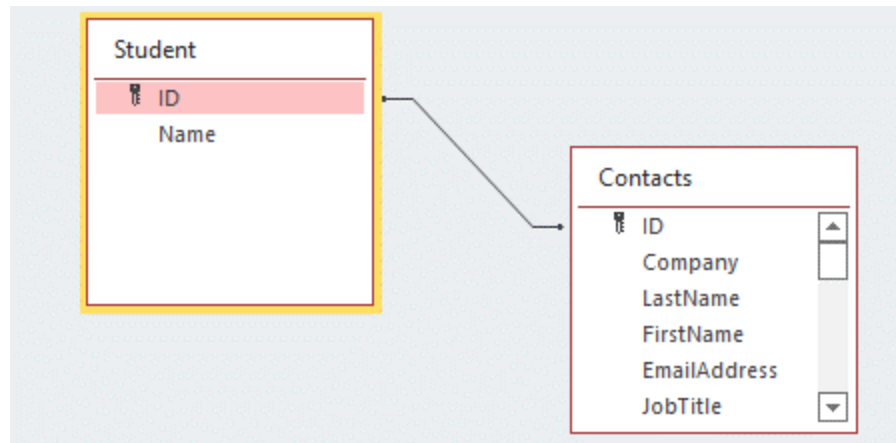


Fig. 31 (Table Relationships)

### Define Input Masks:

An input mask whenever you want users to enter data in a specific way. An input mask can require users to enter dates in a specific format, for example, DD-MM-YYYY, or telephone numbers that follow the conventions for a specific country.

- In the Field Name column in the upper portion of the table design grid, click in the **“Date”** cell
- Click the Input Mask property box in the lower portion of the table design grid to display the **“Input Mask Wizard”** button (“...”) on the far right of the cell

ID	Number
Name	Long Text
Date	Date/Time

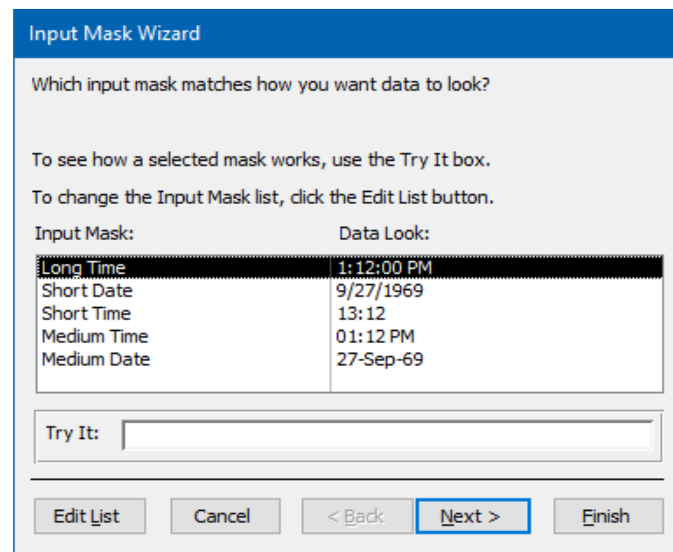
Field Properties

General Lookup

Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No

Fig. 32 (Input Masks)

“Input Mask Wizard” dialog appears.



The Input Mask Wizard dialog box is shown. It has a blue title bar and a light gray background. The text inside says: "Which input mask matches how you want data to look?" followed by instructions: "To see how a selected mask works, use the Try It box." and "To change the Input Mask list, click the Edit List button." Below this is a table with two columns: "Input Mask:" and "Data Look:". The table contains the following rows:

Input Mask:	Data Look:
Long Time	1:12:00 PM
Short Date	9/27/1969
Short Time	13:12
Medium Time	01:12 PM
Medium Date	27-Sep-69

Below the table is a "Try It:" text box. At the bottom are five buttons: "Edit List", "Cancel", "< Back", "Next >", and "Finish". The "Next >" button is highlighted with a blue border.

Fig. 33 (Input Mask Wizard dialog)

- Click “**Medium Date**” to select the “**DD-MON-YR**” date format and then click “**Next**”
- Click “**Next**” to accept the default settings
- Click “**Finish**”



The Input Mask configuration table is shown. It has two tabs: "General" and "Lookup". The "General" tab is selected. The table has the following rows:

Format	
Input Mask	99:00:00\ > LL;0;_
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Indexed	No
IME Mode	No Control
IME Sentence Mode	Phrase Predict
Text Align	General

An orange arrow points to the "Input Mask" cell.

Fig. 34 (Input Mask)

### Create a Simple Form:

- Open the “**Contacts**” table
- On the “**Create**” tab, in the “**Forms**” group, click the “**Form**” button. Access creates the form and displays it in Layout view

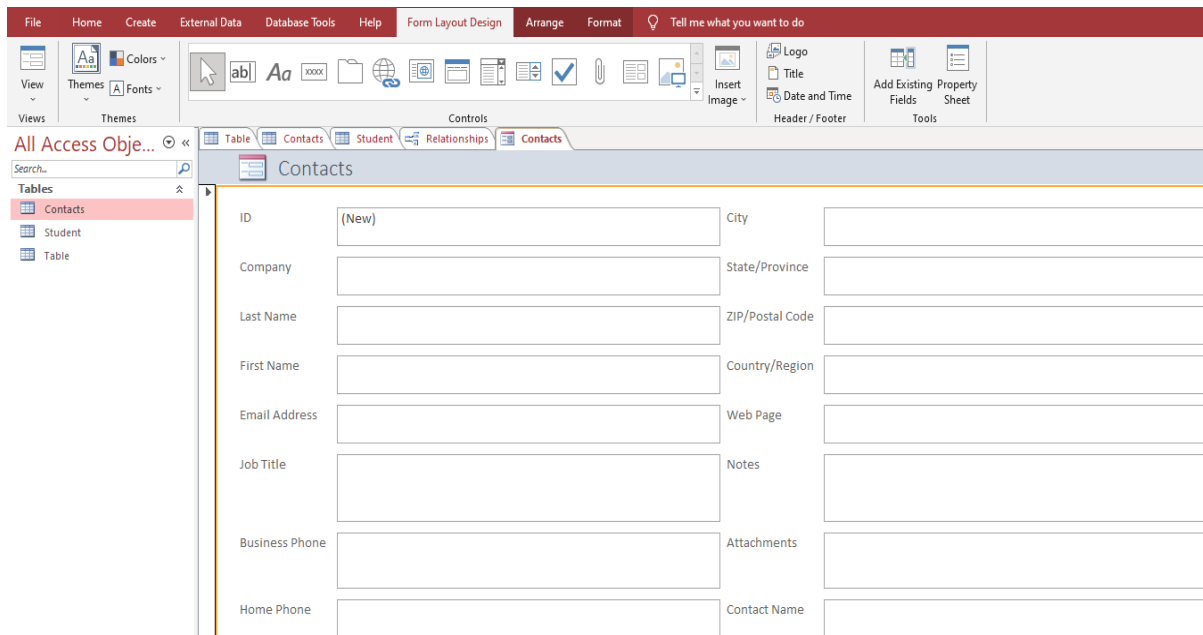


Fig. 35 (Creating Form)

- Click the **“File”** tab and then click **“Save”**

#### Apply a Theme:

- Double-click the **“Contacts”** form in the Navigation Pane to open it
- On the **“Home”** tab, in the **“Views”** group, click the lower half of the View button and then click **“Layout View”** on the **“View”** menu

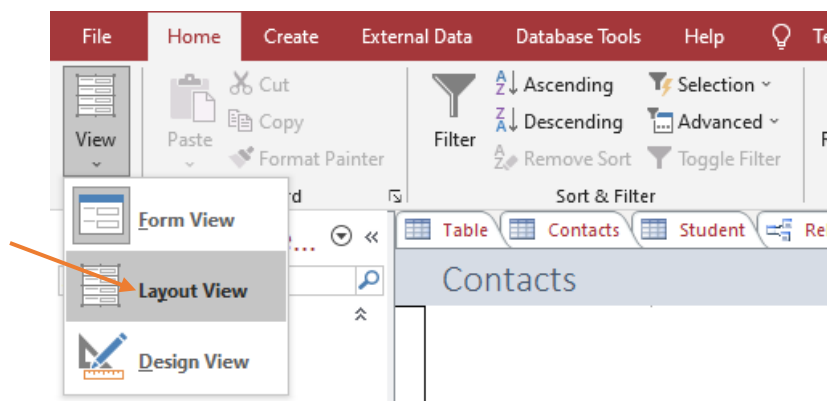


Fig. 36 (Form themes)

- On the **“Form Layout Tools Design”** contextual tab, in the **“Themes”** group, click the **“Themes”** button

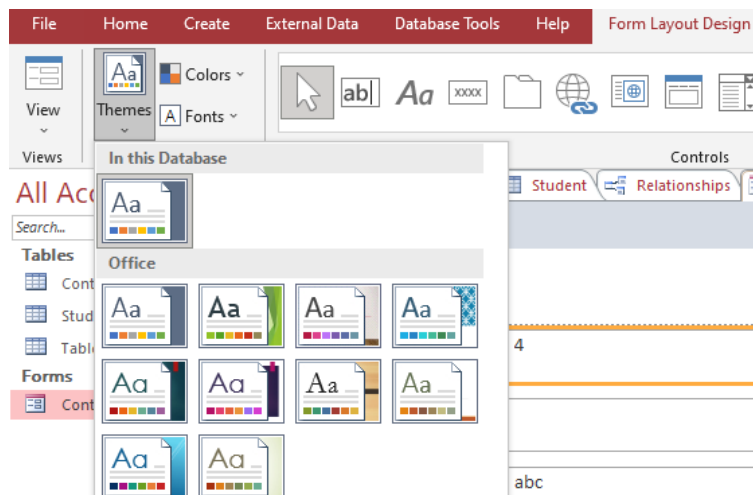


Fig. 37 (Form Themes)

- Click **“Integral”** theme to apply it to the form

Fig. 38 (Form Themes)

### Create Reports:

Reports are commonly used as formatted hard copies of table or query data. You can modify a report's design, but you cannot add or edit data in a report. The purpose of a report is to allow users to view data, not edit it

- . In the Navigation Pane, click the **“Contacts”** table to select it
- . On the **“Create”** tab, in the **“Reports”** group, click the **“Report”** button

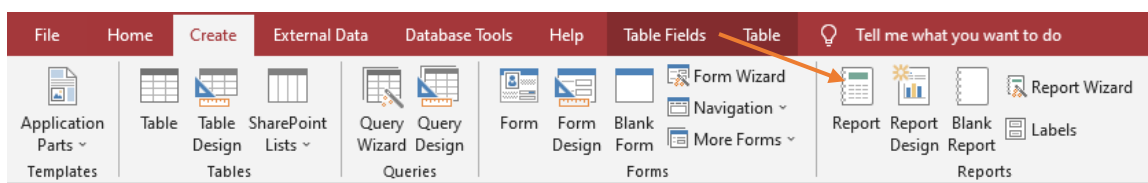
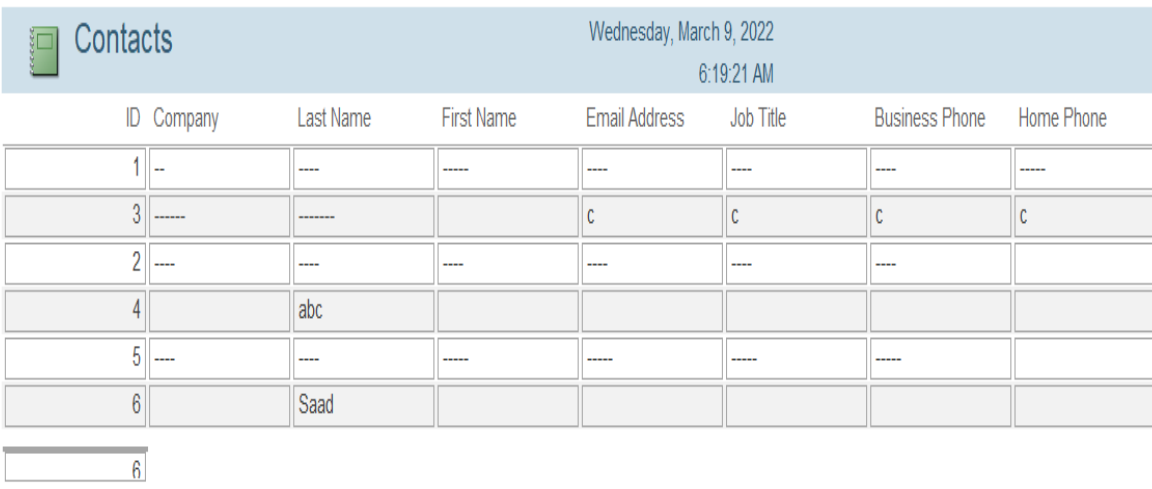


Fig. 39 (Creating Report)

The report will be displayed.



ID	Company	Last Name	First Name	Email Address	Job Title	Business Phone	Home Phone
1	--	---	---	---	---	---	---
3	-----	-----	-----	c	c	c	c
2	---	---	---	---	---	---	---
4	---	abc	---	---	---	---	---
5	---	---	---	---	---	---	---
6	---	Saad	---	---	---	---	---

Fig. 40 (Creating Report)

### Apply a theme:

- Double-click the **“Contacts”** report in the Navigation Pane to open it
- On the **“Home”** tab, in the **“Views”** group, click the lower half of the View button and then click **“Layout View”** on the **“View”** menu

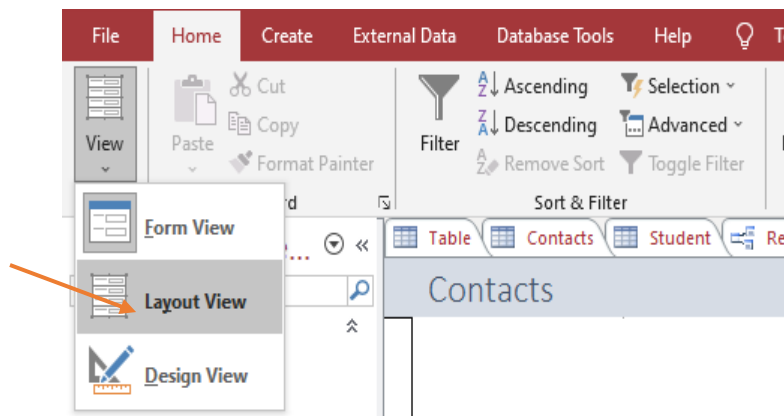


Fig. 41 (Change View)

- On the **“Report Layout Design”** contextual tab, in the **“Themes”** group, click the **“Themes”** button

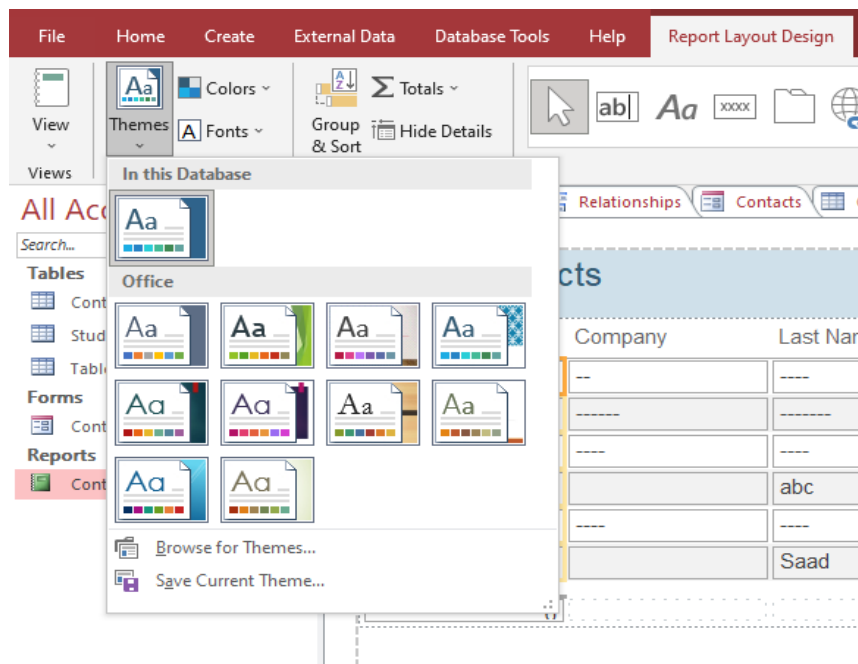


Fig. 42 (Report Themes)

- Click “Integral” theme to apply it to the report

The screenshot shows the 'Contacts' report with the 'Integral' theme applied. The report has a blue header bar with the title 'Contacts' and a green icon. Below the header is a table with three columns: 'ID', 'Company', and 'Last Name'. The table contains six rows of data. The first row is highlighted with an orange border. The second row is highlighted with a yellow border. The third row is highlighted with a yellow border. The fourth row is highlighted with a yellow border. The fifth row is highlighted with a yellow border. The sixth row is highlighted with a yellow border. The table is shown in a preview mode with a dashed border.

ID	Company	Last Name
1	--	---
3	----	-----
2	----	---
4		abc
5	----	---
6		Saad

Fig. 43 (Report Themes)



**Task 01: Teacher Student Relation****[20 minutes / 20 marks]**

Teacher_ID ▾	Name ▾	No_of_Courses ▾	Click to Add ▾
*	(New)	0	

Fig. 44 (In-Lab task)

Student_ID ▾	Name ▾	Subject ▾	Teacher_ID ▾	Click to Add ▾
1	Saad	ICT	2	
*	(New)		0	

Fig. 45 (In-Lab task)

- Create two tables, “Teachers” and “Students” respectively as shown above in the figures
- There should be “ten” entries in the “Students” table and three entries in the “**Teachers**” table
- Make “**Student\_ID**” primary key in the “**Students**” table
- Make “**Teacher\_ID**” primary key in the “**Teachers**” table
- Add a relationship between tables on the basis of “**Teacher\_ID**”
- Name access file with “**Your Roll No**”
- Email the file to the TA, the subject should be “**Lab 09\_Task 01\_Your Roll No**”

**Task 02: Formatting & Creating Forms and Reports****[20 minutes / 30 marks]**

- For the Tables in the above task, create Forms & Reports respectively
- The theme for Reports & Forms should be “**Organic**”
- Filter “**Name**” columns of tables on the basis on names which “**contains A**”
- Name access file with “**Your Roll No**”
- Email the file to the TA, the subject should be “**Lab 09\_Task 02\_Your Roll No**”

**Post-Lab activities:****Task 01: Customers Record****[Estimated time 30 minutes / 40 marks]**

- Create Table:
  - Named “**Customers**”
  - You should have at last 10 Customers with their information included in the table
- Table Fields:
  - ID (Primary Key)
  - First Name
  - Last Name
  - City
  - Address
  - Date of Purchase
  - Amount of Purchase
- Sort table by “**City**” field in “**Descending Order**”
- Apply “**Input Mask**” on “**Date of Purchase**” of your own choice
- Create “**Report**” of the “**Customers**” table
- Create “**Form**” of the “**Customers**” table
- Apply “**Wisp**” theme on Report and Form

**Submissions:**

- For Pre-Lab Activity: Perform Pre-Lab as mentioned above. Save the respective document in folder “RollNo\_Pre-Lab-09”. Then zip the whole folder (RollNo\_Pre-Lab-09.zip), and email it to your respective TA.
- For In-Lab: Perform mentioned tasks of In-Lab activity. Make a folder on Desktop by the name “RollNo\_In-Lab-09”. Then save each document in folder “RollNo\_In-Lab-09”.
- For Post-Lab Activity: Perform Post-Lab as mentioned above. Save the respective document in folder “RollNo\_Post-Lab-09”. Then zip the whole folder (RollNo\_Post-Lab-09.zip), and email it to your respective TA.

**Evaluations Metric:**

- All the Lab tasks will be evaluated offline by TA’s.
- Division of Pre-Lab tasks: [20 marks]
  - Task 01 (Creating Tables) [20 marks]
- Division of In-Lab tasks: [40 marks]
  - Task 01 (Teacher-Student Relation) [20 marks]
  - Task 02 (Creating Reports and Forms) [20 marks]
- Division of Post-Lab tasks: [40 marks]
  - Task 01 (Customers Record) [40 marks]

**References and Additional Material:**

- Mary Lemons, Microsoft Official Academic Course, Microsoft Access 2016, Wiley Publisher, 2016. ISBN: 978-111-927443-8.  
[https://drive.google.com/drive/u/1/folders/1V9nh8WIKOIQvi\\_ig98\\_YCaP7Vvei-tQz](https://drive.google.com/drive/u/1/folders/1V9nh8WIKOIQvi_ig98_YCaP7Vvei-tQz)
- Learn Microsoft ® Access:  
<https://support.microsoft.com/en-us/access>

**Lab Time Activity Simulation Log:**

- Slot – 01 – 00:00 – 00:15: Settlement and attendance
- Slot – 02 – 00:15 – 00:30: Demonstration on screen (Microsoft ® Access)
- Slot – 03 – 00:30 – 00:45: Demonstration on screen (Microsoft ® Access)
- Slot – 04 – 00:45 – 01:00: Demonstration on screen (Microsoft ® Access)
- Slot – 05 – 01:00 – 01:15: Demonstration on screen (Microsoft ® Access)
- Slot – 06 – 01:15 – 01:30: Demonstration on screen (Microsoft ® Access)
- Slot – 07 – 01:30 – 01:45: Demonstration on screen (Microsoft ® Access)
- Slot – 08 – 01:45 – 02:00: Discussion on In-Lab Task
- Slot – 09 – 02:00 – 02:15: In-Lab Tasks
- Slot – 10 – 02:15 – 02:30: In-Lab Tasks
- Slot – 11 – 02:30 – 02:45: In-Lab Tasks
- Slot – 12 – 02:45 – 03:00: Discussion on Post-Lab Task