

**GE-161L**

**Introduction to Information and Communication Technologies**

**Laboratory 11**

**Introduction to Microsoft ® Access – III**

**Version: 1.0.0**

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**Department of Information Technology**

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**Lahore, Pakistan**

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**Learning Objectives:**

- Sub-Query in Microsoft ® Access
- Advance Queries in Microsoft ® Access
- Joins in Microsoft ® Access
- Charts 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:

#### Task 01: Prerequisite for In-Lab

[Estimated 15 minutes / 10 marks]

- Create a Table named “**Students**”
- “**Students**” table should have following fields
  - ID
  - First Name
  - Last Name
  - Email
  - Fee

Add Record of minimum “**30**” Students

- Create a Table named “**Student Attendance**”
- “**Student Attendance**” table should have following fields
  - ID
  - Attendance Date
  - Status (Absent, Present)
  - Student ID
  - Subject
- Add attendance details for each student in “**ICT**” & “**ICT Lab**” Subjects respectively
- Create a Multi Table Query between “**Student**” and “**Student Attendance**” table as done in In-Lab 10
- 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-Lab11**”

## In-Lab Activities:

### Creating a Sub-Query:

- On the “Create” tab, in the “Queries” group, click the “Query Design” button

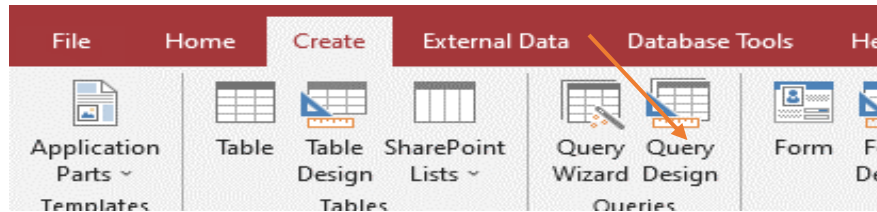


Fig. 1 (Creating Sub Query)

The “Show Table” dialog box appears.

- On the “Tables” tab, click “Students”, click “Add”, and then click “Close”

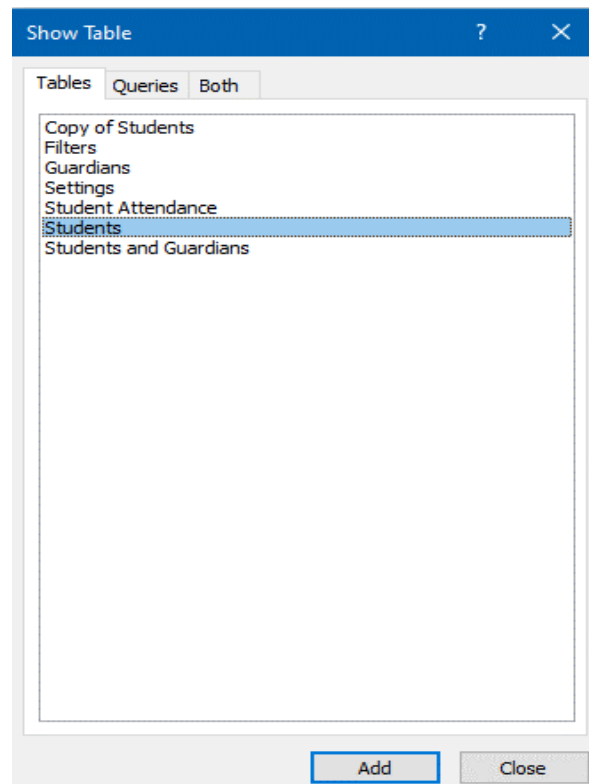


Fig. 2 (Show Table dialog)

The table field list appears as a window in the upper section of the query design grid.

- In the list of table fields, double-click “First Name”, “Last Name”, “E-mail Address”, and “Fee” to add those fields to the design grid at the bottom of the page

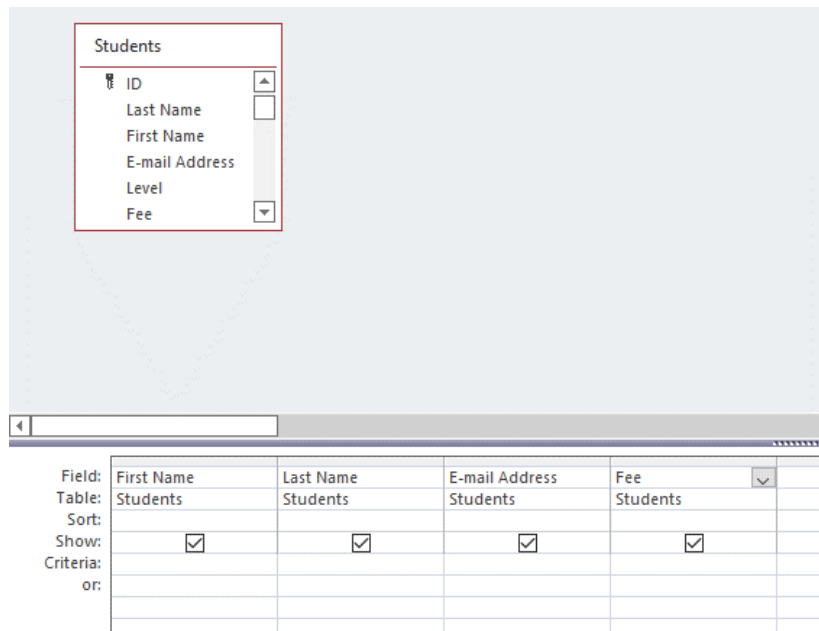


Fig. 3 (Design View)

- Place the insertion point in the Criteria row of the “Fee” field and then press “Shift+F2” to display the “Zoom dialog” box
- Type the following expression in the Zoom dialog box> “>(SELECT Min(Fee) FROM Students)” which eventually return Students with fees greater than the minimum fee
- Click “OK”

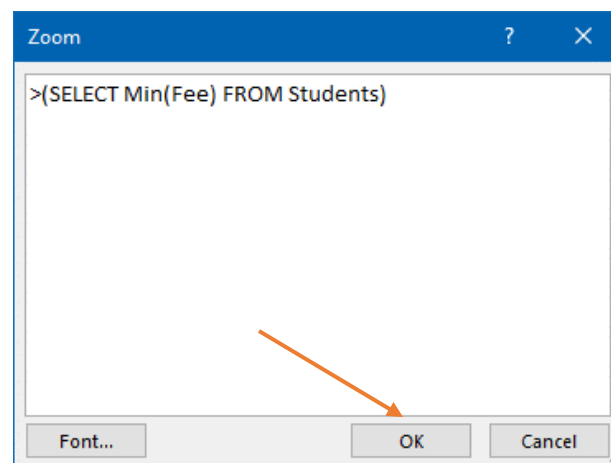


Fig. 4 (Zoom dialog)

- On the “Query Design” tab, in the “Results” group, click “Run”. The query results are displayed

	First Name	Last Name	E-mail Address	Fee
	John	Stewart	john@yahoo.com	1000
	Saad	Rahman	bsef19m021@pucit.edu.p	2000
*				

Fig. 5 (Sub Query)

**Sub-Query in SQL View:**

- On the “**Create**” tab, in the “**Queries**” group, click the “**Query Design**” button

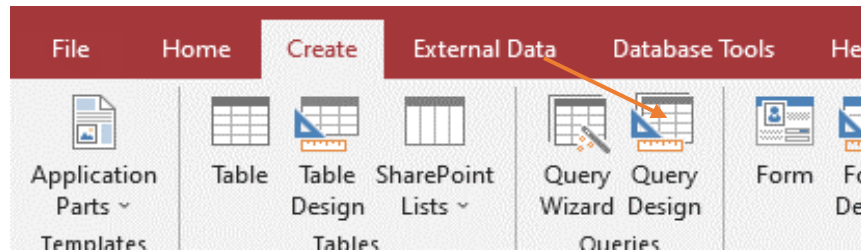


Fig. 6 (Sub Query)

The “**Show Table**” dialog box appears.

- On the “**Tables**” tab, click “**Students**”, click “**Add**”, and then click “**Close**”

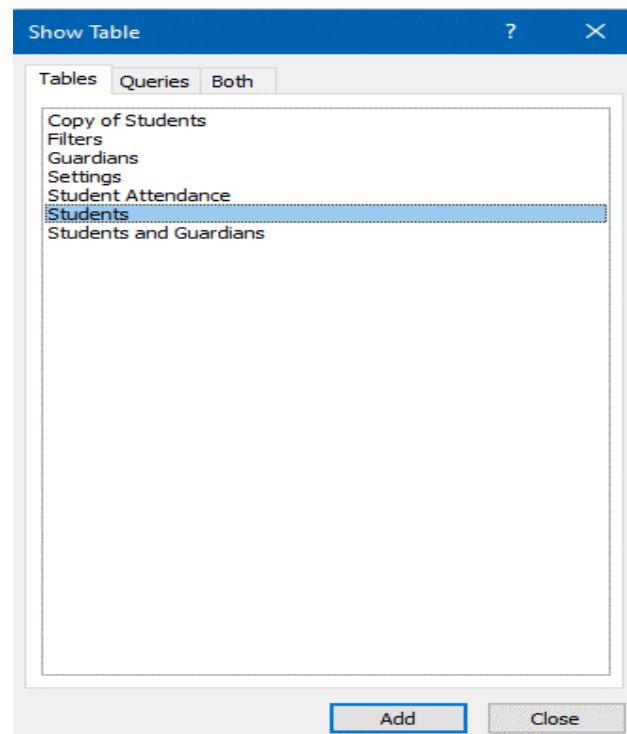


Fig. 7 (Show Table Dialog)

- On the “**Query Design**” tab, in the “**Results**” group, click “**View**” and select the “**SQL view**”

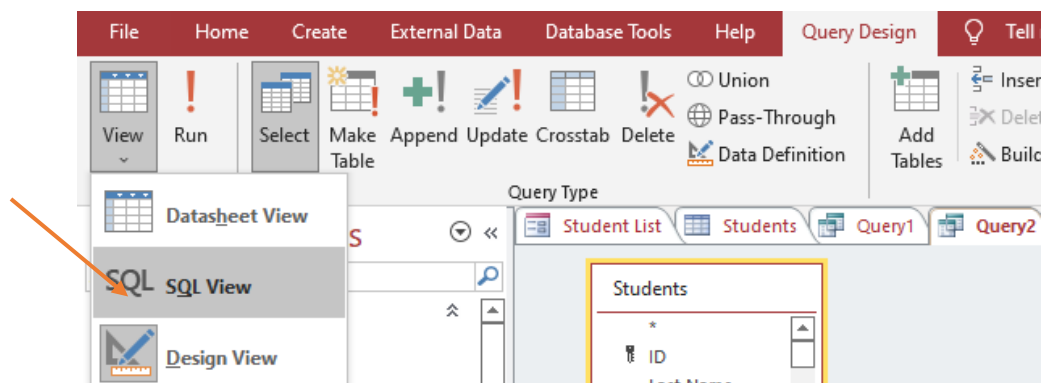




Fig. 8 (SQL View)

- Type the following query “**SELECT \* FROM Students WHERE (((Fee)=(SELECT Min(Fee) FROM Students))));**”, which selects the students with minimum fee
- On the “**Query Design**” tab, in the “**Results**” group, click “**Run**”

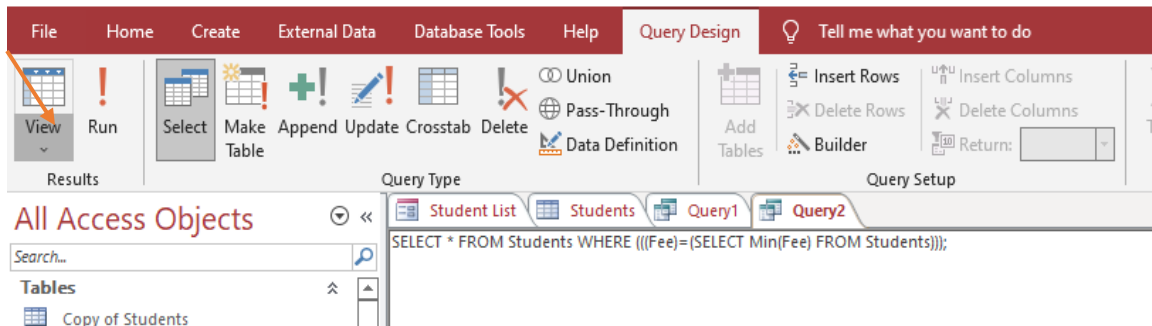


Fig. 9 (SQL View)

The query results will be displayed.

ID	Last Name	First Name	E-mail Address	Level	Fee	Date of Birth	ID Number	H
5	Rahman	Saad	bsef19m021@pucit.edu.p		5000			
*(New)					0			

Fig. 10 (SQL View)

### Make Table Query:

- Right-click the “**Students Query**” document tab and then choose “**Design View**” to display the query in Design view
- On the “**Query Design**” tab, in the “**Query Type**” group, click “**Make Table**”

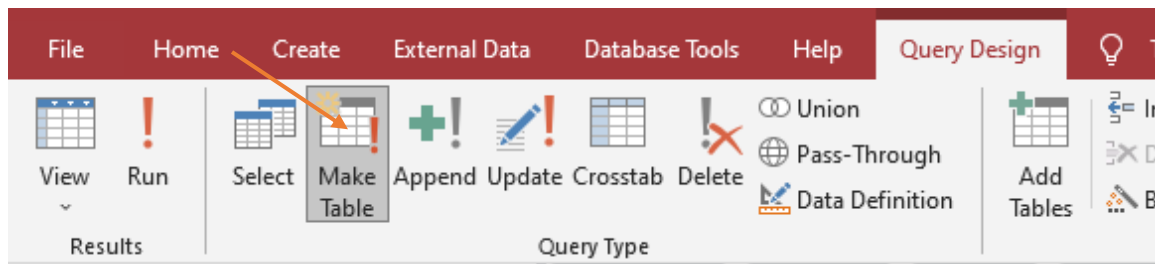


Fig. 11 (Make Table Query)

The Make Table dialog box appears.

- In the “**Table Name**” box, type “**Students Backup**”
- Click “**OK**”

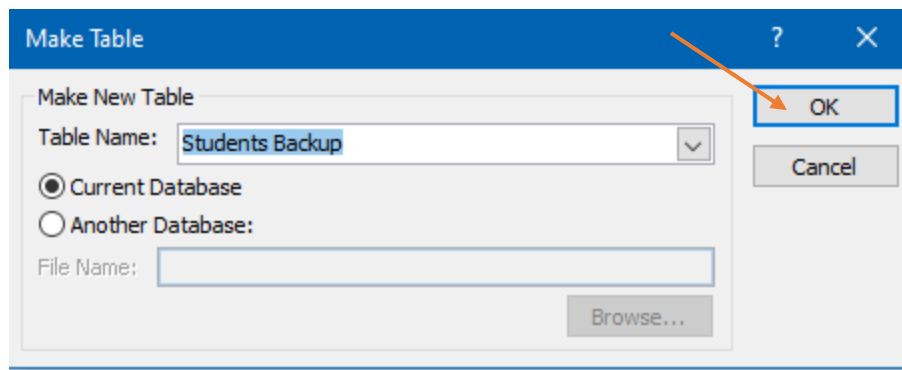


Fig. 12 (Make Table dialog)

- On the **“Design”** tab, in the **“Results”** group, click **“Run”**

A new table named Students Backup appears in the Navigation Pane.

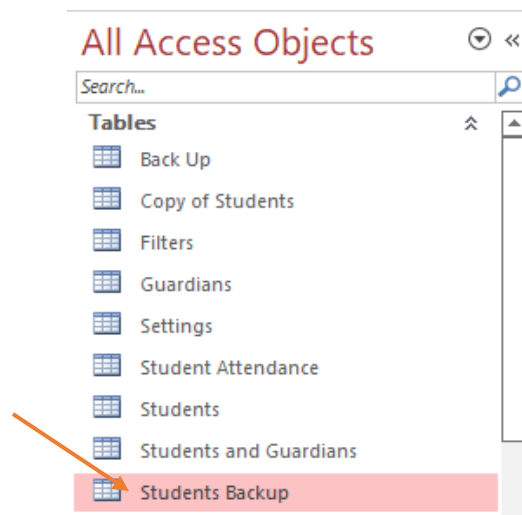


Fig. 13 (Navigation Pane)

#### Delete Query:

- Right-click the **“Student Backup Query”** document tab and then choose **“Design View”** to display the query in Design view
- Type **“John”** in the Criteria row of the **“First Name”** field

Field:	[ID]	[First Name]	[Last Name]
Table:	Students Backup	Students Backup	Students Backup
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		John	
or:			

Fig. 14 (Delete Query)

- On the **“Design”** tab, in the **“Query Type”** group, click **“Delete”**

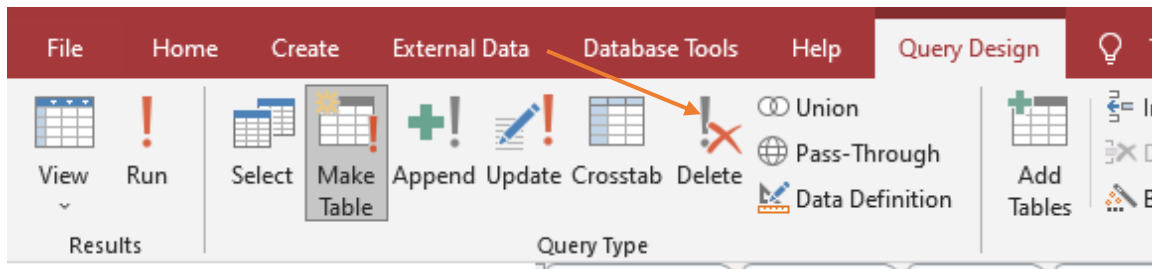


Fig. 15 (Delete Query)

- On the “**Design**” tab, in the “**Results**” group, click “**Run**”

An alert message appears, asking if you are sure you want to delete the selected records.

- Click “**Yes**”
- Double-click “**Students Backup: Table**” in the Navigation Pane to open it. Notice that all the records for students with First Name “**John**”, have been deleted

ID	First Name	Last Name
#Deleted	#Deleted	#Deleted
3	Saad	Rahman
5	Saad	Rahman
*	(New)	

Fig. 16 (Delete Query)

#### Delete in SQL View:

- Open “**Student Query**”
- On “**Home Tab**” under “**Views**” group, select “**SQL View**” from dropdown

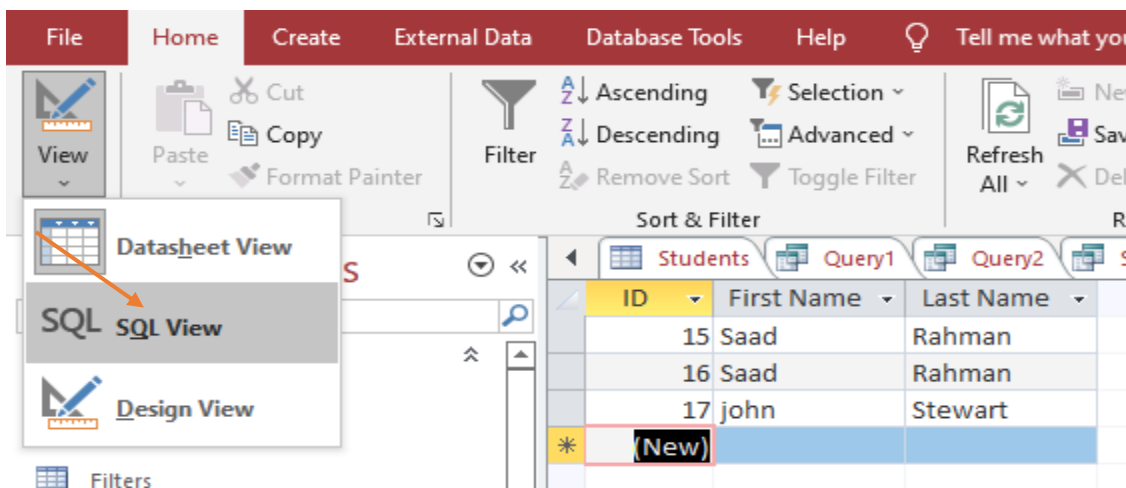


Fig. 17 (Delete SQL View)

- Type the following query: “**DELETE \* FROM Students WHERE (((Students.[Fee])>5000));**”, which deletes students with fee greater than 5000
- On the “**Design**” tab, in the “**Query Type**” group, click “**Delete**”

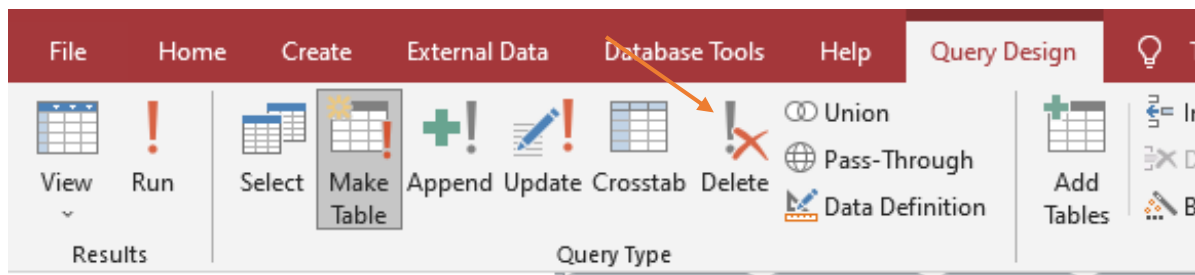


Fig. 18 (Delete SQL View)

- On the “**Design**” tab, in the “**Results**” group, click “**Run**”

An alert message appears, asking if you are sure you want to delete the selected records.

- Click “**Yes**”
- Double-click “**Students: Table**” in the Navigation Pane to open it. Notice that all the records for students with “**Fee greater than 5000**”, have been deleted

	ID	Last Name	First Name	E-mail Address	Level	Fee	D
+	15	Rahman	Saad			5000	
+	#Deleted	#Deleted	#Deleted	#Deleted	#Deleted	#Deleted	
*	(New)					0	
	Total						

Fig. 19 (Delete SQL View)

### Inner Join Query:

An inner join includes rows in the query only when the joined field matches records in both tables. Inner joins are the most common type of join. Most of the time, you don’t need to do anything to use an inner join. Access automatically creates inner joins if you add two tables to a query and those tables each have a field with the same name and the same or compatible data type and one of the join fields is a primary key.

- Right-click the “**Students Attendance Query**” document tab and then choose “**Design View**” to display the query in Design view
- Double-click the “**join line**” between the tables, indicating which fields are joined

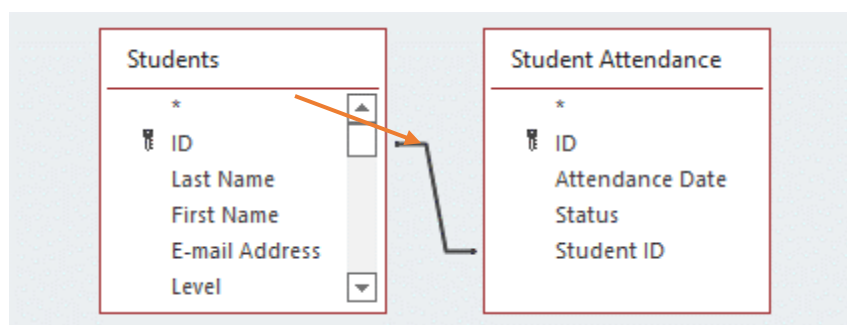


Fig. 20 (Table Relationship)

“**Join Properties**” dialog will appear.

- First option is selected by default. If not then select the first option
- Click “**OK**”

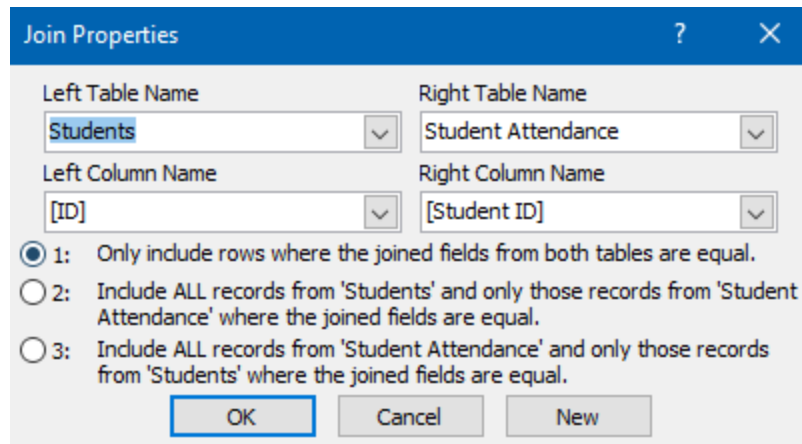


Fig. 21 (Join Properties dialog)

- On the “Query Design” tab, in the “Results” group, click “Run”

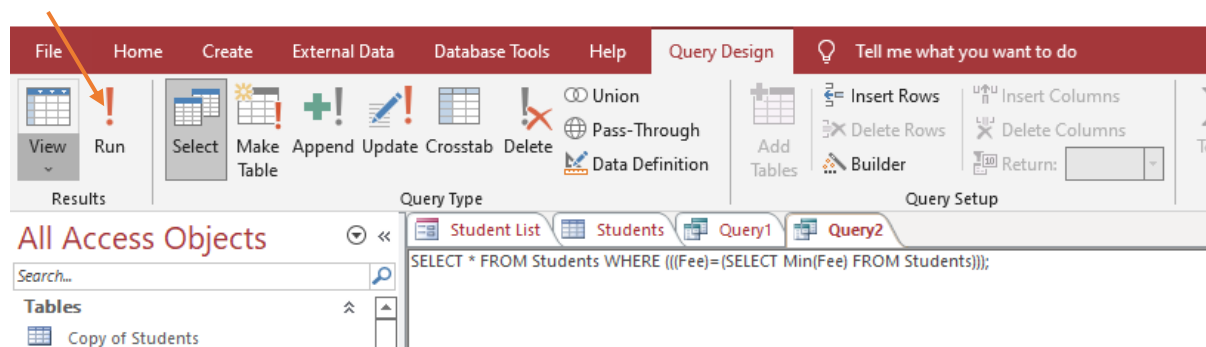


Fig. 22 (Run Query)

Rows will be displayed where join fields in both table matches.

First Name	Last Name	Attendance Date	Status
Saad	Rahman	8/24/2015	Absent - Excused
Saad	Rahman	8/26/2015	Present

Fig. 23 (Inner Join Query)

### Left Outer Join:

In Left Outer Join, the query includes all of the rows from the table on the left and only those records from the table on the right that match the join field in the left table.

- Right-click the “Students Attendance Query” document tab and then choose “Design View” to display the query in Design view
- Double-click the “join line” between the tables, indicating which fields are joined

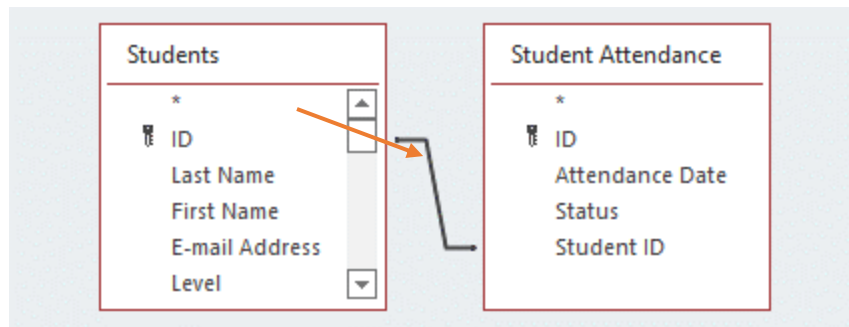


Fig. 24 (Table Relationship)

“Join Properties” dialog will appear.

- First option is selected by default. Select “Option 2”
- Click “OK”

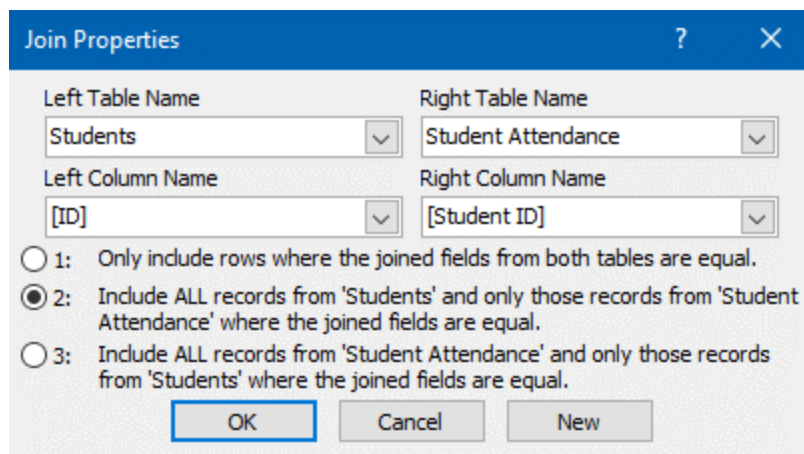


Fig. 25 (Join Properties dialog)

- On the “Query Design” tab, in the “Results” group, click “Run”

All rows from Students table will be displayed and only those fields will be displayed from Student Attendance where join fields are equal.

	First Name	Last Name	Attendance Date	Status
	Saad	Rahman	8/24/2015	Absent - Excused
	Saad	Rahman	8/26/2015	Present
	John	Stewart		
*				

Fig. 26 (Left Outer Join Query)

### Right Outer Join:

In Right Outer Join, the query includes all of the rows from the table on the right and only those rows from the table on the left that match the join field in the right table

- Right-click the “Students Attendance Query” document tab and then choose “Design View” to display the query in Design view
- Double-click the “join line” between the tables, indicating which fields are joined

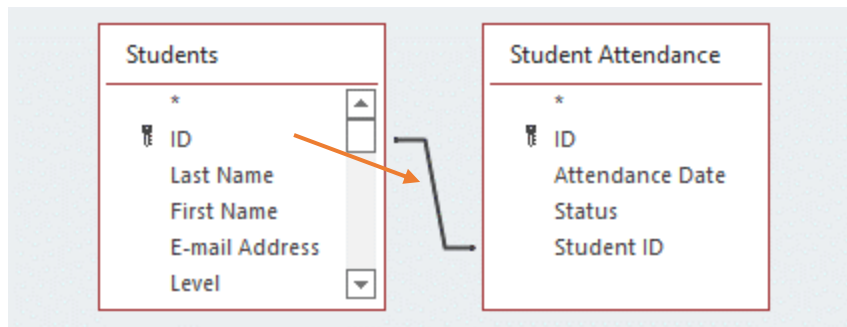


Fig. 27 (Table Relationship)

“Join Properties” dialog will appear.

- First option is selected by default. Select “Option 3”
- Click “OK”

Fig. 28 (Join Properties dialog)

- On the “Query Design” tab, in the “Results” group, click “Run”

All rows from Student Attendance table will be displayed and only those fields will be displayed from Student where join fields are equal.

First Name	Last Name	Attendance Date	Status
		8/25/2015	Absent - Unexcused
		8/27/2015	Present
		8/23/2015	Present
		8/22/2015	Present
		8/2/2016	Present
Saad	Rahman	8/24/2015	Absent - Excused
Saad	Rahman	8/26/2015	Present
*			

Fig. 29 (Right Outer Join Query)

### Create a Chart:

- Double-click the “Students” report in the Navigation Pane to open it
- Change to “Design” view

- Expand the “Page Footer” Section

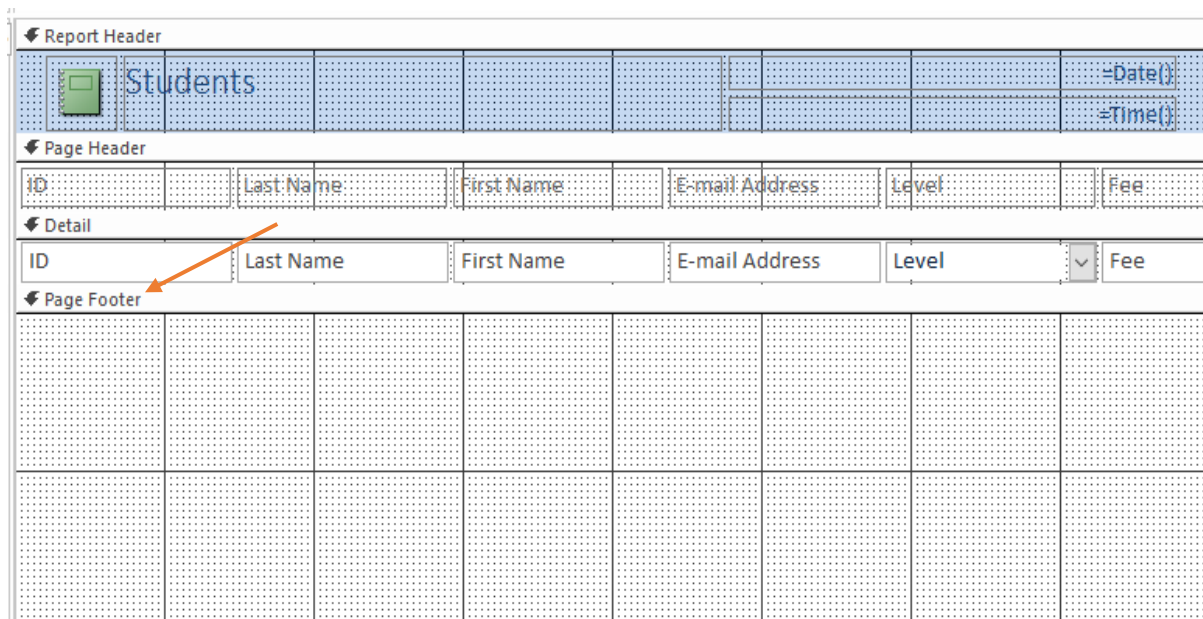


Fig. 30 (Page Footer)

- On the “Report Design” tab, in the “Controls” group, click the “Chart” button

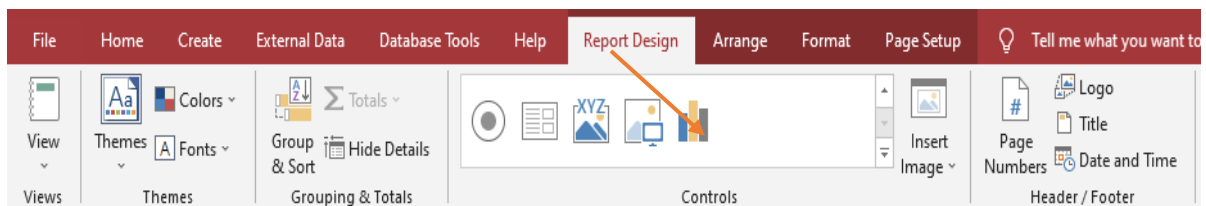


Fig. 31 (Chart)

The pointer changes to a plus sign with a chart icon

- Click in the upper-left corner of the Page Footer section, hold the mouse button, and drag to the lower-right corner to create a rectangular placeholder where the chart will be inserted
- Release the mouse button

The “Chart Wizard” dialog box will appear.

- Select the “Students” table as your data source
- Click the “Next” button



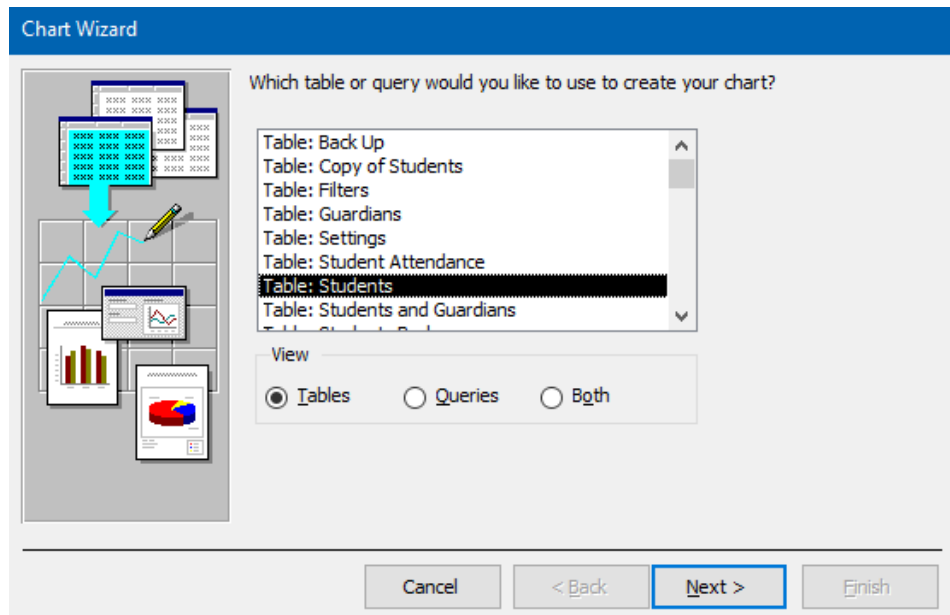


Fig. 32 (Chart Wizard dialog)

- Click the “>>” button to move all the fields to the “**Fields for Chart**” box
- Click the “**Next**” button

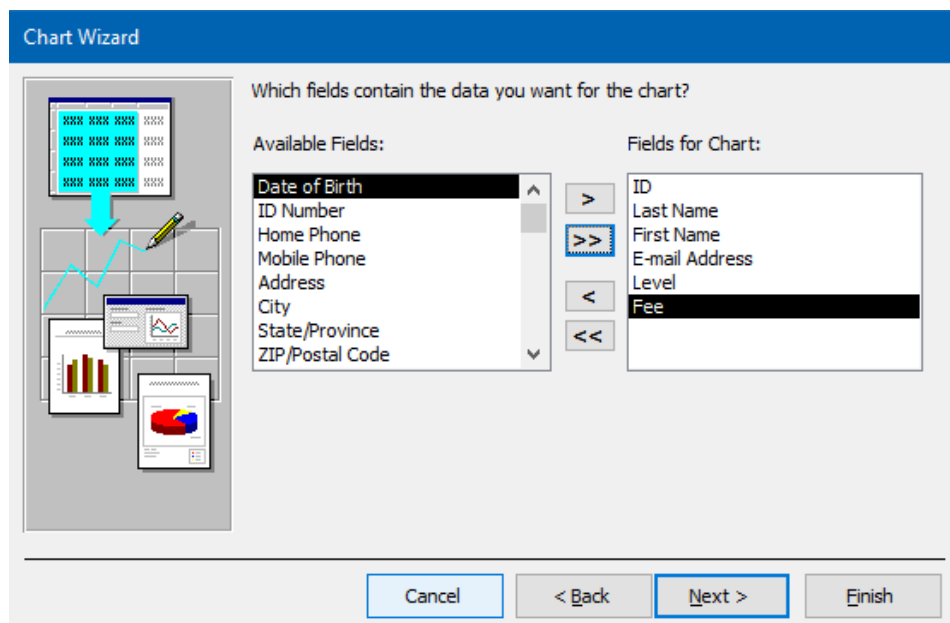


Fig. 33 (Chart Wizard dialog)

- Click the “**3D Column Chart**” button—the second icon in the first row
- Click “**Next**” button

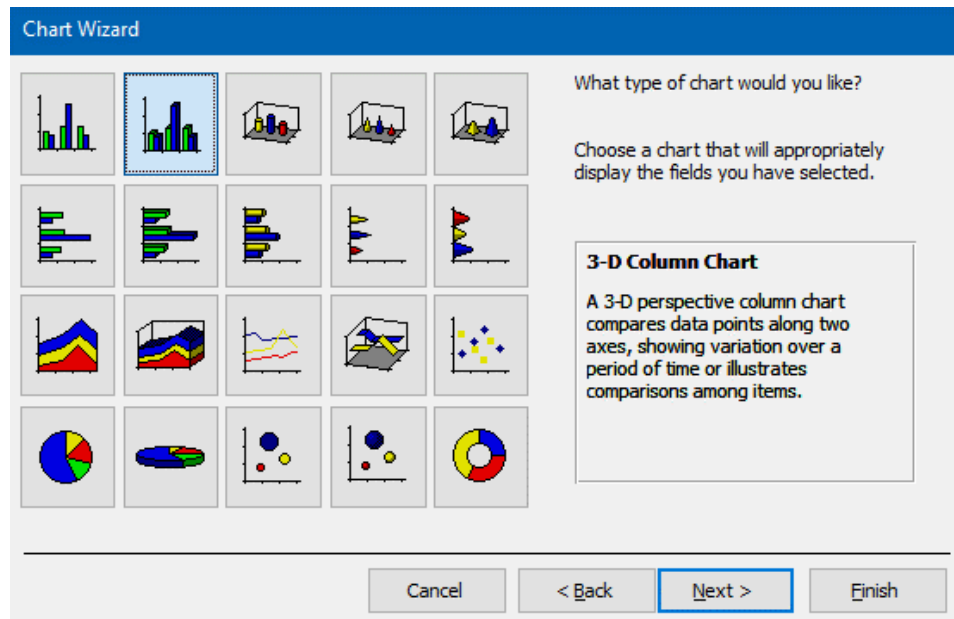


Fig. 34 (Chart Wizard dialog)

- Click “Next” button
- Click the down arrow in the “Report Fields” menu and then select “<No Field>”
- Click the down arrow in the “Chart Fields” menu and then select “<No Field>”
- Click “Next”

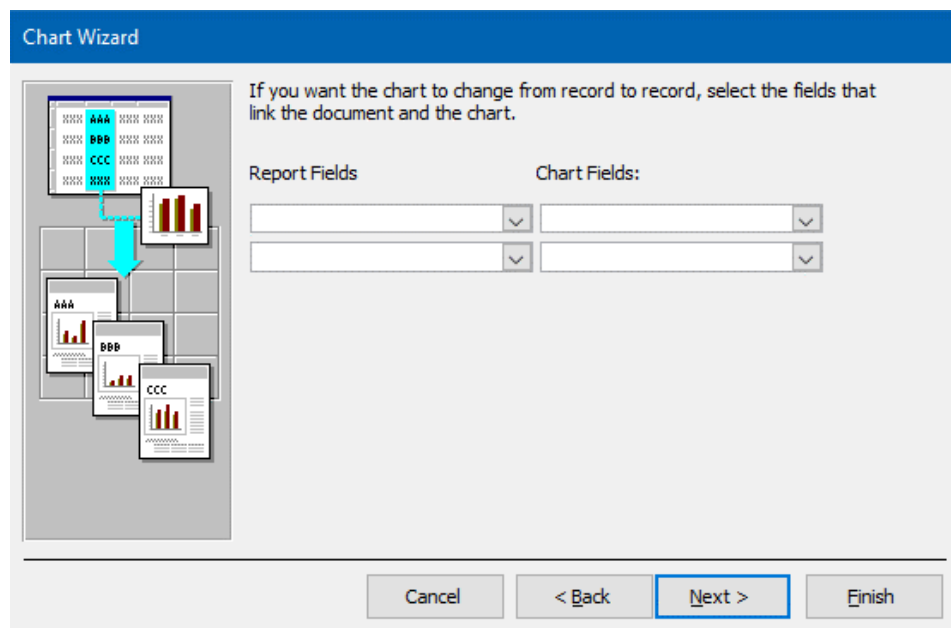


Fig. 35 (Chart Wizard dialog)

- Enter title for your chart
- Click “Finish”

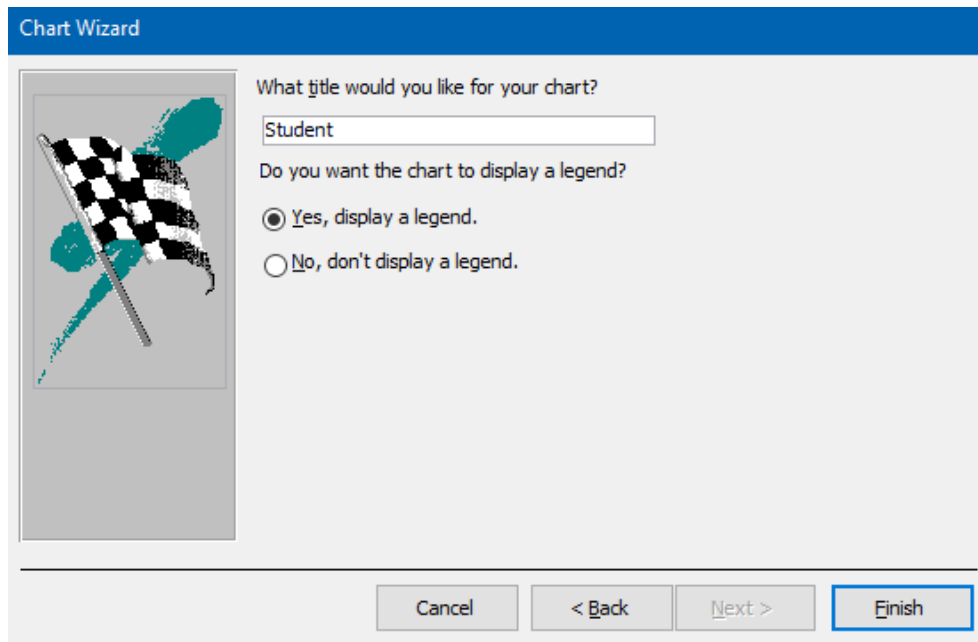


Fig. 36 (Chart Wizard dialog)

- Change the view to **“Report View”**

Chart will be displayed with fee of each student shown against his ID.

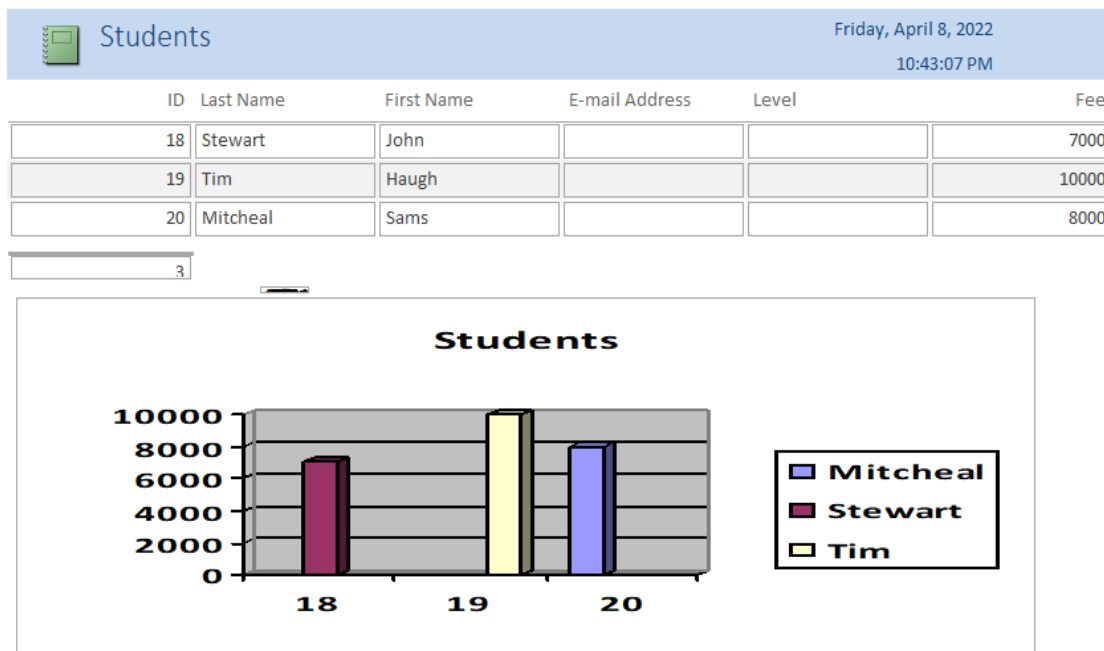


Fig. 37 (Chart)

#### Change Chart Options:

- Change to **“Design”** view
- Double click the chart

The Microsoft Graph software launches, displaying the chart in a view similar to Design view

- Click “**Chart**” on the “**menu bar**” and then select “**Chart Options**” from the menu that appears

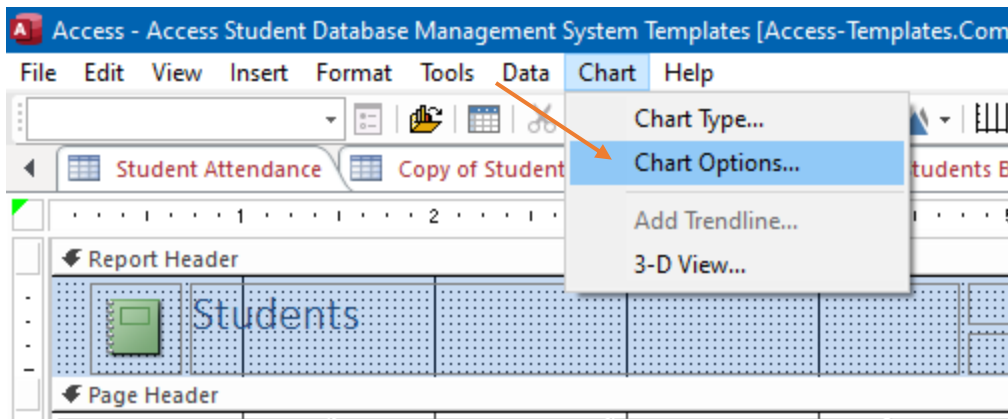


Fig. 38 (Chart Options)

- Click the “**Gridlines**” tab to display the options on the tab
- Select the “**Major gridlines**” check box in the “**Category (X) axis**” section

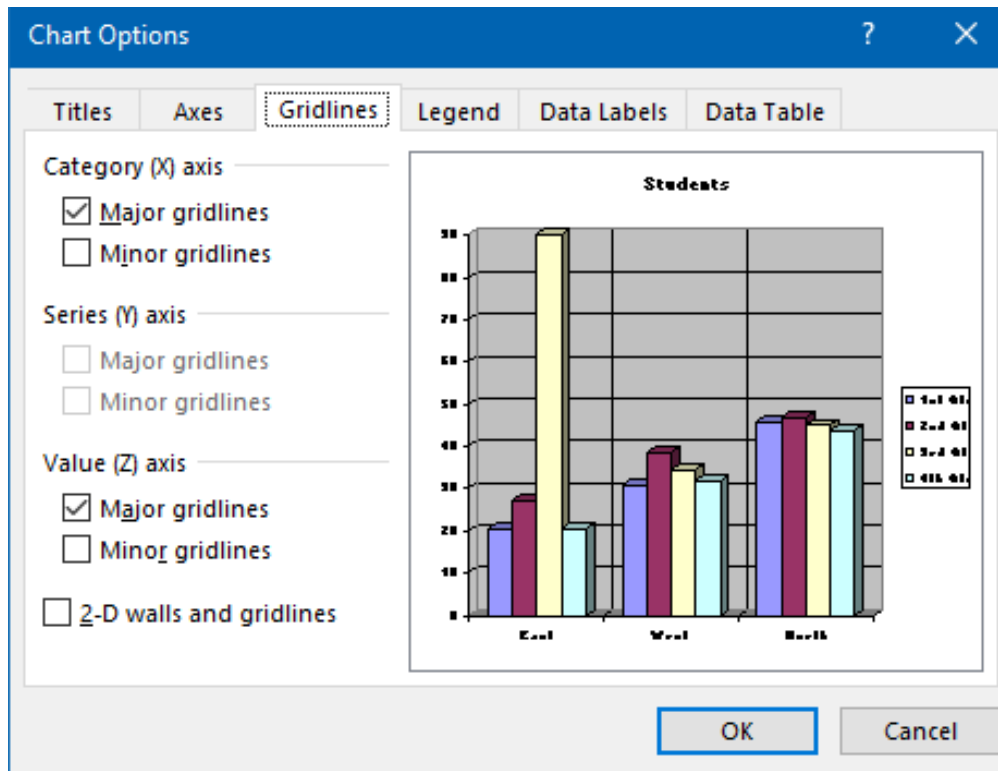


Fig. 39 (Chart Options dialog)

- Click the “**Legend**” tab to display the options on the tab
- Select the “**Corner**” check box in the “**Placement**” section

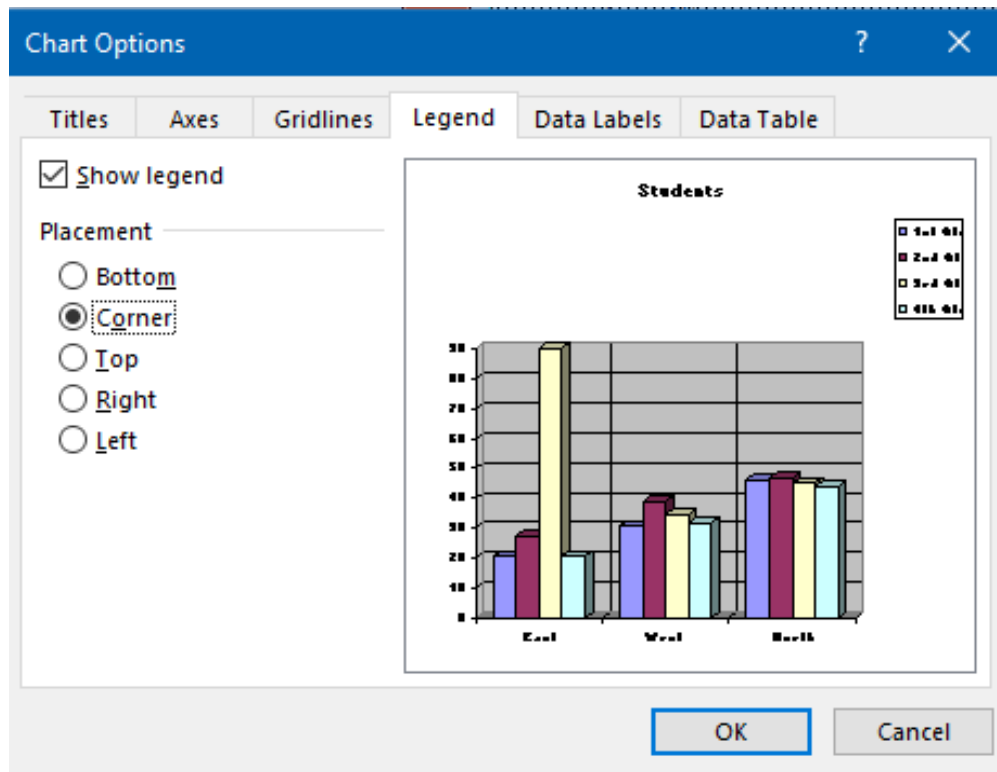


Fig. 40 (Chart Options dialog)

- Click “OK”
- Click the “File” menu and then select “Save”

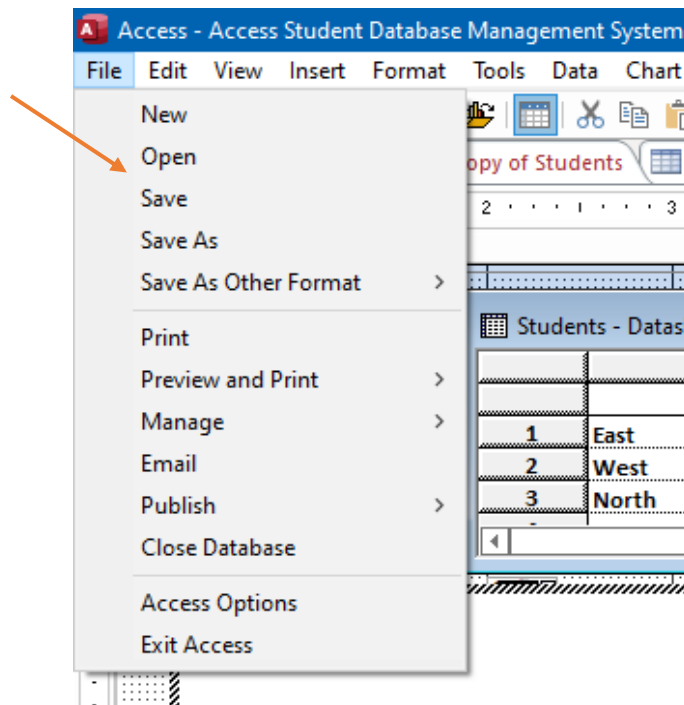


Fig. 41 (Save Chart Options)

- Change to “Report” view

The changes will appear in the chart.

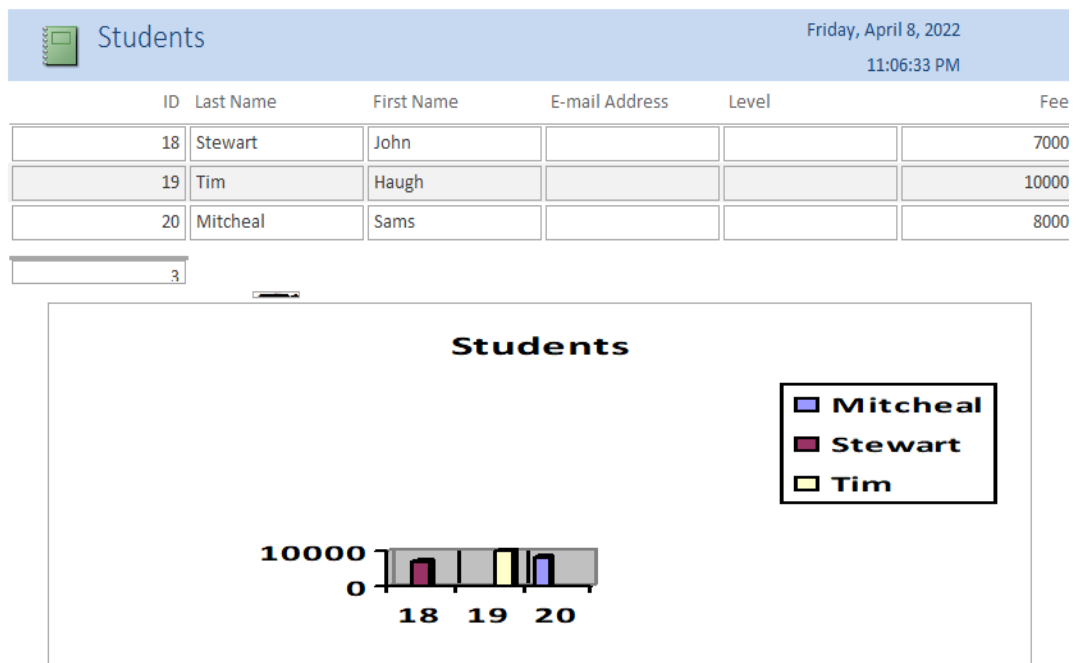


Fig. 42 (Chart)

**Task 01: Student Attendance Record****[30 minutes / 35 marks]**

- Open the Pre-Lab document
- Create a Simple Query in “**Students**” table and in “**Student Attendance**” table
- Make a table named “**Students Copy**” using “**Make Table Query**”
- Create a Sub Query of “**Students**” table with following fields:
  - First Name
  - Last Name
  - Email
  - Fee respectively
- The “**Sub Query**” should return the rows where “**Fee**” is less than the “**Maximum Fee**”
- Use “**Delete Query**” to delete the rows of “**Students Copy**” table where “**Fee**” is equal to the “**Minimum Fee**” using “**SQL View**”
- Create a “**Right Outer Join**” query between “**Students Copy**” and “**Student Attendance**” tables
- Name access file with “**Your Roll No**”

**Task 02: Creating Chart****[10 minutes / 15 marks]**

- Create a “**3D Bar Chart**” for “**Students**” query created in the above tasks
- Change following “**chart options**”:
  - Check the “**Major Gridlines**” of x-axis
  - Place “**Legend**” at the “**top**”
  - Show the “**values**” in the data label

## Post-Lab activities:

### Task 01: Museum Mercantile

[Estimated time 60 minutes / 100 marks]

The County Museum runs a small gift shop that is staffed by volunteers and called “Museum Mercantile.” The museum purchases products from vendors that specialize in handcrafted products and vintage merchandise. The director of the museum has asked you to create and update a database that volunteers can use. The database consists of two tables:

The “**Product**” table contains information on items available for sale.

The “**Vendor**” table contains information on the vendors.

- Create a New Blank database in which to store all the objects related to the gift shop data
- Create the “**Product**” table using the structure shown below:

Field Name	Data Type	Field Size
Product ID (Primary Key)	Short Text	4
Description	Short Text	25
On Hand	Number	Long Integer
Cost	Currency	
Selling Price	Currency	
Vendor Code	Short Text	2

Fig. 43 (Post Lab Task)

- Switch to Datasheet View, add the data below to the “**Product**” table:

Product ID	Description	On Hand	Cost	Selling Price	Vendor Code
CH04	Chess Set	11	\$26.75	\$28.90	WW
DI24	Dinosaurs	14	\$3.75	\$4.95	MS
GL18	Globe	2	\$27.50	\$29.95	MS
JG01	Jigsaw Puzzle	3	\$5.40	\$6.95	MS
PC03	Pick Up Sticks	5	\$8.50	\$10.95	WW
ST23	Stationery	8	\$3.95	\$5.00	AR
TD05	Tiddlywinks	6	\$13.75	\$15.95	WW
WI10	Wizard Cards	10	\$7.50	\$9.95	MS
WL34	Wildlife Posters	15	\$2.50	\$2.95	AR
YO12	Wooden Yo-yo	9	\$1.60	\$1.95	WW

Fig. 44 (Post Lab Task)

- Create the “**Vendor**” table using the structure shown below:



Field Name	Data Type	Field Size
Vendor Code	Short Text	2
Company	Short Text	20
Street Address	Short Text	15
City	Short Text	15
State	Short Text	2
Zip Code	Short Text	9
Telephone Number	Short Text	15

Fig. 45 (Post Lab Task)

- Make **“Vendor Code”** as primary key
- Create a **“form”** using the Form Wizard based on the **“Vendor”** table
- Add the following records using the Form:

Vendor Code	Company	Street Address	City	State	Zip Code	Telephone Number
AR	Artisan's Co-op	3540 Grand	Hancock	WI	69780	414-555-7865
MS	Museum Stores	134 Union	Delana	SD	41345	605-555-3498
WW	Woodworkers	655 Clive	Great Falls	WV	34567	304-555-4532

Fig. 46 (Post Lab Task)

- Delete the record for **“Product ID GL18”** in the **“Product”** table using Delete Query
- Create a query from the **“Product”** table. Display the **“Product ID”**, **“Description”**, **“Cost”**, and **“Vendor Code”** for all products where the **“Vendor Code”** is **“MS”**
  - Criteria: All products whose description ends with the letter **“s”**
- Create a **“Sub Query”** from the **“Product”** table: Display all fields where the Products cost is more than the average product cost
- Using the Report Wizard, create a **“report”** based on the **“Product”** table to include the following fields
  - Product ID
  - Description
  - Cost
  - Selling Price

## Submissions:

- For Pre-Lab Activity:
  - Perform Pre-Lab as mentioned above.
  - Save the respective document in folder “RollNo\_Pre-Lab-11”.
  - Then zip the whole folder (RollNo\_Pre-Lab-11.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-11”.
  - Then save each document in folder “RollNo\_In-Lab-11”.
- For Post-Lab Activity:
  - Perform Post-Lab as mentioned above.
  - Save the respective document in folder “RollNo\_Post-Lab-11”.
  - Then zip the whole folder (RollNo\_Post-Lab-11.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: [10 marks]
  - Task 01 (In-Lab Prerequisite) [10 marks]
- Division of In-Lab tasks: [50 marks]
  - Task 01 (Student Attendance Record) [35 marks]
  - Task 02 (Creating Chart) [15 marks]
- Division of Post-Lab tasks: [100 marks]
  - Task 01 (Museum Mercantile) [100 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: Discussion on In-Lab Task
- 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