

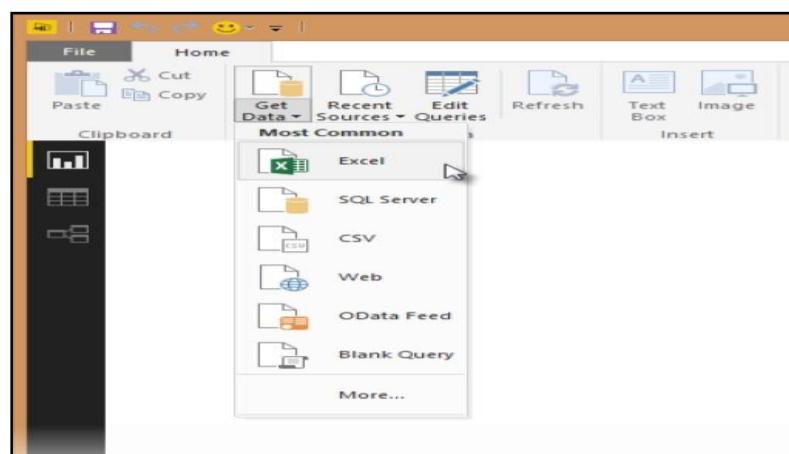
Practical 1: Import the legacy data from Excel and load in the target system.

Steps 1: Create an excel sheet with data

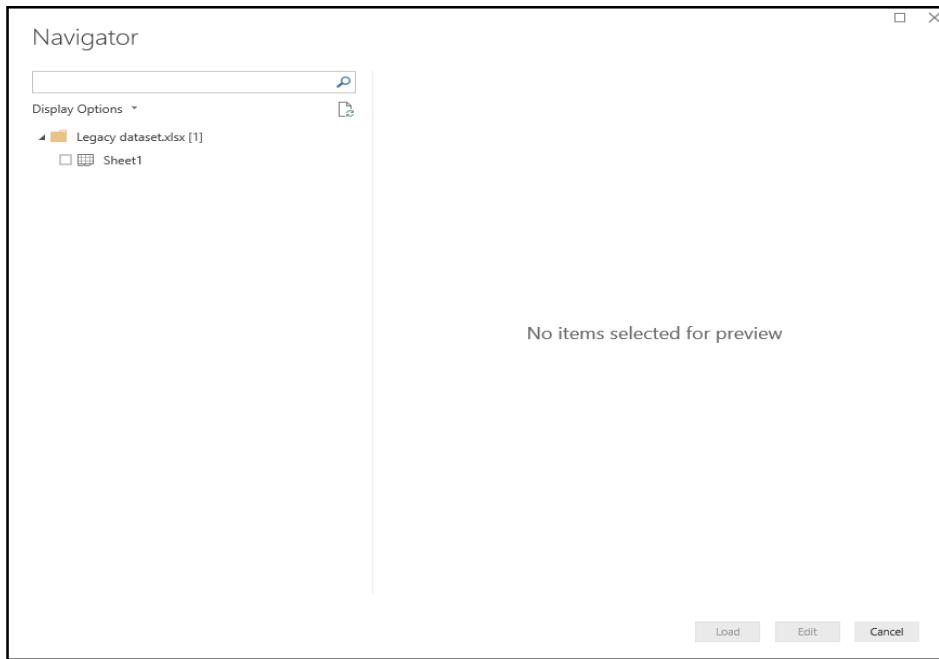
	A	B	C	D	E	F	G
1	OrderDate	Region	Rep	Item	Units	Unit Cost	Total
2	9-1-14	Central	Smith	Desk	2	125.00	250.00
3	6-17-15	Central	Kivell	Desk	5	125.00	625.00
4	9-10-15	Central	Gill	Pencil	7	1.29	9.03
5	11-17-15	Central	Jardine	Binder	11	4.99	54.89
6	10-31-15	Central	Andrews	Pencil	14	1.29	18.06
7	2-26-14	Central	Gill	Pen	27	19.99	539.73
8	10-5-14	Central	Morgan	Binder	28	8.99	251.72
9	12-21-15	Central	Andrews	Binder	28	4.99	139.72
10	2-9-14	Central	Jardine	Pencil	36	4.99	179.64
11	8-7-15	Central	Kivell	Pen Set	42	23.95	1,005.90
12	1-15-15	Central	Gill	Binder	46	8.99	413.54
13	1-23-14	Central	Kivell	Binder	50	19.99	999.50
14	3-24-15	Central	Jardine	Pen Set	50	4.99	249.50
15	5-14-15	Central	Gill	Pencil	53	1.29	68.37
16	7-21-15	Central	Morgan	Pen Set	55	12.49	686.95
17	4-10-15	Central	Andrews	Pencil	66	1.99	131.34
18	12-12-14	Central	Smith	Pencil	67	1.29	86.43
19	4-18-14	Central	Andrews	Pencil	75	1.99	149.25
20	5-31-15	Central	Gill	Binder	80	8.99	719.20
21	2-1-15	Central	Smith	Binder	87	15.00	1,305.00
22	5-5-14	Central	Jardine	Pencil	90	4.99	449.10
23	6-25-14	Central	Morgan	Pencil	90	4.99	449.10
24	12-4-15	Central	Jardine	Binder	94	19.99	1,879.06

Step 2: Open Power BI desktop

Step 3: Go to Home Ribbon-> Get Data-> Excel and browse your excel file



Step 4: In the Navigator tab, select your table (Sheet1) from your dataset (Legacy dataset.xlsx).



Step 5: Click Edit

The screenshot shows the 'Navigator' dialog box with 'Sheet1' selected. The main area displays a table with the following data:

OrderDate	Region	Rep	Item	Units	Unit Cost	Total
01-09-2014	Central	Smith	Desk	2	125	
17-06-2015	Central	Kivell	Desk	5	125	
10-09-2015	Central	Gill	Pencil	7	1.29	
17-11-2015	Central	Jardine	Binder	11	4.99	
31-10-2015	Central	Andrews	Pencil	14	1.29	
26-02-2014	Central	Gill	Pen	27	19.99	
05-10-2014	Central	Morgan	Binder	28	8.99	
21-12-2015	Central	Andrews	Binder	28	4.99	
09-02-2014	Central	Jardine	Pencil	36	4.99	
07-08-2015	Central	Kivell	Pen Set	42	23.95	
15-01-2015	Central	Gill	Binder	46	8.99	
23-01-2014	Central	Kivell	Binder	50	19.99	
24-03-2015	Central	Jardine	Pen Set	50	4.99	
14-05-2015	Central	Gill	Pencil	53	1.29	
21-07-2015	Central	Morgan	Pen Set	55	12.49	
10-04-2015	Central	Andrews	Pencil	66	1.99	
12-12-2014	Central	Smith	Pencil	67	1.29	
18-04-2014	Central	Andrews	Pencil	75	1.99	
31-05-2015	Central	Gill	Binder	80	8.99	
01-02-2015	Central	Smith	Binder	87	15	
05-05-2014	Central	Jardine	Pencil	90	4.99	
25-06-2014	Central	Morgan	Pencil	90	4.99	
04-12-2015	Central	Jardine	Binder	94	19.99	

At the bottom right of the dialog box are three buttons: 'Load' (yellow), 'Edit' (highlighted with a blue oval), and 'Cancel'.

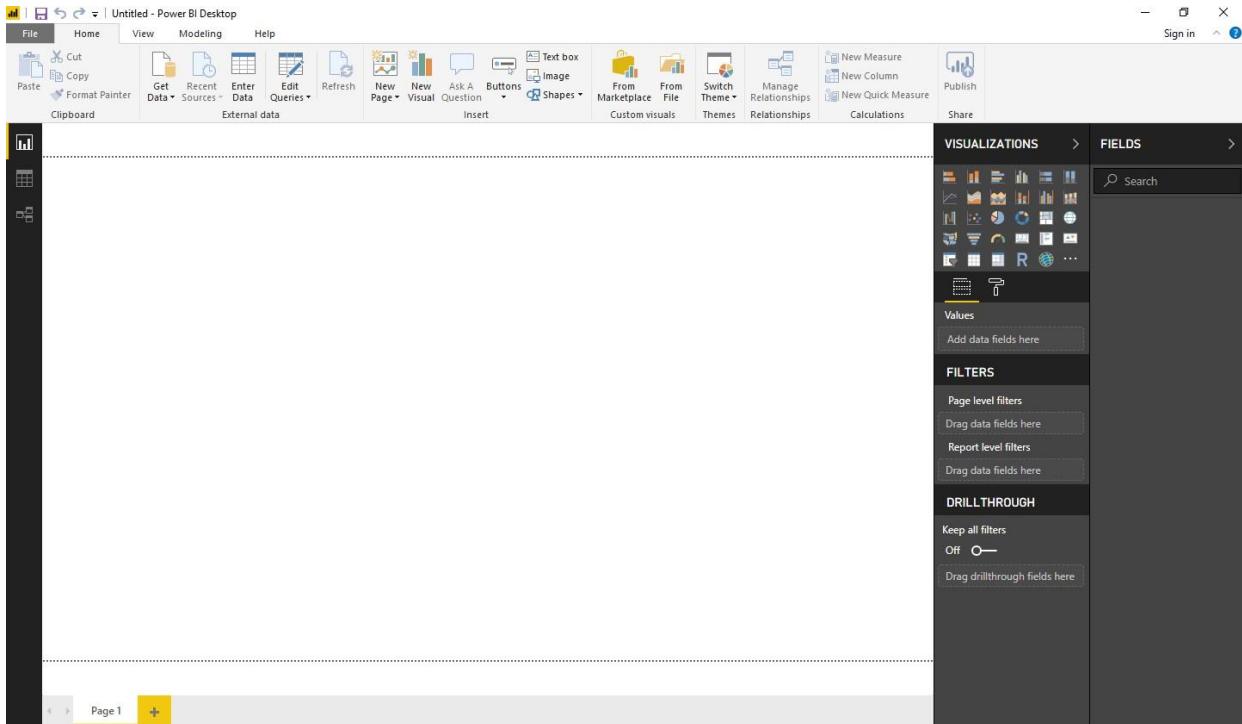
Step 6: You will obtain this screen for queries

The screenshot shows the Microsoft Power Query Editor interface. The main area displays a table with 23 rows of data. The columns are labeled: OrderDate, Region, Rep, Item, Units, Unit Cost, and Total. The data includes various purchases from different regions by different representatives for different items like Desks, Pencils, and Pen Sets. The right side of the screen features the 'QUERY SETTINGS' pane, which includes sections for 'PROPERTIES' (Name: Sheet1) and 'APPLIED STEPS' (with a 'Changed Type' step highlighted). The bottom status bar indicates '7 COLUMNS, 23 ROWS' and 'PREVIEW DOWNLOADED AT 0602'.

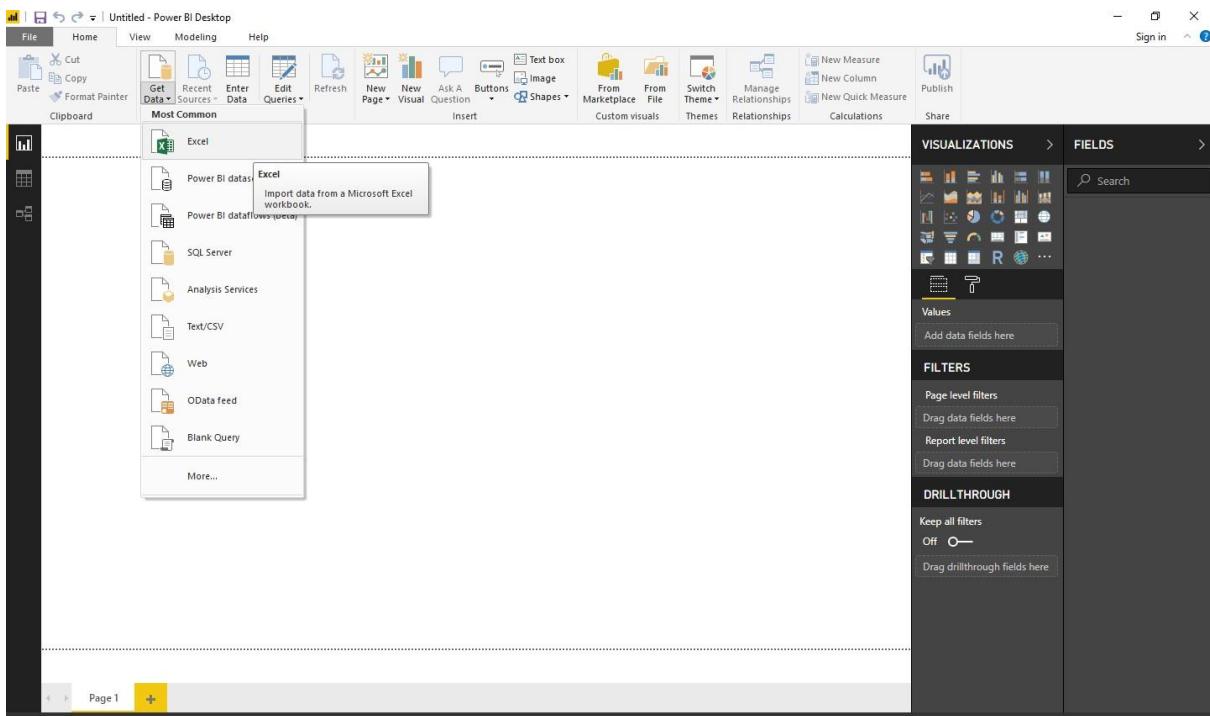
OrderDate	Region	Rep	Item	Units	Unit Cost	Total
03-09-2014	Central	Smith	Desk	2	125	250
17-06-2015	Central	Kiell	Desk	5	125	625
10-09-2015	Central	Gill	Pencil	7	1.29	9.03
17-11-2015	Central	Jardine	Binder	11	4.99	54.89
31-10-2015	Central	Andrews	Pencil	14	1.29	18.06
26-02-2014	Central	Gill	Pen	27	19.99	539.73
05-10-2014	Central	Morgan	Binder	28	8.99	251.72
21-12-2015	Central	Andrews	Binder	28	4.99	139.72
09-02-2014	Central	Jardine	Pencil	36	4.99	179.64
07-08-2015	Central	Kiell	Pen Set	42	23.95	1005.9
15-01-2015	Central	Gill	Binder	46	8.99	413.54
23-01-2014	Central	Kiell	Binder	50	19.99	999.5
24-03-2015	Central	Jardine	Pen Set	50	4.99	248.5
14-05-2015	Central	Gill	Pencil	53	1.29	68.37
23-07-2015	Central	Morgan	Pen Set	55	12.49	686.95
19-04-2015	Central	Andrews	Pencil	66	1.99	131.34
12-12-2014	Central	Smith	Pencil	67	1.29	86.43
18-04-2014	Central	Andrews	Pencil	75	1.99	149.25
31-05-2015	Central	Gill	Binder	80	8.99	719.2
01-02-2015	Central	Smith	Binder	87	15	1305
05-05-2014	Central	Jardine	Pencil	90	4.99	448.1
25-06-2014	Central	Morgan	Pencil	90	4.99	448.1
04-12-2015	Central	Jardine	Binder	94	19.99	1879.05

Practical 2: Perform the Extraction Transformation and Loading (ETL) process to construct the database in SQL server.

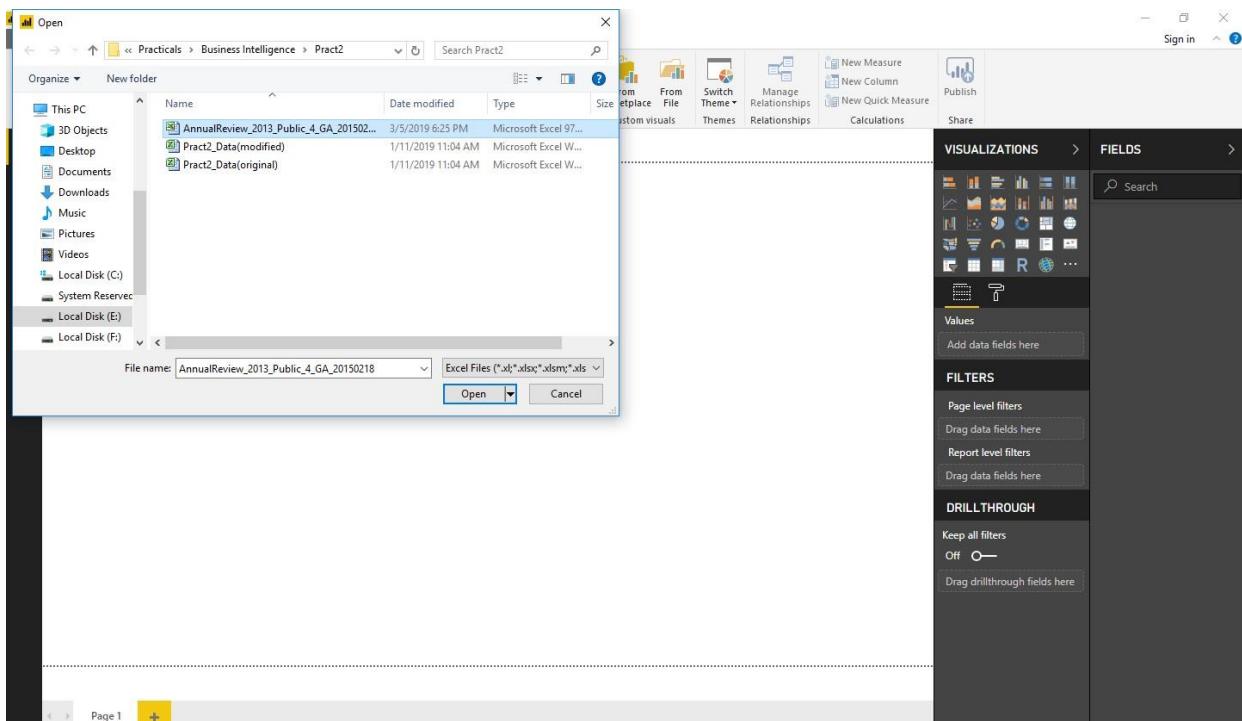
Step 1: Open Power BI.



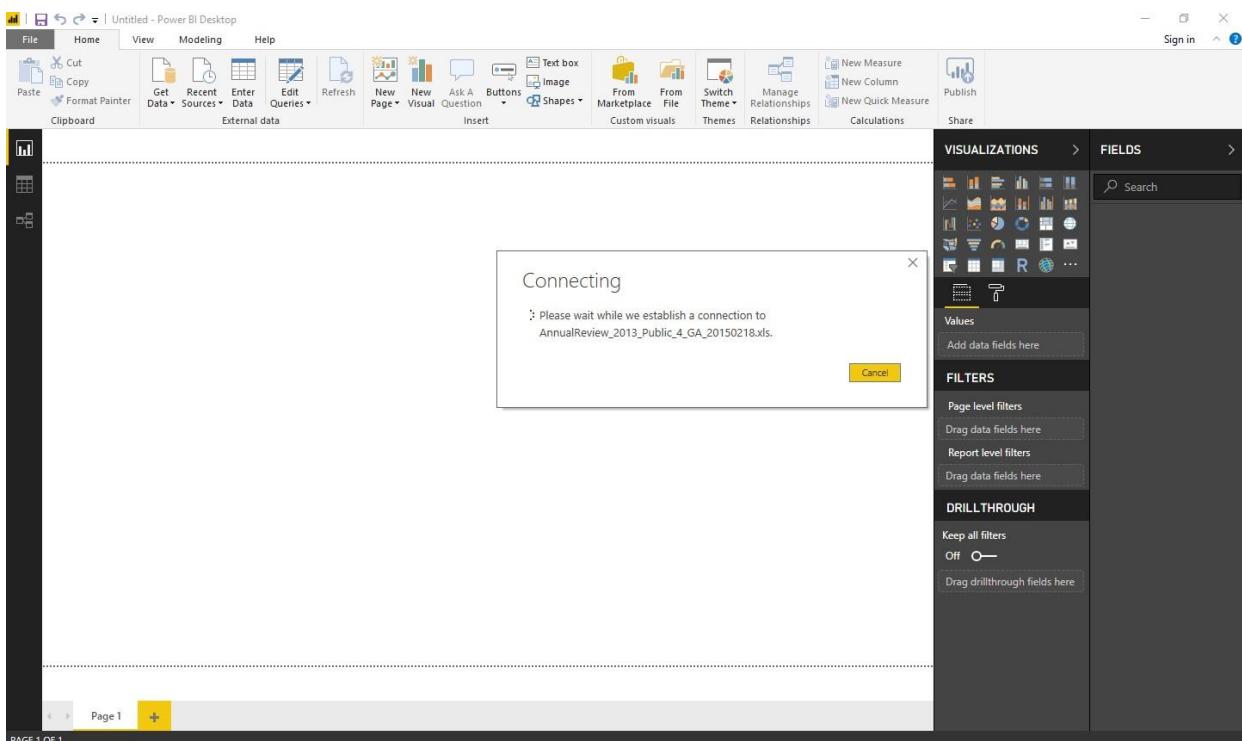
Step 2: Get Data → Excel



Step 3: Choose your Excel data.



Step 4: Loading might take time.



Step 5: Select Data GA.

The screenshot shows the Power BI Desktop interface with the 'Data' view open. In the left pane, under 'Data Sources', 'Data_GA' is selected. The main area displays a table titled 'Data_GA' with four columns: Column1, Column2, Column3, and Column4. The data consists of 33 rows of general aviation accident information. At the bottom right of the table, there are 'Load', 'Edit', and 'Cancel' buttons. The status bar at the bottom indicates 'PAGE 1 OF 1' and the system tray shows the date and time as '3/5/2019 6:25 PM'.

Column1	Column2	Column3	Column4
General Aviation Accident Aircraft, 2013	null	null	
ntsp_no	aircraft_key	ev_date	latitude
WPR13CA079	1	1/1/2013	423428N
WPR13LA082	1	1/2/2013	361238N
WPR13FA083	1	1/2/2013	350358N
WPR13FA080	1	1/2/2013	354337N
CEN13FA122	1	1/2/2013	430834N
ERA13FA101	1	1/1/2013	335310N
CEN13FA121	1	1/2/2013	351826N
WPR13CA084	1	1/3/2013	381727N
ERA13LA104	1	1/2/2013	275456N
CEN13CA124	1	1/2/2013	305556N
ERA13FA105	1	1/4/2013	292732N
ANC13CA019	1	1/4/2013	615419N
WPR13LA085	1	1/5/2013	330009N
WPR13FA086	1	1/6/2013	354237N
ERA13CA107	1	1/7/2013	371014N
WPR13LA087	1	1/8/2013	361959N
WPR13CA088	1	1/8/2013	385515N
CEN13FA130	1	1/11/2013	411206N
CEN13LA127	1	1/2/2013	413925N
CEN13FA131	1	1/12/2013	333945N

Step 6: Click on Edit button

This screenshot is identical to the previous one, showing the Power BI Desktop interface with the 'Data' view open and 'Data_GA' selected. The 'Edit' button is highlighted with a yellow box, indicating it has been clicked. The table and its data are the same as in the previous step.

Step 7: Power Query Editor window will open.

Untitled - Power Query Editor

File Home Transform Add Column View Help

Queries [1] Data_GA

A_B Column1 A_B Column2 A_B Column3 A_B Column4 A_B Column5 A_B Column6 A_B Column7 A_B Column8

1	General Aviation Accident Aircraft, 2013	null	null	null	null	null	null
2	ntsb_no	aircraft_key	ev_date	latitude	longitude	ev_city	ev_state
3	WPR13CA079	1	1/1/2013	423428N	1215226W	Chiloquin	OR
4	WPR13LA082	1	1/2/2013	361238N	1151140W	North Las Vegas	NV
5	WPR13FA083	1	1/2/2013	350358N	1203706W	Oceano	CA
6	WPR13FA080	1	1/2/2013	354337N	1190945W	Delano	CA
7	CEN13FA122	1	1/2/2013	450834N	0952858W	Clear Lake	IA
8	ERA13FA101	1	1/1/2013	355310N	0871900W	Jasper	AL
9	CEN13FA121	1	1/2/2013	351826N	0963450W	Seminole	OK
10	WPR13CA084	1	1/3/2013	381727N	1213840W	Five Points	CA
11	ERA13LA104	1	1/2/2013	275456N	0822658W	Tampa	FL
12	CEN13CA124	1	1/2/2013	305556N	0994833W	Menard	TX
13	ERA13FA105	1	1/4/2013	292732N	0811108W	Palm Coast	FL
14	ANC13CA019	1	1/4/2013	615419N	1485525W	Palmer	AK
15	WPR13LA085	1	1/5/2013	330009N	1164305W	Julian	CA
16	WPR13FA086	1	1/6/2013	354237N	1185414W	Woody	CA
17	ERA13CA107	1	1/7/2013	371014N	0833455W	Bear Branch	KY
18	WPR13LA087	1	1/8/2013	361959N	1194930W	Riverdale	CA
19	WPR13CA088	1	1/8/2013	340745N	1172405W	Rialto	CA
20	WPR13CA089	1	1/8/2013	385515N	1205153W	Georgetown	CA
21	CEN13FA130	1	1/11/2013	411206N	1002813W	Maxwell	NE
22	CEN13LA127	1	1/2/2013	413925N	0860205W	Elkhart	IN
23	CEN13FA131	1	1/12/2013	333945N	0953252W	Paris	TX
24	ERA13FA109	1	1/12/2013	272310N	0823343W	Sarasota	FL
25	ERA13LA110	1	1/12/2013	335858N	0834003W	Sarasota	FL
26	ERA13LA113	1	1/13/2013	355404N	0754205W	Manteo	NC
27	CEN13LA132	1	1/7/2013	341352N	0953715W	Antlers	OK
28	CEN13CA133	1	1/11/2013	414128N	0933359W	Ankeny	IA
29	ERA13LA111	1	1/13/2013	391021N	0752925W	Dover	DE
30	ERA13LA112	1	1/11/2013	275616N	0821604W	Brandon	FL
31	CEN13CA134	1	1/10/2013	345856N	1060018W	Moriarty	NM

21 COLUMNS, 999+ ROWS

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ENG IN 3/5/2019

Step 8: Reduce→Remove rows→Remove top rows.

Untitled - Power Query Editor

File Home Transform Add Column View Help

Queries [1] Data_GA

A_B Column1 A_B Column2 A_B Column3 A_B Column4 A_B Column5 A_B Column6 A_B Column7 A_B Column8

1	General Aviation Accident Aircraft, 2013	null	null	null	null	null	null
2	ntsb_no	aircraft_key	ev_date	latitude	longitude	ev_city	ev_state
3	WPR13CA079	1	1/1/2013	423428N	1215226W	Chiloquin	OR
4	WPR13LA082	1	1/2/2013	361238N	1151140W	North Las Vegas	NV
5	WPR13FA083	1	1/2/2013	350358N	1203706W	Oceano	CA
6	WPR13FA080	1	1/2/2013	354337N	1190945W	Delano	CA
7	CEN13FA122	1	1/2/2013	450834N	0952858W	Clear Lake	IA
8	ERA13FA101	1	1/1/2013	355310N	0871900W	Jasper	AL
9	CEN13FA121	1	1/2/2013	351826N	0963450W	Seminole	OK
10	WPR13CA084	1	1/3/2013	381727N	1213840W	Five Points	CA
11	ERA13LA104	1	1/2/2013	275456N	0822658W	Tampa	FL
12	CEN13CA124	1	1/2/2013	305556N	0994833W	Menard	TX
13	ERA13FA105	1	1/4/2013	292732N	0811108W	Palm Coast	FL
14	ANC13CA019	1	1/4/2013	615419N	1485525W	Palmer	AK
15	WPR13LA085	1	1/5/2013	330009N	1164305W	Julian	CA
16	WPR13FA086	1	1/6/2013	354237N	1185414W	Woody	CA
17	ERA13CA107	1	1/7/2013	371014N	0833455W	Bear Branch	KY
18	WPR13LA087	1	1/8/2013	361959N	1194930W	Riverdale	CA
19	WPR13CA088	1	1/8/2013	340745N	1172405W	Rialto	CA
20	WPR13CA089	1	1/8/2013	385515N	1205153W	Georgetown	CA
21	CEN13FA130	1	1/11/2013	411206N	1002813W	Maxwell	NE
22	CEN13LA127	1	1/2/2013	413925N	0860205W	Elkhart	IN
23	CEN13FA131	1	1/12/2013	333945N	0953252W	Paris	TX
24	ERA13FA109	1	1/12/2013	272310N	0823343W	Sarasota	FL
25	ERA13LA110	1	1/12/2013	335858N	0834003W	Winder	GA
26	ERA13LA113	1	1/13/2013	355404N	0754205W	Manteo	NC
27	CEN13LA132	1	1/7/2013	341352N	0953715W	Antlers	OK
28	CEN13CA133	1	1/11/2013	414128N	0933359W	Ankeny	IA
29	ERA13LA111	1	1/13/2013	391021N	0752925W	Dover	DE
30	ERA13LA112	1	1/11/2013	275616N	0821604W	Brandon	FL
31	CEN13CA134	1	1/10/2013	345856N	1060018W	Moriarty	NM

21 COLUMNS, 999+ ROWS

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Step 9: Enter the number of rows you want to reduce (here it is just one row from top)

The screenshot shows the Power Query Editor interface with a table of flight data. A modal dialog box titled "Remove Top Rows" is open, prompting the user to specify how many rows to remove from the top. The input field contains the value "1". The "OK" and "Cancel" buttons are visible at the bottom of the dialog.

Step 10: Transform→Use first row as headers.

The screenshot shows the Power Query Editor interface with the same flight data table. A modal dialog box titled "Use First Row as Headers" is open, with the instruction "Promote the first row of this table into column headers." The "OK" button is highlighted in yellow.

Step 11: Your table has appropriate headers now.

Queries [1] Data_GA

	ntsб_no	aircraft_key	ev_date	latitude	longitude	ev_city	ev_state	ev_country
1	WPR13CA079		1/1/2013	423428N	1215226W	Chiloequin	OR	USA
2	WPR13LA082		1/2/2013	361238N	1151140W	North Las Vegas	NV	USA
3	WPR13FA083		1/2/2013	350358N	1203706W	Oceano	CA	USA
4	WPR13FA080		1/2/2013	354337N	1190945W	Delano	CA	USA
5	CEN13FA122		1/2/2013	430834N	0932858W	Clear Lake	IA	USA
6	ERA13FA101		1/1/2013	335310N	0871900W	Jasper	AL	USA
7	CEN13FA121		1/2/2013	351826N	0963450W	Seminole	OK	USA
8	WPR13CA084		1/3/2013	381727N	1213840W	Five Points	CA	USA
9	ERA13LA104		1/2/2013	275456N	0822658W	Tampa	FL	USA
10	CEN13CA124		1/2/2013	305556N	0994833W	Menard	TX	USA
11	ERA13FA105		1/4/2013	292732N	0811108W	Palm Coast	FL	USA
12	ANC13CA019		1/4/2013	615415N	1485252W	Palmer	AK	USA
13	WPR13LA085		1/5/2013	330009N	1164305W	Julian	CA	USA
14	WPR13FA086		1/6/2013	354237N	1188514W	Woody	CA	USA
15	ERA13CA107		1/7/2013	371014N	0833455W	Bear Branch	KY	USA
16	WPR13LA087		1/8/2013	361959N	1194930W	Riverdale	CA	USA
17	WPR13CA088		1/8/2013	340745N	1172405W	Rialto	CA	USA
18	WPR13CA089		1/8/2013	385515N	1205153W	Georgetown	CA	USA
19	CEN13FA130		1/11/2013	411206N	1002813W	Maxwell	NE	USA
20	CEN13LA127		1/2/2013	413925N	0860205W	Elkhart	IN	USA
21	CEN13FA131		1/12/2013	333945N	0953252W	Paris	TX	USA
22	ERA13FA109		1/12/2013	272310N	0822343W	Sarasota	FL	USA
23	ERA13LA110		1/12/2013	335858N	0834003W	Winder	GA	USA
24	ERA13LA113		1/13/2013	355404N	0754205W	Manteo	NC	USA
25	CEN13LA132		1/7/2013	341352N	0953715W	Antlers	OK	USA
26	CEN13CA133		1/11/2013	414128N	0933359W	Ankeny	IA	USA
27	ERA13LA111		1/13/2013	391021N	0752925W	Dover	DE	USA
28	ERA13LA112		1/11/2013	275616N	0821604W	Brandon	FL	USA
29	CEN13CA134		1/10/2013	345856N	1060018W	Moriarty	NM	USA
30	WPR13CA092		1/10/2013	335526N	1121404W	Lake Pleasant	AZ	USA
31	CEN13CA136		1/15/2013	405300N	0831852W	Upper Sandusky	OH	USA

21 COLUMNS, 199+ ROWS PREVIEW DOWNLOADED AT 6:28 PM

Step 12: Right click on the columns which you don't want to use → Remove Columns.

Queries [1] Data_GA

	ntsб_no	aircraft_key	ev_date	latitude	longitude	ev_city	state	ev_country
1	WPR13CA079		1/1/2013	423428N	1215226W	Chiloequin	USA	USA
2	WPR13LA082		1/2/2013	361238N	1151140W	North Las Vegas	USA	USA
3	WPR13FA083		1/2/2013	350358N	1203706W	Oceano	CA	USA
4	WPR13FA080		1/2/2013	354337N	1190945W	Delano	CA	USA
5	CEN13FA122		1/2/2013	430834N	0932858W	Clear Lake	IA	USA
6	ERA13FA101		1/1/2013	335310N	0871900W	Jasper	AL	USA
7	CEN13FA121		1/2/2013	351826N	0963450W	Seminole	OK	USA
8	WPR13CA084		1/3/2013	381727N	1213840W	Five Points	CA	USA
9	ERA13LA104		1/2/2013	275456N	0822658W	Tampa	FL	USA
10	CEN13CA124		1/2/2013	305556N	0994833W	Menard	TX	USA
11	ERA13FA105		1/4/2013	292732N	0811108W	Palm Coast	FL	USA
12	ANC13CA019		1/4/2013	615415N	1485252W	Palmer	AK	USA
13	WPR13LA085		1/5/2013	330009N	1164305W	Julian	CA	USA
14	WPR13FA086		1/6/2013	354237N	1188514W	Woody	CA	USA
15	ERA13CA107		1/7/2013	371014N	0833455W	Bear Branch	KY	USA
16	WPR13LA087		1/8/2013	361959N	1194930W	Riverdale	CA	USA
17	WPR13CA088		1/8/2013	340745N	1172405W	Rialto	CA	USA
18	WPR13CA089		1/8/2013	385515N	1205153W	Georgetown	CA	USA
19	CEN13FA130		1/11/2013	411206N	1002813W	Maxwell	NE	USA
20	CEN13LA127		1/2/2013	413925N	0860205W	Elkhart	IN	USA
21	CEN13FA131		1/12/2013	333945N	0953252W	Paris	TX	USA
22	ERA13FA109		1/12/2013	272310N	0822343W	Sarasota	FL	USA
23	ERA13LA110		1/12/2013	335858N	0834003W	Winder	GA	USA
24	ERA13LA113		1/13/2013	355404N	0754205W	Manteo	NC	USA
25	CEN13LA132		1/7/2013	341352N	0953715W	Antlers	OK	USA
26	CEN13CA133		1/11/2013	414128N	0933359W	Ankeny	IA	USA
27	ERA13LA111		1/13/2013	391021N	0752925W	Dover	DE	USA
28	ERA13LA112		1/11/2013	275616N	0821604W	Brandon	FL	USA
29	CEN13CA134		1/10/2013	345856N	1060018W	Moriarty	NM	USA
30	WPR13CA092		1/10/2013	335526N	1121404W	Lake Pleasant	AZ	USA
31	CEN13CA136		1/15/2013	405300N	0831852W	Upper Sandusky	OH	USA

21 COLUMNS, 199+ ROWS PREVIEW DOWNLOADED AT 6:28 PM

Step 13: Replace values by selecting that cell → right click → replace values...

The screenshot shows the Power Query Editor interface. In the center, there is a table named 'Data_GA' with 26 rows of data. On the right side, the 'QUERY SETTINGS' pane is open, showing the 'APPLIED STEPS' section which includes 'Removed Columns'. A context menu is open over the cell at row 25, column 10 ('ev_highest_injury'), with the 'Replace Values...' option highlighted.

Step 14: Provide the new value and click on OK.

The screenshot shows the Power Query Editor interface with the 'Replace Values' dialog box open. The dialog has two input fields: 'Value To Find' containing 'null' and 'Replace With' containing '0'. Below the dialog, the 'Data_GA' table shows the first few rows of data. The 'QUERY SETTINGS' pane on the right shows the 'APPLIED STEPS' section with 'Removed Columns' selected.

Step 15: All values having the values you wished to replace earlier will be replaced with new values.

Screenshot of the Power Query Editor showing the replacement of values in the 'Data_GA' query.

QUERY SETTINGS

- PROPERTIES**
 - Name: Data_GA
- APPLIED STEPS**
 - Source
 - Navigation
 - Changed Type
 - Removed Top Rows
 - Promoted Headers
 - Changed Type1
 - Removed Columns
 - Replaced Value** (selected)

Transform ribbon (top right):

- Properties
- Advanced Editor
- Choose Columns
- Remove Columns
- Keep Rows
- Remove Rows
- Reduce Rows
- Sort
- Split Column
- Group By
- Replace Values
- Data Type: Whole Number
- Use First Row as Headers
- Merge Queries
- Append Queries
- Combine Files
- Combine

Queries [1] (left sidebar):

- Data_GA

Data View (main area):

Row	ntsb_no	ev_date	ev_city	ev_state	ev_country	inj_tot_f	inj_tot_s	ev_highest_injury
1	WPR13CA079	1/1/2013	Chiloquin	OR	USA	0	null	NONE
2	WPR13LA082	1/2/2013	North Las Vegas	NV	USA	0	null	NONE
3	WPR13FA083	1/2/2013	Oceano	CA	USA	1	null	FATL
4	WPR13FA080	1/2/2013	Delano	CA	USA	1	null	FATL
5	CEN13FA122	1/2/2013	Clear Lake	IA	USA	3	null	FATL
6	ERA13FA101	1/1/2013	Jasper	AL	USA	3	null	FATL
7	CEN13FA121	1/2/2013	Seminole	OK	USA	0	4	SERS
8	WPR13CA084	1/3/2013	Five Points	CA	USA	0	null	MINR
9	ERA13LA104	1/2/2013	Tampa	FL	USA	0	null	NONE
10	CEN13CA124	1/2/2013	Menard	TX	USA	0	null	NONE
11	ERA13FA105	1/4/2013	Palm Coast	FL	USA	3	null	FATL
12	ANC13CA019	1/4/2013	Palmer	AK	USA	0	null	NONE
13	WPR13LA085	1/5/2013	Julian	CA	USA	0	null	MINR
14	WPR13FA086	1/6/2013	Woody	CA	USA	2	null	FATL
15	ERA13CA107	1/7/2013	Bear Branch	KY	USA	0	null	NONE
16	WPR13LA087	1/8/2013	Riverville	CA	USA	0	1	SERS
17	WPR13CA088	1/8/2013	Riello	CA	USA	0	null	MINR
18	WPR13CA089	1/8/2013	Georgetown	CA	USA	0	null	MINR
19	CEN13FA130	1/11/2013	Maxwell	NE	USA	4	null	FATL
20	CEN13LA127	1/2/2013	Elkhart	IN	USA	0	null	NONE
21	CEN13FA131	1/12/2013	Paris	TX	USA	3	null	FATL
22	ERA13FA109	1/12/2013	Sarasota	FL	USA	2	null	FATL
23	ERA13LA110	1/12/2013	Winder	GA	USA	0	null	NONE
24	ERA13LA113	1/13/2013	Manteo	NC	USA	1	null	FATL
25	CEN13LA132	1/7/2013	Antlers	OK	USA	0	null	NONE
26	CEN13CA133	1/11/2013	Ankeny	IA	USA	0	null	NONE
27	ERA13LA111	1/13/2013	Dover	DE	USA	1	null	FATL
28	ERA13LA112	1/11/2013	Brandon	FL	USA	0	null	NONE
29	CEN13CA134	1/10/2013	Moriarty	NM	USA	0	null	NONE
30	WPR13CA092	1/10/2013	Lake Pleasant	AZ	USA	0	null	NONE
31	CEN13CA136	1/15/2013	Upper Sandusky	OH	USA	0	null	NONE

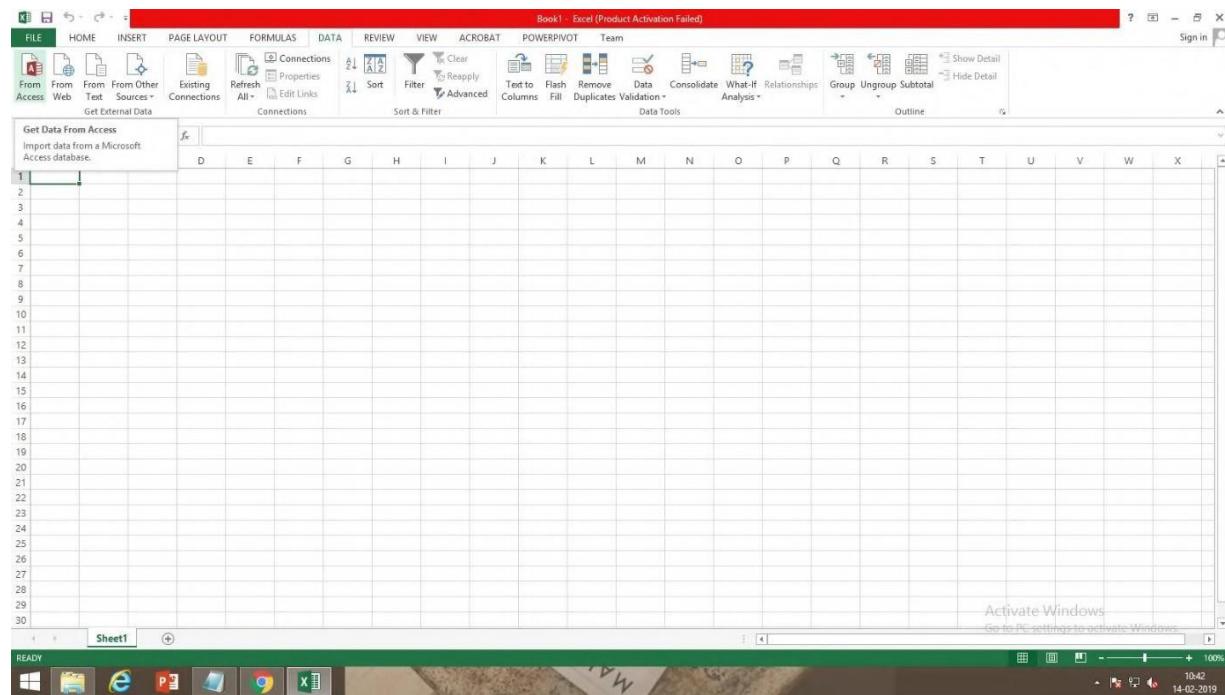
PREVIEW DOWNLOADED AT 6:31 PM

ENG 6:31 PM IN 3/5/2019

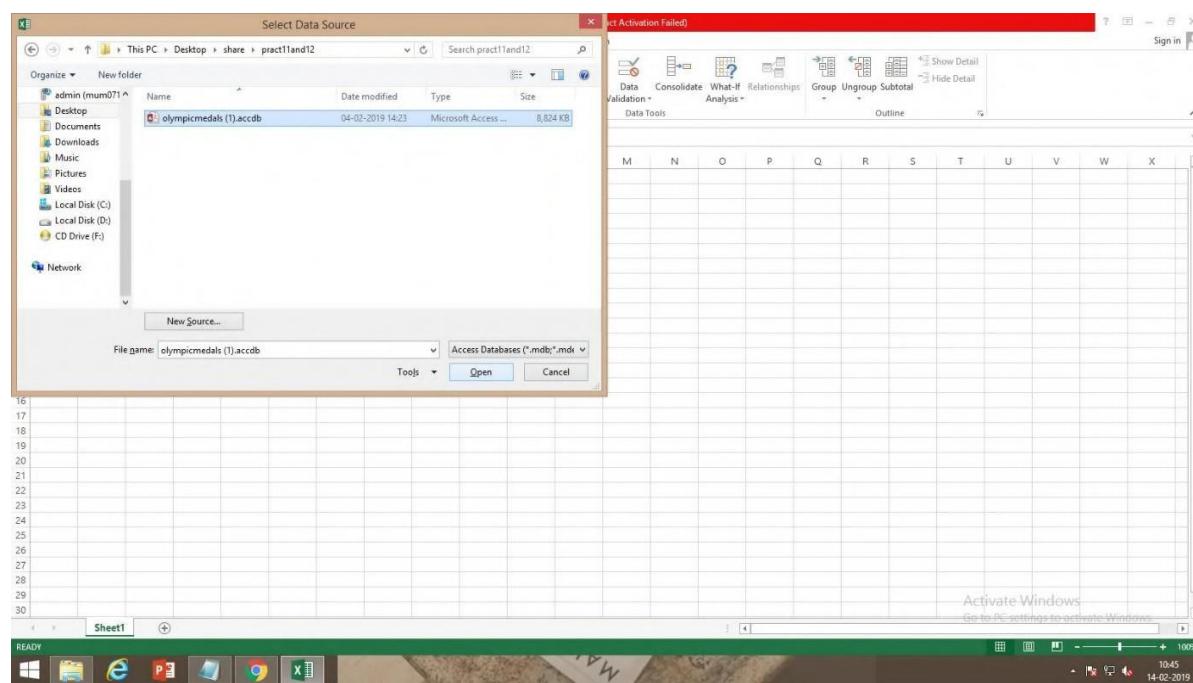
Practical 5(A): Import the warehouse data in Microsoft Excel and create the Pivot table & Pivot Chart.

Step 1: Open a blank workbook.

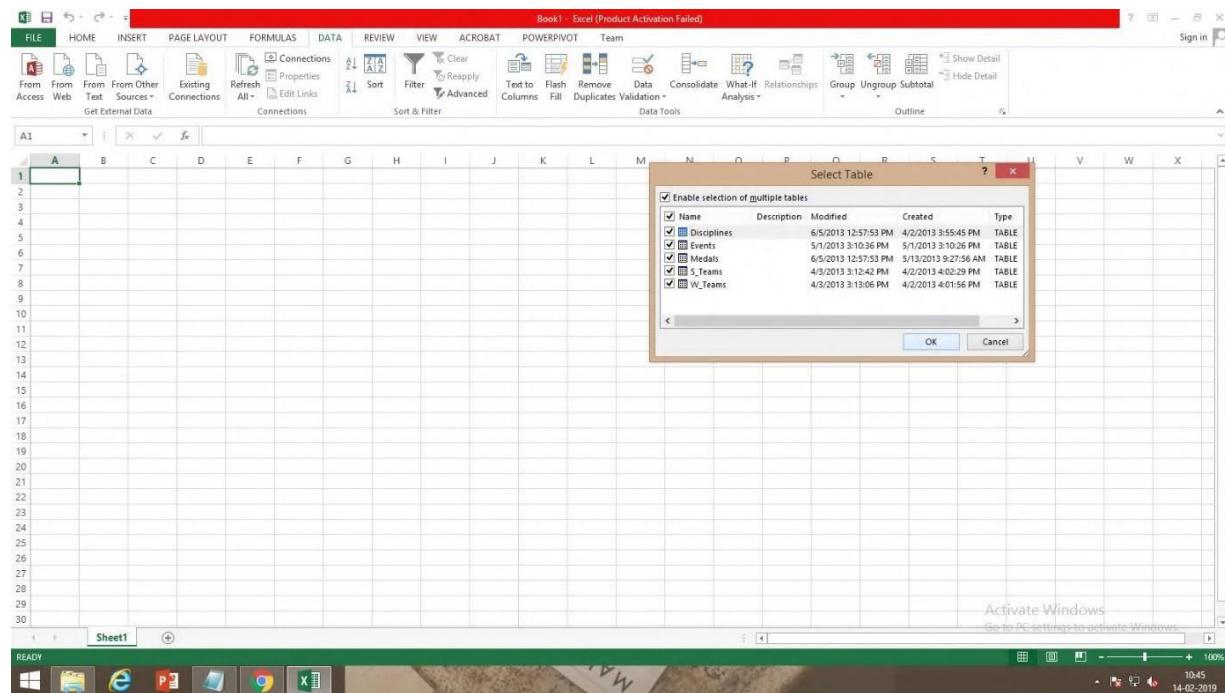
Click Data -> Get External Data -> From Access.



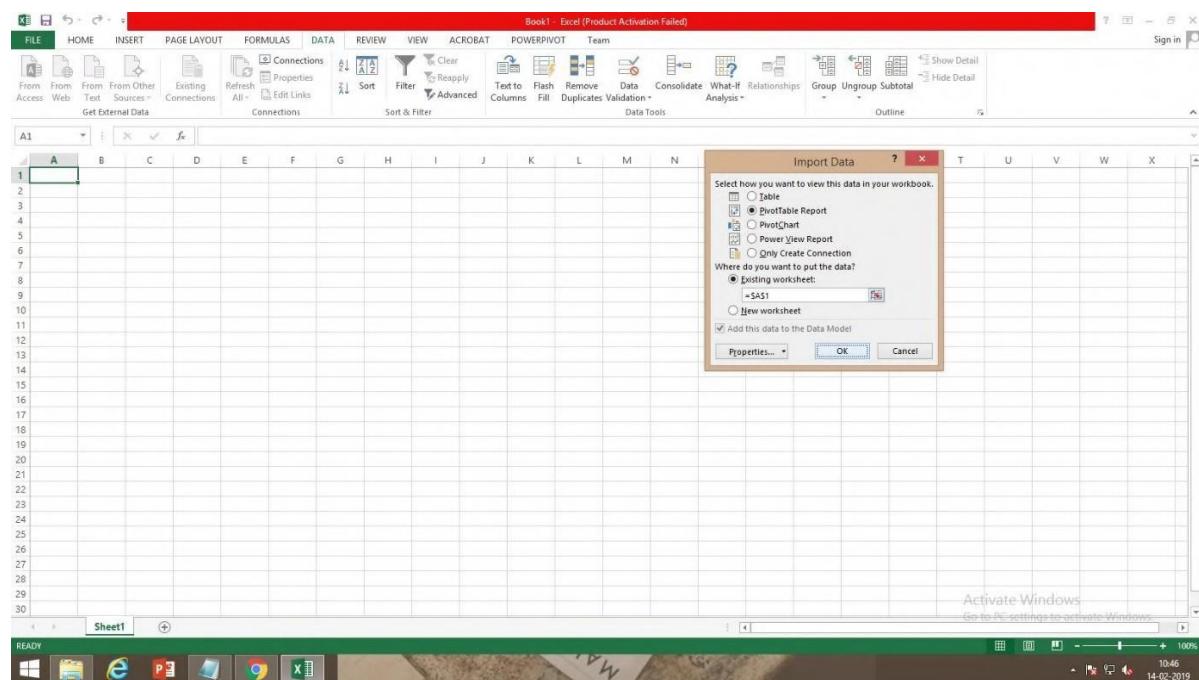
Step 2: Select the OlympicMedals.accdb file and click Open.



Step 3: Check the Enable Selection of Multiple Tables box and select all the tables. Click OK.



Step 4: The Import Data window appears. Select the PivotTable Report option and click OK.



Step 5: A pivot table is created using the imported tables.

The screenshot shows the Microsoft Excel ribbon with the 'PIVOTTABLE TOOLS' tab selected. The 'ANALYZE' tab is active. In the main area, a PivotTable is visible in the top-left corner of the worksheet. The 'PivotTable Fields' pane on the right shows the 'Medals' table expanded under the 'ROWS' category. The table structure includes fields such as Event, Discipline, Sport, and Participation. The status bar at the bottom indicates the date as 14-02-2019 and the time as 10:48.

Step 6: In PivotTable Fields, expand the Medals table. Find the NOC_CountryRegions and drag it to the Columns area.

The screenshot shows the Microsoft Excel ribbon with the 'PIVOTTABLE TOOLS' tab selected. The 'ANALYZE' tab is active. In the main area, a PivotTable is visible in the top-left corner of the worksheet. The 'PivotTable Fields' pane on the right shows the 'NOC_CountryRegion' table expanded under the 'COLUMNS' category. The table structure includes fields such as Edition, Session, AthleteID, Athlete, NOC_CountryRegion, Gender, Event_gender, Sport, and DisciplineID. The status bar at the bottom indicates the date as 14-02-2019 and the time as 10:49.

Step 7: Find the Disciplines table and drag it to the Rows area.

The screenshot shows the Microsoft Excel ribbon with the 'ANALYZE' tab selected. The PivotTable Fields pane on the right displays the 'Disciplines' table with its fields: Discipline, DisciplineID, and SportID. The 'ROWS' section of the pane has 'Discipline' selected. The main worksheet, 'Sheet1', contains a list of sports disciplines from A1 to Z1, including Alpine Skiing, Archery, Artistic G., Athletics, Badminton, Baseball, Basketball, Basque Pelota, Beach volley, Biathlon, BMX, Bobslleigh, Boxing, Canoe / Kayak F, Canoe / Kayak S, Cricket, Croquet, Cross Country S, Curling, Cycling Road, Cycling Track, Diving, Dressage, Eventing, Fencing, Figure skating, Football, and Freestyle Skl.

Step 8: filter disciplines to display only five sports: archery, diving, fencing, figure skating and speed skating.

Click anywhere in the PivotTable to ensure the excel PivotTable is selected. In the PivotTable Fields list, where the Disciplines table is expanded, hover over its Discipline field and a drop down arrow appears to the right of the field. Click the dropdown, click “Select All” to remove all selections, then scroll down and select archery, diving, fencing, figure skating and speed skating. Click OK.

The screenshot shows the Microsoft Excel ribbon with the 'ANALYZE' tab selected. The PivotTable Fields pane on the right displays the 'Disciplines' table with its fields: Discipline, DisciplineID, and SportID. The 'ROWS' section of the pane has 'Discipline' selected. A context menu is open over the 'Discipline' field, showing options like 'Sort A to Z', 'Sort Z to A', 'More Sort Options...', 'Clear Filter From "Discipline"', 'Label Filters', and 'Value Filters'. The 'Value Filters' section is expanded, showing checkboxes for various sports disciplines. The checkboxes for Archery, Diving, Fencing, Figure skating, and Speed skating are checked. The other disciplines like Alpine Skiing, Badminton, etc., have their checkboxes unchecked. The 'OK' button at the bottom of the context menu is visible.

Step 9: In PivotTable Fields, from the Medals table, drag Medal to the VALUES area. Since Values must be numeric, Excel automatically changes Medal to Count of Medal.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1 - Excel (Product Activation Failed)". The PivotTable Fields pane on the right is open, showing the "ACTIVE" section with "Medal" checked. The main worksheet displays a PivotTable with data for sports like Archery, Diving, Fencing, Figure skating, and Speed skating across countries like AUS, AUT, BEL, BLR, BOH, BUL, CAN, CHN, CUB, DEN, EGY, ESP, EUA, EUN, FIN, FRA, FRG, GBR, GDR, GER, GRE, HUN, INA, ITA, JPN, KAZ, KOR, MEX, NED, NOR, POL, PRK, ROU, RUS, SWE, TUR, UNG, URY, UZB, VEN, and YUG. The PivotTable Fields pane also shows other fields like NOC_CountryRegion, Discipline, and DisciplineEvent.

Step 10: From the Medals table, select Medal again and drag it into the FILTERS area.

This screenshot shows the same Excel environment as the previous one, but with a key difference: the "Medal" field has been moved from the "VALUES" section of the PivotTable Fields pane to the "FILTERS" section. This change allows for filtering the data based on the number of medals won by each country. The main worksheet and PivotTable structure remain the same, displaying the same range of sports and countries as in Step 9.

Step 11: Let's filter the PivotTable to display only those countries or regions with more than 90 total medals.

In the PivotTable, click the dropdown to the right of Column Labels.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1 - Excel (Product Activation Failed)". The ribbon is set to the "ANALYZE" tab, which contains the "PIVOTTABLE TOOLS" tab. The PivotTable Fields pane on the right shows "Medal" under the "ROWS" category and "Count of Medal" under the "VALUES" category. The main worksheet area displays a PivotTable with data for various countries. A "Value Filters" dialog box is open, showing a dropdown menu with "Greater Than..." selected. The status bar at the bottom indicates "Activate Windows" and the date "14-02-2019".

Step 12: Select Value Filters and select Greater Than....

The screenshot shows the same Microsoft Excel environment as the previous step. The "Value Filters" dialog box is open, and the "Greater Than..." option is highlighted in the dropdown menu. The PivotTable Fields pane and the main worksheet area are visible in the background. The status bar at the bottom indicates "Activate Windows" and the date "14-02-2019".

Step 13: Type 90 in the last field (on the right). Click OK.

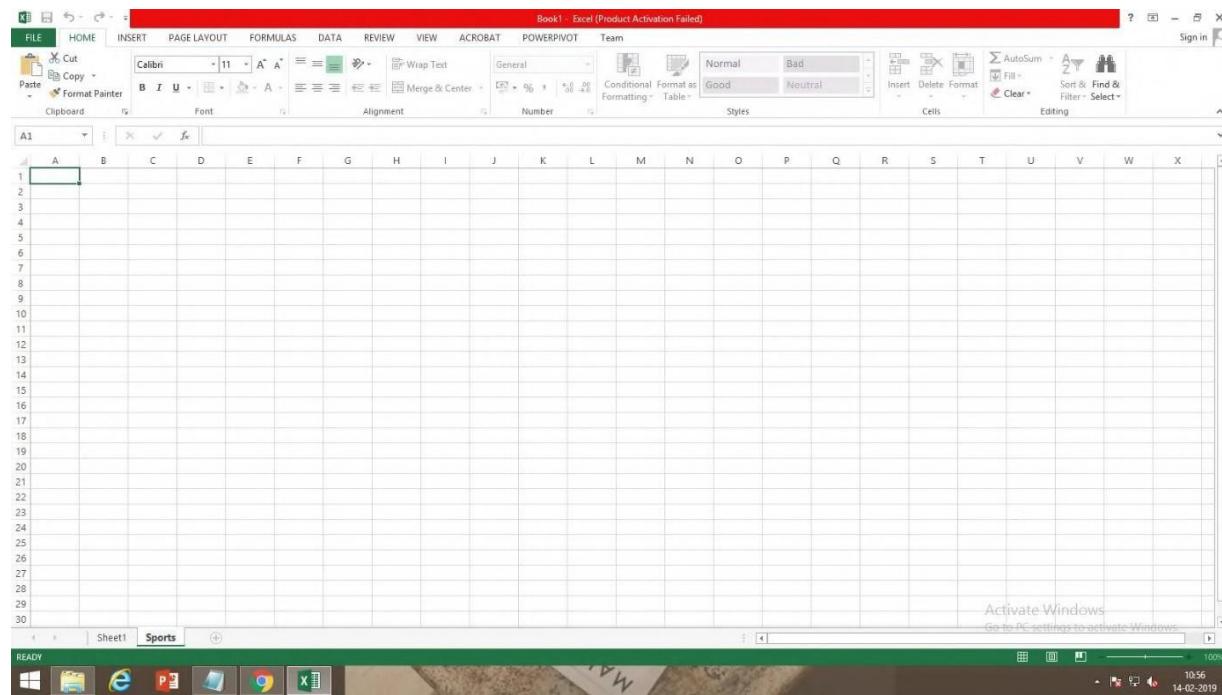
The screenshot shows a Microsoft Excel spreadsheet titled "Book1 - Excel (Product Activation Failed)". The PivotTable Fields pane on the right indicates that "Medal" is selected for the rows and "Discipline" is selected for the values. A "Value Filter (NOC_CountryRegion)" dialog box is open, showing the condition "Count of Medal is greater than 90". The main PivotTable area displays medal counts for countries like AUS, AUT, BEL, BLR, BOH, BUL, CAN, CHN, CUB, DEN, EGY, ESP, EUA, FIN, FRA, FRG, GBR, and others. The "Grand Total" row shows the sum of all medal counts.

Step 14: Your PivotTable looks like the following screen.

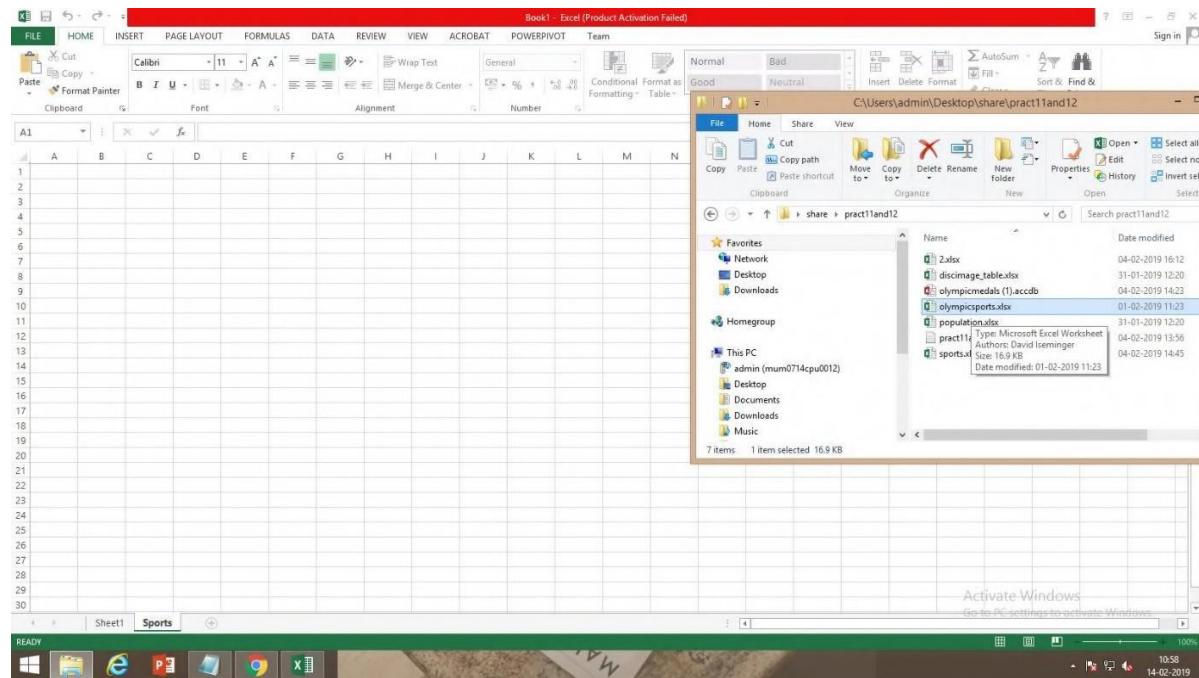
The screenshot shows the same Microsoft Excel spreadsheet after applying the filter. The PivotTable Fields pane remains the same. The main table now only displays data for countries where the count of medals is greater than 277, specifically CHN, FRA, GER, HUN, ITA, NED, RUS, URS, and USA. The "Grand Total" row shows the sum of all medal counts for these countries.

Step 15: Let's start by creating a blank worksheet, then import data from an Excel workbook.

Insert a new Excel worksheet, and name it Sports.



Step 16: Browse to the folder that contains the downloaded sample data files, and open OlympicSports.xlsx.



Step 17: Select and copy the data in Sheet1. If you select a cell with data, such as cell A1, you can press Ctrl + A to select all adjacent data. Close the OlympicSports.xlsx workbook.

On the Sports worksheet, place your cursor in cell A1 and paste the data.

	Sport	Code
1	Sport	Sport01
2	Aquatics	S1
3	Archery	S2
4	Athletics	S3
5	Badminton	S4
6	Baseball	S5
7	Basketball	S6
8	Basque Pt	S7
9	Biathlon	S8
10	Bobsleigh	S9
11	Boxing	S10
12	Canoe / K.S11	
13	Cricket	S12
14	Croquet	S13
15	Curling	S14
16	Cycling	S15
17	Equestrian	S16
18	Fencing	S17
19	Football	S18
20	Golf	S19
21	Gymnastics	S20
22	Handball	S21
23	Hockey	S22
24	Ice Hockey	S23
25	Jeu de paix	S24
26	Judo	S25
27	Lacrosse	S26
28	Luge	S27
29	Modern P	S28
30	Polo	S29

Step 18: With the data still highlighted, press Ctrl + T to format the data as a table. You can also format the data as a table from the ribbon by selecting HOME > Format as Table. Since the data has headers, select My table has headers in the Create Table window that appears.

Step 19: Name the table. In TABLE TOOLS > DESIGN > Properties, locate the Table Name field and type Sports. The workbook looks like the following screen.

Save the workbook.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1 - Excel (Product Activation Failed)". The ribbon is visible at the top with tabs for FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, ACROBAT, POWERPIVOT, Team, and DESIGN. The DESIGN tab is selected. In the center of the screen, there is a table with the first row labeled "Sport" and "SportID". The table contains 30 rows of data, each with a Sport name and its corresponding SportID. The "Table Style Options" group in the ribbon is expanded, showing various style options. The status bar at the bottom right indicates "Activate Windows Go to PC settings to activate Windows".

Step 20: Insert a new Excel worksheet, and name it Hosts.

The screenshot shows the same Microsoft Excel spreadsheet from Step 19. A new worksheet tab named "Hosts" has been inserted, positioned between "Sheet1" and "Sports". The "Hosts" sheet is currently active, showing a blank grid of cells from A1 to X30. The ribbon at the top remains the same, with the DESIGN tab still selected. The status bar at the bottom right indicates "Activate Windows Go to PC settings to activate Windows".

Step 21: Select and copy the following table, including the table headers.

City	NOC_CountryRegion	Alpha-2 Code	Edition	Season
Melbourne / Stockholm	AUS	AS	1956	Summer
Sydney	AUS	AS	2000	Summer
Innsbruck	AUT	AT	1964	Winter
Innsbruck	AUT	AT	1976	Winter
Antwerp	BEL	BE	1920	Summer
Antwerp	BEL	BE	1920	Winter
Montreal	CAN	CA	1976	Summer
Lake Placid	CAN	CA	1980	Winter
Calgary	CAN	CA	1988	Winter
St. Moritz	SUI	SZ	1928	Winter
St. Moritz	SUI	SZ	1948	Winter
Beijing	CHN	CH	2008	Summer
Berlin	GER	GM	1936	Summer
Garmisch-Partenkirchen	GER	GM	1936	Winter
Barcelona	ESP	SP	1992	Summer
Helsinki	FIN	FI	1952	Summer
Paris	FRA	FR	1900	Summer
Paris	FRA	FR	1924	Summer
Chamonix	FRA	FR	1924	Winter
Grenoble	FRA	FR	1968	Winter
Albertville	FRA	FR	1992	Winter
London	GBR	UK	1908	Summer
London	GBR	UK	1908	Winter
London	GBR	UK	1948	Summer
Munich	GER	DE	1972	Summer
Athens	GRC	GR	2004	Summer
Cortina d'Ampezzo	ITA	IT	1956	Winter
Rome	ITA	IT	1960	Summer
Turin	ITA	IT	2006	Winter
Tokyo	JPN	JA	1964	Summer

City	NOC_CountryRegion	Alpha-2 Code	Edition	Season
Sapporo	JPN	JA	1972	Winter
Nagano	JPN	JA	1998	Winter
Seoul	KOR	KS	1988	Summer
Mexico	MEX	MX	1968	Summer
Amsterdam	NED	NL	1928	Summer
Oslo	NOR	NO	1952	Winter
Lillehammer	NOR	NO	1994	Winter
Stockholm	SWE	SW	1912	Summer
St Louis	USA	US	1904	Summer
Los Angeles	USA	US	1932	Summer
Lake Placid	USA	US	1932	Winter
Squaw Valley	USA	US	1960	Winter
Moscow	URS	RU	1980	Summer
Los Angeles	USA	US	1984	Summer
Atlanta	USA	US	1996	Summer
Salt Lake City	USA	US	2002	Winter
Sarajevo	YUG	YU	1984	Winter

In Excel, place your cursor in cell A1 of the Hosts worksheet and paste the data.

City	NO	Country	Region	Population	Year
Melbourne	AUS	AS	1956	Summer	
Sydney	AUS	AS	2000	Summer	
Innsbruck	AUT	AT	1964	Winter	

Step 22: Format the data as a table. As described earlier in this tutorial, you press Ctrl + T to format the data as a table, or from HOME > Format as Table. Since the data has headers, select My table has headers in the Create Table window that appears.

The 'Format As Table' dialog box is open, prompting for the range of data (A\$1:\$E\$4) and indicating that the table has headers. The background shows the same table structure with rows 1 through 4 visible.

City	NO	Country	Region	Population	Year
Melbourne	AUS	AS	1956	Summer	
Sydney	AUS	AS	2000	Summer	
Innsbruck	AUT	AT	1964	Winter	

Table Tools DESIGN tab

Table Name: Hosts

Table Style Options:

- Header Row
- First Column
- Filter Button
- Total Row
- Last Column
- Banded Rows
- Banded Columns

Table Styles: A grid of 20 color-coded styles.

Data:

City	NOC	CountryRegion	Alpha-2 Code	Edition	Season
Melb					
our					
e /	AUS		AS	1956	Summer
Stock					
holm					
Sydn					
ey	AUS		AS	2000	Summer
Innsb					
ruck	AUT		AT	1964	Winter
Innsb					
ruck	AUT		AT	1976	Winter
Antw					
erp	BEL		BE	1920	Summer

Step 23: Name the table. In TABLE TOOLS > DESIGN > Properties locate the Table Name field, and type Hosts.

Table Tools DESIGN tab

Table Name: Melbourne / Stockholm

Table Style Options:

- Header Row
- First Column
- Filter Button
- Total Row
- Last Column
- Banded Rows
- Banded Columns

Table Styles: A grid of 20 color-coded styles.

Data:

City	NOC	CountryRegion	Alpha-2 Code	Edition	Season
Melb					
our					
e /	AUS		AS	1956	Summer
Stock					
holm					
Sydn					
ey	AUS		AS	2000	Summer
Innsb					
ruck	AUT		AT	1964	Winter
Innsb					
ruck	AUT		AT	1976	Winter
Antw					
erp	BEL		BE	1920	Summer

Step 24: Select the Edition column, and from the HOME tab, format it as Number with 0 decimal places.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1.xlsx". The data consists of six rows of information. The columns are labeled: City, NOC_CountryRegion, Alpha-2 Code, Edition, and Season. The "Edition" column contains the years 1956, 2000, 1964, 1976, and 1920. The "Season" column contains the words "Summer", "Summer", "Winter", "Winter", and "Summer". The "Edition" column is currently selected. The "HOME" tab is active in the ribbon. A context menu for the "Edition" column is open, showing options like "General", "Number", "Currency", "Percentage", and "Text". The "Number" option is highlighted. The status bar at the bottom right shows "AVERAGE: 1959.574468 COUNT: 48 SUM: 92100".

Step 25: Save the workbook. Your workbook looks like the following screen.

The screenshot shows the same Microsoft Excel spreadsheet after saving. The data remains the same: six rows of information with columns for City, NOC_CountryRegion, Alpha-2 Code, Edition, and Season. The "Edition" column now displays the years 1956, 2000, 1964, 1976, and 1920 without decimal places. The "Season" column still contains "Summer", "Summer", "Winter", "Winter", and "Summer". The "HOME" tab is still active. The status bar at the bottom right shows "AVERAGE: 1950 COUNT: 48 SUM: 92100".

Step 26: On Sheet1, at the top of PivotTable Fields, click All to view the complete list of available tables.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1.xlsx - Excel (Product Activation Failed)". The PivotTable Fields pane is open on the right side, showing the "ACTIVE" section set to "ALL". Under "Choose fields to add to report:", there is a list of tables: Disciplines, Medals, Events, Hosts, S_Teams, Sports, and W_Teams. Below this, under "Drag fields between areas below:", the "FILTERS" area contains "Medal" and the "COLUMNS" area contains "NOC_Country...". The "ROWS" area contains "Discipline" and the "VALUES" area contains "Count of Medal". The main worksheet displays a PivotTable with data for various sports disciplines across different countries, with a Grand Total row.

Step 27: Expand Sports and select Sport to add it to the PivotTable. Notice that Excel prompts you to create a relationship, as seen in the following screen.

This screenshot is similar to the previous one, showing the PivotTable Fields pane with the "ACTIVE" section set to "ALL". However, the "Sports" table entry in the list is highlighted with a yellow background, and a tooltip message "Relationships between tables may be needed." appears above it, along with a "CREATE..." button. The rest of the interface and data in the PivotTable are identical to the previous screenshot.

Step 28: Click CREATE, in the highlighted PivotTable Fields area to open the Create Relationship dialog,

The screenshot shows a Microsoft Excel spreadsheet titled "Book1.xlsx" with the status bar indicating "Excel (Product Activation Failed)". The ribbon tabs are visible at the top, and the "PIVOTTABLE TOOLS" tab is selected. A PivotTable is displayed on the sheet, showing medal counts by sport and country. The "PivotTable Fields" pane is open on the right side, showing the "ACTIVE" section with "ALL". A "Create Relationship" dialog box is overlaid on the pane. The dialog box has "Table:" set to "Sports" and "Column (Foreign)" also set to "Sports". It also shows "Related Table:" and "Related Column (Primary):" dropdowns. Below the dialog, the message "Creating relationships between tables is necessary to show related data from different tables on the same report." is displayed. The "OK" button is visible at the bottom of the dialog.

Step 29: In Table, choose Disciplines from the dropdown list.

In Column (Foreign), choose SportID.

In Related Table, choose Sports.

In Related Column (Primary), choose SportID.

Click OK.

Tutorial: Import Data into Excel

imported. Let's create the relationship.

4. Click **CREATE...** in the highlighted **PivotTable Fields** area to open the **Create Relationship** dialog, as shown in the following screen.

5. In **Table**, choose **Disciplines** from the drop-down menu.

6. In **Column (Foreign)**, choose **SportID**.

7. In **Related Table**, choose **Sports**.

8. In **Related Column (Primary)**, choose **SportID**.

9. Click **OK**.

The PivotTable changes to reflect the new relationship. But the PivotTable doesn't look right quite yet, because of the ordering of fields in the **ROWS** area. Discipline is a subcategory of a given sport, but since we arranged Discipline above Sport in the **ROWS** area, it's not organized properly. The following screen shows this unwanted ordering.

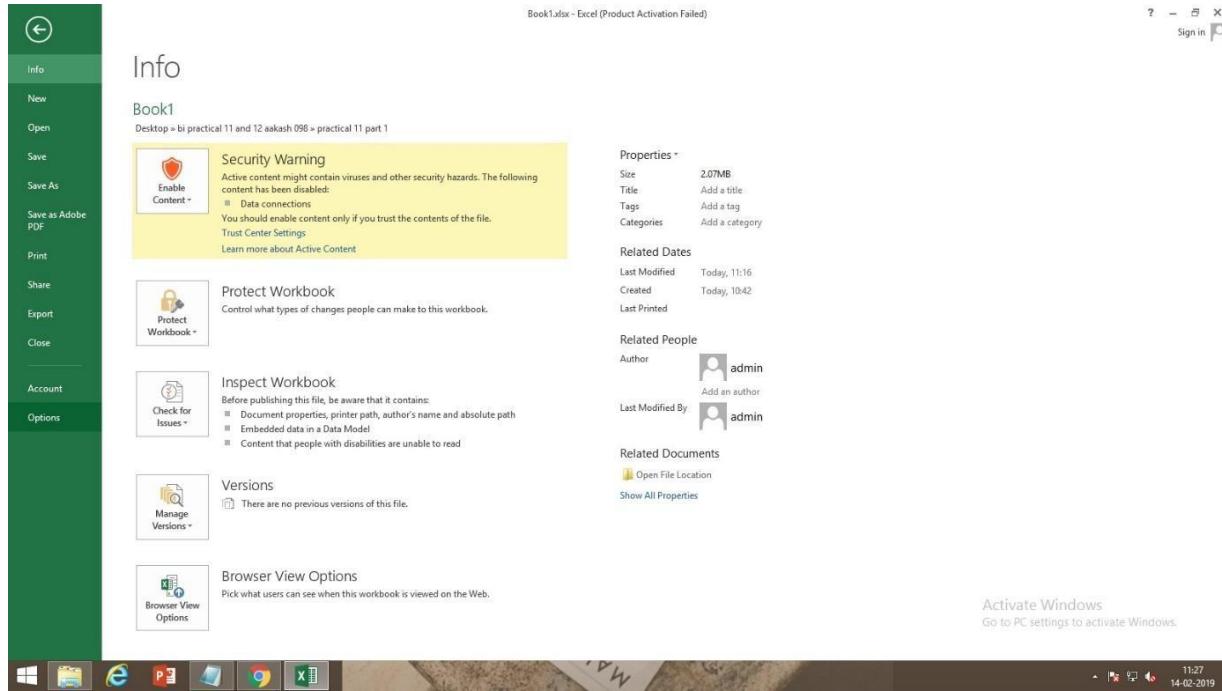
Activate Windows
Go to PC settings to activate Windows.

Step 30: In the **ROWS** area, move Sport above Discipline. That's much better, and the PivotTable displays the data how you want to see it, as shown in the following screen.

Sport	Discipline												Count of Medal
	All	BEL	CHN	FRA	GER	HUN	ITA	NED	RUS	URS	USA	Grand Total	
Aquatics	60	1	24	9	24	14	131					263	
Diving	60	1	24	9	24	14	131					263	
Archery	51	15	46	6	12	9	1	7	52			199	
Fencing	44	19	283	51	226	328	24	41	145	48		1209	
Skating	4	26	18	45	12	9	78	37	102	124		455	
Figure skating	3	7	18	11	12	2	3	29	42	51		178	
Speed skating	1	19	34	7	75	8	60	73				277	
Grand Total	99	120	348	126	238	358	111	103	268	355		2126	

Practical 5(B): Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart to perform data analysis.

Step 1: Go to FILE > Options > Add-Ins.



Step 2: In the Manage box near the bottom, click COM Add-ins > Go

Name	Location	Type
Active Application Add-ins		
Acrobat PDFMaker Office COM Addin	C:\...\PDFMOfficeAddin.dll	COM Add-in
Microsoft Office PowerPivot for Excel 2013	C:\...\ExcelClientAddin.dll	COM Add-in
Power View	C:\...\ReportingExcelClient.dll	COM Add-in
Team Foundation Add-in	"C:\...\TFSServiceAdd-in.dll"	COM Add-in
Visual Studio Tools for Office Design-Time Adaptor for Excel	C:\...\VSTOExcelAdaptor.dll	COM Add-in
Inactive Application Add-ins		
Analysis ToolPak	C:\...\Analysr\ANALYS32.XLL	Excel Add-in
Analysis ToolPak - VBA	C:\...\xl\atpvbaEN.XLAM	Excel Add-in
Date (XML)	C:\...\Smart Tag\MOFL.DLL	Action
Euro Currency Tools	C:\...\EuroTool\XLAM	Excel Add-in
Inquire	C:\...\SDCF\NativeShim.dll	COM Add-in
Microsoft Actions Pane 3	C:\...\OLVER\SOLVER.XLAM	XML Expansion Pack
Solver Add-in		

Step 3: Check the Microsoft Office Power Pivot in Microsoft Excel 2013 box, and then click OK.

Book1.xlsx - Excel (Product Activation Failed)

PIVOTTABLE TOOLS

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ACROBAT POWERPIVOT Team ANALYZE DESIGN

Font: Calibri, Size: 11, Bold, Italic, Underline, Alignment: Wrap Text, Conditional Format as Table, Styles: Normal, Good, Bad, Neutral, Insert, Delete, Format, Cells, Editing.

Table Fields: ALL, Discipline, DisciplineID, SportID, Event, EventID, Sport, DisciplineID, Discipline.

Add-Ins available: Acrobat PDFMaker Office COM Add-in, Microsoft Office PowerPivot for Excel 2013, Power View, Team Foundation Add-in, Visual Studio Tools for Office Design-Time Adaptor for Excel.

Location: C:\Program Files (x86)\Adobe\Acrobat DC\PDFMaker\Office\PDFOMOfficeAddin.dll

Load Behavior: Load at Startup

Drag fields between areas below:

FILTERS: Medal

COLUMNS: NOC_Country

ROWS: Sport

VALUES: Count of Medal

Activate Windows

Defer Layout Update

READY Sheet1 Sports Hosts +

100% 11:28 14-02-2019

Step 4: The following data is displayed.

Step 5: The Excel workbook includes a table called Hosts. We imported Hosts by copying it and pasting it into Excel, then formatted the data as a table.

	City	NOC	CountryRegion	Alpha-2 Code	Edition	Season
1	Melbourne	AUS	AU	AS	1956	Summer
2	Sydney	AUS	AU	AS	2000	Summer
3	Innsbruck	AUT	AT	AT	1964	Winter
4	Innsbruck	AUT	AT	AT	1976	Winter
5	Antwerp	BEL	BE	BE	1920	Summer
6	Antwerp	BEL	BE	BE	1920	Winter

Step 6: In Excel, click the Hosts tab to make it the active sheet.

On the ribbon, select POWER PIVOT > Tables > Add to Data Model. This step adds the Hosts table to the Data Model.

	City	NOC	CountryRegion	Alpha-2 Code	Edition	Season
1	Melbourne	AUS	AU	AS	1956	Summer
2	Sydney	AUS	AU	AS	2000	Summer
3	Innsbruck	AUT	AT	AT	1964	Winter
4	Innsbruck	AUT	AT	AT	1976	Winter
5	Antwerp	BEL	BE	BE	1920	Summer
6	Antwerp	BEL	BE	BE	1920	Winter

Step 7: the Power Pivot window shows all the tables in the model, including Hosts. Click through a couple of tables. In Power Pivot you can view all of the data that your model contains, even if they aren't displayed in any worksheets in Excel, such as the Disciplines, Events, and Medals data below, as well as S_Teams, W_Teams, and Sports.

The screenshot shows the Power Pivot window with the 'Hosts' table selected. The table data is as follows:

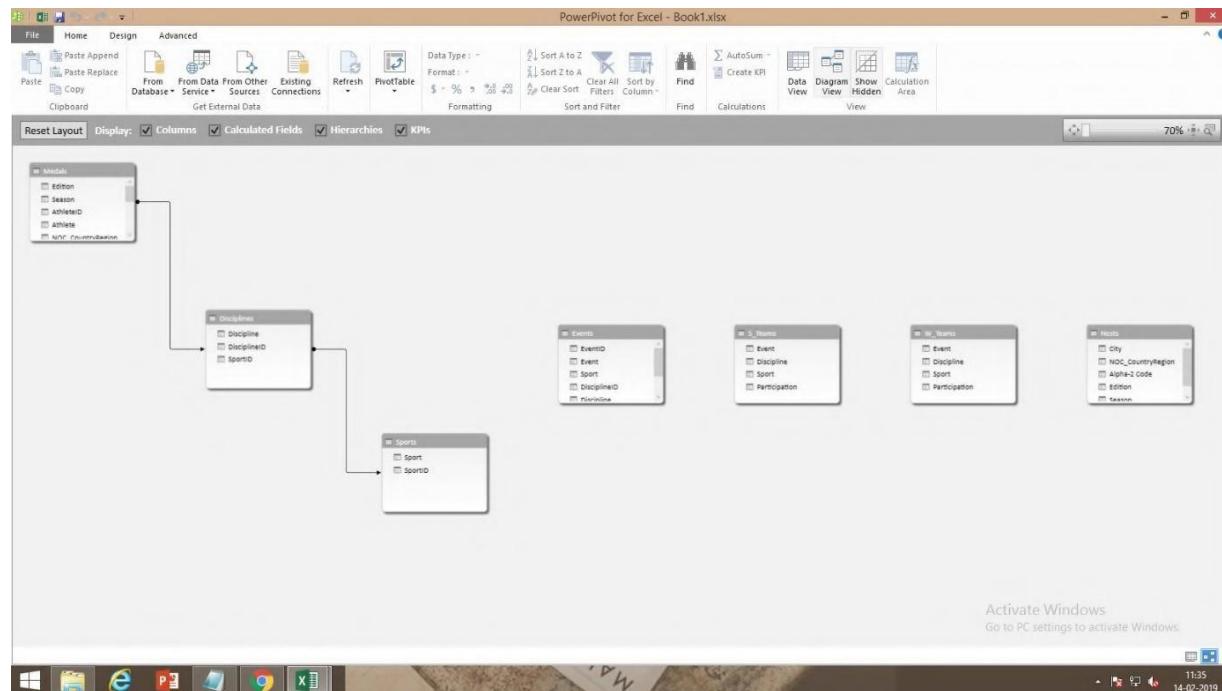
City	NOC_CountryRegion	Alpha-2 Code	Edition	Season
Melb.. AUS	AS	1956	Summer	
Sydney AUS	AS	2000	Summer	
Innsbr.. AUT	AT	1964	Winter	
Innsbr.. AUT	AT	1976	Winter	
Antwerp BEL	BE	1920	Summer	
Antwerp BEL	BE	1920	Winter	
Montreal CAN	CA	1976	Summer	
Lake Pl... CAN	CA	1980	Winter	
Calgary CAN	CA	1988	Winter	
St. Moritz SUI	SZ	1928	Winter	
St. Moritz SUI	SZ	1948	Winter	
Beijing CHN	CH	2008	Summer	
Berlin GER	GM	1936	Summer	
Garmisch GER	GM	1936	Winter	
Barcelona ESP	SP	1992	Summer	
Helsinki FIN	FI	1952	Summer	
Paris FRA	FR	1900	Summer	
Paris FRA	FR	1924	Summer	
Chamonix FRA	FR	1924	Winter	
Grenoble FRA	FR	1968	Winter	
Albertville FRA	FR	1992	Winter	
London GBR	UK	1908	Summer	
London GBR	UK	1908	Winter	
London GBR	UK	1948	Summer	

Step 8: In the Power Pivot window, in the View section, click Diagram View.

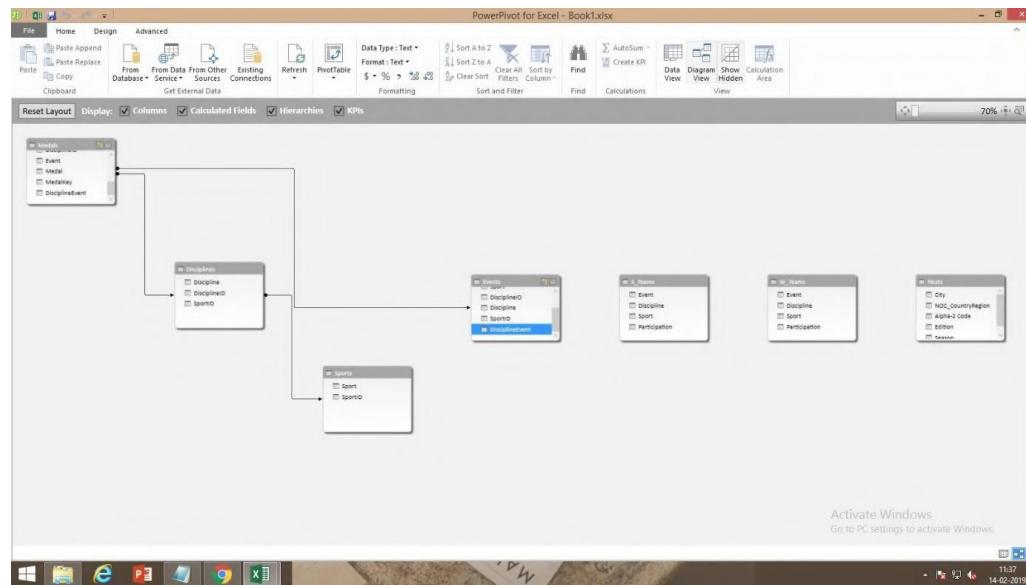
The screenshot shows the Power Pivot window with the 'Hosts' table selected. A tooltip is displayed over the 'Diagram View' button in the ribbon, providing the following information:

Diagram View
Switch to diagram view of the model. Use this view to perform metadata driven operations such as managing relationships and creating hierarchies.

Step 9: Use the slide bar to resize the diagram so that you can see all objects in the diagram. Rearrange the tables by dragging their title bar, so they're visible and positioned next to one another. Notice that four tables are unrelated to the rest of the tables: Hosts, Events, W_Teams, and S_Teams.

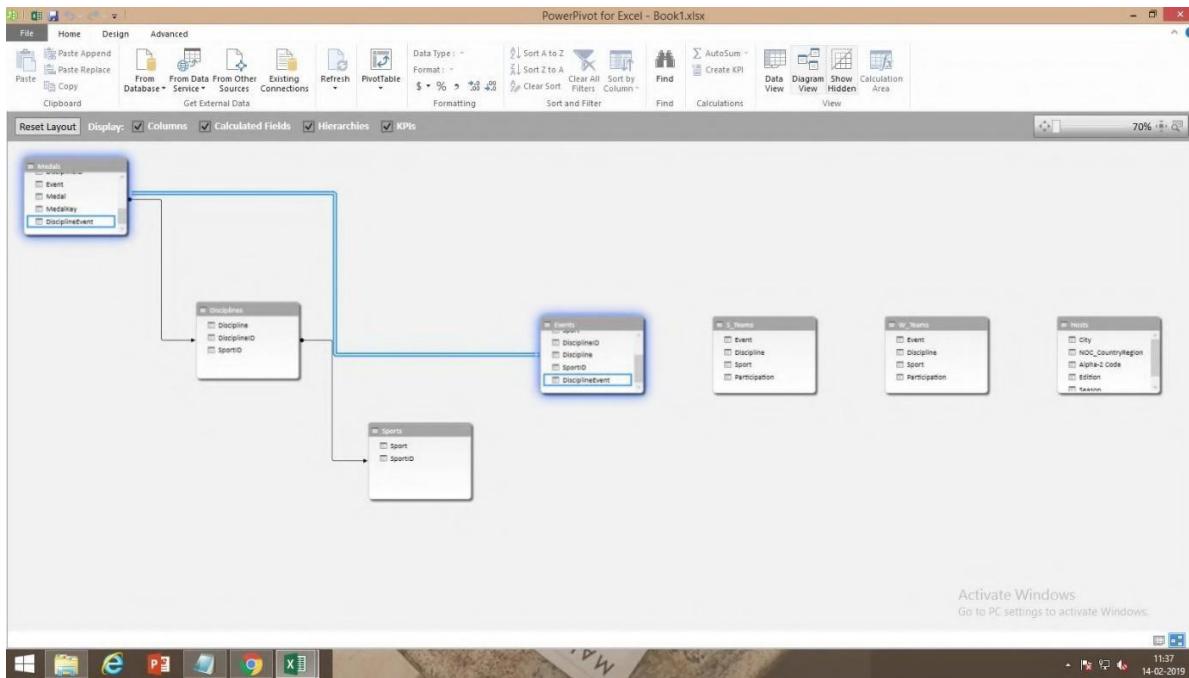


Step 10: Notice that both the Medals table and the Events table have a field called DisciplineEvent. Upon further inspection, you determine that the DisciplineEvent field in the Events table consists of unique, non-repeated values.

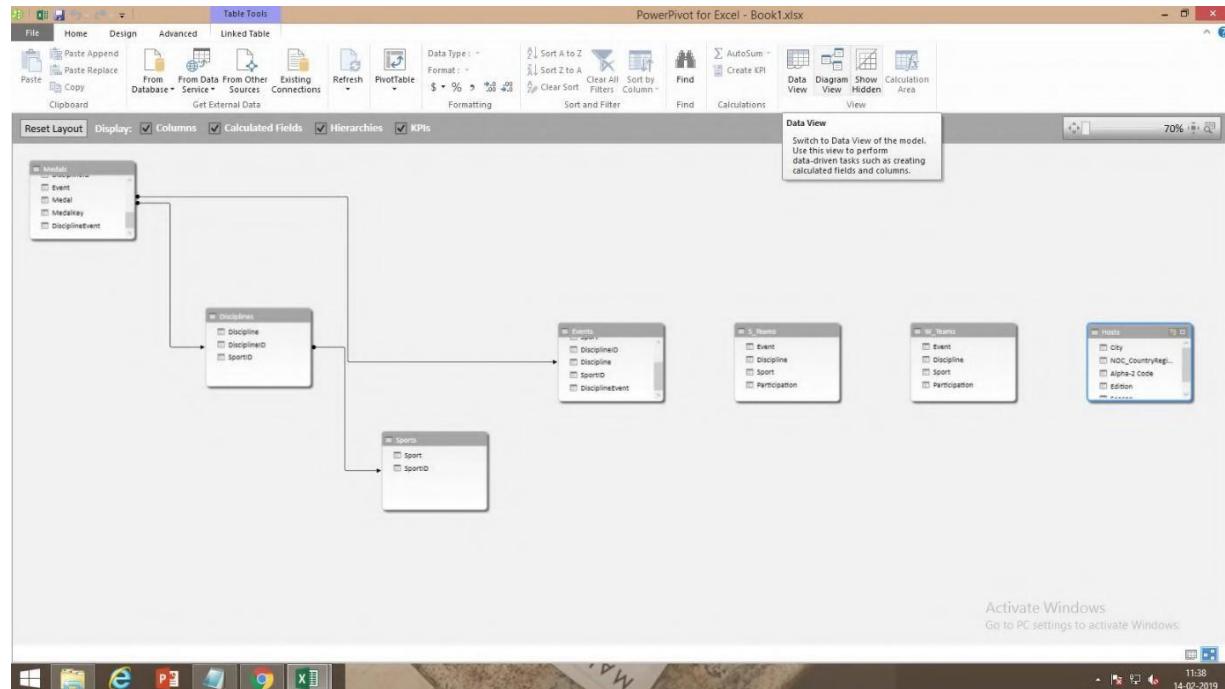


Step 11: Create a relationship between the Medals table and the Events table. While in Diagram View, drag the DisciplineEvent field from the Events table to the DisciplineEvent field in Medals. A line appears between them, indicating a relationship has been established.

Click the line that connects Events and Medals. The highlighted fields define the relationship, as shown in the following screen.



Step 12: To connect Hosts to the Data Model, we need a field with values that uniquely identify each row in the Hosts table. Then we can search our Data Model to see if that same data exists in another table. Looking in Diagram View doesn't allow us to do this. With Hosts selected, switch back to Data View.



Step 13: The following screen appears.

The screenshot shows the PowerPivot for Excel interface with the 'Data View' tab selected. A table titled 'City' is displayed, showing data for various host cities across different editions and seasons. The table includes columns: City, NOC_CountryRegion, Alpha-2 Code, Edition, and Season. The data shows multiple editions of the Olympics held in various countries.

	City	NOC_CountryRegion	Alpha-2 Code	Edition	Season	Add Column
1	Melb...	AUS	AS	1956	Summer	
2	Sydney	AUS	AS	2000	Summer	
3	Innsbr...	AUT	AT	1964	Winter	
4	Innsbr...	AUT	AT	1976	Winter	
5	Antw...	BEL	BE	1920	Summer	
6	Antw...	BEL	BE	1920	Winter	
7	Mont...	CAN	CA	1976	Summer	
8	Lake P...	CAN	CA	1980	Winter	
9	Calgary	CAN	CA	1988	Winter	
10	St. Mo...	SUI	SZ	1928	Winter	
11	St. Mo...	SUI	SZ	1948	Winter	
12	Beijing	CHN	CH	2008	Summer	
13	Berlin	GER	GM	1936	Summer	
14	Garmi...	GER	GM	1936	Winter	
15	Barcel...	ESP	SP	1992	Summer	
16	Helsinki	FIN	FI	1952	Summer	
17	Paris	FRA	FR	1900	Summer	
18	Paris	FRA	FR	1924	Summer	
19	Cham...	FRA	FR	1924	Winter	
20	Greno...	FRA	FR	1968	Winter	
21	Albert...	FRA	FR	1992	Winter	
22	London	GBR	UK	1908	Summer	
23	London	GBR	UK	1908	Winter	
24	London	GBR	UK	1948	Summer	

Activate Windows
Go to PC settings to activate Windows

Step 14: Select the Hosts table in Power Pivot. Adjacent to the existing columns is an empty column titled Add Column. Power Pivot provides that column as a placeholder. There are many ways to add a new column to a table in Power Pivot, one of which is to simply select the empty column that has the title Add Column.

City	NOC	CountryRegion	Alpha-2 Code	Edition	Season	Add Column
Melb...	AUS		AS	1956	Summer	
Sydney	AUS		AS	2000	Summer	
Innsbr...	AUT		AT	1964	Winter	
Innsbr...	AUT		AT	1976	Winter	
Antw...	BEL		BE	1920	Summer	
Antw...	BEL		BE	1920	Winter	
Mont...	CAN		CA	1976	Summer	
Lake R...	CAN		CA	1980	Winter	
Calgary	CAN		CA	1988	Winter	
St. Mo...	SUI		SZ	1928	Winter	
St. Mo...	SUI		SZ	1948	Winter	
Beijing	CHN		CH	2008	Summer	
Berlin	GER		GM	1936	Summer	
Garmi...	GER		GM	1936	Winter	
Barcel...	ESP		SP	1992	Summer	
Helsinki	FIN		FI	1952	Summer	
Paris	FRA		FR	1900	Summer	
Paris	FRA		FR	1924	Summer	
Cham...	FRA		FR	1924	Winter	
Greno...	FRA		FR	1968	Winter	
Albert...	FRA		FR	1992	Winter	
London	GBR		UK	1908	Summer	
London	GBR		UK	1908	Winter	
London	GBR		UK	1948	Summer	

Step 15: In the formula bar, type the following DAX formula.
“=CONCATENATE([Edition],[Season])”

City	NOC	CountryRegion	Alpha-2 Code	Edition	Season	Add Column
Melb...	AUS		AS	1956	Summer	1956 Summer
Sydney	AUS		AS	2000	Summer	2000 Summer
Innsbr...	AUT		AT	1964	Winter	1964 Winter
Innsbr...	AUT		AT	1976	Winter	1976 Winter
Antw...	BEL		BE	1920	Summer	1920 Summer
Antw...	BEL		BE	1920	Winter	1920 Winter
Mont...	CAN		CA	1976	Summer	1976 Summer
Lake R...	CAN		CA	1980	Winter	1980 Winter
Calgary	CAN		CA	1988	Winter	1988 Winter
St. Mo...	SUI		SZ	1928	Winter	1928 Winter
St. Mo...	SUI		SZ	1948	Winter	1948 Winter
Beijing	CHN		CH	2008	Summer	2008 Summer
Berlin	GER		GM	1936	Summer	1936 Summer
Garmi...	GER		GM	1936	Winter	1936 Winter
Barcel...	ESP		SP	1992	Summer	1992 Summer
Helsinki	FIN		FI	1952	Summer	1952 Summer
Paris	FRA		FR	1900	Summer	1900 Summer
Paris	FRA		FR	1924	Summer	1924 Summer
Cham...	FRA		FR	1924	Winter	1924 Winter
Greno...	FRA		FR	1968	Winter	1968 Winter
Albert...	FRA		FR	1992	Winter	1992 Winter
London	GBR		UK	1908	Summer	1908 Summer
London	GBR		UK	1908	Winter	1908 Winter
London	GBR		UK	1948	Summer	1948 Summer

Step 16: When you finish building the formula, press Enter to accept it. Values are populated for all the rows in the calculated column.

City	NOC_CountryRegion	Alpha-2 Code	Edition	Season	CalculatedColumn1
Melb...	AUS	AS	1956	Summer	1956Summer
Sydney	AUS	AS	2000	Summer	2000Summer
Innsbr...	AUT	AT	1964	Winter	1964Winter
Innsbr...	AUT	AT	1976	Winter	1976Winter
Antw...	BEL	BE	1920	Summer	1920Summer
Antw...	BEL	BE	1920	Winter	1920Winter
Mont...	CAN	CA	1976	Summer	1976Summer
Lake P...	CAN	CA	1988	Winter	1988Winter
Calgary	CAN	CA	1988	Winter	1988Winter
St. Mo...	SUI	SZ	1928	Winter	1928Winter
St. Mo...	SUI	SZ	1948	Winter	1948Winter
Beijing	CHN	CH	2008	Summer	2008Summer
Berlin	GER	GM	1936	Summer	1936Summer
Garmi...	GER	GM	1936	Winter	1936Winter
Barcel...	ESP	SP	1992	Summer	1992Summer
Helsinki	FIN	FI	1952	Summer	1952Summer
Paris	FRA	FR	1900	Summer	1900Summer
Paris	FRA	FR	1924	Summer	1924Summer
Cham...	FRA	FR	1924	Winter	1924Winter
Greno...	FRA	FR	1968	Winter	1968Winter
Albert...	FRA	FR	1992	Winter	1992Winter
London	GBR	UK	1908	Summer	1908Summer
London	GBR	UK	1908	Winter	1908Winter
London	GBR	UK	1948	Summer	1948Summer

Step 17: Let's rename the calculated column to EditionID. You can rename any column by double-clicking it, or by right-clicking the column and choosing Rename Column. When completed, the Hosts table in Power Pivot looks like the following screen.

City	NOC_CountryRegion	Alpha-2 Code	Edition	Season	EditionID
Melb...	AUS	AS	1956	Summer	1956Summer
Sydney	AUS	AS	2000	Summer	2000Summer
Innsbr...	AUT	AT	1964	Winter	1964Winter
Innsbr...	AUT	AT	1976	Winter	1976Winter
Antw...	BEL	BE	1920	Summer	1920Summer
Antw...	BEL	BE	1920	Winter	1920Winter
Mont...	CAN	CA	1976	Summer	1976Summer
Lake P...	CAN	CA	1988	Winter	1988Winter
Calgary	CAN	CA	1988	Winter	1988Winter
St. Mo...	SUI	SZ	1928	Winter	1928Winter
St. Mo...	SUI	SZ	1948	Winter	1948Winter
Beijing	CHN	CH	2008	Summer	2008Summer
Berlin	GER	GM	1936	Summer	1936Summer
Garmi...	GER	GM	1936	Winter	1936Winter
Barcel...	ESP	SP	1992	Summer	1992Summer
Helsinki	FIN	FI	1952	Summer	1952Summer
Paris	FRA	FR	1900	Summer	1900Summer
Paris	FRA	FR	1924	Summer	1924Summer
Cham...	FRA	FR	1924	Winter	1924Winter
Greno...	FRA	FR	1968	Winter	1968Winter
Albert...	FRA	FR	1992	Winter	1992Winter
London	GBR	UK	1908	Summer	1908Summer
London	GBR	UK	1908	Winter	1908Winter
London	GBR	UK	1948	Summer	1948Summer

Step 18: Create a new column in the Medals table, like we did for Hosts. In Power Pivot select the Medals table, and click Design > Columns > Add. Notice that *Add Column* is selected.

The screenshot shows the PowerPivot interface with the 'Data View' tab selected. The ribbon at the top has 'Home' and 'Design' tabs. The 'Design' tab is active, and its 'Columns' section shows 'Add Column' is selected. The main area displays the 'Medals' table with columns: Edition, Season, AthleteID, Athlete, NOC_CountryRegion, Gender, Event_gender, Sport, Discipline, Event, Medal, MedalKey, DisciplineEvent, and Add Column. The 'Add Column' column is currently empty. The status bar at the bottom right shows the date as 14-02-2019 and the time as 11:45.

Step 19: In the formula bar above the table, type the following DAX formula. “= YEAR([Edition])”

The screenshot shows the PowerPivot interface with the 'Data View' tab selected. The ribbon at the top has 'File', 'Home', and 'Design' tabs. The formula bar at the top contains the DAX formula '=YEAR([Edition])'. The main area displays the 'Medals' table with the same columns as before. A new column 'CalculatedColumn1' has been added, showing the year value for each row. The status bar at the bottom right shows the date as 14-02-2019 and the time as 11:46.

Step 20: When you finish building the formula, press Enter. Values are populated for all the rows in the calculated column, based on the formula you entered. Rename the column by right-clicking CalculatedColumn1 and selecting Rename Column. Type Year, and then press Enter.

PowerPivot for Excel - Book1.xlsx																							
File		Home		Design		Advanced																	
Paste Append	From Database	From Service	From Other Sources	Existing Connections	Refresh	PivotTable	Data Type: Auto (Whole Number)	Format: General	\$ ▾	% ▾	0.00	0.00	Sort Smallest to Largest	Sort Largest to Smallest	Clear All Filters	Sort by Column	Find	AutoSum	Create KPI	Data View	Diagram View	Show Hidden	Calculation Area
[Year]	[fx] =YEAR([Edition])																						
[Year]																				Add Column			
01-01-19... Winter	A29666	URS	Men	M	Skiing	D18	4x10km ...	Gold	M10187	D184x10km relay		1956											
01-01-19... Winter	A29667	SWE	Men	M	Skiing	D18	4x10km ...	Bronze	M10188	D184x10km relay		1956											
01-01-19... Winter	A29668	FIN	Men	M	Skiing	D18	4x10km ...	Silver	M10189	D184x10km relay		1956											
01-01-19... Winter	A29729	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M10319	D184x10km relay		1960											
01-01-19... Winter	A29730	NOR	Men	M	Skiing	D18	4x10km ...	Silver	M10320	D184x10km relay		1960											
01-01-19... Winter	A29731	FIN	Men	M	Skiing	D18	4x10km ...	Gold	M10321	D184x10km relay		1960											
01-01-19... Winter	A29732	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M10322	D184x10km relay		1960											
01-01-19... Winter	A29733	NOR	Men	M	Skiing	D18	4x10km ...	Silver	M10323	D184x10km relay		1960											
01-01-19... Winter	A29734	FIN	Men	M	Skiing	D18	4x10km ...	Gold	M10324	D184x10km relay		1960											
01-01-19... Winter	A29735	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M10325	D184x10km relay		1960											
01-01-19... Winter	A29737	NOR	Men	M	Skiing	D18	4x10km ...	Silver	M10327	D184x10km relay		1960											
01-01-19... Winter	A29738	FIN	Men	M	Skiing	D18	4x10km ...	Gold	M10328	D184x10km relay		1960											
01-01-19... Winter	A29790	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M11192	D184x10km relay		1960											
01-01-19... Winter	A29791	NOR	Men	M	Skiing	D18	4x10km ...	Silver	M11193	D184x10km relay		1960											
01-01-19... Winter	A29792	FIN	Men	M	Skiing	D18	4x10km ...	Gold	M11194	D184x10km relay		1960											
01-01-19... Winter	A29855	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M11326	D184x10km relay		1964											
01-01-19... Winter	A29856	SWE	Men	M	Skiing	D18	4x10km ...	Gold	M11327	D184x10km relay		1964											
01-01-19... Winter	A29857	FIN	Men	M	Skiing	D18	4x10km ...	Silver	M11328	D184x10km relay		1964											
01-01-19... Winter	A29858	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M11329	D184x10km relay		1964											
01-01-19... Winter	A29859	SWE	Men	M	Skiing	D18	4x10km ...	Gold	M11330	D184x10km relay		1964											
01-01-19... Winter	A29860	FIN	Men	M	Skiing	D18	4x10km ...	Silver	M11331	D184x10km relay		1964											
01-01-19... Winter	A29865	URS	Men	M	Skiing	D18	4x10km ...	Bronze	M11336	D184x10km relay		1964											
01-01-19... Winter	A29866	SWE	Men	M	Skiing	D18	4x10km ...	Gold	M11337	D184x10km relay		1964											
01-01-19... Winter	A29867	FIN	Men	M	Skiing	D18	4x10km ...	Silver	M11338	D184x10km relay		1964											

Step 21: Create the EditionID calculated column, so select *Add Column*. In the formula bar, type the following DAX formula and press Enter. “=CONCATENATE([Year],[Season])”

Step 22: Sort the column in ascending order.

The screenshot shows the PowerPivot ribbon at the top with various tabs like File, Home, Design, Advanced, etc. Below the ribbon is a table with columns: Season, AthleteID, Athlete, NOC_CountryRegion, Gender, Event_gender, Sport, Discipline, Event, Medal, MedalKey, DisciplineEvent, Year, and EditionID. A context menu is open over the 'EditionID' column header, showing options like 'Sort A to Z', 'Sort Z to A', 'Clear Sort', 'Sort by Column', 'Find', and 'Calculations'. The 'Sort A to Z' option is highlighted. The table data includes rows for various athletes from different countries and years, such as Winter 1996 and Summer 1996.

Step 23: The Medals table in Power Pivot now looks like the following screen.

This screenshot shows the same PowerPivot interface after sorting. The 'EditionID' column header now has a small green arrow pointing up, indicating it is sorted in ascending order. The table data remains the same, showing rows for various athletes and their medal information across different years and editions.

Step 24: In the Power Pivot window, select Home > View > Diagram View from the ribbon.

PowerPivot for Excel - Book1.xlsx

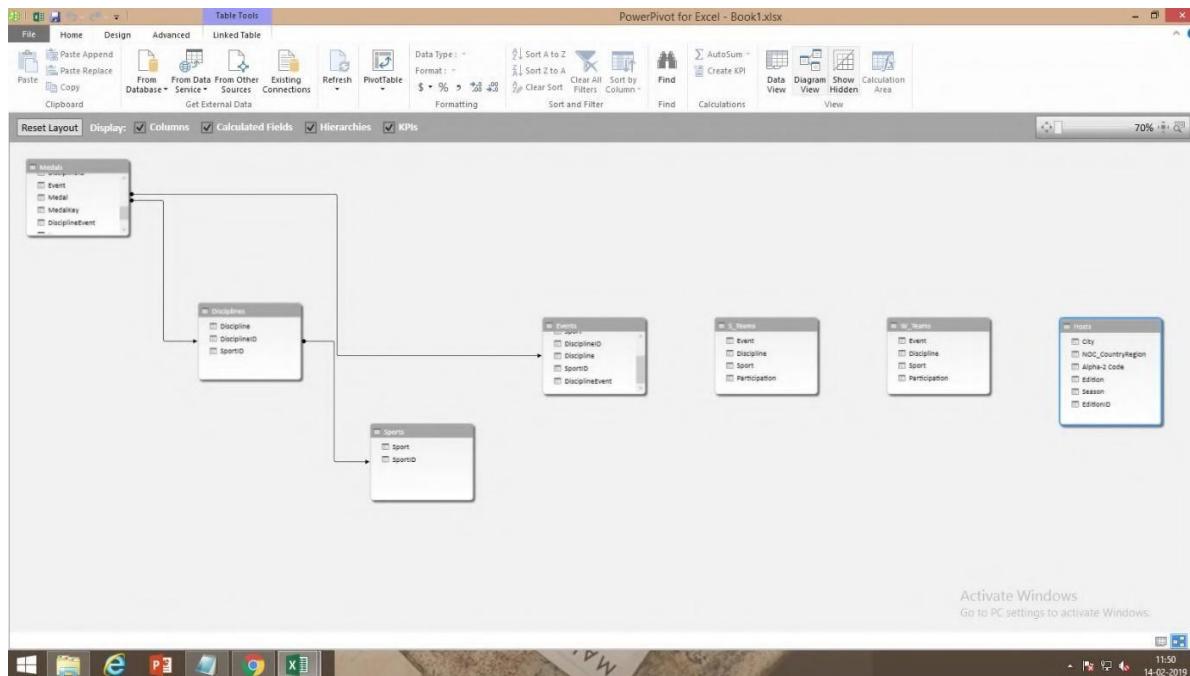
The screenshot shows a Microsoft Excel window titled "PowerPivot for Excel - Book1.xlsx". The ribbon tabs are "File", "Home", "Design", and "Advanced". The "Home" tab is selected, showing various data manipulation tools like Paste Append, Copy, Refresh, and PivotTable. The "Data Tools" group includes Data Type: Auto (Text), Sort A to Z, Sort Z to A, Clear All Filters, Sort by Column, Find, AutoSum, Create KPI, Data View, Diagram View, Show Hidden, Calculation Area, and View.

The main area displays a PivotTable with data from multiple tables. The columns include Season, AthleteID, Athlete, NOC_CountryRegion, Gender, Event_gender, Sport, Discipline, Event, Medal, and MedalKey. A formula bar at the top shows the formula =CONCATENATE([Year],[Season]).

A "Diagram View" pane is open on the right side, showing a hierarchical tree structure of the data model. It lists various entities and their relationships, such as EditionID, Edition, and various sports disciplines. A tooltip in the Diagram View pane provides information about the model's metadata-driven operations.

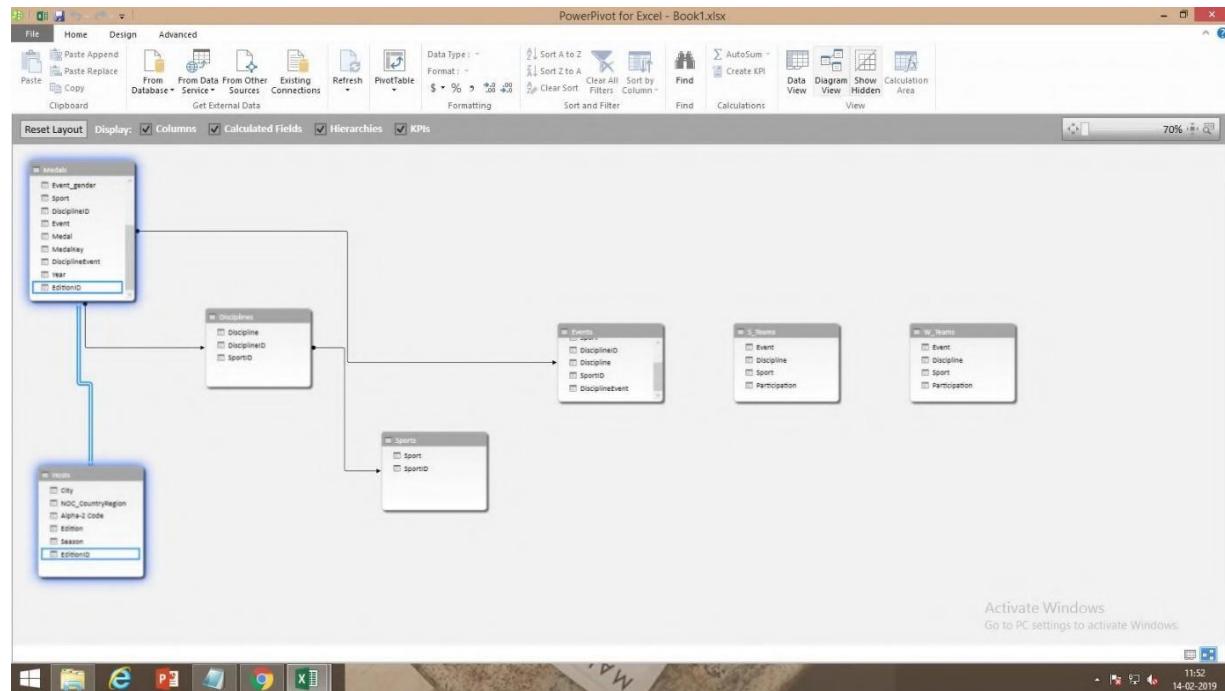
The status bar at the bottom indicates "Record 1 of 32,591" and "Activate Windows Go to PC settings to activate Windows". The taskbar shows icons for File Explorer, Edge, File Explorer, and Excel.

Step 25: Expand Hosts so you can view all of its fields.



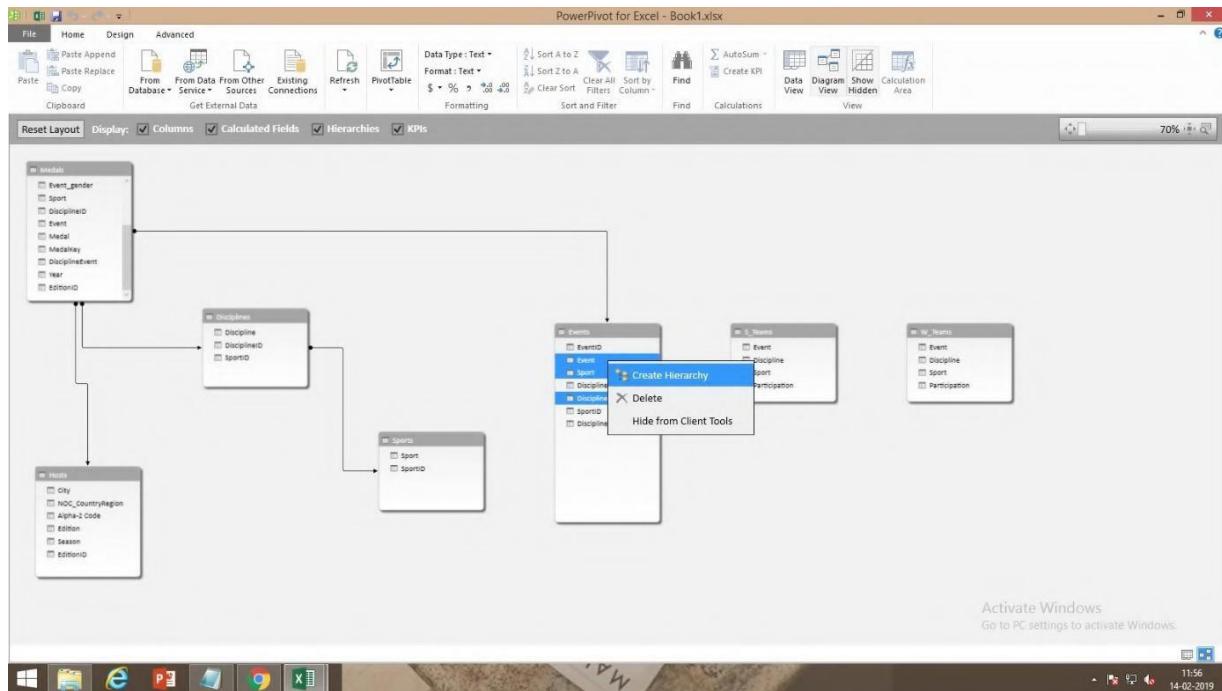
Step 26: Position the Hosts table so that it is next to Medals.

Drag the EditionID column in Medals to the EditionID column in Hosts. Power Pivot creates a relationship between the tables based on the EditionID column, and draws a line between the two columns, indicating the relationship.

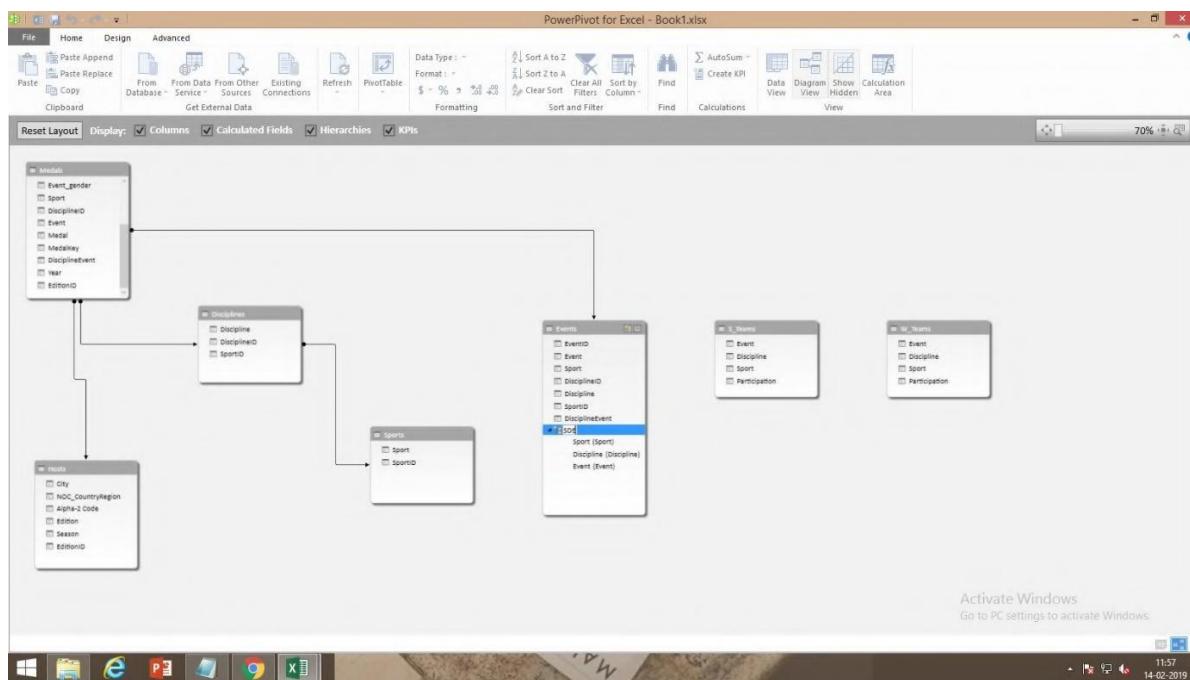


Step 27: Expand the Events table so that you can more easily see all of its fields.

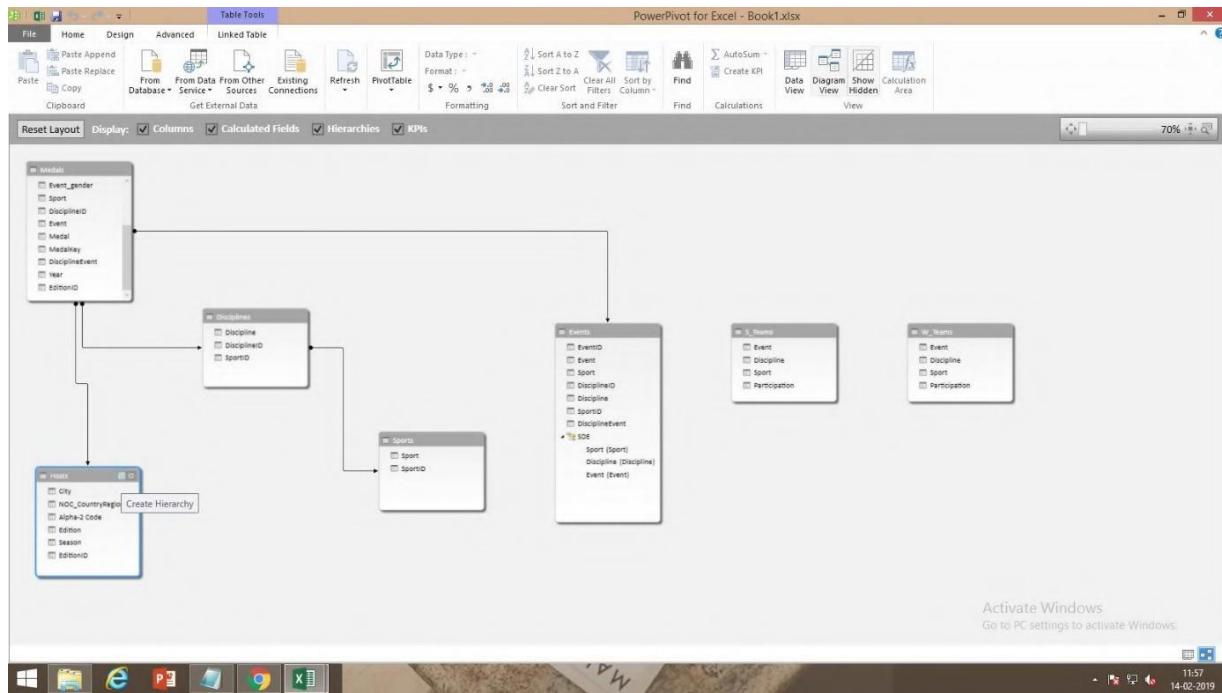
Press and hold Ctrl, and click the Sport, Discipline, and Event fields. With those three fields selected, right-click and select Create Hierarchy.



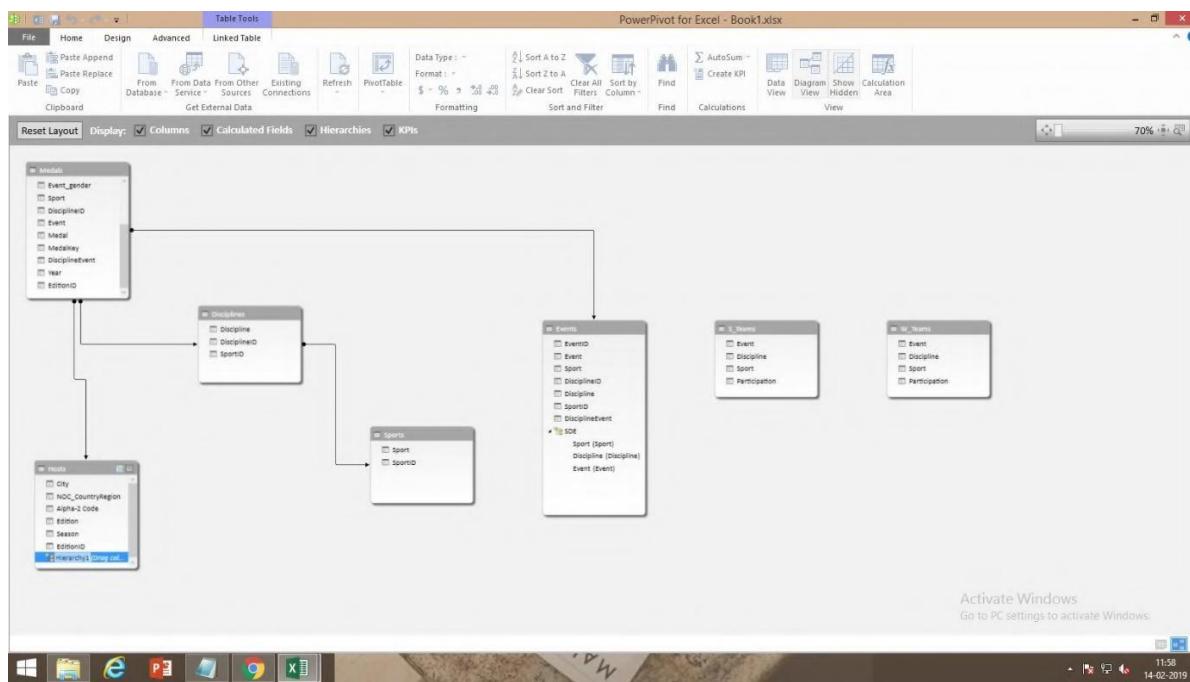
Step 28: A parent hierarchy node, Hierarchy 1, is created at the bottom of the table, and the selected columns are copied under the hierarchy as child nodes. Double-click the title, Hierarchy1, and type SDE to rename your new hierarchy.



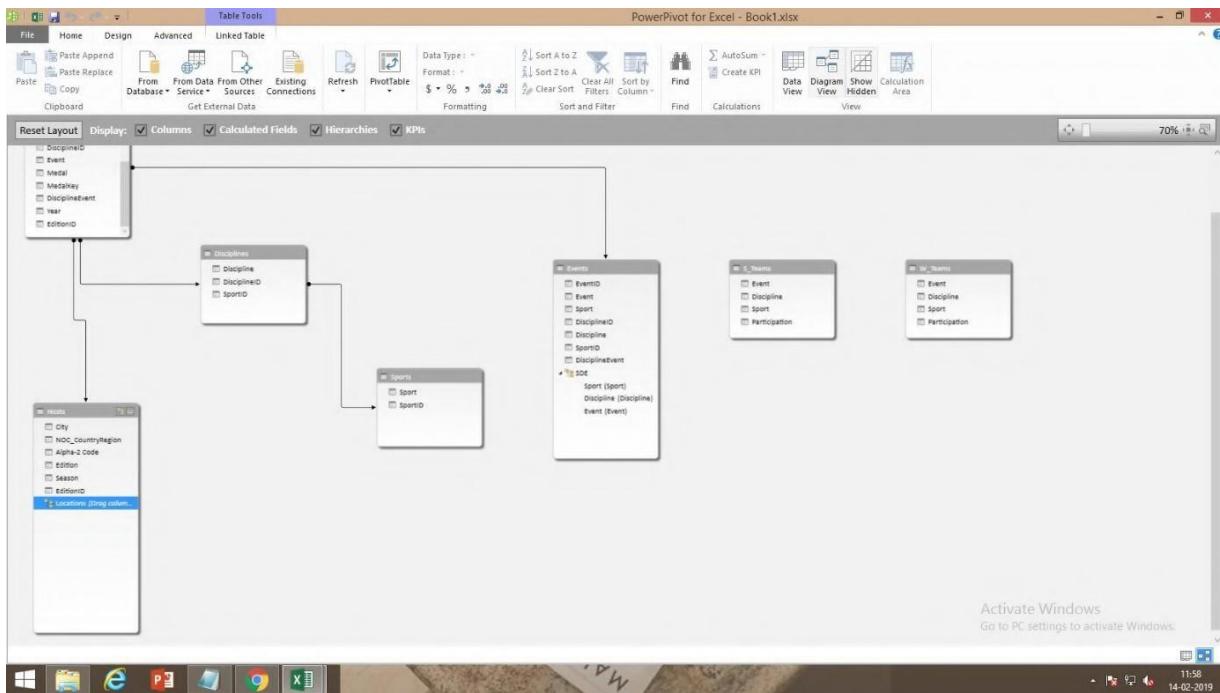
Step 29: Still in Diagram View in Power Pivot, select the Hosts table and click the Create Hierarchy button in the table header.



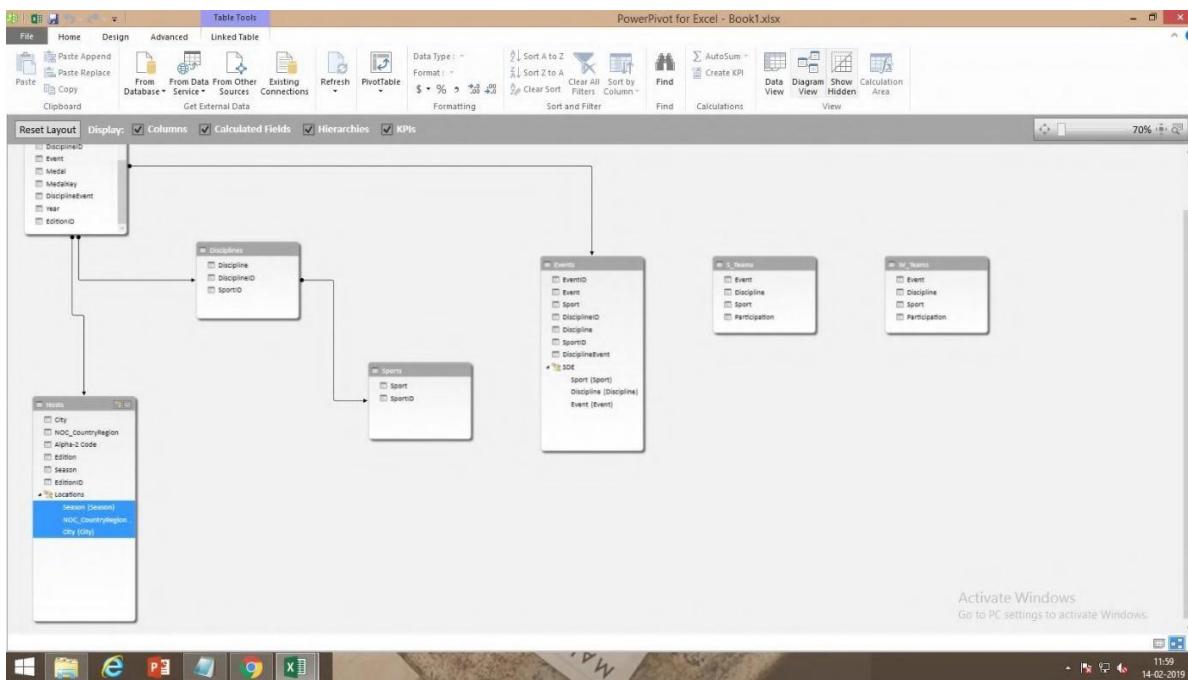
Step 30: An empty hierarchy parent node appears at the bottom of the table.



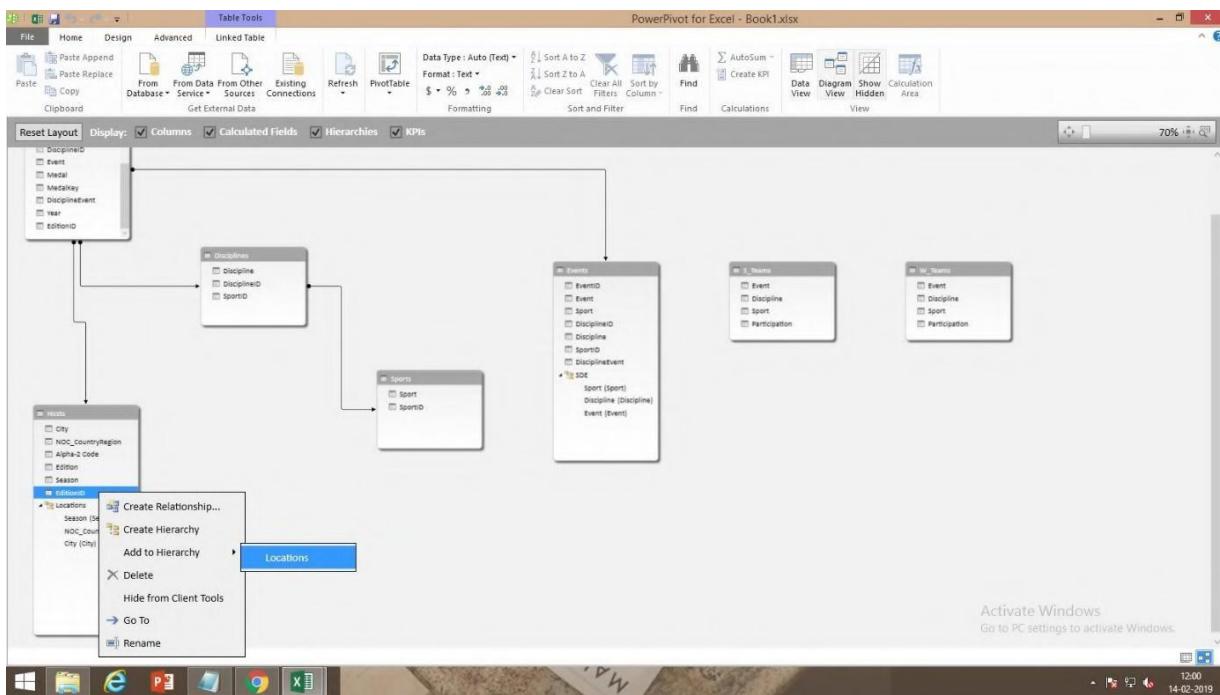
Step 31: Type Locations as the name for your new hierarchy.



Step 32: There are many ways to add columns to a hierarchy. Drag the Season, City and NOC_CountryRegion fields onto the hierarchy name (in this case, Locations) until the hierarchy name is highlighted, then release to add them.



Step 33: Right-click EditionID and select Add to Hierarchy. Choose Locations



Step 34: Go back to Excel. In Sheet1, remove the fields from the ROWS area of PivotTable Fields.

Book1.xlsx - Excel (Product Activation Failed)

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ACROBAT POWERPIVOT Team ANALYZE DESIGN

Manage Calculated Fields... Calculations Data Model Calculations Slicer Alignment Tables Relationships

A1 Medal All

Count of Medal

		Column Labels												
Row Labels	CHN	FRA	GER	HUN	ITA	NED	RUS	URS	USA	Grand Total				
Aquatics	60	1	24	9	24	14	131			263				
Diving	60	1	24	9	24	14	131			263				
Archery	51	15	46	6	12	9	1	7	52	199				
Archery	51	15	46	6	12	9	1	7	52	199				
Fencing	44	19	283	51	226	328	24	41	145	48	1209			
Fencing	44	19	283	51	226	328	24	41	145	48	1209			
Skating	4	26	18	45	12	9	78	37	102	124	455			
Figure skating	3	7	18	11	12	2	3	29	42	51	178			
Speed skating	1	19		34	7	75	8	60	73		277			
Grand Total	99	120	348	126	238	358	111	103	268	355	2126			

PivotTable Fields

ACTIVE ALL

Choose fields to add to report:

- Disciplines
- Discipline
- SportID
- Sport
- Events
- SDE
- More Fields

Move Up

Move Down

Move to Beginning

Move to End

Move to Report Filter

Move to Row Labels

Move to Values

Remove Field

Field Settings...

Sport Discipline Count of Medal

Activate Windows

Defer Layout Update

READY

Sheet1 Sports Hosts +

100% 12:01 14-02-2019

Screenshot of Microsoft Excel showing a PivotTable Fields pane open. The 'ACTIVE' section shows 'Disciplines' selected. A context menu is open over the 'Discipline' field, with 'Remove Field' highlighted.

PivotTable Fields

ACTIVE | ALL

Choose fields to add to report:

- Disciplines
 - Discipline
 - DisciplinedID
 - SportID
- Events
 - SDE
 - More Fields

Move Up | Move Down | Move to Beginning | Move to End | Move to Report Filter | Move to Row Labels | Move to Column Labels | Move to Values | Remove Field | Field Settings... | Discipline | Count of Medal

Sheet1 Sports Hosts +

READY

Step 35: Remove all the fields from the COLUMNS area.

Screenshot of Microsoft Excel showing a PivotTable Fields pane open. The 'ACTIVE' section shows 'NOC_Country' selected. A context menu is open over the 'NOC_Country' field, with 'Remove Field' highlighted.

PivotTable Fields

ACTIVE | ALL

Choose fields to add to report:

- Disciplines
 - Discipline
 - DisciplinedID
 - SportID
- Events
 - SDE
 - More Fields
- Medals
 - Edition
 - Season

Drag fields between areas below:

FILTERS | COLUMNS | ROWS

Medal | NOC_Country

Move Up | Move Down | Move to Beginning | Move to End | Move to Report Filter | Move to Row Labels | Move to Column Labels | Move to Values | Remove Field | Field Settings... | Medal | NOC_Country

Sheet1 Sports Hosts +

READY

Step 36: The only remaining fields in the PivotTable fields are Medal in the FILTERS area, and Count of Medal in the VALUES area.

Medal	All
Count of Medal	32591

Step 37: From the PivotTable Fields area, drag SDE from the Events table to the ROWS area.

Row Labels	Count of Medal
Aquatics	3545
Archery	305
Athletics	3411
Badminton	120
Baseball	335
Basketball	940
Basque Pelota	4
Biathlon	290
Bobsleigh	344
Boxing	842
Canoë / Kayak	1002
Cricket	24
Croquet	8
Curling	21
Cycling	1003
Equestrian	675
Fencing	1539
Football	1387
Golf	20
Gymnastics	2060
Handball	886
Hockey	1325
Ice Hockey	596
Judo	435
Lacrosse	59
Luge	139
Modern Pentathlon	174

Step 38: Then drag Locations from the Hosts table into the COLUMNS area. Just by dragging those two hierarchies, your PivotTable is populated with a lot of data, all of which is arranged in the hierarchy you defined in the previous steps.

	Count of Medal	Column Labels	All	Summer	Winter	Grand Total
1	Medal		All			
2						
3	Count of Medal	Column Labels	All	Summer	Winter	Grand Total
4	Row Labels					
5	Aquatics			3545	3545	
6	Archery			305	305	
7	Athletics			3411	3411	
8	Badminton			120	120	
9	Baseball			335	335	
10	Basketball			940	940	
11	Basque Pelota			4	4	
12	Biathlon			290	290	
13	Bobsleigh			344	344	
14	Boxing			842	842	
15	Canoe / Kayak			1002	1002	
16	Cricket			24	24	
17	Croquet			8	8	
18	Curling			3	21	
19	Cycling			1003	1003	
20	Equestrian			675	675	
21	Fencing			1539	1539	
22	Football			1387	1387	
23	Golf			20	20	
24	Gymnastics			2060	2060	
25	Handball			886	886	
26	Hockey			1325	1325	
27	Ice Hockey			596	596	
28	Judo			435	435	
29	Lacrosse			59	59	
30	Luge			139	139	

Step 39: Let's filter that data a bit, and just see the first ten rows of events. In the PivotTable, click the arrow in Row Labels, click (Select All) to remove all selections, then click the boxes beside the first ten Sports.

Step 40: Your PivotTable now looks like the following screen.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1.xlsx - Excel (Product Activation Failed)". The PivotTable Fields pane on the right indicates that the "Medal" field is selected for both Rows and Columns. The data shows medal counts for various sports, with a breakdown for Aquatics:

Sport	Medal	All	Summer	Winter	Grand Total
Aquatics		3545		3545	3545
Archery		305		305	305
Athletics		3411		3411	3411
Badminton		120		120	120
Baseball		335		335	335
Basketball		940		940	940
Basque Pelota		4		4	4
Biathlon		290		290	290
Bobsleigh		344		344	344
Boxing		842		842	842
Grand Total		9502		634	10136

Step 41: You can expand any of those Sports in the PivotTable, when we expand the Aquatics sport, we see all of its child discipline elements and their data. When we expand the Diving discipline under Aquatics, we see its child events too, as shown in the following screen. We can do the same for Water Polo, and see that it has only one event.

The screenshot shows the same Excel spreadsheet with the "Water Polo" sport selected in the PivotTable. The data now includes a detailed breakdown for Aquatics:

Sport	Medal	All	Column Labels	Summar	Winter	Grand Total
Aquatics		3545		3545	3545	3545
Diving		84		84	84	84
plain high diving		9		9	9	9
plunge for distance		3		3	3	3
synchronized diving 10m platform		36		36	36	36
synchronized diving 3m springboard		36		36	36	36
Swimming		2428		2428	2428	2428
Synchronized S.		153		153	153	153
Water Polo		880		880	880	880
water polo		880		880	880	880
Archery		305		305	305	305
Athletics		3411		3411	3411	3411
Badminton		120		120	120	120
Baseball		335		335	335	335
Basketball		940		940	940	940
Basque Pelota		4		4	4	4
Biathlon		290		290	290	290
Bobsleigh		344		344	344	344
Boxing		842		842	842	842
Grand Total		9502		634	10136	

Step 42: In the PivotTable Fields area, remove Locations from the COLUMNS area.

The screenshot shows the PivotTable Fields dialog box in the Excel ribbon. The 'COLUMNS' section is selected. Inside, the 'Locations' field is highlighted. A context menu is open at the bottom of the list, with the 'Remove field...' option highlighted in green. The main PivotTable grid shows medal counts for various sports, with Water Polo selected in row 13.

	All	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	Medal	All																									
2																											
3	Count of Medal		Column Labels																								
4	Row Labels		Summarize by	Summer	Winter	Grand Total																					
5	Aquatics			3545		3545																					
6	Diving				84		84																				
7	plain high diving					9		9																			
8	plunge for distance					3		3																			
9	synchronized diving 10m platform					36		36																			
10	synchronized diving 3m springboard					36		36																			
11	Swimming					2428		2428																			
12	Synchronized S.					153		153																			
13	Water Polo					880		880																			
14	water polo					880		880																			
15	Archery					305		305																			
16	Athletics					3411		3411																			
17	Badminton					120		120																			
18	Baseball					335		335																			
19	Basketball					940		940																			
20	Basque Pelota					4		4																			
21	Biathlon					290		290																			
22	Bobsleigh					344		344																			
23	Boxing					842		842																			
24	Grand Total					9502		634		10136																	
25																											
26																											
27																											
28																											
29																											
30																											

Step 43: Your PivotTable will have the following screen.

The screenshot shows the PivotTable Fields dialog box in the Excel ribbon. The 'VALUES' section is selected, showing 'Count of Medal' selected. A context menu is open at the bottom of the list, with the 'Remove field...' option highlighted in green. The main PivotTable grid shows medal counts for various sports, with Water Polo selected in row 13.

	All	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	Medal	All																									
2																											
3	Row Labels		Count of Medal																								
4	Aquatics		3545																								
5	Diving		84																								
6	plain high diving		9																								
7	plunge for distance		3																								
8	synchronized diving 10m platform		36																								
9	synchronized diving 3m springboard		36																								
10	Swimming		2428																								
11	Synchronized S.		153																								
12	Water Polo		880																								
13	water polo		880																								
14	Archery		305																								
15	Athletics		3411																								
16	Badminton		120																								
17	Baseball		335																								
18	Basketball		940																								
19	Basque Pelota		4																								
20	Biathlon		290																								
21	Bobsleigh		344																								
22	Boxing		842																								
23	Grand Total		10136																								
24																											
25																											
26																											
27																											
28																											
29																											
30																											

Step 44: Then remove SDE from the ROWS area. You're back to a basic PivotTable.

The screenshot shows a Microsoft Excel window with the ribbon tabs: FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, ACROBAT, POWERPIVOT, Team, ANALYZE, DESIGN. The main area displays a PivotTable with data from row 1 to 30. Row 1 contains the header 'Medal' and 'All'. Rows 2 and 3 show summary data. Rows 4 through 13 list specific sports and their counts. Row 14 is a subtotal for 'Swimming', Row 15 for 'Athletics', and so on. Row 23 is a grand total. The PivotTable Fields pane on the right lists fields like Disciplines, Events, Hosts, Locations, More Fields, Medals, Sports, and S_Teams. A context menu is open over the 'SDE' field in the 'ROWS' section, with 'Remove Field' highlighted.

Step 45: Your PivotTable will have the following screen.

The screenshot shows the same Microsoft Excel window after the 'SDE' field has been removed from the 'ROWS' area. The main table now only contains the 'Medal' field in the first column. The PivotTable Fields pane on the right shows 'Count of Medal' under the 'VALUES' section. The rest of the interface, including the ribbon and taskbar, remains the same.

Step 46: From the Hosts table, drag Season, City, NOC_CountryRegion, and EditionID into the COLUMNS area, and arrange them in that order, from top to bottom.

Medal	All	Summer	Amsterdam	NED Total	Antwerp	BEL Total	Antwerp Total	Athens	GRC Total	Athens Total	Atlanta	USA Total	Atlanta Total	Barcelona	ESP Total	
1928Summer	709	709	709	1259	1259	1259	1259	1998	1998	1998	1996Summer	1859	1859	1859	1705	1705
Count of Medal																

Step 47: From the Events table, drag Sport, Discipline, and Event into the ROWS area, and arrange them in that order, from top to bottom.

Medal	All	Count of Medal	
1	Medal	All	
2	Count of Medal	Column Labels	
3	Count of Medal	Summer	
4		Amsterdam	
5		NED Total	
6		1928Summer	
7	Row Labels	Antwerp	
8	Aquatics	BEL Total	
9	Diving	Antwerp Total	
10	plain high diving	Athens	
11	plunge for distance	GRC Total	
12	synchronized diving 10m platform	2004Summer	
13	synchronized diving 3m springboard	Athens Total	
14	Swimming	Atlanta	
15	100m backstroke	USA Total	
16	100m breaststroke	1996Summer	
17	100m butterfly	1998	
18	100m freestyle	1998	
19	1500m freestyle	1998	
20	200m backstroke	1998	
21	200m breaststroke	1998	
22	200m butterfly	1998	
23	200m freestyle	1998	
24	200m individual medley	1998	
25	200m obstacle event	1998	
26	200m team swimming	1998	
27	400m freestyle	1998	
28	400m breaststroke	1998	
29	400m freestyle	1998	
30	400m individual medley	1998	
	Sheet1	Sports	Hosts

Step 48: In the PivotTable, filter Row Labels to the top ten Sports.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1.xlsx - Excel (Product Activation Failed)". The main area displays a PivotTable with data from 1928 to 1996 Summer Olympics. The PivotTable Fields pane on the right indicates that the "Sport" field is currently selected under the "ROWS" category. A context menu is open over the "Sport" field in the Row Labels, listing various sports such as Aquatics, Diving, Athletics, and Swimming. The "OK" button of the context menu is highlighted.

Step 49: Collapse all the rows and columns

This screenshot is identical to the one above, showing the Microsoft Excel interface with the PivotTable Fields pane and the context menu over the "Sport" field. The "OK" button in the context menu is now explicitly highlighted, indicating the next step in the process.

Step 50: Expand Aquatics, then Diving and Water Polo . Your workbook looks like the following screen.

Book1.xlsx - Excel (Product Activation Failed)

FILE **HOME** **INSERT** **PAGE LAYOUT** **FORMULAS** **DATA** **REVIEW** **VIEW** **ACROBAT** **POWERPIVOT** **Team** **ANALYZE** **DESIGN**

Manage Calculated Fields **Align Vertically** Align Horizontally Add to Data Model **Update All** Detect Settings

Data Model Calculations Tables Relationships

A15 Synchronized S.

Column Labels

Count of Medal

Row Labels

1 Medal All

2

3 Count of Medal

4

5 Amsterdam Total Antwerp Total Athens Total Atlanta Total

6 Amsterdam BEL GRC GRC USA Atlanta USA

7 NED Total 1920Summer 1920Summer 2004Summer 1996Summer USA Total

8 Aquatics 75 75 75 75 320 320 320 250 250 250

9 Diving 75 3 3 24 24 24 12 12 12 250 250 250

10 plain high diving 3 3 33 33 33 30 30 30

11 plunge for distance 3 3 33 33 33 30 30 30

12 synchronized diving 10m platform 12 12 12 12 12 12 12 12 12

13 synchronized diving 3m springboard 12 12 12 12 12 12 12 12 12

14 Swimming 51 51 51 48 48 48 185 185 185 181 181 181

15 Synchronized S. 51 51 51 48 48 48 185 185 185 181 181 181

16 Water Polo 24 24 24 24 24 24 78 78 78 39 39 39

17 water polo 24 24 24 24 24 24 78 78 78 39 39 39

18 Archery 80 80 80 24 24 24 24 24 24 24 24 24

19 Athletics 108 108 108 117 117 117 183 183 183 180 180 180

20 Badminton 24 24 24 24 24 24 24 24 24 24 24 24

21 Baseball 24 24 24 24 24 24 71 71 71 60 60 60

22 Basketball 24 24 24 24 24 24 70 70 70 72 72 72

23 Basque Pelota 24 24 24 24 24 24 70 70 70 72 72 72

24 Biathlon 24 24 24 24 24 24 44 44 44 48 48 48

25 Bobsleigh 24 24 24 24 24 24 44 44 44 48 48 48

26 Boxing 24 24 24 24 24 24 736 736 736 658 658 658

27 Grand Total 207 207 207 296 296 296 736 736 736 658 658 658

28

29

30

PivotTable Fields

ACTIVE ALL

Choose fields to add to report:

- Events
- SDE
- More Fields
 - EventID
 - Event
 - Sport
 - DisciplineID
 - Discipline
 - SportID
 - DisciplineEvent

Drag fields between areas below:

FILTERS

Medal

ROWS

Sport

Discipline

Event

COLUMNS

Season

City

NOC_Country

EditionID

VALUES

Count of Medal

Activate Windows

Go to Microsoft.com/Activate

Defer Layout Update

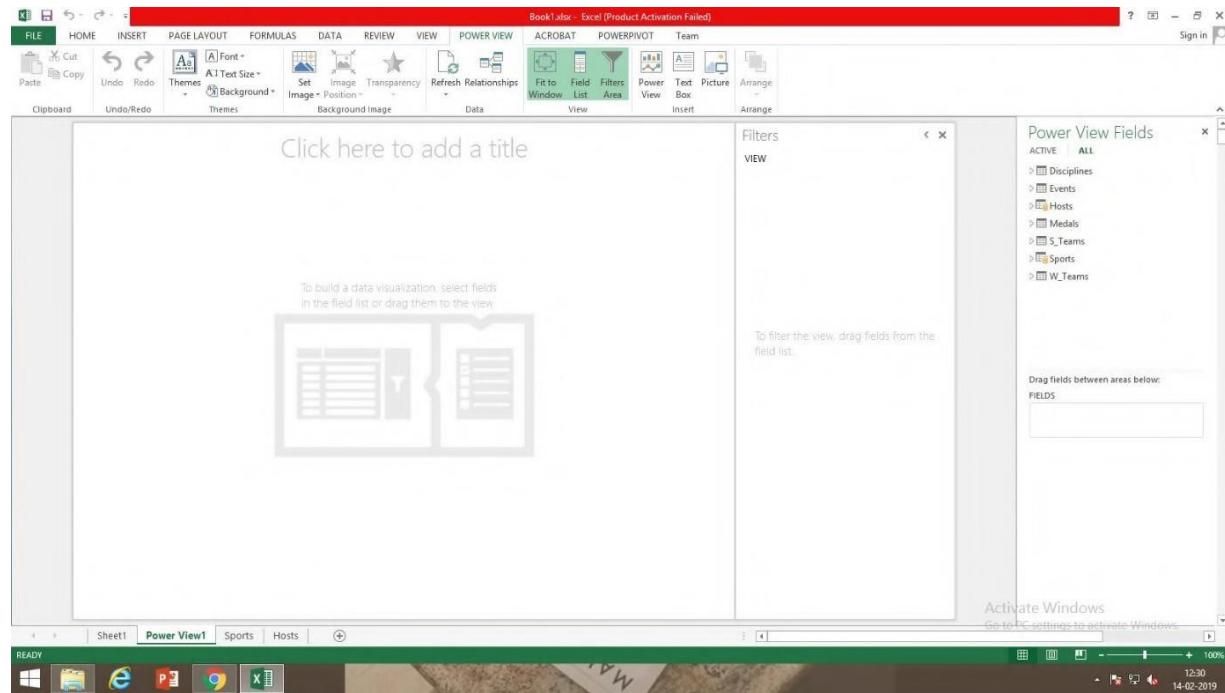
READY

Step 1: In Excel, click INSERT > Reports > Power View Reports.

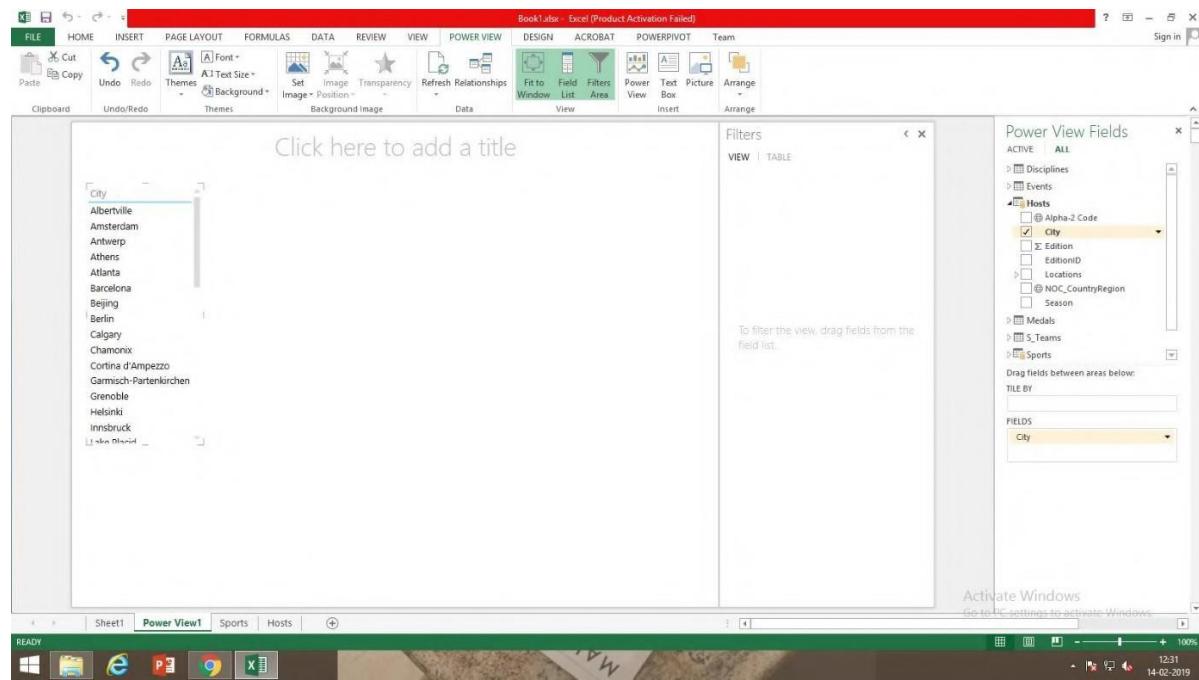
This screenshot shows a Microsoft Excel spreadsheet titled "Book1.xlsx - Excel (Product Activation Failed)". The main area displays a PivotTable with data from the "Sports" sheet. The PivotTable Fields pane on the right shows fields like Medal, Sport, Discipline, and Event. The Power View ribbon tab is selected, and a tooltip "Insert a Power View Report" is visible. The status bar at the bottom indicates "Activate Windows" and the date "14-02-2019".

This screenshot is similar to the previous one, but a progress dialog box is overlaid on the screen, displaying "Working on opening Power View sheet...". The rest of the interface, including the PivotTable and ribbon tabs, remains the same.

Step 2: A blank Power View report appears as a sheet in the workbook.



Step 3: In the Power View Fields area, click the arrow beside Hosts to expand it, and click City.



Step 4: Expand the Medals table.

Click here to add a title

City	Sport
Albertville	Biathlon
Albertville	Bobsleigh
Albertville	Ice Hockey
Albertville	Luge
Albertville	Skating
Albertville	Skiing
Amsterdam	Aquatics
Amsterdam	Athletics
Amsterdam	Boxing
Amsterdam	Cycling
Amsterdam	Equestrian
Amsterdam	Fencing
Amsterdam	Football
Amsterdam	Gymnastics
Amsterdam	Hockey

Filters

Power View Fields

ACTIVE: ALL

- DisciplineEvent
- DisciplineID
- Edition
- EditionID
- Event
- Event_gender
- Gender
- Medal
- MedalKey
- NOC_CountryRegion
- Season
- Sport
- Σ Year

Drag fields between areas below:

TILE BY

FIELDS

City

Step 5: Click Sport. With this, Power View lists the Sport beside the city, as shown in the following screen.

Click here to add a title

City	Sport
Albertville	Biathlon
Albertville	Bobsleigh
Albertville	Ice Hockey
Albertville	Luge
Albertville	Skating
Albertville	Skiing
Amsterdam	Aquatics
Amsterdam	Athletics
Amsterdam	Boxing
Amsterdam	Cycling
Amsterdam	Equestrian
Amsterdam	Fencing
Amsterdam	Football
Amsterdam	Gymnastics
Amsterdam	Hockey

Filters

Power View Fields

ACTIVE: ALL

- DisciplineEvent
- DisciplineID
- Edition
- EditionID
- Event
- Event_gender
- Gender
- Medal
- MedalKey
- NOC_CountryRegion
- Season
- Sport**
- Σ Year

Drag fields between areas below:

TILE BY

FIELDS

City

Sport

Step 6: Click on the dropdown arrow besides Sport and select Add to Table as Count.

The screenshot shows a Microsoft Excel window with the title "Book1.xlsx - Excel (Product Activation Failed)". The ribbon tabs include FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, POWER VIEW, DESIGN, ACROBAT, POWERPIVOT, and Team. The Power View tab is selected. On the left, there's a table with columns "City", "Sport", and "Count of Sport". The data includes various cities and their associated sports and counts. To the right of the table is a "Filters" pane with "VIEW" and "TABLE" tabs. Below it is a message: "To filter the view, drag fields from the field list." The main area is titled "Click here to add a title". On the far right is the "Power View Fields" pane under the "ACTIVE" tab, which lists fields like EditionID, Event, Event_gender, Gender, Medal, MedalKey, NOC_CountryRegion, Season, and Sport. The "Sport" field has a dropdown arrow pointing to "Add to Table as Count". At the bottom, there's a "FIELDS" section with "City", "Sport", and "# Count of Sport". The taskbar at the bottom shows icons for File, Home, Insert, Page Layout, Formulas, Data, Review, View, Power View, Design, Acrobat, PowerPivot, and Team. The system tray shows the date and time as 14-02-2019 12:33.

Step 7: In the FIELDS area of Power View Fields, click the arrow next to Sport and select Count (Not Blank). Now Power View is counting the sports, rather than listing them, as shown in the following screen.

This screenshot is identical to the one above, showing the Microsoft Excel interface with the Power View Fields pane. However, the "FIELDS" section in the Power View Fields pane now shows the "Sport" field expanded, with its dropdown menu open. The "Count (Not Blank)" option is highlighted with a yellow box. Other options visible in the menu include "Remove Field", "Do Not Summarize", "Count (Distinct)", and "Show items with no data". The rest of the interface, including the table data and the Power View Fields pane, remains the same as in the previous step.

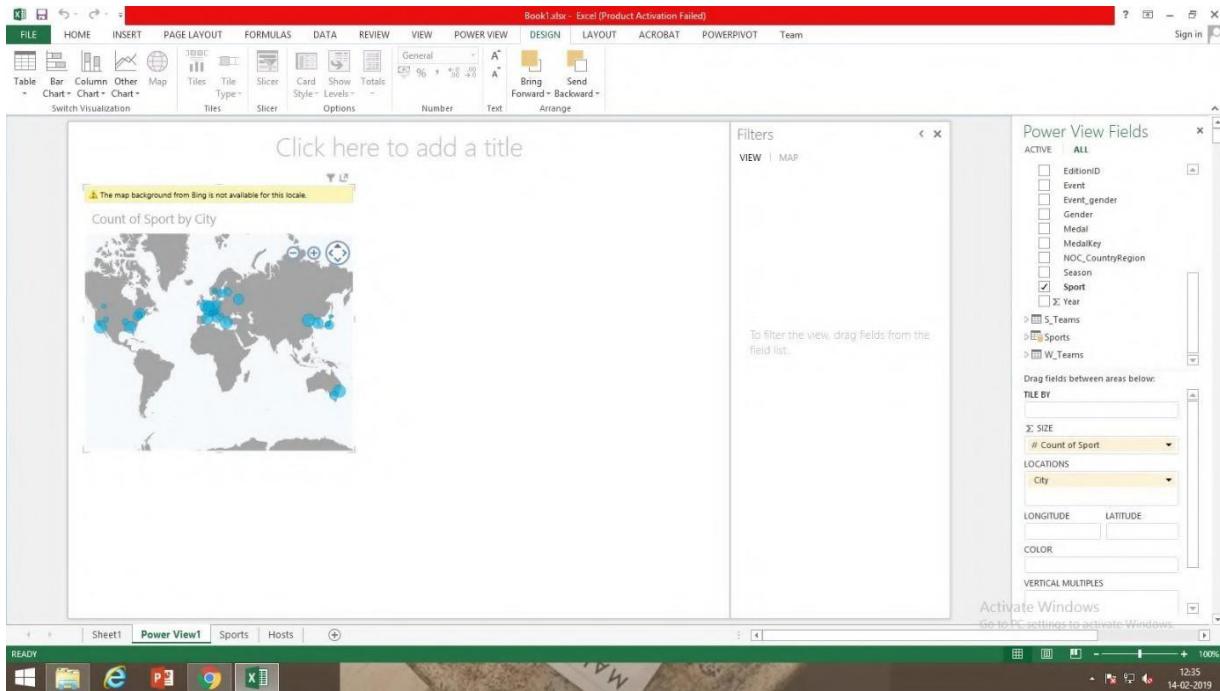
Step 8: You will have the following screen.

The screenshot shows a Microsoft Excel window titled "Book1.xlsx - Excel (Product Activation Failed)". The ribbon is visible at the top with tabs like FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, POWER VIEW, DESIGN, ACROBAT, POWERPIVOT, and Team. The DESIGN tab is selected. On the left, there's a "Switch Visualization" dropdown menu with options like Table, Bar, Column, Other, Map, etc. The main area displays a table titled "Click here to add a title". The table has three columns: "City", "Count of Sport", and "Count of Sport". The data includes rows for Albertville, Amsterdam, Antwerp, Athens, Atlanta, Barcelona, Beijing, Berlin, Calgary, Chamonix, Cortina d'Ampezzo, Garmisch-Partenkirchen, Grenoble, Helsinki, and Innsbruck. To the right of the table is a "Filters" pane with "VIEW" and "TABLE" tabs. Below the filters is a message: "To filter the view, drag fields from the field list." A "Power View Fields" pane is open, showing a list of fields: EditionID, Event, Event_gender, Gender, Medal, MedalKey, NOC_CountryRegion, Season, Sport, Year, S_Teams, Sports, and W_Teams. Under "ACTIVE", "Sport" is checked. In the "FIELDS" section, "City", "# Count of Sport", and "# Count of Sport" are listed. The status bar at the bottom shows "Activate Windows Go to PC settings to activate Windows" and the date "14-02-2019".

Step 9: On the ribbon, select DESIGN > Switch Visualization > Map. The DESIGN tab is only available if the Power View table is selected. You may get a warning about enabling external content when you switch to the Map visualization.

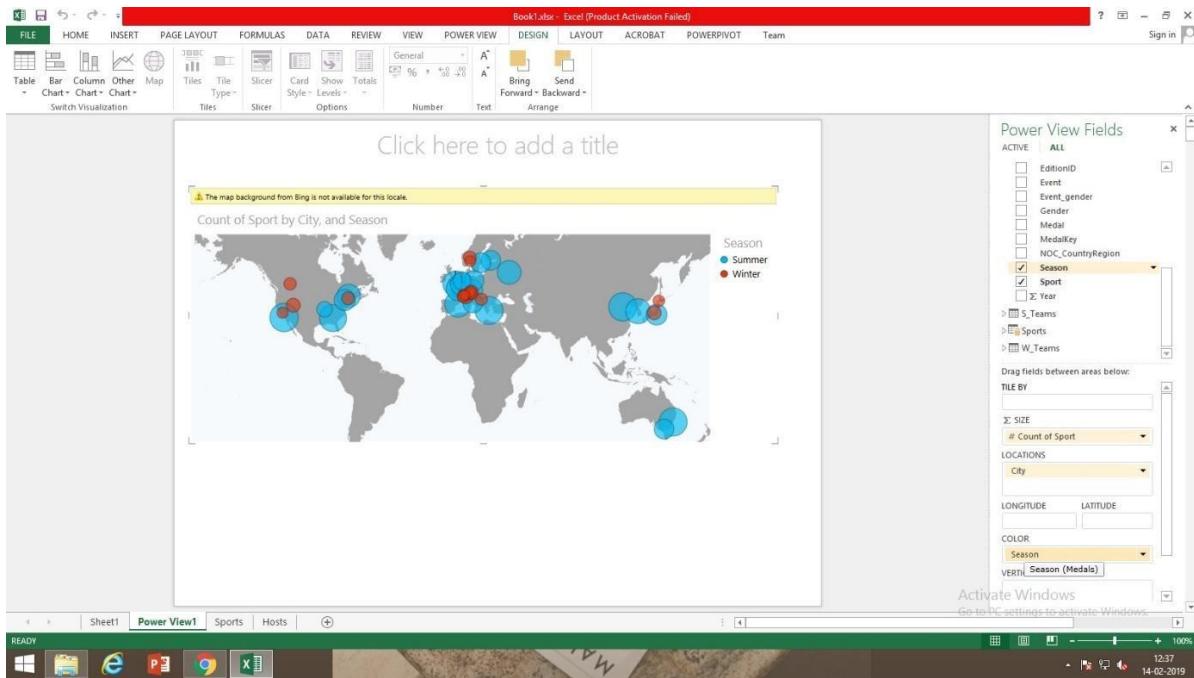
This screenshot is similar to the previous one, but the DESIGN tab is explicitly selected in the ribbon. The "Switch Visualization" dropdown menu is open, and the "Map" option is highlighted. The rest of the interface, including the table, filters, and power view fields panes, remains the same as in Step 8.

Step 10: A map replaces the table as the visualization. On the map, blue circles of varying size indicate the number of different sport events held at each Olympic Host location.

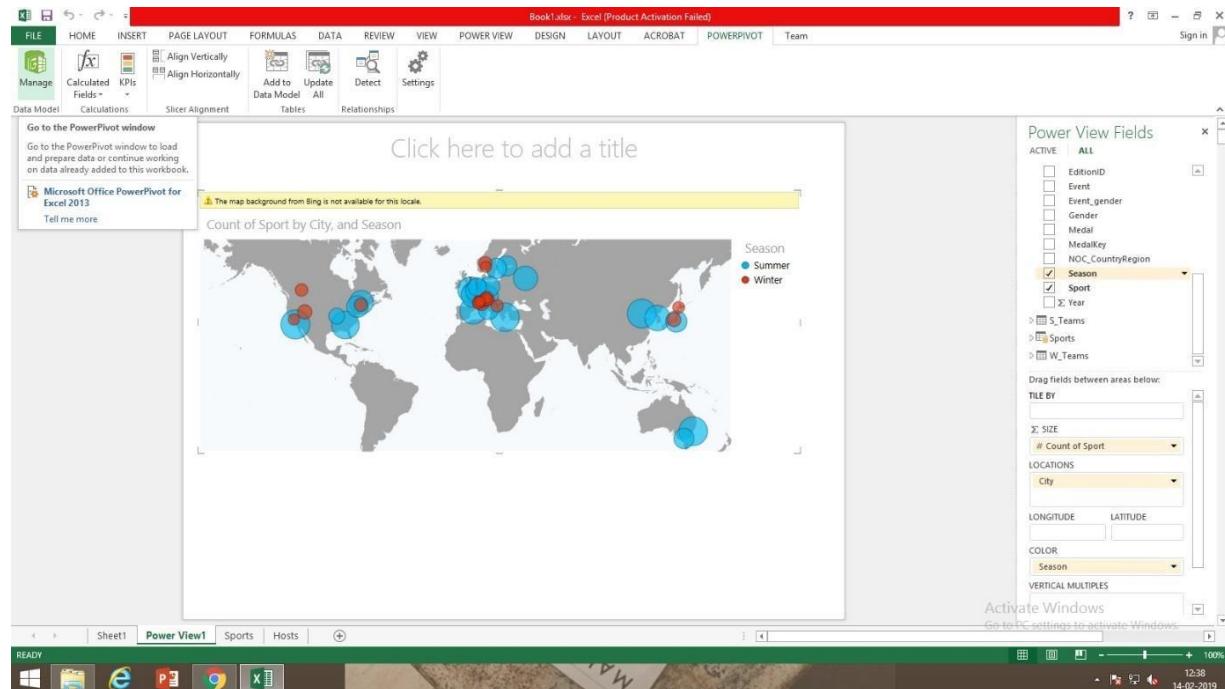


Step 11: To make the most use of the report area, let's collapse the Filters area. Click the arrow in the upper right corner of the Filters area.

In Power View Fields, expand Medals. Drag the Season field down to the COLOR area.



Step 12: In Excel, click Power Pivot > Data Model > Manage to display the Power Pivot window.



Step 13: Select the Medals table. Make sure the Calculation Area is displayed. The Calculation Area is found below the table data, and is used for creating, editing, and managing calculated fields.

[Edition]	Season	AthleteID	Athlete	NOC_CountryRegion	Gender	Event_gender	Sport	Disciplin...	Event	Medal	MedalKey	DisciplineE...	Year	EditionID
02-01-19... Summer	A20428	PREVOST, ...	ZZX	Women	X	Tennis	D60	mixed d...	Silver	M479	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A11647	JONES, M...	ZZX	Women	X	Tennis	D60	mixed d...	Bronze	M482	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A21636	ROSENBA...	ZZX	Women	X	Tennis	D60	mixed d...	Bronze	M483	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A4527	COOPER, ...	GBR	Women	X	Tennis	D60	mixed d...	Gold	M495	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A4527	COOPER, ...	GBR	Women	W	Tennis	D60	singles	Gold	M493	D60singles	1900	1900Summer	
02-01-19... Summer	A20428	PREVOST, ...	FRA	Women	W	Tennis	D60	singles	Silver	M498	D60singles	1900	1900Summer	
02-01-19... Summer	A21636	ROSENBA... BOH		Women	W	Tennis	D60	singles	Bronze	M499	D60singles	1900	1900Summer	
02-01-19... Summer	A35	ABBOTT, ...	USA	Women	W	Golf	D29	individ...	Gold	M263	D29individual golf	1900	1900Summer	
02-01-19... Summer	A27800	WHITTIER, ...	USA	Women	W	Golf	D29	individ...	Silver	M264	D29individual golf	1900	1900Summer	
02-01-19... Summer	A20402	PRATT, Da...	USA	Women	W	Golf	D29	individ...	Bronze	M265	D29individual golf	1900	1900Summer	
02-01-19... Summer	A11647	JONES, M...	USA	Women	W	Tennis	D60	singles	Bronze	M484	D60singles	1900	1900Summer	
02-01-19... Summer	A15626	MAHONY, ...	ZZX	Men	X	Tennis	D60	mixed d...	Silver	M478	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A5902	DOHERTY, ...	ZZX	Men	X	Tennis	D60	mixed d...	Bronze	M480	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A27435	WARDEN, ...	ZZX	Men	X	Tennis	D60	mixed d...	Bronze	M481	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A5902	DOHERTY, ...	GBR	Men	X	Tennis	D60	mixed d...	Gold	M495	D60mixed doubles	1900	1900Summer	
02-01-19... Summer	A5187	DE BELLEG...	FRA	Men	X	Equestri...	D36	long ju...	Bronze	M198	D36long jump ind...	1900	1900Summer	
02-01-19... Summer	A7984	GARDERE, ...	FRA	Men	X	Equestri...	D36	high jump	Gold	M199	D36high jump	1900	1900Summer	
02-01-19... Summer	A25961	TRISSINO, ...	ITA	Men	X	Equestri...	D36	high jump	Gold	M201	D36high jump	1900	1900Summer	
02-01-19... Summer	A25961	TRISSINO, ...	ITA	Men	X	Equestri...	D36	long ju...	Silver	M202	D36long jump ind...	1900	1900Summer	
02-01-19... Summer	A26428	VAN DE P...	BEL	Men	X	Equestri...	D36	high jump	Bronze	M203	D36high jump	1900	1900Summer	
02-01-19... Summer	A26558	VAN LAN...	BEL	Men	X	Equestri...	D36	long ju...	Gold	M205	D36long jump ind...	1900	1900Summer	
02-01-19... Summer	A9278	HAEGEMAN...	BEL	Men	X	Equestri...	D36	individ...	Gold	M206	D36individual ju...	1900	1900Summer	
02-01-19... Summer	A26428	VAN DE P...	BEL	Men	X	Equestri...	D36	individ...	Silver	M204	D36individual ju...	1900	1900Summer	
02-01-19... Summer	A5215	DE CHAM...	FRA	Men	X	Equestri...	D36	individ...	Bronze	M21475	D36individual ju...	1900	1900Summer	

Step 14: To view the Calculation Area, select Home > View > Calculation Area, as shown in the following screen.

AthleteID	Athlete	NOC_CountryRegion	Gender	Event_gender	Sport	Disciplin...	Event	Medal	MedalKey	DisciplineE...	ID	Add Column
r A20428	PREVOST, ...	ZZX	Women	X	Tennis	D60	mixed d...	Silver	M479	D60mixed doubles	1900	1900Summer
r A11647	JONES, M...	ZZX	Women	X	Tennis	D60	mixed d...	Bronze	M482	D60mixed doubles	1900	1900Summer
r A21636	ROSENBA...	ZZX	Women	X	Tennis	D60	mixed d...	Bronze	M483	D60mixed doubles	1900	1900Summer
r A4527	COOPER, ...	GBR	Women	X	Tennis	D60	mixed d...	Gold	M495	D60mixed doubles	1900	1900Summer
r A4527	COOPER, ...	GBR	Women	W	Tennis	D60	singles	Gold	M493	D60singles	1900	1900Summer
r A20428	PREVOST, ...	FRA	Women	W	Tennis	D60	singles	Silver	M498	D60singles	1900	1900Summer
r A21636	ROSENBA...	BOH	Women	W	Tennis	D60	singles	Bronze	M499	D60singles	1900	1900Summer
r A35	ABBOTT, ...	USA	Women	W	Golf	D29	individ...	Gold	M263	D29individual golf	1900	1900Summer
r A27800	WHITTIER, ...	USA	Women	W	Golf	D29	individ...	Silver	M264	D29individual golf	1900	1900Summer
r A20402	PRATT, Da...	USA	Women	W	Golf	D29	individ...	Bronze	M265	D29individual golf	1900	1900Summer
r A11647	JONES, M...	USA	Women	W	Tennis	D60	singles	Bronze	M484	D60singles	1900	1900Summer
r A15626	MAHONY, ...	ZZX	Men	X	Tennis	D60	mixed d...	Silver	M478	D60mixed doubles	1900	1900Summer
r A5902	DOHERTY, ...	ZZX	Men	X	Tennis	D60	mixed d...	Bronze	M480	D60mixed doubles	1900	1900Summer
r A27435	WARDEN, ...	ZZX	Men	X	Tennis	D60	mixed d...	Bronze	M481	D60mixed doubles	1900	1900Summer
r A5906	DOHERTY, ...	GBR	Men	X	Tennis	D60	mixed d...	Gold	M494	D60mixed doubles	1900	1900Summer
r A5187	DE BELLEG...	FRA	Men	X	Equestr...	D36	long j...	Bronze	M198	D36long jump ind...	1900	1900Summer
r A7984	GARDERE, ...	FRA	Men	X	Equestr...	D36	high jump	Gold	M199	D36high jump	1900	1900Summer
r A25961	TRUSSINO, ...	ITA	Men	X	Equestr...	D36	high jump	Gold	M201	D36high jump	1900	1900Summer
r A25961	TRUSSINO, ...	ITA	Men	X	Equestr...	D36	long j...	Silver	M202	D36long jump ind...	1900	1900Summer
r A26428	VAN DE P...	BEL	Men	X	Equestr...	D36	high jump	Bronze	M203	D36high jump	1900	1900Summer
r A26558	VAN LAN...	BEL	Men	X	Equestr...	D36	long j...	Gold	M205	D36long jump ind...	1900	1900Summer
r A9278	HAEGEMA, ...	BEL	Men	X	Equestr...	D36	individ...	Gold	M200	D36individual ju...	1900	1900Summer
r A26428	VAN DE P...	BEL	Men	X	Equestr...	D36	individ...	Silver	M204	D36individual ju...	1900	1900Summer
r A5215	DE CHAM...	FRA	Men	X	Equestr...	D36	individ...	Bronze	M21475	D36individual ju...	1900	1900Summer

Step 15: In the Calculation Area, select the cell directly below the Edition column. From the ribbon, select AutoSum > Distinct Count.

AthleteID	Athlete	NOC_CountryRegion	Gender	Event_gender	Sport	Disciplin...	Event	Medal	MedalKey	DisciplineE...	ID	Add Column
r A20428	PREVOST, ...	ZZX	Women	X	Tennis	D60	mixed d...	Silver	M479	D60mixed doubles	1900	1900Summer
r A11647	JONES, M...	ZZX	Women	X	Tennis	D60	mixed d...	Bronze	M482	D60mixed doubles	1900	1900Summer
r A21636	ROSENBA...	ZZX	Women	X	Tennis	D60	mixed d...	Bronze	M483	D60mixed doubles	1900	1900Summer
r A4527	COOPER, ...	GBR	Women	X	Tennis	D60	mixed d...	Gold	M495	D60mixed doubles	1900	1900Summer
r A4527	COOPER, ...	GBR	Women	W	Tennis	D60	singles	Gold	M493	D60singles	1900	1900Summer
r A20428	PREVOST, ...	FRA	Women	W	Tennis	D60	singles	Silver	M498	D60singles	1900	1900Summer
r A21636	ROSENBA...	BOH	Women	W	Tennis	D60	singles	Bronze	M499	D60singles	1900	1900Summer
r A35	ABBOTT, ...	USA	Women	W	Golf	D29	individ...	Gold	M263	D29individual golf	1900	1900Summer
r A27800	WHITTIER, ...	USA	Women	W	Golf	D29	individ...	Silver	M264	D29individual golf	1900	1900Summer
r A20402	PRATT, Da...	USA	Women	W	Golf	D29	individ...	Bronze	M265	D29individual golf	1900	1900Summer
r A11647	JONES, M...	USA	Women	W	Tennis	D60	singles	Bronze	M484	D60singles	1900	1900Summer
r A15626	MAHONY, ...	ZZX	Men	X	Tennis	D60	mixed d...	Silver	M478	D60mixed doubles	1900	1900Summer
r A5902	DOHERTY, ...	ZZX	Men	X	Tennis	D60	mixed d...	Bronze	M480	D60mixed doubles	1900	1900Summer
r A27435	WARDEN, ...	ZZX	Men	X	Tennis	D60	mixed d...	Bronze	M481	D60mixed doubles	1900	1900Summer
r A5906	DOHERTY, ...	GBR	Men	X	Tennis	D60	mixed d...	Gold	M494	D60mixed doubles	1900	1900Summer
r A5187	DE BELLEG...	FRA	Men	X	Equestr...	D36	long j...	Bronze	M198	D36long jump ind...	1900	1900Summer
r A7984	GARDERE, ...	FRA	Men	X	Equestr...	D36	high jump	Gold	M199	D36high jump	1900	1900Summer
r A25961	TRUSSINO, ...	ITA	Men	X	Equestr...	D36	high jump	Gold	M201	D36high jump	1900	1900Summer
r A25961	TRUSSINO, ...	ITA	Men	X	Equestr...	D36	long j...	Silver	M202	D36long jump ind...	1900	1900Summer
r A26428	VAN DE P...	BEL	Men	X	Equestr...	D36	high jump	Bronze	M203	D36high jump	1900	1900Summer
r A26558	VAN LAN...	BEL	Men	X	Equestr...	D36	long j...	Gold	M205	D36long jump ind...	1900	1900Summer
r A9278	HAEGEMA, ...	BEL	Men	X	Equestr...	D36	individ...	Gold	M200	D36individual ju...	1900	1900Summer
r A26428	VAN DE P...	BEL	Men	X	Equestr...	D36	individ...	Silver	M204	D36individual ju...	1900	1900Summer
r A5215	DE CHAM...	FRA	Men	X	Equestr...	D36	individ...	Bronze	M21475	D36individual ju...	1900	1900Summer

Step 16: Power Pivot creates a DAX expression for the active cell in the Calculation Area. In this case, Power Pivot automatically created the following DAX formula: “Distinct Count of Edition:=DISTINCTCOUNT([Edition])”.

Step 17: Save the Excel workbook. The Data Model is updated with the new calculated field. When you return to the Power View tab in Excel, a warning lets you know the Data Model has been updated

Step 18: Open the Power Pivot window. In the Calculation Area, select the cell directly below the AutoSum calculation you completed in the previous section.

The screenshot shows the Power Pivot for Excel interface with the 'Data View' tab selected. The main area displays a table of Olympic medal data. The formula bar at the top has the following text: '=Percentage of All Medals:=[Count of Medal]/CALCULATE([Count of Medal],ALL(Medals))'. The status bar at the bottom right indicates the date as 14-02-2019 and the time as 12:45.

Step 19: In the formula bar, type the following DAX formula. IntelliSense provides available commands based on what you type, and you can press Tab to select the highlighted IntelliSense option.
“Percentage of All Medals:=[Count of Medal]/CALCULATE([Count of Medal],ALL(Medals))”

The screenshot shows the Power Pivot for Excel interface with the 'Data View' tab selected. The main area displays a table of Olympic medal data. The formula bar at the top has the following text: '=Percentage of All Medals:=[Count of Medal]/CALCULATE([Count of Medal],ALL(Medals))'. The status bar at the bottom right indicates the date as 14-02-2019 and the time as 12:45.

Step 20: When you switch back to the Excel window, Excel lets you know the Data Model has been updated. In Excel, select the PivotTable in Sheet1. In PivotTable Fields, expand the Medals table. At the bottom of the fields list are the two calculated fields we just created, as shown in the following screen. Select Percentage of All Medals.

The screenshot shows the Microsoft Excel interface with the following details:

- Excel Title Bar:** Book1.xlsx - Excel [Product Activation Failed]
- Tab Bar:** FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, ACROBAT, POWERPIVOT, Team, ANALYZE, DESIGN
- PivotTable Fields Pane:**
 - ACTIVE: ALL
 - Choose fields to add to report: Percentage of All Medals (checkbox selected)
 - Drag fields between areas below:
 - FILTERS: Medal, Session, City, NOC_Cou..., EditionID
 - ROWS: Sport, Discipline, Event
 - VALUES: Count of Medal, Percentage of All Medals
- PivotTable Data:**

Medal	All					
Column Labels	Summer					
	Amsterdam					
	NED					
Row Labels	1928Summer					
Aquatics	Count of Medal	Percentage of All Medals				
Diving	75	0.002301249	75	0.002301249	75	0.002301249
Swimming	51	0.001564849	51	0.001564849	51	0.001564849
Synchronized S.	24	0.0007364	24	0.0007364	24	0.0007364
Water Polo	24	0.0007364	24	0.0007364	24	0.0007364
Grand Total	207	0.006351447	207	0.006351447	207	0.006351447
- Bottom Status Bar:** Go to Power Pivot Windows | Update | 12:46 | 14-02-2019

Step 21: In the PivotTable, the Percentage of All Medals field appears after Count of Medal. It's not formatted as a percentage, so select those fields. Once they're selected, click HOME > Number > Percentage. In the same section of the ribbon, adjust the number of decimal places to two

The screenshot shows a Microsoft Excel window with a PivotTable. The PivotTable has columns labeled 'Winter Count of Medal', 'Winter Percentage of All Medals', 'Total Count of Medal', and 'Total Percentage of All Medals'. The 'Total Percentage of All Medals' column contains numerical values like 3545, 84, 9, 3, etc. A context menu is open over this column, specifically the 'Number' format dropdown. The 'Percentage' option is highlighted in green. At the bottom of the dropdown menu, there is a link 'More Number Formats...'. The Excel ribbon is visible at the top, showing the 'HOME' tab is selected.

Step 22: Your pivot table looks like the following screen.

This screenshot shows the same Microsoft Excel window with the PivotTable after applying the Percentage format. The 'Total Percentage of All Medals' column now displays values such as 10.88%, 0.26%, 0.03%, etc., representing the percentage of all medals for each row. The PivotTable structure remains the same with columns for Winter Count, Winter Percentage, Total Count, and Total Percentage. The Excel ribbon is visible at the top, showing the 'HOME' tab is selected.

Step 23: The Power Pivot window should still be available. If not, click Power Pivot > Data Model > Manage. In Power Pivot, select Home > View > Data View to make sure Data View is selected. Select the Medals table.

On the Advanced tab, click Reporting Properties > Default Field Set. A window appears that lets you specify default fields for tables created using client tools such as Power View.

The screenshot shows the Microsoft Excel ribbon at the top with tabs like File, Home, Design, and Advanced. The Advanced tab is selected. Below the ribbon, there's a toolbar with icons for Create and Manage, Show Implicit Calculated Fields, Summaries By, Default Field Set, Table Behavior, and Reporting Properties. The Reporting Properties icon is highlighted. A dropdown menu labeled "Selected: <Default>" is open. The main area displays a table titled "Medals" with columns: Edition, Season, AthleteID, Athlete, Event, Medal, MedalKey, DisciplineEvent, Year, and EditionID. The table contains numerous rows of data, mostly from the 1900 Summer Olympics. At the bottom left, there are buttons for Sum of E., Distinct C., and Percenta... . At the bottom right, there are buttons for Activate Windows, Go to PC settings to activate Windows, and a status bar showing 12:49 and 14-02-2019.

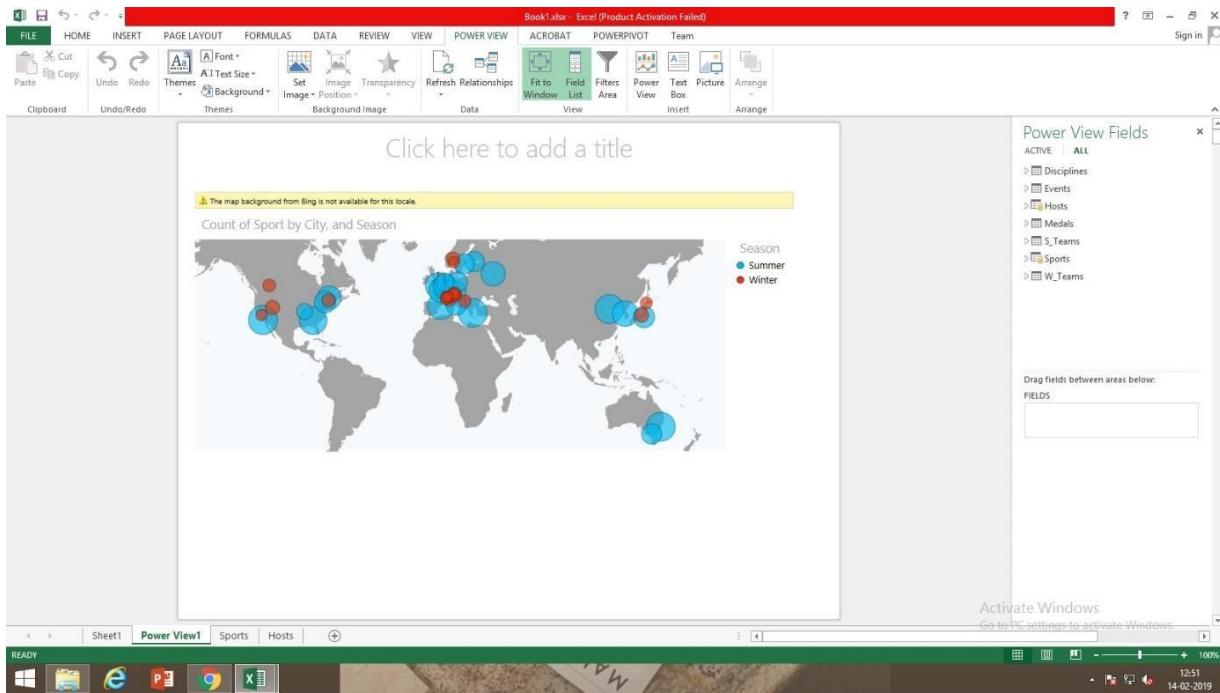
Step 24: Select Sport, Event, EditionID, Athlete, and Medal in the left pane, and click Add -> to make them the default fields. Make sure they appear in the right pane, Default fields, in the order they were listed. The Default Field Set window looks like the following screen.

Screenshot of PowerPivot for Excel showing the 'Default Field Set' dialog box. The dialog box is titled 'Default Field Set for Table Medals'. It contains a list of fields from the 'Medals' table: AthleteID, DisciplineEvent, DisciplineID, District_Court_of_Edition, Edition, Event, Event_gender, Gender, Medal, MedalKey, NOC_CountryRegion, Percentage_of_All_Medals, Season, Sport, and Year. The 'Sport' field is selected and highlighted in blue. Below the list are buttons for 'Add >', 'Remove <', 'Move Up', and 'Move Down'. At the bottom right are 'OK' and 'Cancel' buttons. The background shows a PowerPivot PivotTable with data for Athletes and their medals.

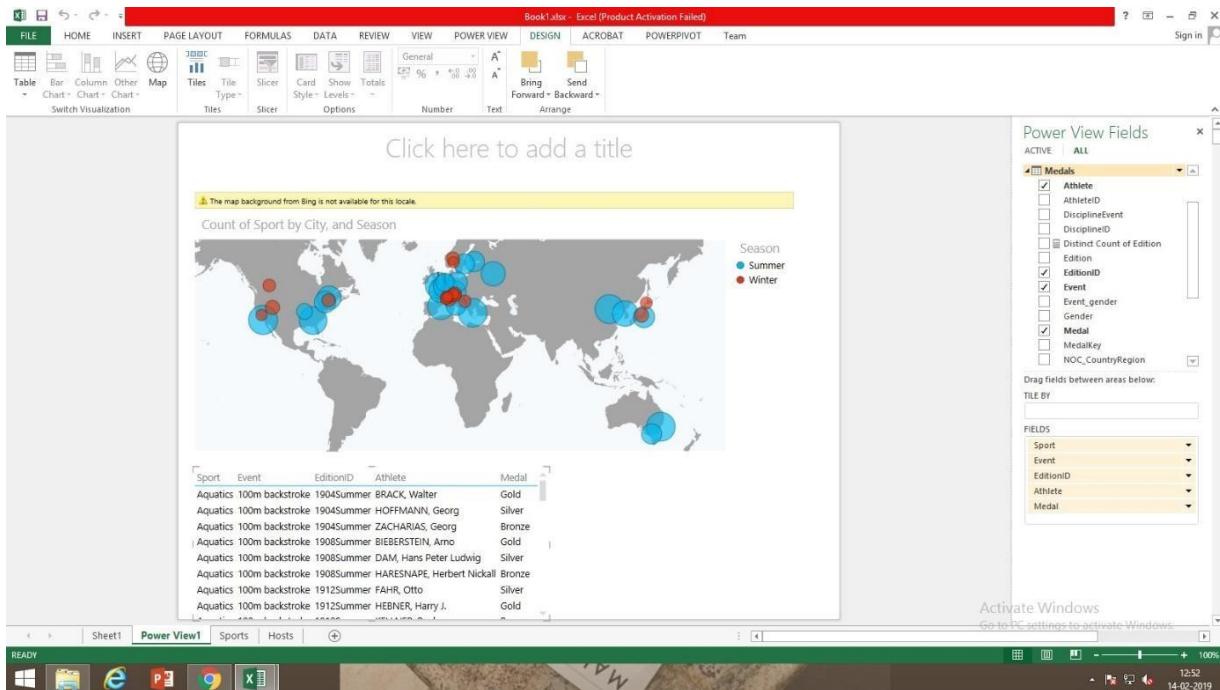
Step 25: Click OK to save the default field set for the Medals table.

Screenshot of PowerPivot for Excel showing the 'Default Field Set' dialog box. The dialog box is titled 'Default Field Set for Table Medals'. The 'Sport' field is selected and highlighted in blue. Below the list are buttons for 'Add >', 'Remove <', 'Move Up', and 'Move Down'. At the bottom right are 'OK' and 'Cancel' buttons. The background shows a PowerPivot PivotTable with data for Athletes and their medals.

Step 26: To see how this works, switch to the Power View sheet in Excel.



Step 27: In the Power View Fields list, click the Medals table name. Power View creates a table and automatically adds the five default fields from the Medals table, in the order you specified, as shown in the following screen. If you accidentally click on the triangle beside Medals, the table simply expands, rather than adding a new table with default fields.



Step 28: Back in Power Pivot, with the Medals table selected, select Advanced > Reporting Properties > Table Behavior. A window appears where you can specify table behavior.

Screenshot of PowerPivot for Excel showing the Table Behavior dialog box. The dialog box is titled "Table Behavior" and contains the following text: "The properties on this dialog allow you to change the default behavior of different visualization types and default grouping behavior in client tools for this table." Below this, there is a section titled "Row Identifier" with a dropdown menu showing "MedalKey". Other sections include "Keep Unique Rows" (with "AthleteID" selected), "Default Label", and "Default Image". The background shows a PivotTable with data from the "Medals" table.

Step 29: In the Table Behavior window, the Row Identifier is the column that contains only unique keys and no blank values. You have to select a Row Identifier before making other selections in the window. Select MedalKey as the Row Identifier.

Screenshot of PowerPivot for Excel showing the Table Behavior dialog box. The dialog box is titled "Table Behavior" and contains the following text: "The properties on this dialog allow you to change the default behavior of different visualization types and default grouping behavior in client tools for this table." Below this, there is a section titled "Row Identifier" with a dropdown menu showing "MedalKey". Other sections include "Keep Unique Rows" (with "AthleteID" selected), "Default Label", and "Default Image". The background shows a PivotTable with data from the "Medals" table.

Step 30: In the Keep Unique Rows section, select AthleteID. Fields you select here have row values that should be unique, and should not be aggregated when creating Pivot Tables or Power View reports.

The screenshot shows the 'Table Behavior' dialog box in the PowerPivot ribbon. The 'Row Identifier' dropdown is set to 'MedalKey'. Under 'Keep Unique Rows', the 'Athlete' checkbox is selected. The 'Default Label' dropdown is set to '[No Column Selected]'. The background displays a table of medal data and a ribbon menu.

Step 31: For Default Label, select a key that should be used as a default report label. Select Sport.

For Default Image, leave the selection as [No Column Selected], since you haven't added images yet.

The screenshot shows the 'Table Behavior' dialog box in the PowerPivot ribbon. The 'Default Label' dropdown is now set to 'Sport'. The background displays a table of medal data and a ribbon menu.

Step 32: The Table Behavior window looks like the following screen. Click OK.

On the Power View sheet in Excel, select the table you created in the previous steps. From the ribbon, select DESIGN > Table > Card.

Book1.xlsx - Excel (Product Activation Failed)

Power View Fields

ACTIVE | ALL

Medals

- Athlete
- AthleteID
- DisciplineEvent
- DisciplineID
- Distinct Count of Edition
- Edition
- EditionID
- Event
- Event_gender
- Gender
- Medal
- MedalKey
- NOC_CountryRegion

Drag fields between areas below:

TILE BY

FIELDS

- MedalKey
- Sport
- AthleteID
- Event
- EditionID
- Athlete
- Medal

Activate Windows
Go to PC settings to activate Windows.

Step 33: The table you created changes into a collection of Cards; the data is the same, but the visualization of the data has changed.

Book1.xlsx - Excel (Product Activation Failed)

Power View Fields

ACTIVE | ALL

Medals

- Athlete
- AthleteID
- DisciplineEvent
- DisciplineID
- Distinct Count of Edition
- Edition
- EditionID
- Event
- Event_gender
- Gender
- Medal
- MedalKey
- NOC_CountryRegion

Drag fields between areas below:

TILE BY

FIELDS

- MedalKey
- Sport
- AthleteID
- Event
- EditionID
- Athlete
- Medal

Activate Windows
Go to PC settings to activate Windows.

Step 34: In Power Pivot, select Hosts. Select the NOC_CountryRegion field. From Advanced > Reporting Properties > Data Category: click the arrow and select Country/Region from the list of available data categories.

PowerPivot for Excel - Book1.xlsx

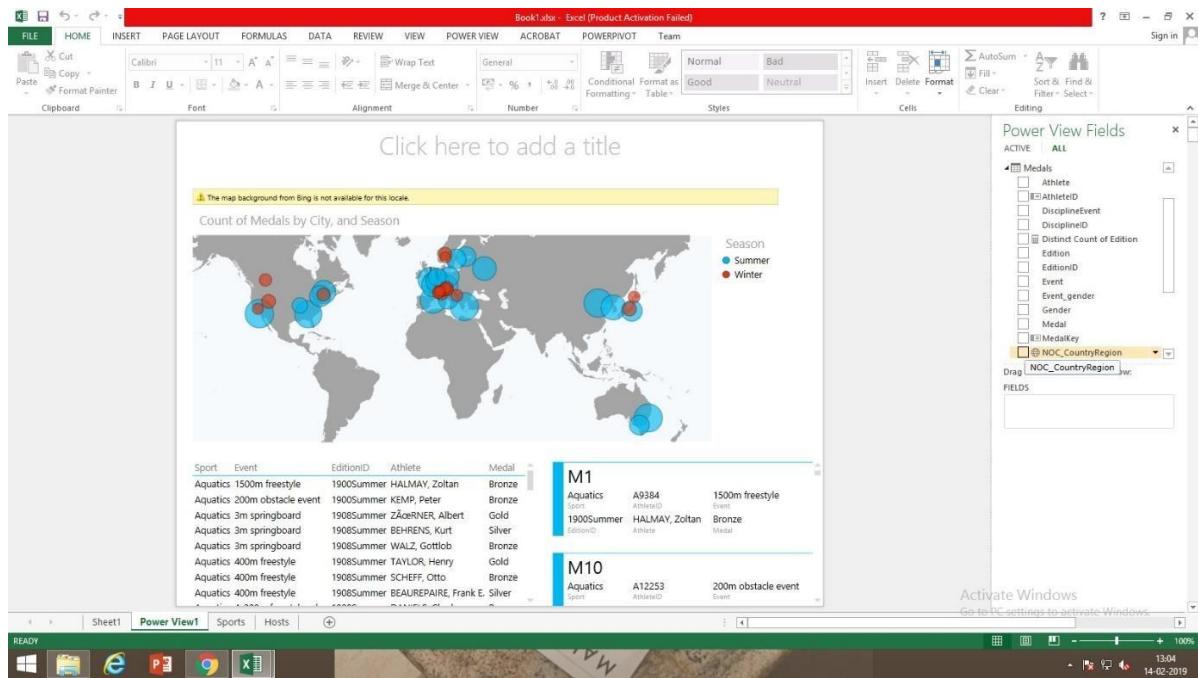
The screenshot shows a Microsoft Excel spreadsheet titled "PowerPivot for Excel - Book1.xlsx". A table named "AUS" is displayed. The "NOC_CountryRegion" column is currently selected. A context menu is open over this column, with the "Data Category" dropdown set to "Country/Region (Suggested)". Other options in the menu include "Address", "City", "Continent", and "Postal Code". The table contains data from various countries and their corresponding NOC codes and regions.

Step 35: In Medals, select the NOC_CountryRegion column. Again, change the Data Category to Country/Region.

PowerPivot for Excel - Book1.xlsx

The screenshot shows a Microsoft Excel spreadsheet titled "PowerPivot for Excel - Book1.xlsx". A table is displayed with many columns. The "NOC_CountryRegion" column is currently selected. A context menu is open over this column, with the "Data Category" dropdown set to "Country/Region". Other options in the menu include "Address", "City", "Continent", and "Postal Code". The table contains data related to athletes, events, and medals.

Step 36: Return to Excel, and select the Power View sheet. Expand the Medals table in Power View Fields, and notice that the NOC_CountryRegion field now has a small globe icon beside it. The globe indicates that NOC_CountryRegion contains a geographic location



Practical 6: Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the warehouse data.

A book store and have 100 books in storage. You sell a certain % for the highest price of \$50 and a certain % for the lower price of \$20.

C8				
1	Book Store			
2				
3	total number of books		% sold for the highest price	
4	100		60%	
5				
6		number of books		unit profit
7	highest price	60		\$50
8	lower price	40		\$20
9				
10	total profit			\$3,800
11				

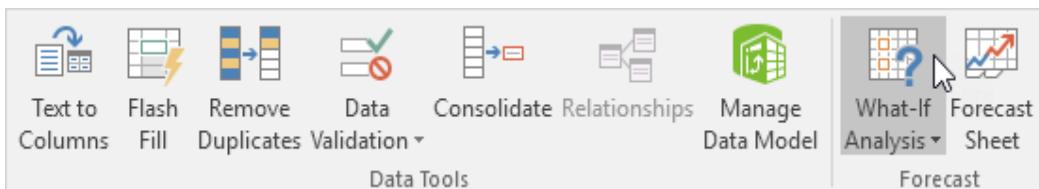
If you sell 60% for the highest price, cell D10 calculates a total profit of $60 * \$50 + 40 * \$20 = \$3800$.

Create Different Scenarios

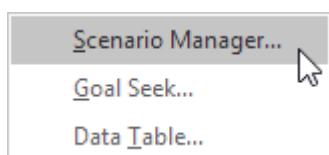
But what if you sell 70% for the highest price? And what if you sell 80% for the highest price? Or 90%, or even 100%? Each different percentage is a different **scenario**. You can use the Scenario Manager to create these scenarios.

Note: You can simply type in a different percentage into cell C4 to see the corresponding result of a scenario in cell D10. However, what-if analysis enables you to easily compare the results of different scenarios. Read on.

1. On the Data tab, in the Forecast group, click What-If Analysis.

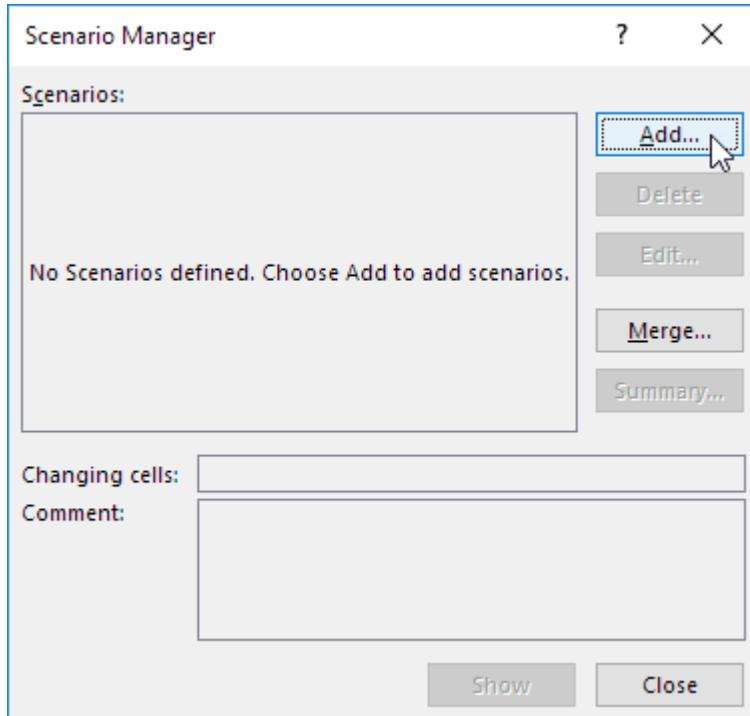


2. Click Scenario Manager.

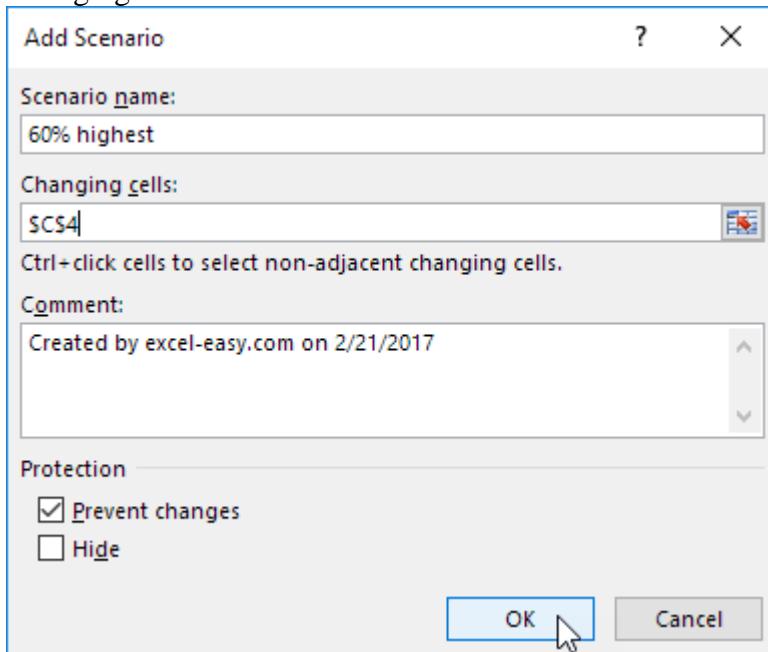


The Scenario Manager dialog box appears.

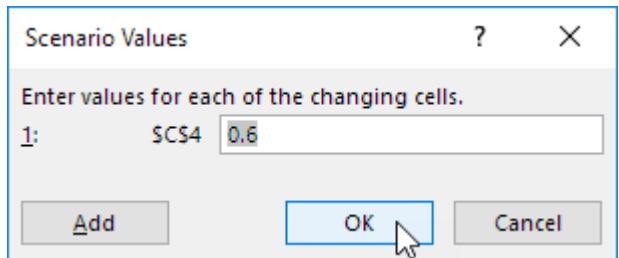
3. Add a scenario by clicking on Add.



4. Type a name (60% highest), select cell C4 (% sold for the highest price) for the Changing cells and click on OK.

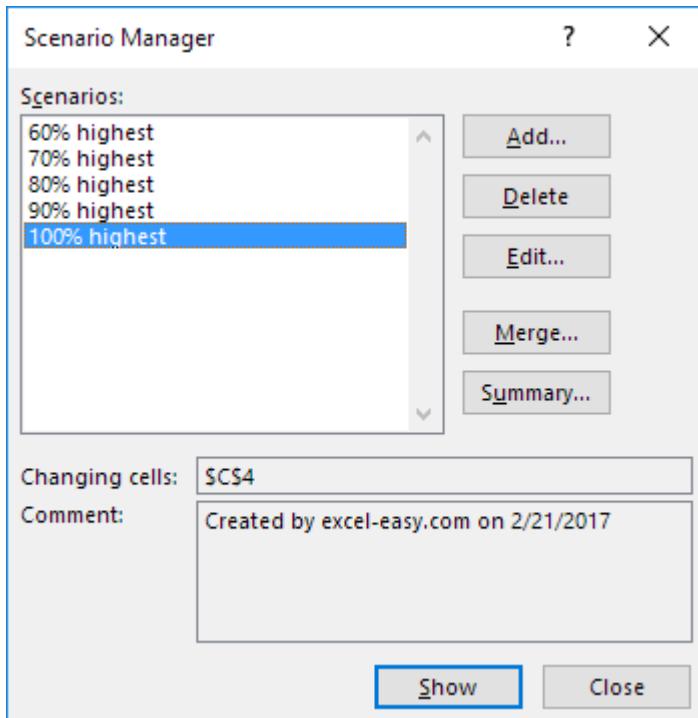


5. Enter the corresponding value 0.6 and click on OK again.



6. Next, add 4 other scenarios (70%, 80%, 90% and 100%).

Finally, your Scenario Manager should be consistent with the picture below:



Practical 7(A): Decision Tree

```
install.packages("party")
```

The package "party" has the function **ctree()** which is used to create and analyze decision tree.

Syntax

The basic syntax for creating a decision tree in R is –

```
ctree(formula, data)
```

Input Data

We will use the R in-built data set named **readingSkills** to create a decision tree. It describes the score of someone's readingSkills if we know the variables "age", "shoeSize", "score" and whether the person is a native speaker or not.

Here is the sample data.

```
# Load the party package. It will automatically load other
# dependent packages.
library(party)

# Print some records from data set readingSkills.
print(head(readingSkills))
```

When we execute the above code, it produces the following result and chart –

```
nativeSpeaker    age    shoeSize      score
1       yes      5   24.83189  32.29385
2       yes      6   25.95238  36.63105
3       no       11  30.42170  49.60593
4       yes      7   28.66450  40.28456
5       yes      11  31.88207  55.46085
6       yes      10  30.07843  52.83124
Loading required package: methods
Loading required package: grid
.....
```

We will use the **ctree()** function to create the decision tree and see its graph.

```
# Load the party package. It will automatically load other
# dependent packages.
library(party)

# Create the input data frame.
input.dat <- readingSkills[c(1:105),]

# Give the chart file a name.
png(file = "decision_tree.png")

# Create the tree.
output.tree <- ctree(
  nativeSpeaker ~ age + shoeSize + score,
```

```

data = input.dat)

# Plot the tree.
plot(output.tree)

# Save the file.
dev.off ()

```

Output: -

```

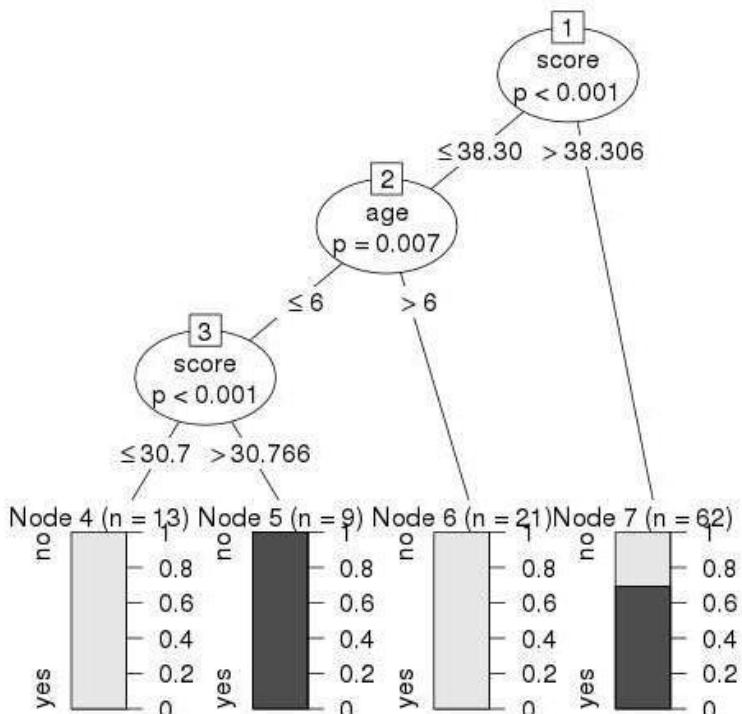
null device
1
Loading required package: methods
Loading required package: grid
Loading required package: mvtnorm
Loading required package: modeltools
Loading required package: stats4
Loading required package: strucchange
Loading required package: zoo

Attaching package: 'zoo'

The following objects are masked from 'package:base':
as.Date, as.Date.numeric

Loading required package: sandwich

```



Practical 7(B): Time Series

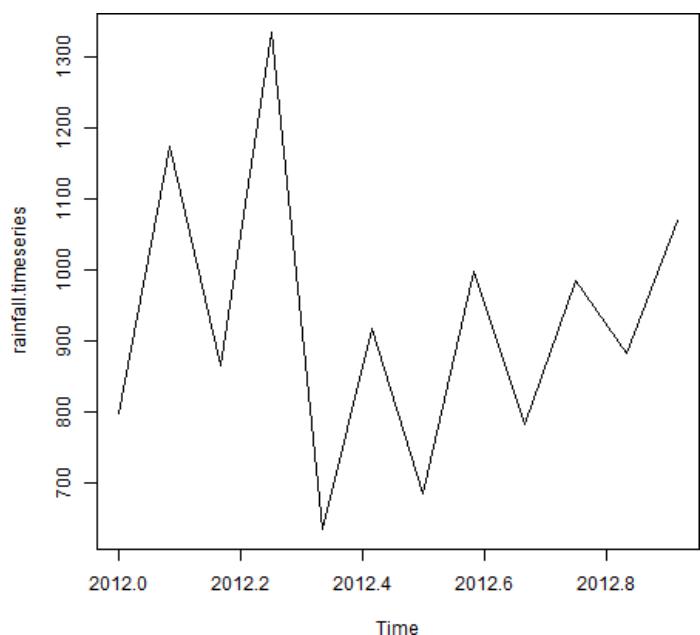
Consider the annual rainfall details at a place starting from January 2012. We create an R time series object for a period of 12 months and plot it.

```
# Get the data points in form of a R vector.  
rainfall <-  
c(799,1174.8,865.1,1334.6,635.4,918.5,685.5,998.6,784.2,985,882.8,1071)  
  
# Convert it to a time series object.  
rainfall.timeseries <- ts(rainfall,start = c(2012,1),frequency = 12)  
  
# Print the timeseries data.  
print(rainfall.timeseries)  
  
# Give the chart file a name.  
png(file = "rainfall.png")  
  
# Plot a graph of the time series.  
plot(rainfall.timeseries)  
  
# Save the file.  
dev.off()
```

Output: -

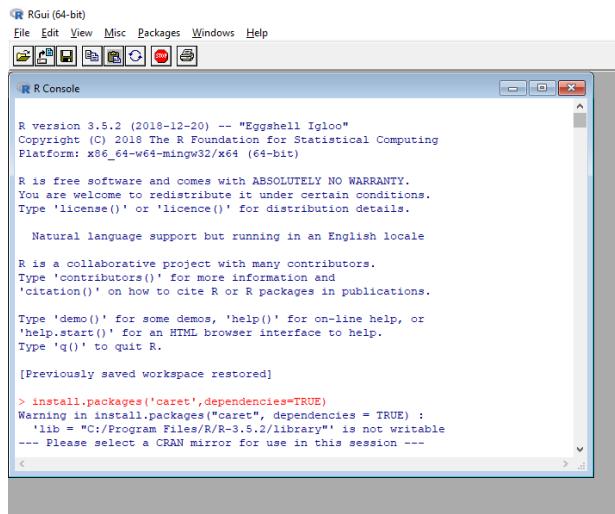
When we execute the above code, it produces the following result and chart –

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
2012	799.0	1174.8	865.1	1334.6	635.4	918.5	685.5	998.6	784.2	
	Oct	Nov	Dec							
2012	985.0	882.8	1071.0							



Practical 8: Perform the data clustering using clustering algorithm.

Step 1 : Install Library → `install.packages('caret',dependencies=TRUE)`



```
R version 3.5.2 (2018-12-20) -- "Eggshell Igloo"
Copyright (C) 2018 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

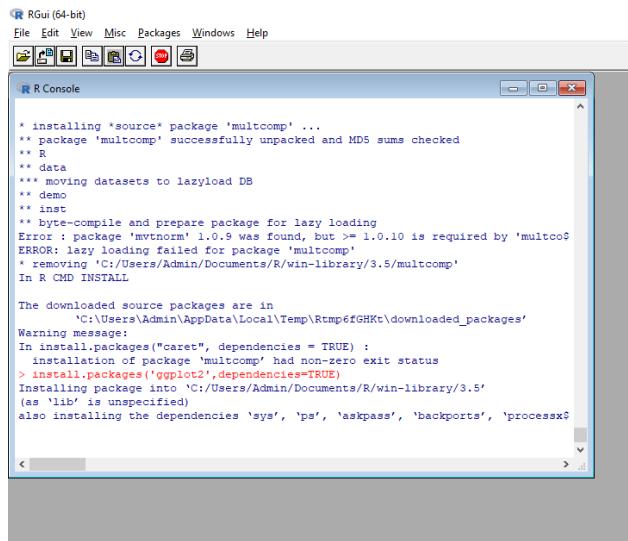
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Previously saved workspace restored]

> install.packages('caret',dependencies=TRUE)
Warning in install.packages("caret", dependencies = TRUE) :
  'lib' = "C:/Program Files/R/R-3.5.2/library" is not writable
--- Please select a CRAN mirror for use in this session ---
```

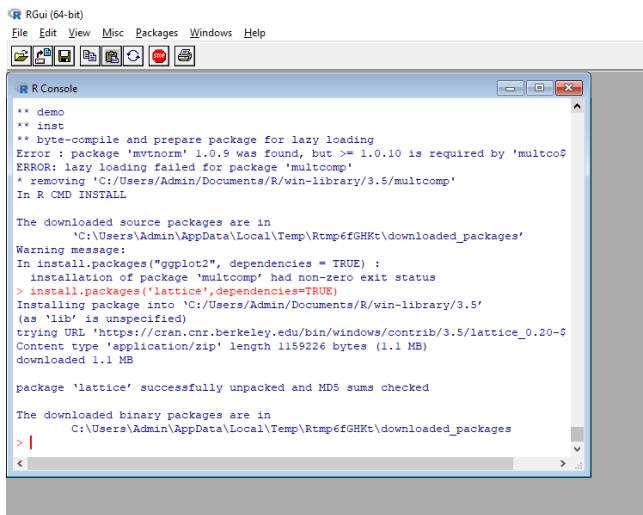
Step 2 : Install Library → `install.packages('ggplot2',dependencies=TRUE)`



```
* installing *source* package 'multcomp' ...
** package 'multcomp' successfully unpacked and MD5 sums checked
** R
** data
*** moving datasets to lazyload DB
** demo
** inst
** byte-compile and prepare package for lazy loading
Error : package 'mvtnorm' 1.0.9 was found, but >= 1.0.10 is required by 'multcomp'
ERROR: lazy loading failed for package 'multcomp'
* removing 'C:/Users/Admin/Documents/R/win-library/3.5/multcomp'
In R CMD INSTALL

The downloaded source packages are in
  'C:/Users/Admin/AppData/Local/Temp/Rtmp6fGHKt/downloaded_packages'
Warning message:
In install.packages("caret", dependencies = TRUE) :
  installation of package 'multcomp' had non-zero exit status
> install.packages('ggplot2',dependencies=TRUE)
Installing package into 'C:/Users/Admin/Documents/R/win-library/3.5'
(as 'lib' is unspecified)
also installing the dependencies 'sys', 'ps', 'askpass', 'backports', 'processx'
```

Step 3 : Install Library → `install.packages('lattice',dependencies=TRUE)`



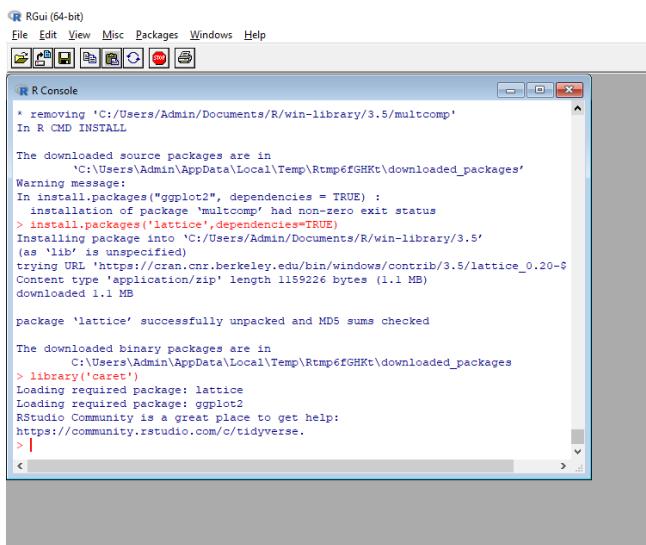
```
RGui (64-bit)
File Edit View Misc Packages Windows Help
R Console
** demo
** inst
** byte-compile and prepare package for lazy loading
Error : package 'vtnorm' 1.0.9 was found, but >= 1.0.10 is required by 'multcomp'
ERROR: lazy loading failed for package 'multcomp'
* removing 'C:/Users/Admin/Documents/R/win-library/3.5/multcomp'
In R CMD INSTALL

The downloaded source packages are in
  'C:/Users/Admin/AppData/Local/Temp/Rtmp6fGHKt/downloaded_packages'
Warning message:
In install.packages("ggplot2", dependencies = TRUE) :
  installation of package 'multcomp' had non-zero exit status
> install.packages("lattice",dependencies=TRUE)
Installing package into 'C:/Users/Admin/Documents/R/win-library/3.5'
(as 'lib' is unspecified)
trying URL 'https://cran.cnr.berkeley.edu/bin/windows/contrib/3.5/lattice_0.20-8.zip'
Content type 'application/zip' length 1159226 bytes (1.1 MB)
downloaded 1.1 MB

package 'lattice' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  'C:/Users/Admin/AppData/Local/Temp/Rtmp6fGHKt/downloaded_packages'
> |
```

Step 4 : `library('caret')`



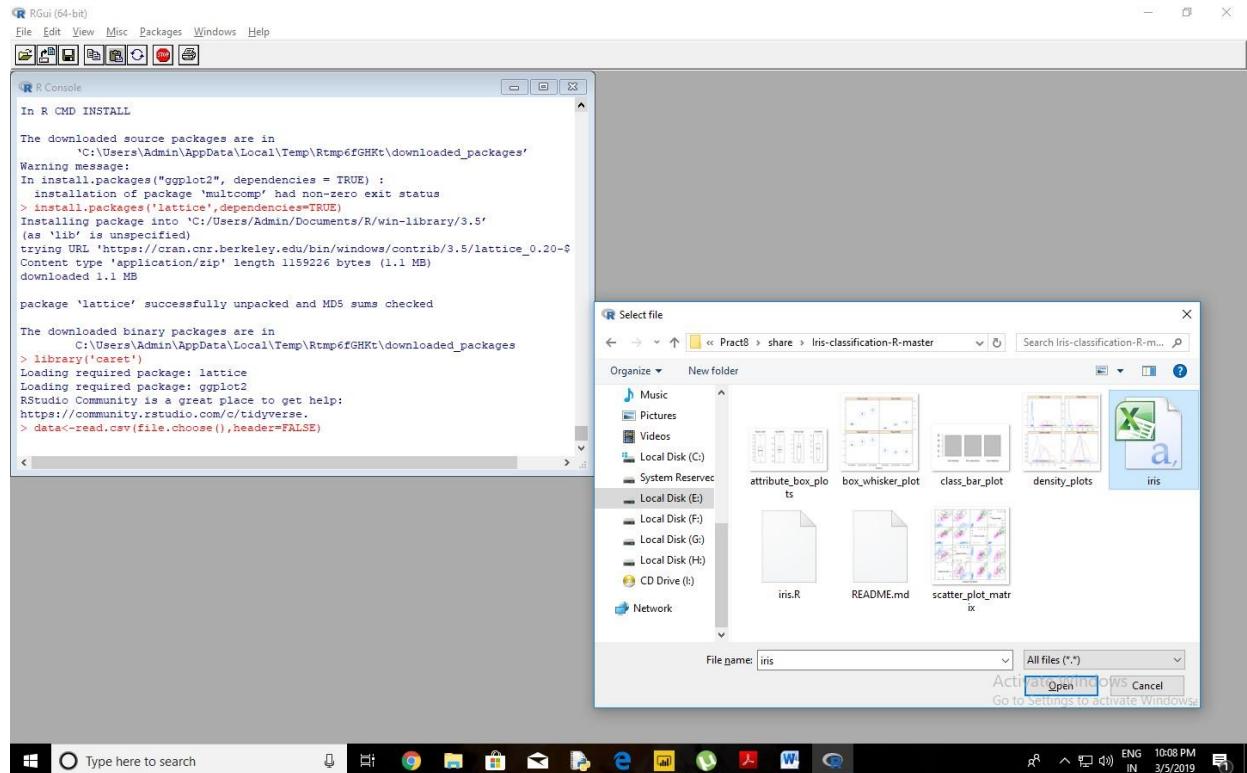
```
RGui (64-bit)
File Edit View Misc Packages Windows Help
R Console
* removing 'C:/Users/Admin/Documents/R/win-library/3.5/multcomp'
In R CMD INSTALL

The downloaded source packages are in
  'C:/Users/Admin/AppData/Local/Temp/Rtmp6fGHKt/downloaded_packages'
Warning message:
In install.packages("ggplot2", dependencies = TRUE) :
  installation of package 'multcomp' had non-zero exit status
> install.packages("lattice",dependencies=TRUE)
Installing package into 'C:/Users/Admin/Documents/R/win-library/3.5'
(as 'lib' is unspecified)
trying URL 'https://cran.cnr.berkeley.edu/bin/windows/contrib/3.5/lattice_0.20-8.zip'
Content type 'application/zip' length 1159226 bytes (1.1 MB)
downloaded 1.1 MB

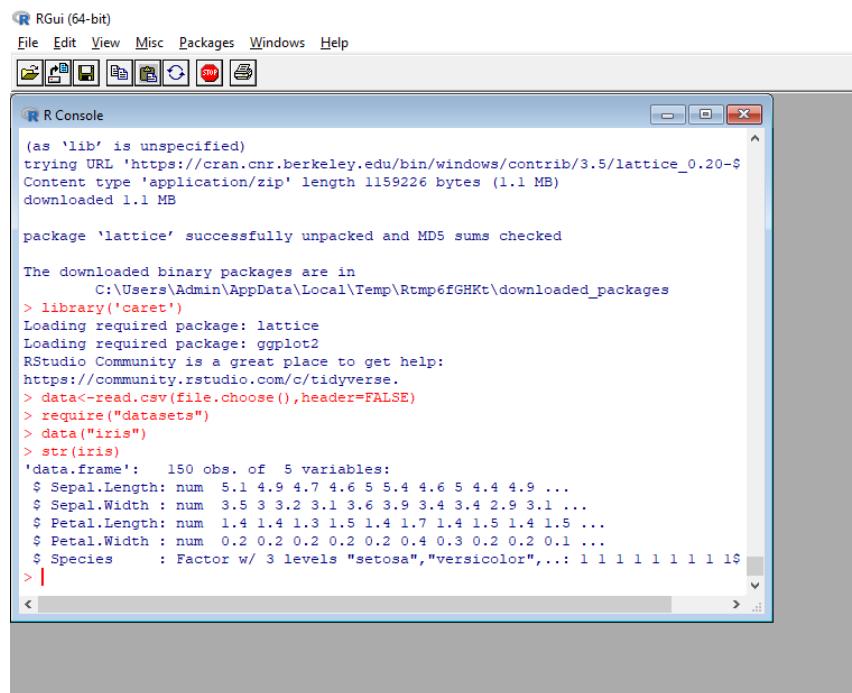
package 'lattice' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  'C:/Users/Admin/AppData/Local/Temp/Rtmp6fGHKt/downloaded_packages'
> library('caret')
Loading required package: lattice
Loading required package: ggplot2
RStudio Community is a great place to get help:
https://community.rstudio.com/c/tidyverse.
> |
```

Step 5 : Choose file(.csv) → `data<-read.csv(file.choose(),header=FALSE)`



Step 6 : Display data in the file.



Step 7 : View the summary and table headers of the data.

R Gui (64-bit)

File Edit View Misc Packages Windows Help

R Console

\$ Species : Factor w/ 3 levels "setosa", "versicolor", ... : 1 1 1 1 1 1 1 1 1 \$

> summary(iris)

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
Min.	:4.300	:2.000	:1.000	:0.100
1st Qu.	:5.100	:2.800	:1.600	:0.300
Median	:5.800	:3.000	:4.350	:1.300
Mean	:5.843	:3.057	:3.758	:1.199
3rd Qu.	:6.400	:3.300	:5.100	:1.800
Max.	:7.900	:4.400	:6.900	:2.500

Species

setosa :50

versicolor:50

virginica:50

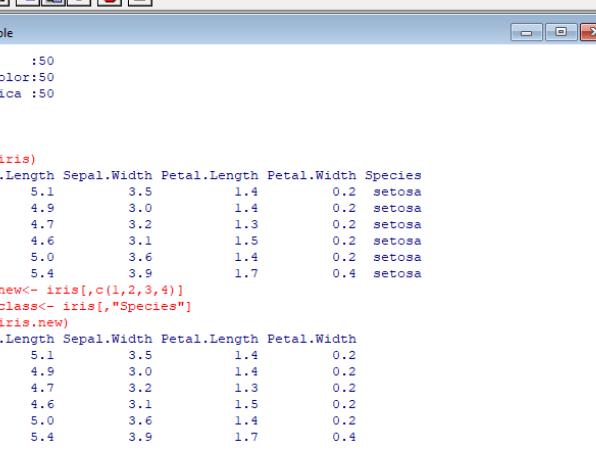
> head(iris)

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa

>

<

Step 8 : Create a new class having only the data that we want.



R Gui (64-bit)

File Edit View Misc Packages Windows Help

File Edit View Misc Packages Windows Help

R Console

```
setosa :50
versicolor:50
virginica :50

> head(iris)
  Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2  setosa
2          4.9         3.0          1.4         0.2  setosa
3          4.7         3.2          1.3         0.2  setosa
4          4.6         3.1          1.5         0.2  setosa
5          5.0         3.6          1.4         0.2  setosa
6          5.4         3.9          1.7         0.4  setosa
> iris.new<- iris[,c(1,2,3,4)]
> iris.class<- iris[,"Species"]
> head(iris.new)
  Sepal.Length Sepal.Width Petal.Length Petal.Width
1          5.1         3.5          1.4         0.2
2          4.9         3.0          1.4         0.2
3          4.7         3.2          1.3         0.2
4          4.6         3.1          1.5         0.2
5          5.0         3.6          1.4         0.2
6          5.4         3.9          1.7         0.4
> |
```

Step 9 : Viewing the headers of our new class

```
> head(iris)
Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2   setosa
2          4.9         3.0          1.4         0.2   setosa
3          4.7         3.2          1.3         0.2   setosa
4          4.6         3.1          1.5         0.2   setosa
5          5.0         3.6          1.4         0.2   setosa
6          5.4         3.9          1.7         0.4   setosa
> iris.new<- iris[,c(1,2,3,4)]
> iris.class<- iris[,"Species"]
> head(iris.new)
Sepal.Length Sepal.Width Petal.Length Petal.Width
1          5.1         3.5          1.4         0.2
2          4.9         3.0          1.4         0.2
3          4.7         3.2          1.3         0.2
4          4.6         3.1          1.5         0.2
5          5.0         3.6          1.4         0.2
6          5.4         3.9          1.7         0.4
> head(iris.class)
[1] setosa setosa setosa setosa setosa setosa
Levels: setosa versicolor virginica
> |
```

Step 10 : Normalize the data.

```
> RGui (64-bit)
File Edit View Misc Packages Windows Help
Sepal.Length Sepal.Width Petal.Length Petal.Width
1          5.1         3.5          1.4         0.2
2          4.9         3.0          1.4         0.2
3          4.7         3.2          1.3         0.2
4          4.6         3.1          1.5         0.2
5          5.0         3.6          1.4         0.2
6          5.4         3.9          1.7         0.4
> head(iris.class)
[1] setosa setosa setosa setosa setosa setosa
Levels: setosa versicolor virginica
> normalize <- function(x) {
+   return ((x-min(x)) / (max(x)-min(x)))
+ }
> iris.new$Sepal.Length<- normalize(iris.new$Sepal.Length)
> iris.new$Sepal.Width<- normalize(iris.new$Sepal.Width)
> iris.new$Petal.Length<- normalize(iris.new$Petal.Length)
> iris.new$Petal.Width<- normalize(iris.new$Petal.Width)
> head(iris.new)
Sepal.Length Sepal.Width Petal.Length Petal.Width
1  0.22222222  0.6250000  0.06779561  0.04166667
2  0.16666667  0.51666667  0.06779561  0.04166667
3  0.11111111  0.5000000  0.05084746  0.04166667
4  0.08333333  0.45833333  0.08474576  0.04166667
5  0.19444444  0.66666667  0.06779561  0.04166667
6  0.30555556  0.79166667  0.11864407  0.12500000
> |
```

Step 11 : Apply K-Means Clustering with 3 clusters using kmeans function.

R Gui (64-bit)
File Edit View Misc Packages Windows Help

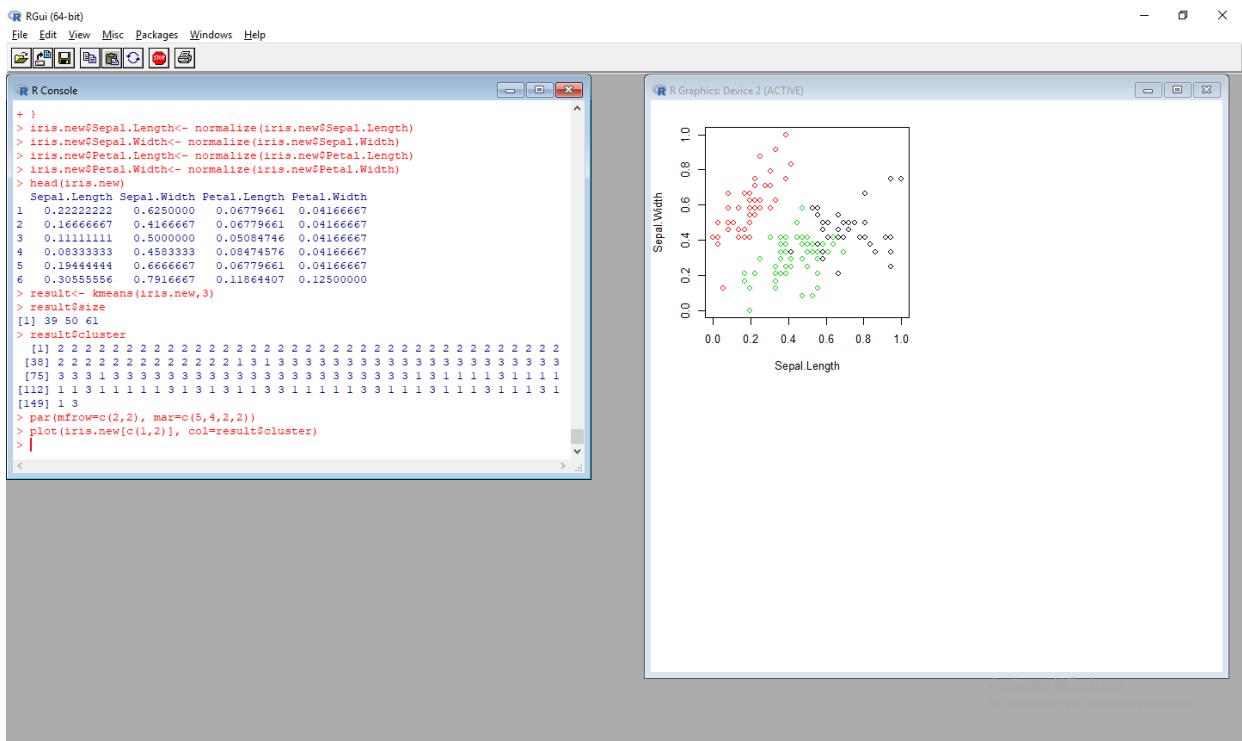
R Console

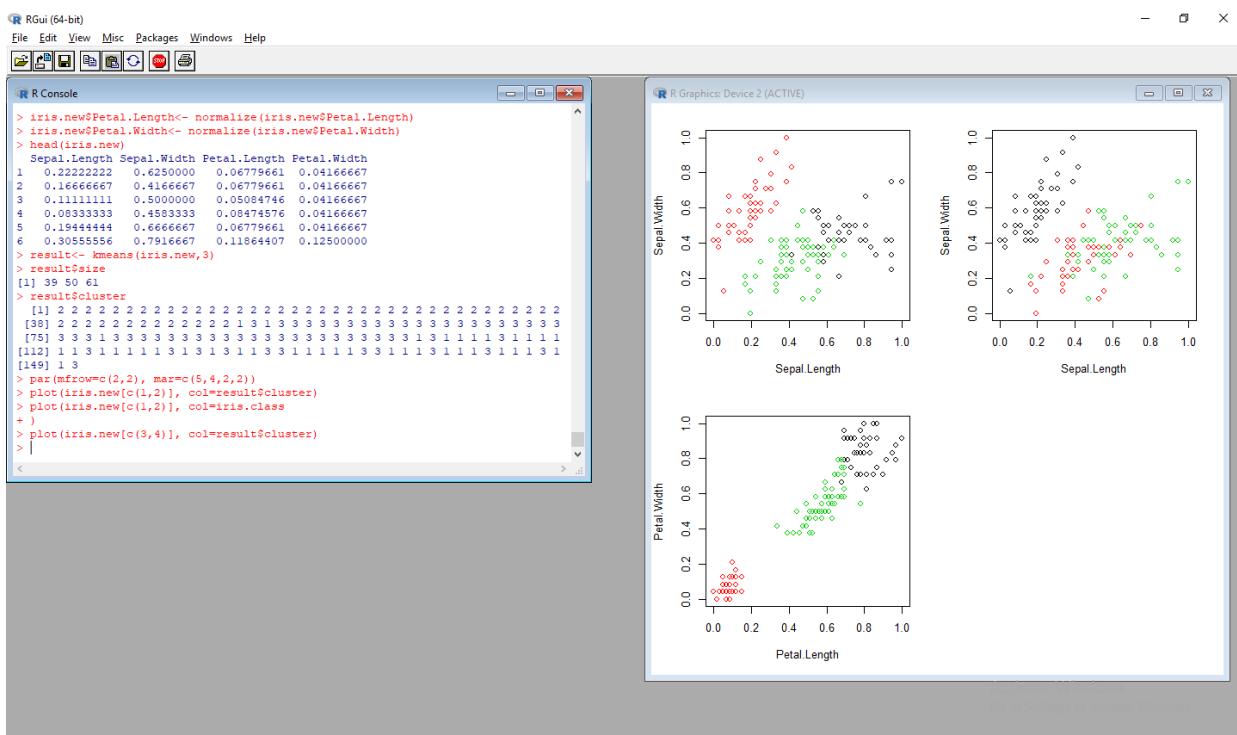
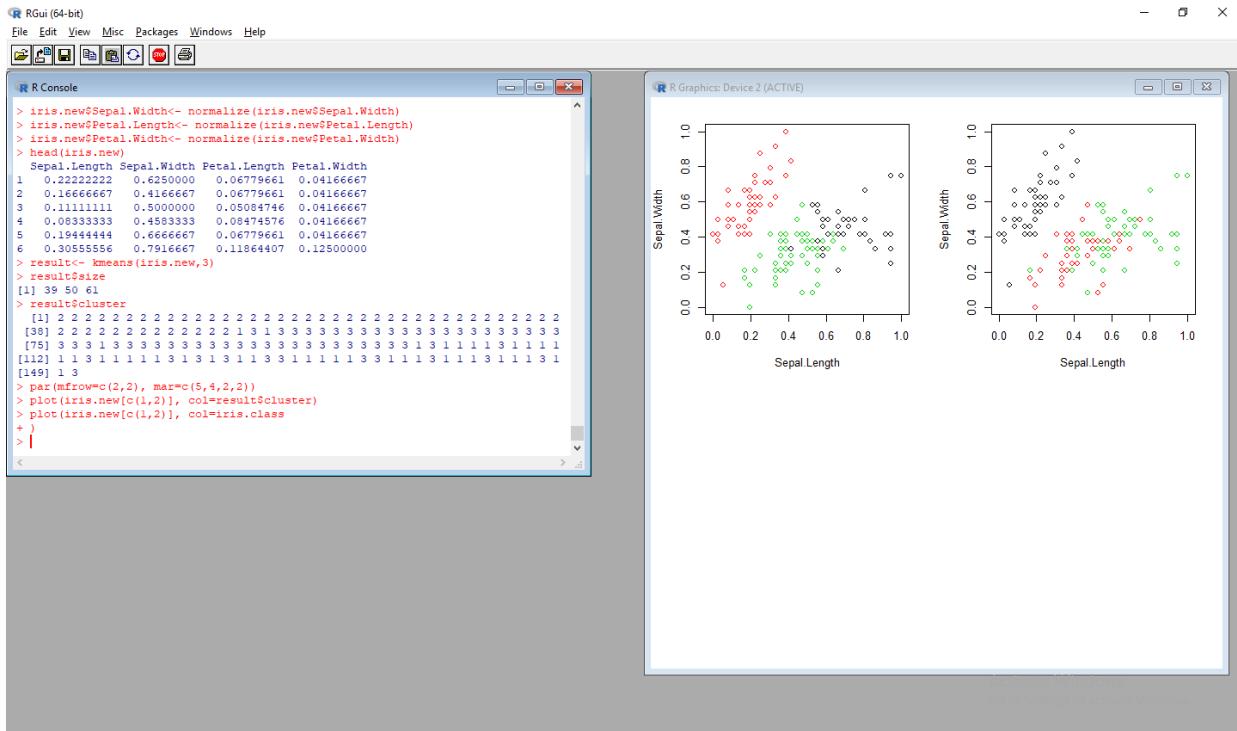
```
> head(iris.class)
#> [1] setosa setosa setosa setosa setosa
#> Levels: setosa versicolor virginica
> normalize <- function(x) {
+   return ((x-min(x))/(max(x)-min(x)))
+ }
> iris.new$Sepal.Length<- normalize(iris.new$Sepal.Length)
> iris.new$Sepal.Width<- normalize(iris.new$Sepal.Width)
> iris.new$Petal.Length<- normalize(iris.new$Petal.Length)
> iris.new$Petal.Width<- normalize(iris.new$Petal.Width)
> head(iris.new)
  Sepal.Length Sepal.Width Petal.Length Petal.Width
1  0.22222222  0.6350000  0.06779661  0.04166667
2  0.16666667  0.41666667  0.05779661  0.04166667
3  0.11111111  0.5000000  0.05084746  0.04166667
4  0.08333333  0.45833333  0.08474576  0.04166667
5  0.15444444  0.66666667  0.06779661  0.04166667
6  0.30555556  0.79166667  0.11864407  0.12500000
> result<- kmeans(iris.new, 3)
> result$size
[1] 39 50 61
> |
```

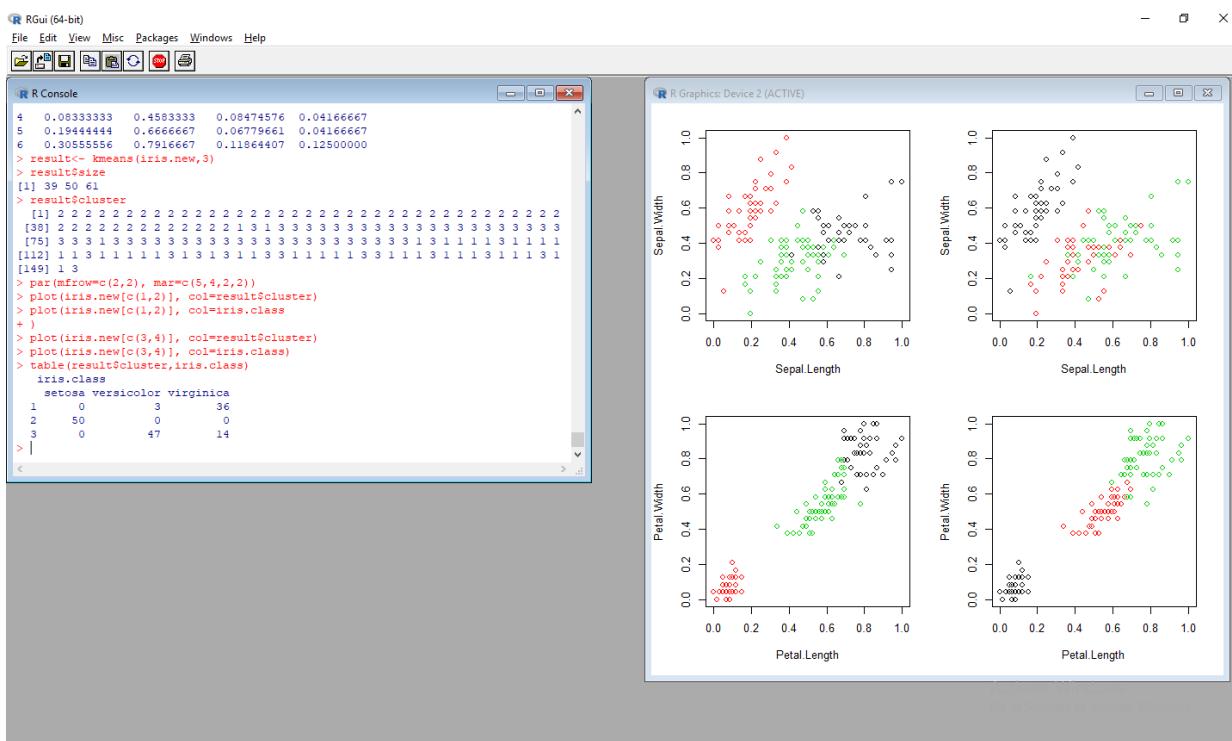
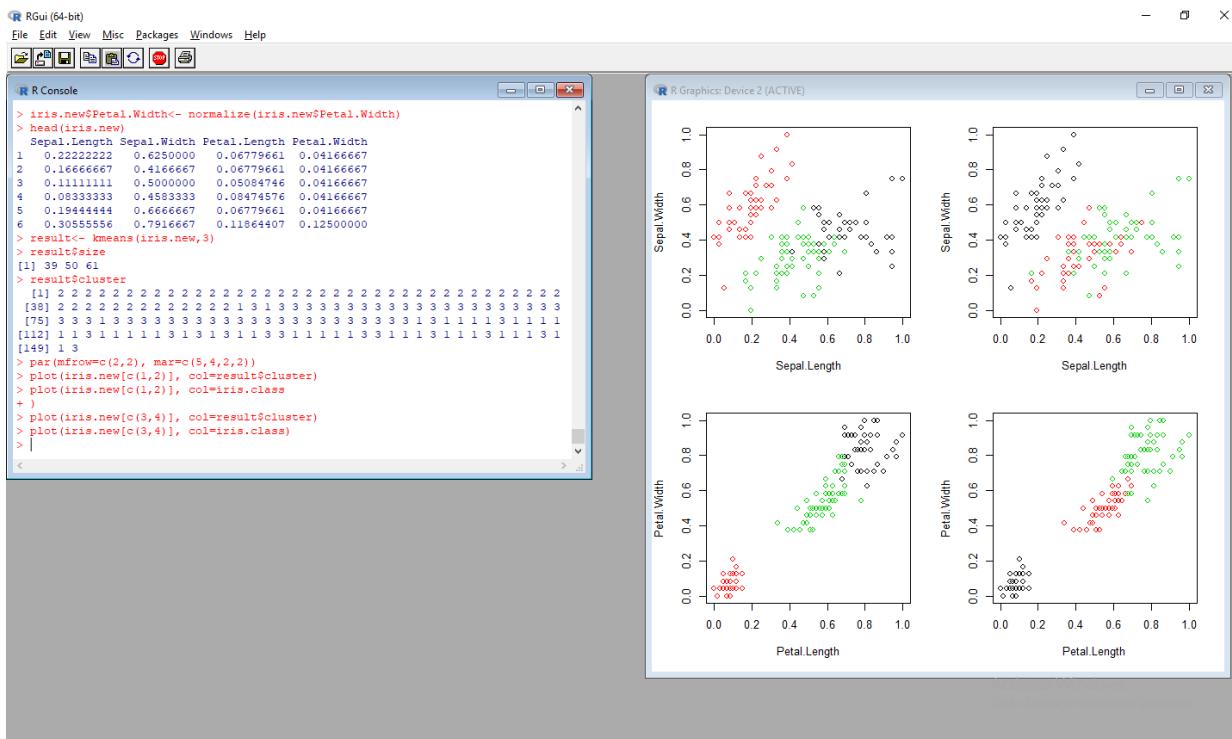
Step 12 : View Results.

Step 13 : Initialize row and columns area to draw the clusters graphically .

Step 14 : Draw the clusters with respect to sepal length and width and petal length and width.







Practical 9: Perform Linear Regression on given warehouse data.

Step 1: Open data in Power BI. (Get Data→Excel→Edit).

Untitled - Power BI Desktop

File Home Modeling Help

Cut Copy Format Painter Get Data Recent Sources Enter Data Edit Queries Refresh New Page New Visual Ask A Question Insert Text box Buttons From Marketplace From File Custom visuals Switch Theme Themes Manage Relationships New Measure New Column New Quick Measure Publish Share

Clipboard External data

New Column Add a calculated column to the selected table.

FIELDS

Search

Sheet1

- Age(X)
- Column**
- Customer ID
- Sales(Y)

TABLE: Sheet1 (10 rows) COLUMN: Column (1 distinct values)

Type here to search

11:16 21-01-2019

Step 2 : Add more columns as per formula of XY, XSquare, YSquare. For performing linear regression.

Untitled - Power BI Desktop

File Home Modeling Help

Cut Copy Format Painter Get Data Recent Sources Enter Data Edit Queries Refresh New Page New Visual Ask A Question Insert Text box Buttons From Marketplace From File Custom visuals Switch Theme Themes Manage Relationships New Measure New Column New Quick Measure Publish Share

Clipboard External data

YSquared = Sheet1[Sales(Y)]*Sheet1[Sales(Y)]

FIELDS

Search

Sheet1

- Age(X)
- Customer ID
- Sales(Y)
- XSquared
- XY
- YSquared**

TABLE: Sheet1 (10 rows) COLUMN: YSquared (4 distinct values)

Type here to search

11:18 21-01-2019

Step 3 : Right click on Fields → Sheet and add a new measure. Which may act as some constant values

The screenshot shows a Power BI Desktop interface with a table named 'Sheet1'. The table has columns: Customer ID, Age(X), Sales(Y), XY, XSquared, and YSquared. A context menu is open over the YSquared column, with 'New measure' selected. The YSquared column contains the formula `YSquared = Sheet1[Sales(Y)]*Sheet1[Sales(Y)]`.

Customer ID	Age(X)	Sales(Y)	XY	XSquared	YSquared
1	18	10	180	324	100
2	25	20	500	625	400
3	27	20	540	729	400
4	42	40	1680	1764	1600
5	21	20	420	441	400
6	39	40	1560	1521	1600
7	48	45	2160	2304	2025
8	33	20	660	1089	400
9	57	45	2565	3249	2025
10	32	20	640	1024	400

Step 4 : Calculate XSum.

The screenshot shows the same Power BI Desktop interface as before, but now with a new measure named 'Xsum' added. The XSquared column contains the formula `Xsum = SUM(Sheet1[Age(X)])`. The context menu over the XSquared column now includes the newly created measure 'Xsum'.

Customer ID	Age(X)	Sales(Y)	XY	XSquared	YSquared
1	18	10	180	324	100
2	25	20	500	625	400
3	27	20	540	729	400
4	42	40	1680	1764	1600
5	21	20	420	441	400
6	39	40	1560	1521	1600
7	48	45	2160	2304	2025
8	33	20	660	1089	400
9	57	45	2565	3249	2025
10	32	20	640	1024	400

Step 5 : Calculate XYSum.

Power BI Desktop interface showing a table named Sheet1 with 10 rows. The table includes columns for Customer ID, Age(X), Sales(Y), XY, Xsquared, and Ysquared. A calculated column XYSum = SUM([Sheet1[XY]]) is present. The Fields pane on the right lists the measures Xsquared, XsquaredSum, Xsum, XY, XYSum, Ysquared, and YsquaredSum.

Step 6 : Calculate rnumerator.

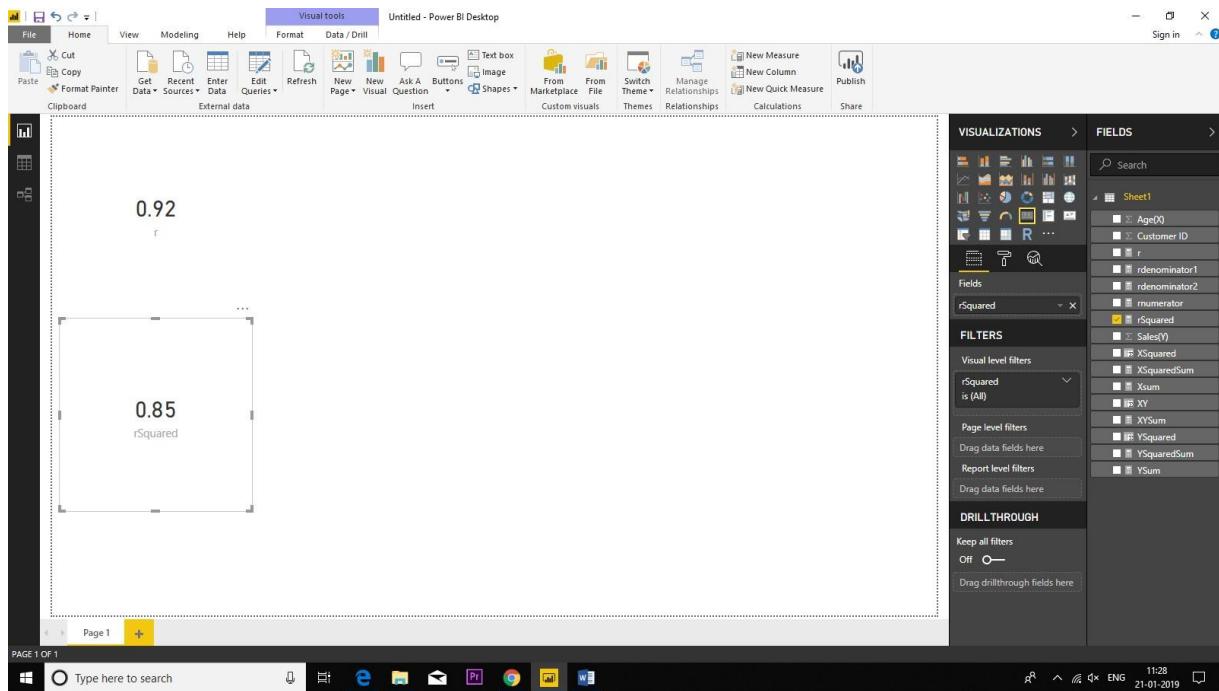
Power BI Desktop interface showing a table with a calculated column rnumerator = 10*[XYSum]-{Xsum}^2/{Ysum}. The Fields pane on the right shows the context menu for the measure XYSum, with options like New measure, New column, New quick measure, Refresh data, Edit query, Rename, Delete, Hide, View hidden, Unhide all, Collapse all, Expand all, and Properties.

Step 7 : Calculate r.

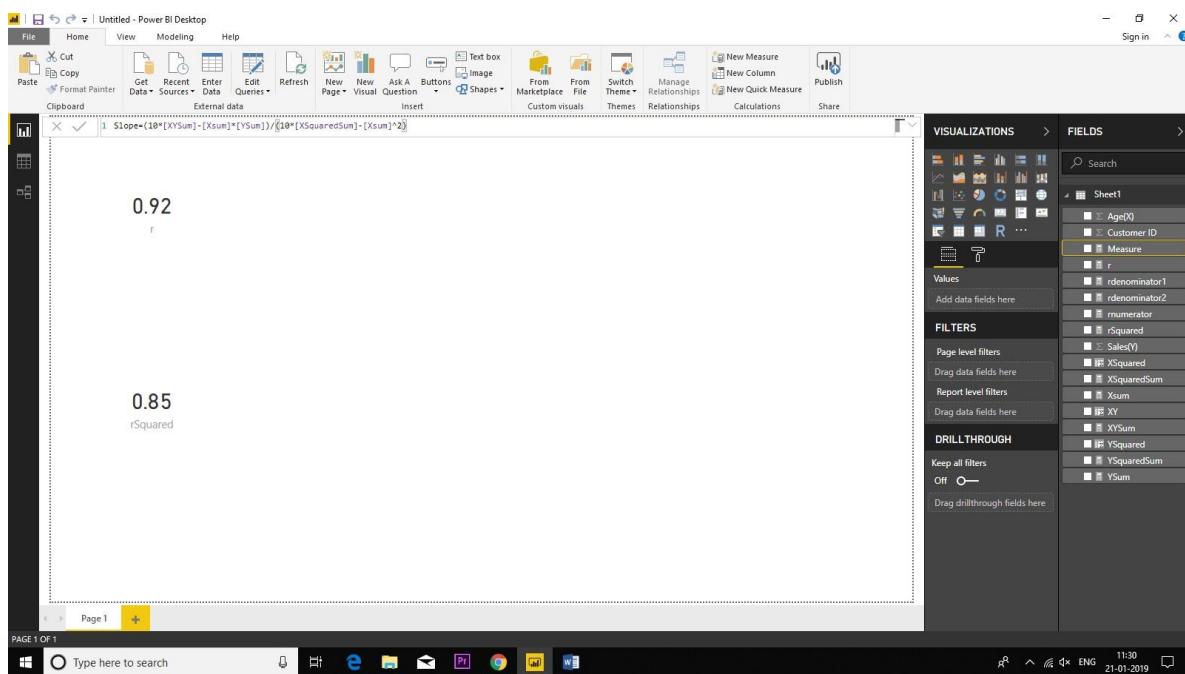
The screenshot shows the Power BI Desktop interface. The formula bar at the top contains the DAX formula: `1 r = DIVIDE({rnumerator},{rdenominator2})`. The Fields pane on the right lists various fields including Age(X), Customer ID, r, rdenominator1, rdenominator2, rnumerator, Sales(Y), Xsquare, XsquareSum, Xsum, XY, XYSum, Ysquare, YsquareSum, and Ysum. The visualizations pane shows a card visualization with the value 0.92.

Step 8 : Select the Card Visualizations to view calculated results.

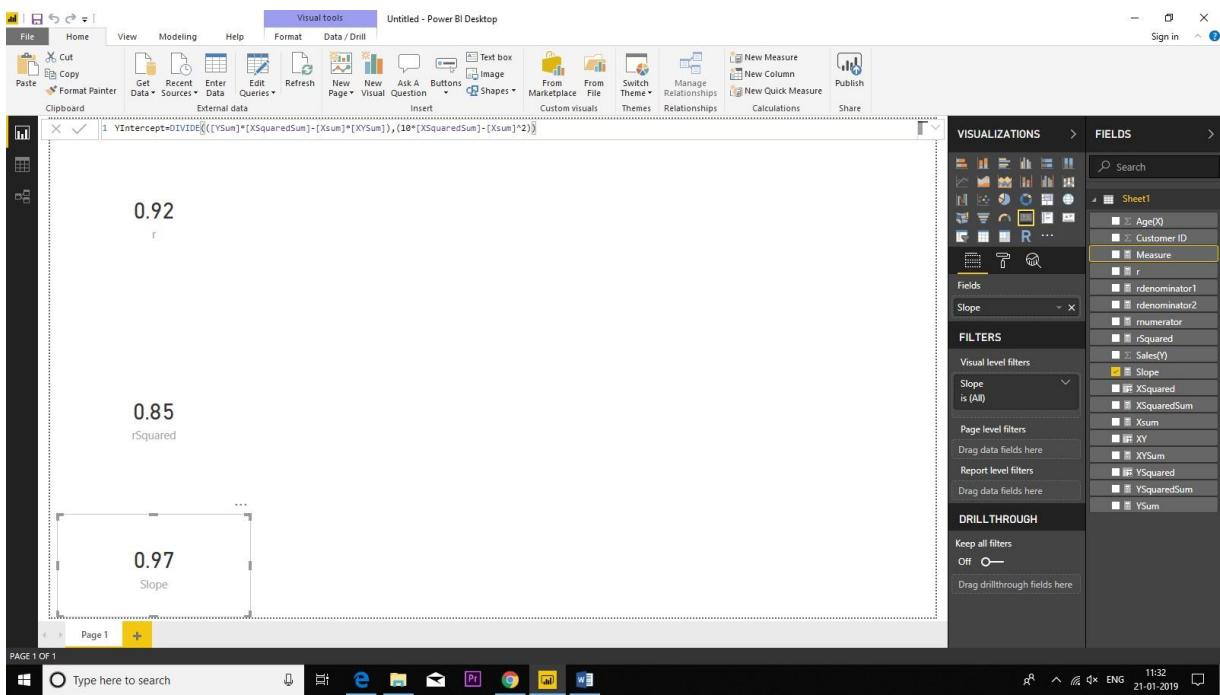
The screenshot shows the Power BI Desktop interface with the calculated result '0.92' displayed in a card visualization. The Fields pane on the right lists the same set of fields as in the previous step. The visualizations pane shows the card visualization with the value 0.92.



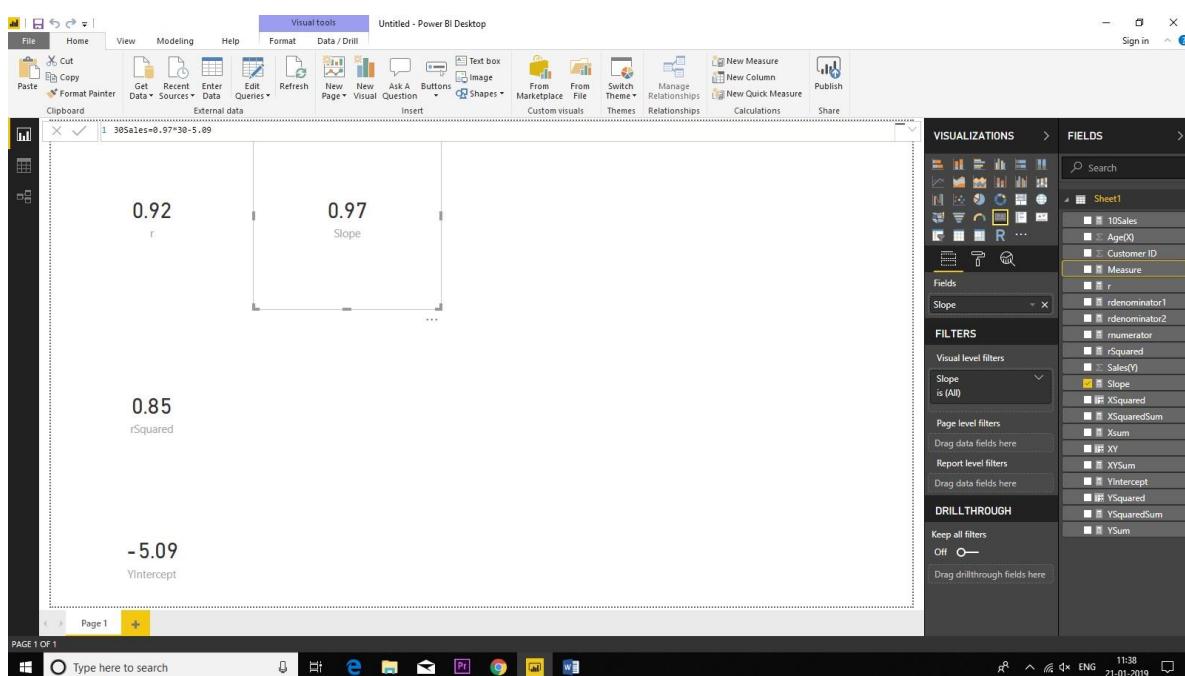
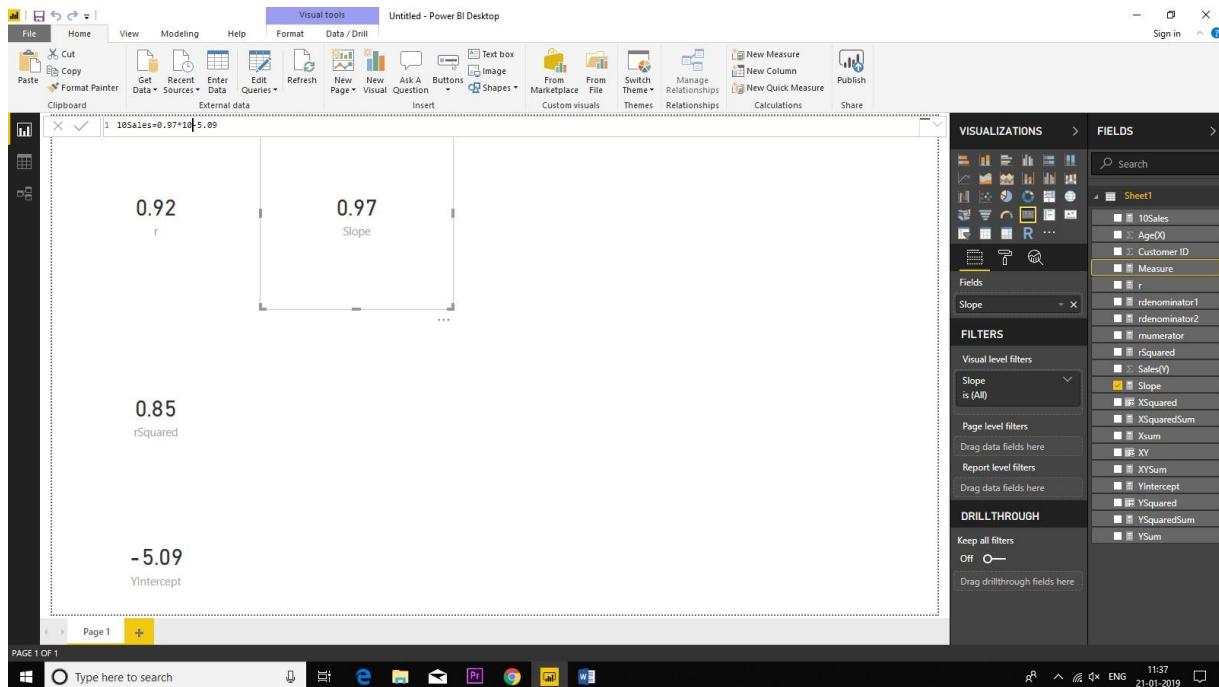
Step 9 : Calculate Slope.

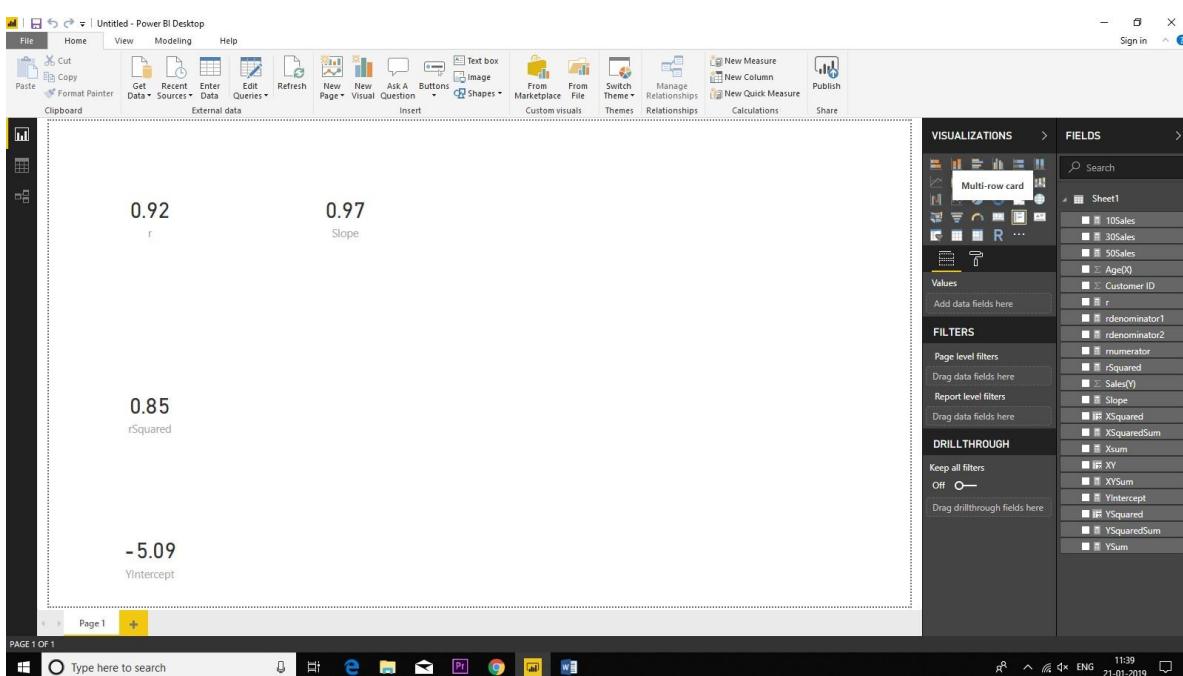
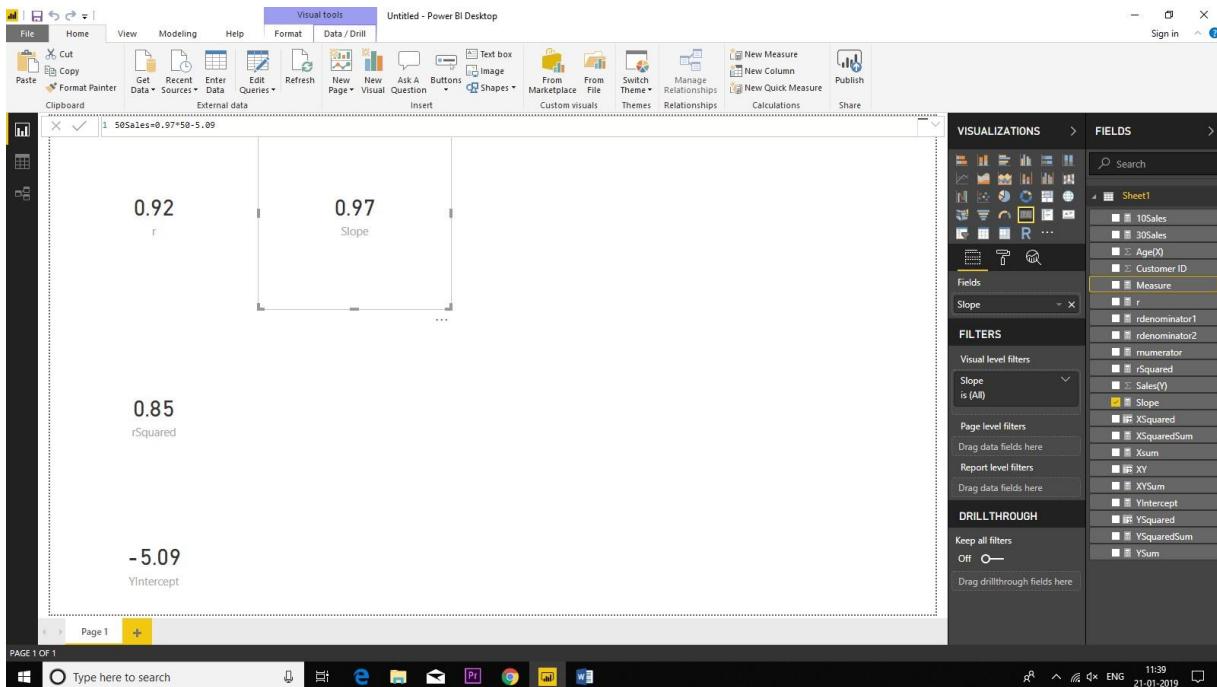


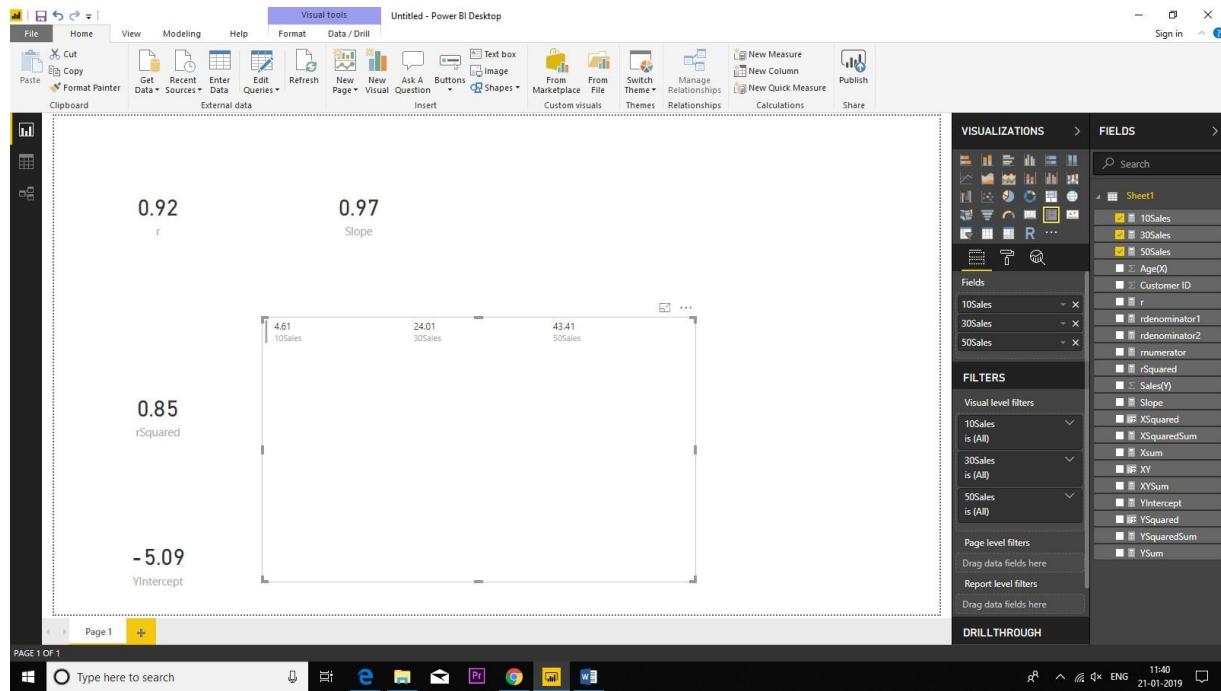
Step 10 : Calculate Y-Intercept.



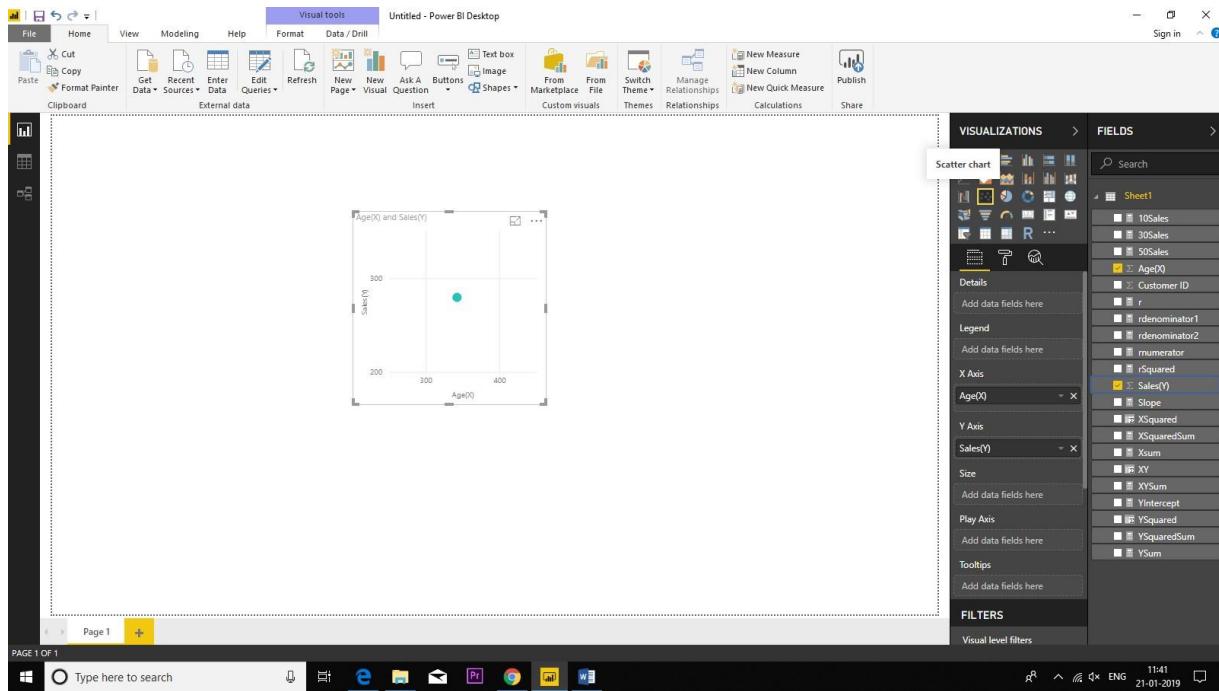
Step 11 : Use the Formula to Calculate the Linear Regression when Sales will be 10,30 and 50.



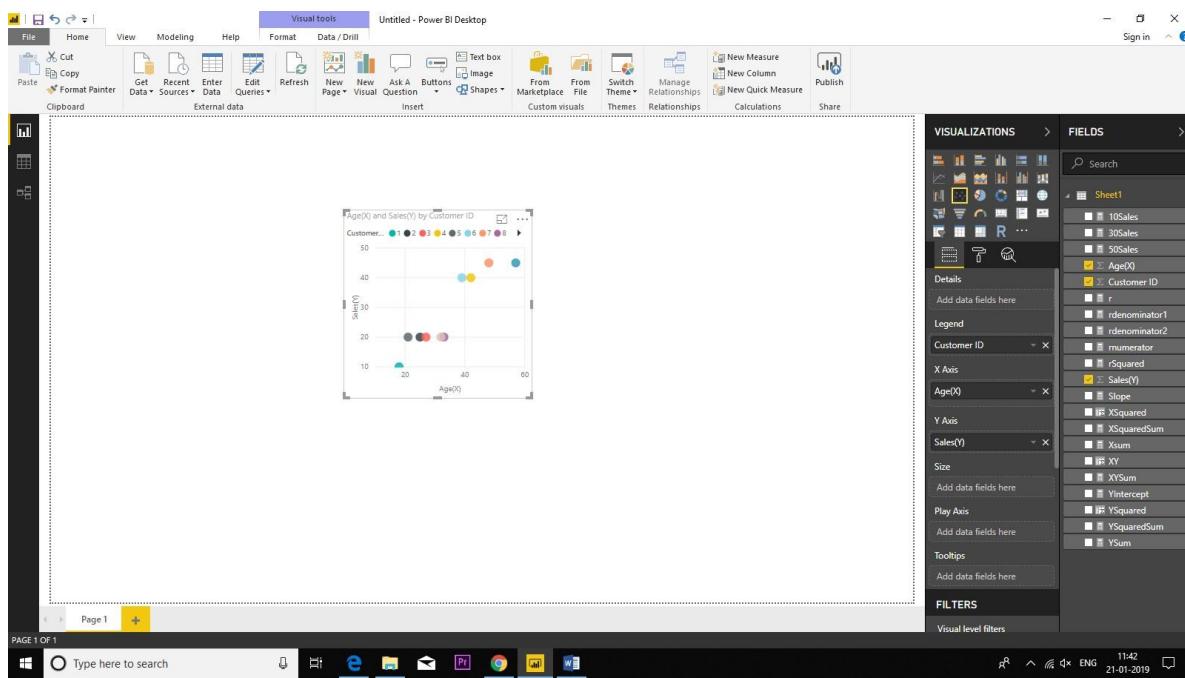




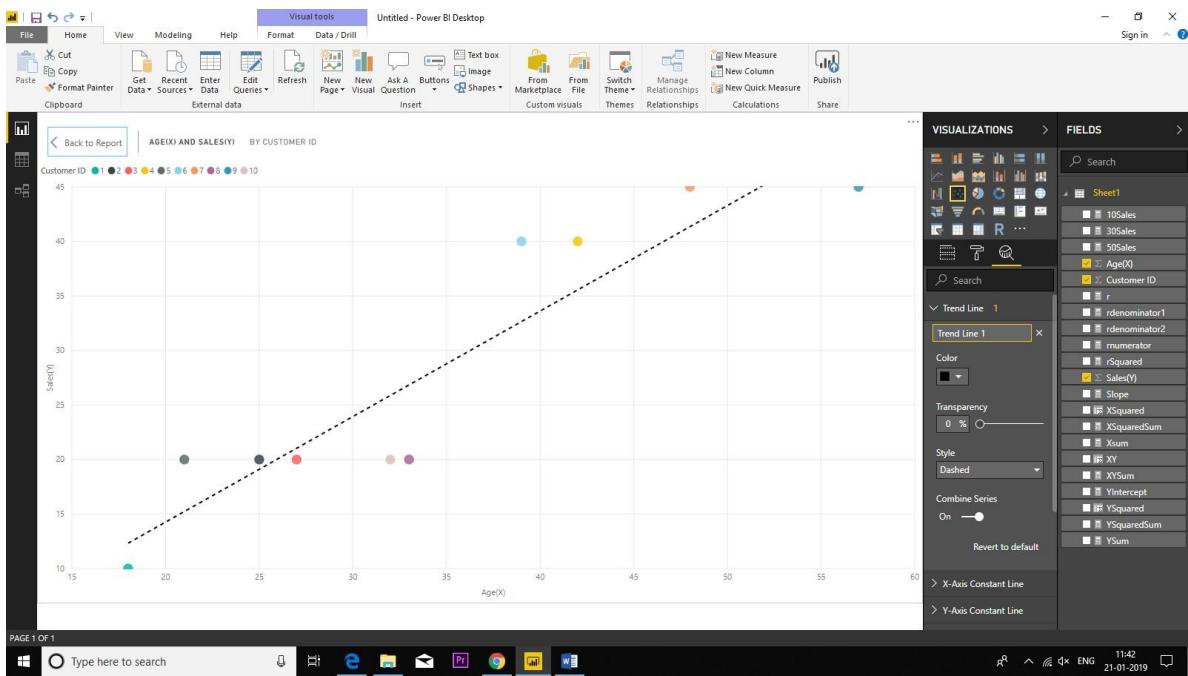
Step 12 : Select Scatter Chart from Visualizations.



Step 13 : Add Legend as Customer ID, X axis as Age and Y axis as Sales.



Step 14 : Select Trend Line to see the graph.



Practical 10: Perform the logistic regression on the given warehouse data.

Data Analysis and Visualization using Excel

Power View is a feature of Microsoft Excel 2013 that enables interactive data exploration, visualization, and presentation encouraging intuitive ad-hoc reporting.

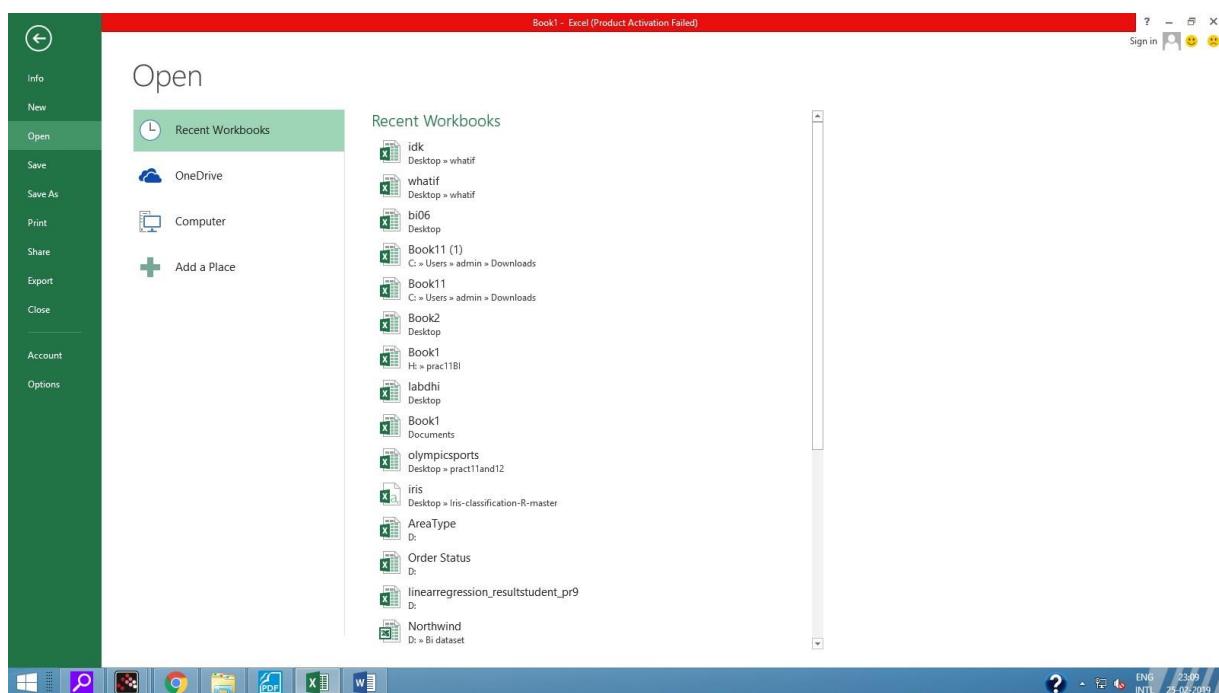
- Create Power View Sheet

Make sure your Power View Add-In Is enabled in Excel 2013

(Note: Install Ms Office 2013 Professional. If Power View Add-In Is not enabled then download and install Silverlight.)

Step 1: Open Excel 2013 (Professional version) → Open blank Workbook

Step 2: Go to File → Options

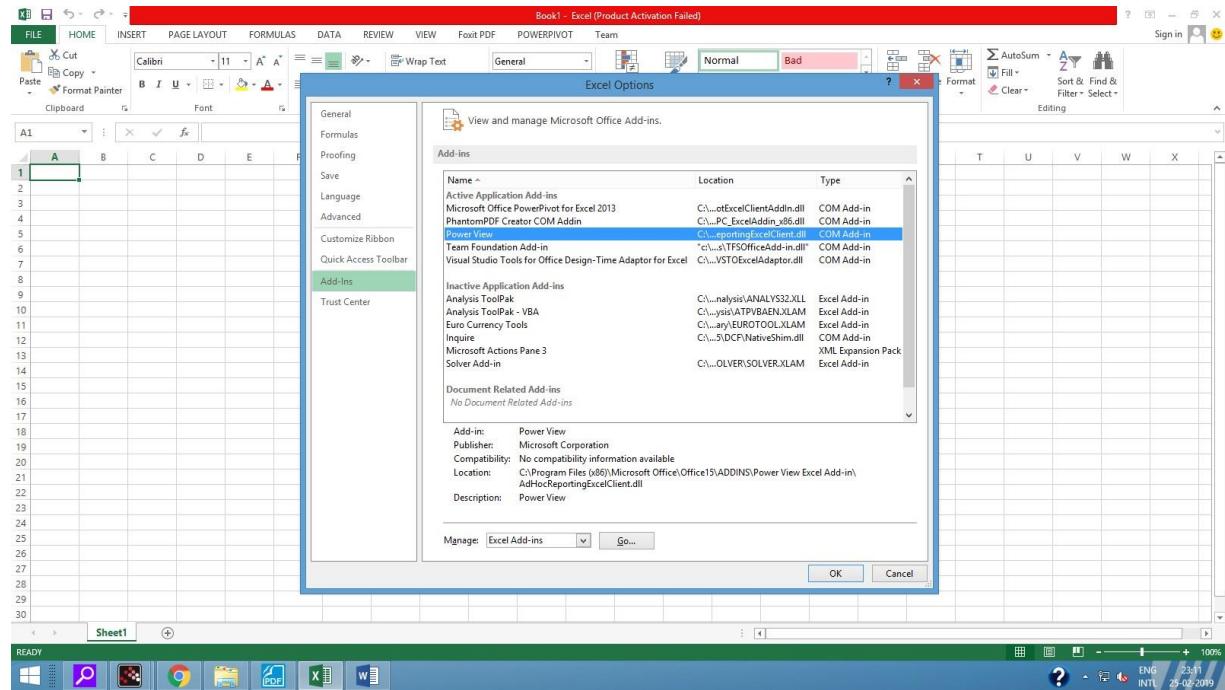


The Excel Options window appears.

Step 3 – Click on Add-Ins.

Step 4 – In the Manage box, click the drop-down arrow and select Excel Add-ins.

Step 5 – All the available Add-ins will be displayed. If Power View Add-ins is enabled, it appears in Active Application Add-ins.



Step 6: If Power View does not appear in Active Add-Ins, follow these steps:

Step 1 – In the Excel Options Window, Click on Add-Ins.

Step 2 – In the Manage box, click the drop-down arrow and select COM

Add-ins

Step 3 – Click on the Go button. A COM Add-Ins Dialog Box appears.

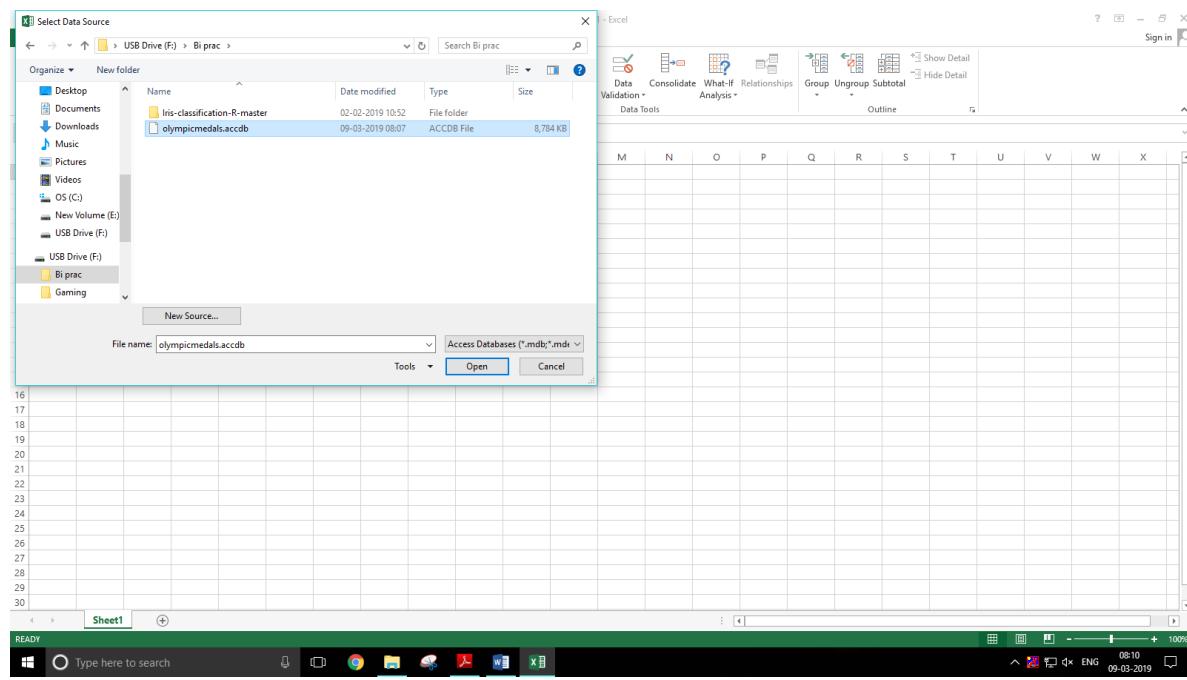
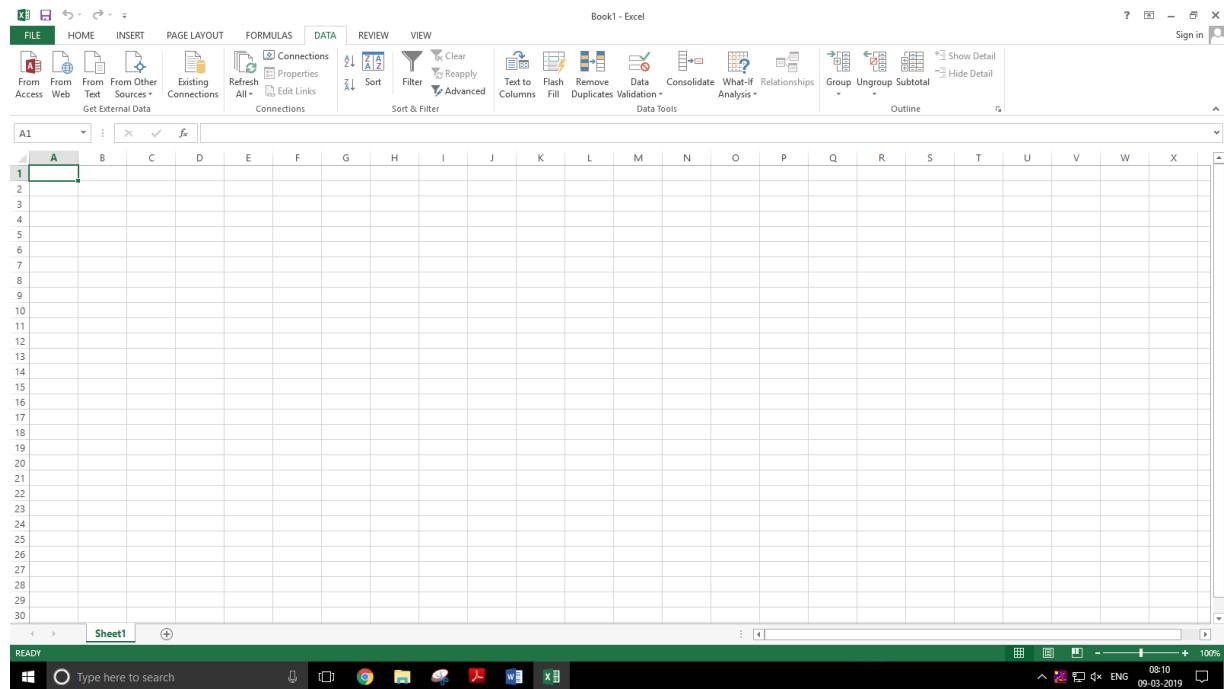
Step 4 – Check the Power View Check Box.

Step 5 – Click OK.

(Note: Above step is required only if Power View is not present in active Add-In)

Now, you are ready to create the Power View sheet

Step 6: Go to data tab → get external data → from access → olympicmedals.accdb



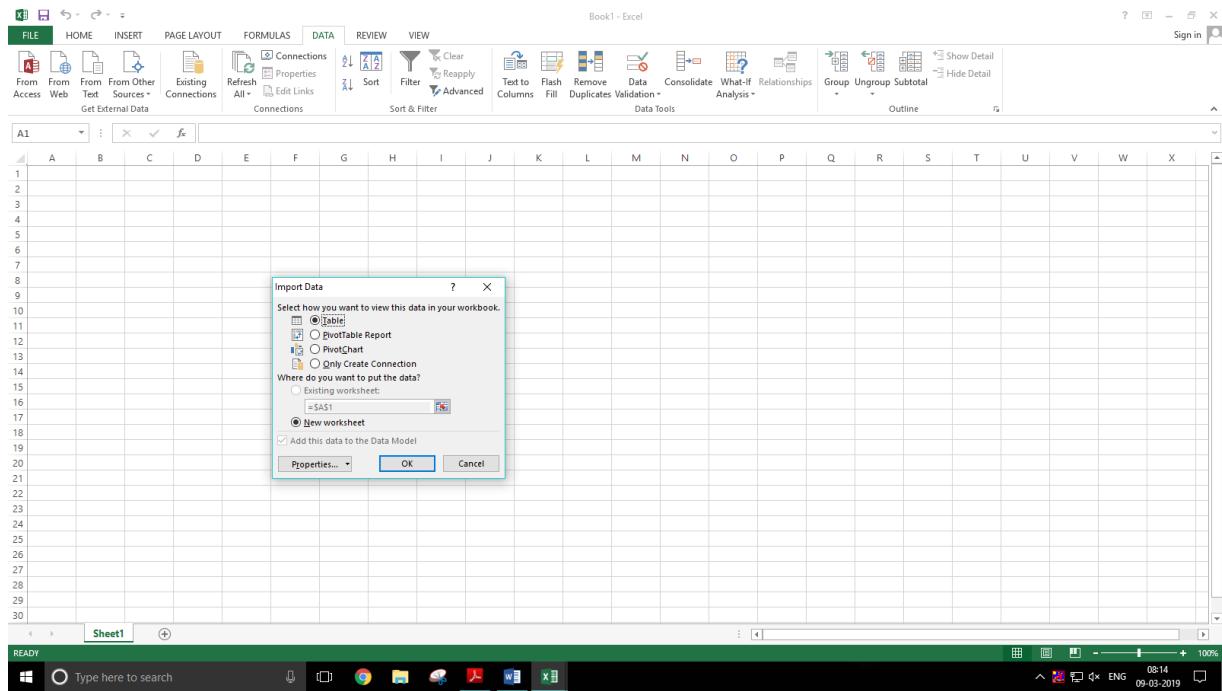


Table opens in new worksheet.

Event	Discipline	Sport	Participation
Combined 15 + 15km mass start	Cross Country S	Skiing	duo
individual	Figure skating	Skating	individual
giant slalom	Alpine Skiing	Skiing	individual
500m	Speed Skating	Skating	individual
5000m	Speed Skating	Skating	individual
10km pursuit	Biathlon	Biathlon	individual
15km	Biathlon	Biathlon	individual
Half-pipe	Snowboard	Skiing	individual
1500m	Short Track S.	Skating	individual
curling	Curling	Curling	team
Team	Nordic Combined	Skiing	team
15km	Cross Country S	Skiing	individual
ice dancing	Figure skating	Skating	duo
4x7.5km relay	Biathlon	Biathlon	team
aerials	Freestyle Ski.	Skiing	individual
four-man	Bobsleigh	Bobsleigh	team
K90 individual (70m)	Ski Jumping	Skiing	individual
downhill	Alpine Skiing	Skiing	individual
Alpine combined	Alpine Skiing	Skiing	individual
K120 team (90m)	Ski Jumping	Skiing	team
10km	Biathlon	Biathlon	individual
Snowboard Cross	Snowboard	Skiing	individual
1000m	Short Track S.	Skating	individual
4x5km relay	Cross Country S	Skiing	team
30km	Cross Country S	Skiing	individual
3000m	Speed Skating	Skating	individual
moguls	Freestyle Ski.	Skiing	individual
5000m relay	Short Track S.	Skating	team
individual	Skeleton	Bobsleigh	individual

Step 7 – Click on Insert tab.

Step 8 – Click on Power View in Reports Group.

Book1 - Excel

Event	Discipline	Sport	Participation
4 giant slalom	Alpine Skiing	Skiing	individual
5 500m	Speed Skating	Skating	individual
6 5000m	Speed Skating	Skating	individual
7 10km pursuit	Biathlon	Biathlon	individual
8 15km	Biathlon	Biathlon	individual
9 Half-pipe	Snowboard	Skiing	individual
10 1500m	Short Track S.	Skating	individual
11 curling	Curling	Curling	team
12 Team	Nordic Combined	Skiing	team
13 15km	Cross Country S	Skating	individual
14 ice dancing	Figure skating	Skating	duo
15 4x7.5km relay	Biathlon	Biathlon	team
16 aerials	Freestyle Ski.	Skiing	individual
17 four-man	Bobsleigh	Bobsleigh	team
18 K90 individual (70m)	Ski Jumping	Skiing	individual
19 downhill	Alpine Skiing	Skiing	individual
20 Alpine combined	Alpine Skiing	Skiing	individual
21 K120 team (90m)	Ski Jumping	Skiing	team
22 10km	Biathlon	Biathlon	individual
23 Snowboard Cross	Snowboard	Skiing	individual
24 1000m	Short Track S.	Skating	individual
25 4x5km relay	Cross Country S	Skating	team
26 30km	Cross Country S	Skating	individual
27 3000m	Speed Skating	Skating	individual
28 moguls	Freestyle Ski.	Skiing	individual
29 5000m relay	Short Track S.	Skating	team
30 individual	Skeleton	Bobsleigh	individual
31 super-G	Alpine Skiing	Skiing	individual
32 doubles	Luge	Luge	duo
33 Individual sprint	Nordic Combined	Skiing	individual

Book1 - Excel

Microsoft Excel Add-ins

You need to enable the Power View add-in to use this feature. This will also enable the PowerPivot add-in.

Enable Cancel

Event	Discipline	Sport	Participation
4 giant slalom	Alpine Skiing	Skiing	individual
5 500m	Speed Skating	Skating	individual
6 5000m	Speed Skating	Skating	individual
7 10km pursuit	Biathlon	Biathlon	individual
8 15km	Biathlon	Biathlon	individual
9 Half-pipe	Snowboard	Skiing	individual
10 1500m	Short Track S.	Skating	individual
11 curling	Curling	Curling	team
12 Team	Nordic Combined	Skiing	team
13 15km	Cross Country S	Skating	individual
14 ice dancing	Figure skating	Skating	duo
15 4x7.5km relay	Biathlon	Biathlon	team
16 aerials	Freestyle Ski.	Skiing	individual
17 four-man	Bobsleigh	Bobsleigh	team
18 K90 individual (70m)	Ski Jumping	Skiing	individual
19 downhill	Alpine Skiing	Skiing	individual
20 Alpine combined	Alpine Skiing	Skiing	individual
21 K120 team (90m)	Ski Jumping	Skiing	team
22 10km	Biathlon	Biathlon	individual
23 Snowboard Cross	Snowboard	Skiing	individual
24 1000m	Short Track S.	Skating	individual
25 4x5km relay	Cross Country S	Skating	team
26 30km	Cross Country S	Skating	individual
27 3000m	Speed Skating	Skating	individual
28 moguls	Freestyle Ski.	Skiing	individual
29 5000m relay	Short Track S.	Skating	team
30 individual	Skeleton	Bobsleigh	individual
31 super-G	Alpine Skiing	Skiing	individual
32 doubles	Luge	Luge	duo
33 Individual sprint	Nordic Combined	Skiing	individual

Power View Sheet is opened.

The screenshot shows a Microsoft Excel window with the 'Book1 - Excel' title bar. The ribbon is open, and the 'DESIGN' tab is selected. In the main workspace, there is a table with columns: Event, Discipline, Sport, and Participation. The table contains several rows of data, such as '10000m Speed Skating Skating individual'. To the right of the table is a 'Power View Fields' pane. At the top of this pane, under 'ACTIVE', 'Discipline', 'Event', 'Participation', and 'Sport' are checked. Below this, there is a section titled 'Drag fields between areas below: TILE BY' with a 'FIELDS' dropdown menu containing the same four fields: Event, Discipline, Sport, and Participation.

The Power View sheet is created for you and added to your Workbook with the Power View. On the Right-side of the Power View, you find the Power View Fields. Under the Power View Fields, you will find Areas.

In the Ribbon, if you click on Design tab, you will find various Visualization options.

This screenshot is identical to the one above it, showing the Microsoft Excel interface with the 'DESIGN' tab selected. The table data and the Power View Fields pane are also identical, displaying the same table 'Table_W_Teams' and the same set of fields: Discipline, Event, Participation, and Sport.

- Create Charts and other Visualizations

For every visualization you want to create, you start on a Power View sheet by creating a table, which you then easily convert to other visualizations, to find one that best illustrates your Data.

Step 1 – Under the Power View Fields, select the fields you want to visualize.

Step 2 – By default, the Table View will be displayed. As you move across the Table, on the top-right corner, you find two symbols – Filters and Pop out.

Step 3 – Click on the Filters symbol. The filters will be displayed on the right side. Filters has two tabs. View tab to filter all visualizations in this View and Table tab to filter the specific values in this table only.

The screenshot shows a Microsoft Excel window with the 'POWER VIEW' tab selected in the ribbon. The main content area displays a table titled 'Click here to add a title' with the following data:

Event	Discipline	Sport	Participation
1000m	Speed Skating	Skating	individual
1000m	Short Track S.	Skating	individual
1000m	Speed Skating	Skating	individual
10km	Biathlon	Biathlon	individual
10km	Cross Country S	Skating	individual
10km pursuit	Biathlon	Biathlon	individual
12.5km mass start	Biathlon	Biathlon	
12.5km pursuit	Biathlon	Biathlon	individual
1500m	Short Track S.	Skating	individual
1500m	Speed Skating	Skating	individual
15km	Biathlon	Biathlon	individual
15km	Cross Country S	Skating	individual
15km mass start	Biathlon	Biathlon	individual
20km	Biathlon	Biathlon	individual
3000m	Speed Skating	Skating	individual
3000m	Short Track S.	Skating	team

The 'Power View Fields' pane on the right shows the following settings:

- ACTIVE**: Table_W_Teams
- FIELDS**: Event, Discipline, Sport, Participation

A 'Filters' pane is also visible, showing the selected filters: Discipline, Event, Participation, and Sport.

- □ Visualization – Matrix

A Matrix is made up of rows and columns like a Table. However, a Matrix has the following capabilities that a Table does not have –

1. Display data without repeating values.
2. Display totals and subtotals by row and column.
3. With a hierarchy, you can drill up/drill down.

Collapse and Expand the Display

The Matrix Visualization appears.

Event	Discipline	Sport	Participation
10000m	Speed Skating	Skating	individual
1000m	Short Track S.	Skating	individual
1000m	Speed Skating	Skating	individual
10km	Biathlon	Biathlon	individual
10km	Cross Country S	Skating	individual
10km pursuit	Biathlon	Biathlon	individual
12.5km mass start	Biathlon	Biathlon	
12.5km pursuit	Biathlon	Biathlon	individual
1500m	Short Track S.	Skating	individual
1500m	Speed Skating	Skating	individual
15km	Biathlon	Biathlon	individual
15km	Cross Country S	Skating	individual
15km mass start	Biathlon	Biathlon	individual
20km	Biathlon	Biathlon	individual
3000m	Speed Skating	Skating	individual
12000m relay	Short Track S.	Skating	team

The Matrix Visualization appears.

You can select required fields for matrix and add required row to ΣValues area to get matrix as output

The Matrix Visualization appears.

Discipline	Sport	# Count of Event
Luge	Luge	2
	Total	2
Nordic Combined	Skiing	3
	Total	3
Short Track S.	Skating	5
	Total	5
Snowboard	Skiing	3
	Total	3
Speed Skating	Skating	7
	Total	7
	Total	20

- Visualization – Card

You can convert a Table to a series of Cards that display the data from each row in the table laid out in a Card format, like an index Card.

Step 1 – Click on the DESIGN tab.

Step 2 – Click on Table in the Switch Visualization Group.

Step 3 – Click on Card.

The screenshot shows a Microsoft Excel window titled "Book1 - Excel". The ribbon tabs are visible at the top, including FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, POWER VIEW, DESIGN, and POWERPIVOT. The "POWER VIEW" tab is selected. In the center of the screen is a "Card" visualization titled "Click here to add a title". The visualization displays a table with three columns: Discipline, Sport, and Count of Event. The data is as follows:

Discipline	Sport	Count of Event
Luge	Luge	2
	Total	2
Nordic Combined	Skiing	3
	Total	3
Short Track S.	Skating	5
	Total	5
Snowboard	Skiing	3
	Total	3
Speed Skating	Skating	7
	Total	7
		Total
		20

To the right of the visualization are the "Filters" and "Power View Fields" panes. The "Filters" pane shows the current view is "MATRIX" with "Count of Event" selected. The "Power View Fields" pane shows fields from "Table_W_Teams" such as Discipline, Event, Participation, and Sport. The "ROWS" section is set to Discipline and Sport, and the "VALUES" section is set to "# Count of Event".

The Card Visualization appears.

The screenshot shows a Microsoft Excel window titled "Prac13.xlsx - Excel". The ribbon tabs are visible at the top, including FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, POWER VIEW, DESIGN, and POWERPIVOT. The "POWER VIEW" tab is selected. In the center of the screen is a "Card" visualization titled "Click here to add a title". The visualization displays a table with three columns: Discipline, Sport, and Count of Event. The data is as follows:

Discipline	Sport	Count of Event
Luge	Luge	2
Nordic Combined	Skiing	3
Short Track S.	Skating	5
Snowboard	Skiing	3
Speed Skating	Skating	7

To the right of the visualization are the "Filters" and "Power View Fields" panes. The "Filters" pane shows the current view is "TABLE" with "Count of Event" selected. The "Power View Fields" pane shows fields from "Table_W_Teams" such as Discipline, Event, Participation, and Sport. The "FIELDS" section is set to Discipline, Sport, and "# Count of Event".

- **Visualization – Charts**

Step 1 – Create a Table Visualization from Medals data.

You can use Line, Bar and Column Charts for comparing data points in one or more data series. In these Charts, the x-axis displays one field and the y-axis displays another, making it easy to see the relationship between the two values for all the items in the Chart.

Line Charts distribute category data evenly along a horizontal (category) axis, and all numerical value data along a vertical (value) axis.

Step 2 – Create a Table Visualization for two Columns, NOC_Country Region and Count of Medal.

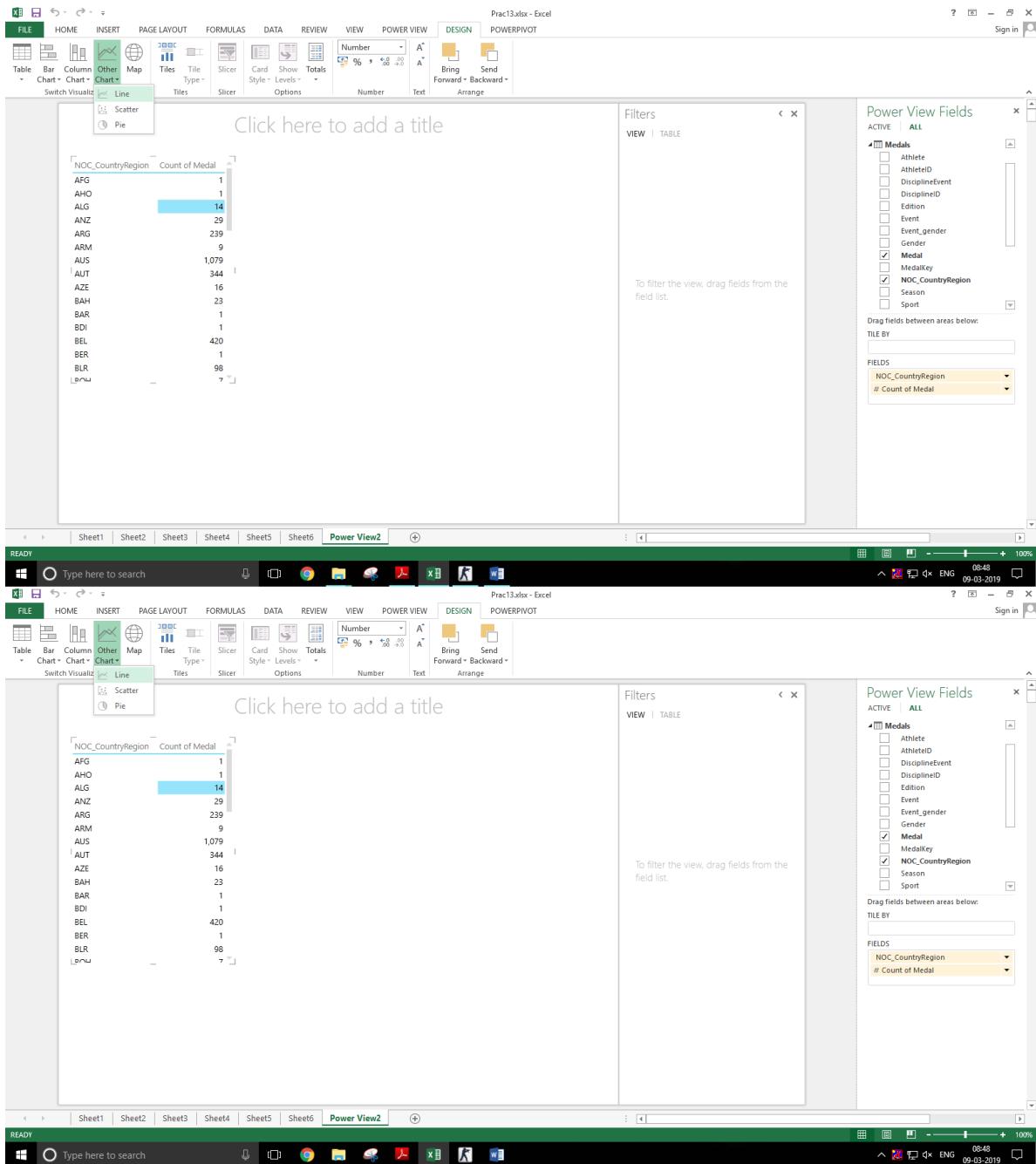
Step 3 – Create the same Table Visualization below.

The screenshot shows a Microsoft Excel window titled "Prac13.xlsx - Excel". The ribbon tabs are FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, POWER VIEW, and DESIGN. The DESIGN tab is selected. The main area contains a table visualization with the title "Click here to add a title". The table has two columns: "NOC_CountryRegion" and "Count of Medal". The data includes:

NOC_CountryRegion	Count of Medal
AFG	1
AHO	1
ALG	14
ANZ	29
ARG	239
ARM	9
AUS	1,079
AUT	344
AZE	16
BAH	23
BAR	1
BDI	1
BEL	420
BER	1
BLR	98
BRB	7

To the right of the table is a "Filters" pane with "VIEW" and "TABLE" tabs. Below the table is a note: "To filter the view, drag fields from the field list." On the far right is a "Power View Fields" pane. Under the "ACTIVE" tab, under the "Medals" section, "NOC_CountryRegion" and "# Count of Medal" are checked. Under "FIELDS", "NOC_CountryRegion" and "# Count of Medal" are also listed. The bottom of the screen shows the Windows taskbar with various icons and the date/time: "09-03-2019 08:47 ENG".

Step 4 – Click on Other Chart in the Switch Visualization group.

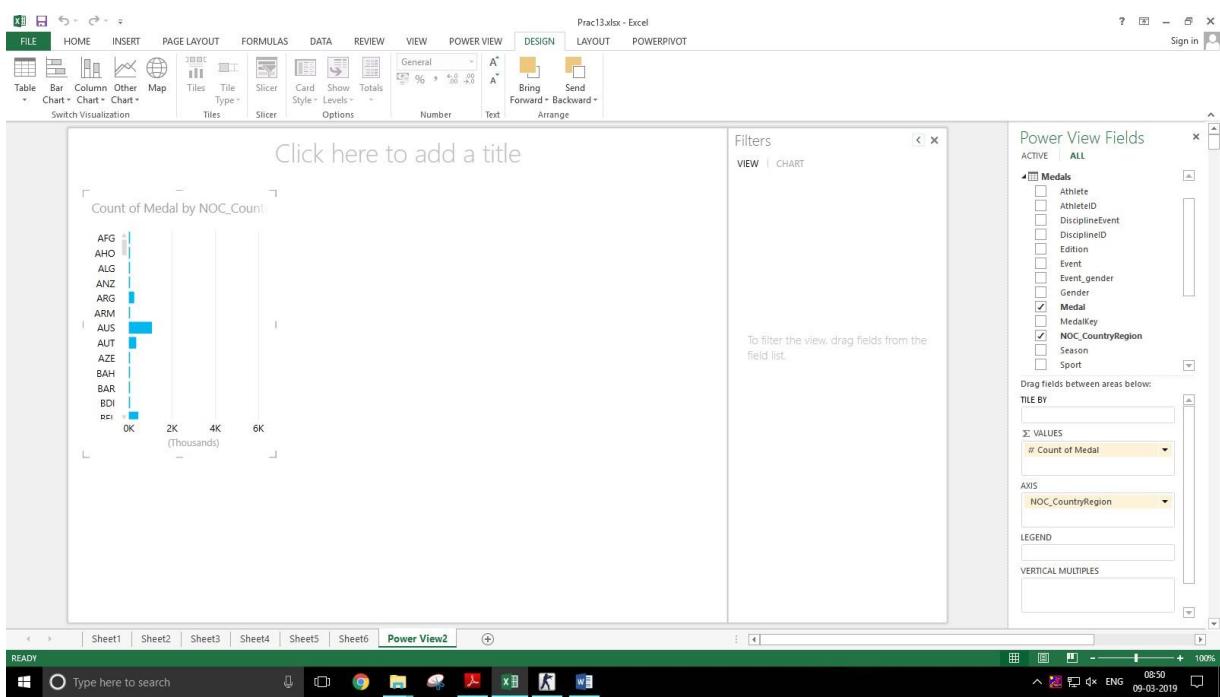
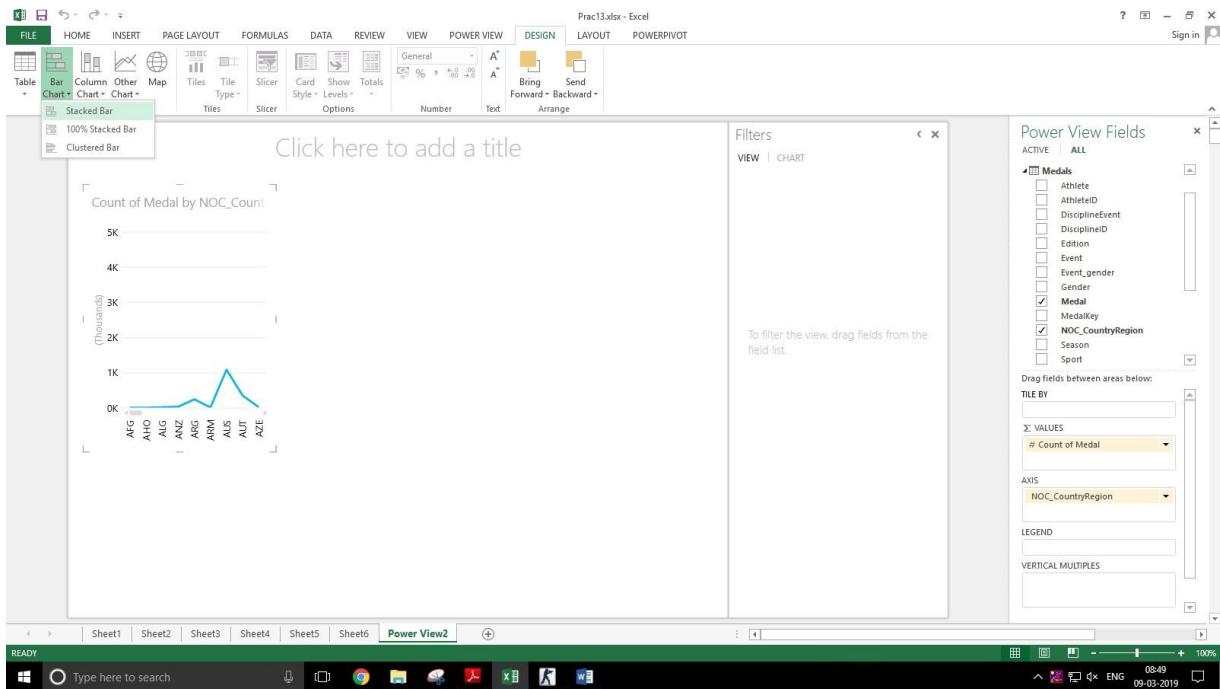


In a Bar Chart, categories are organized along the vertical axis and values along the horizontal axis. In Power View, there are three subtypes of the Bar Chart: Stacked, 100% stacked, and Clustered.

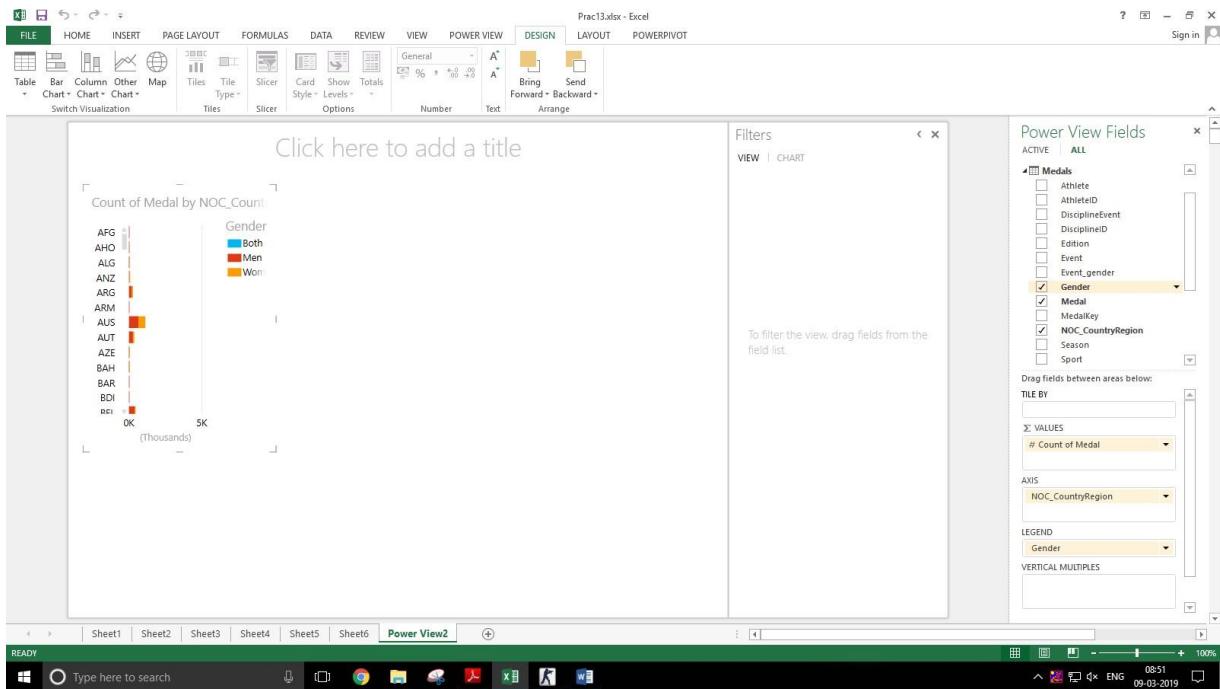
Step 7 – Click on the Line Chart Visualization.

Step 8 – Click on Bar Chart in the Switch Visualization Group.

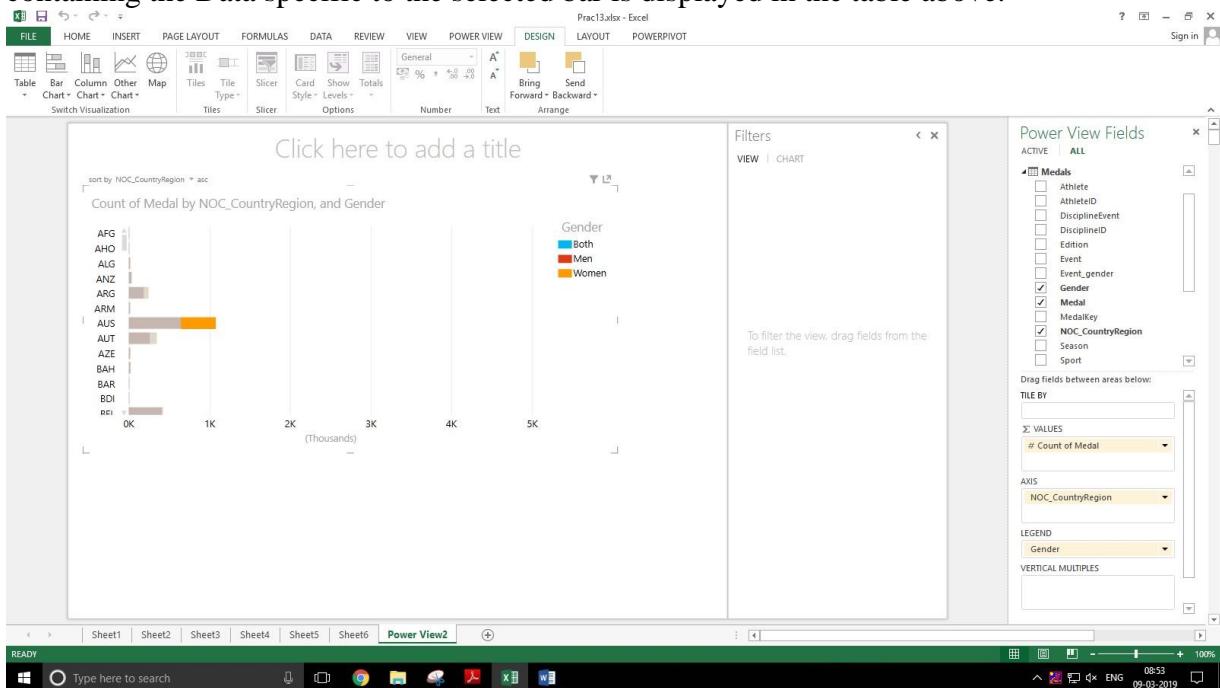
Step 9 – Click on the Stacked Bar option.



Step 10 – In the Power View Fields, in the Medals Table, select the Field Gender also.



Step 11 – Click on one of the bars. That portion of the bar is highlighted. Only the row containing the Data specific to the selected bar is displayed in the table above.



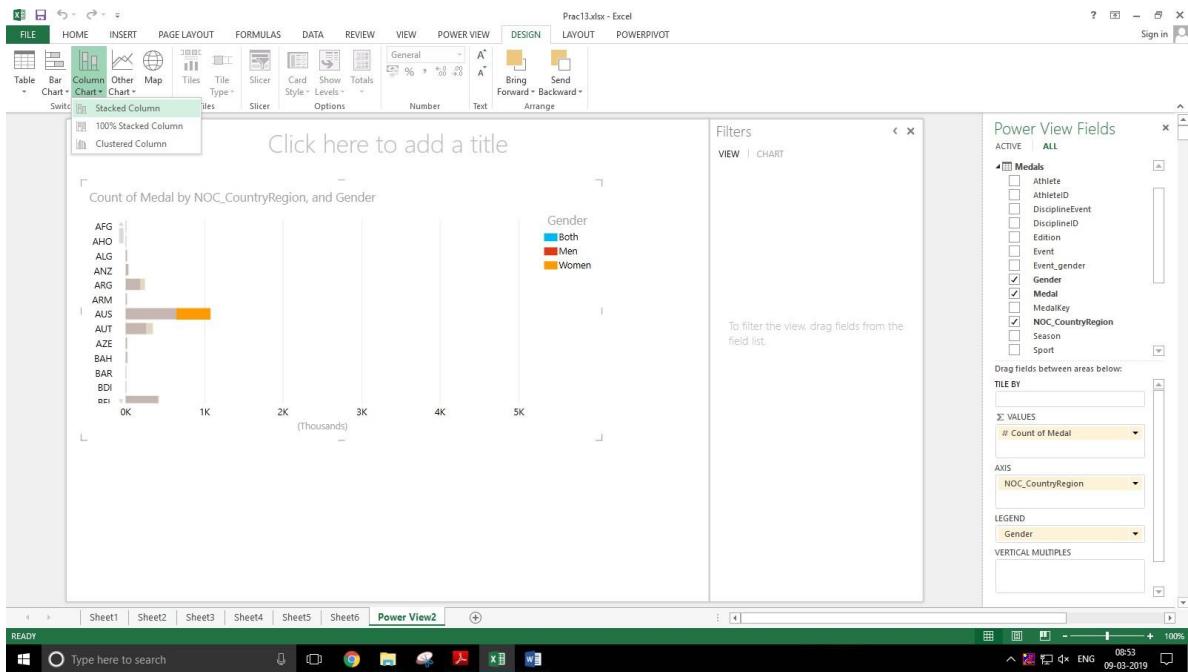
You can use the column charts for showing data changes over a period of time or for illustrating comparison among different items. In a Column Chart, the categories are along the horizontal axis and values are along the vertical axis.

In Power View, there are three Column Chart subtypes: Stacked, 100% stacked, and Clustered.

Step 12 – Click on the Stacked Bar Chart Visualization.

Step 13 – Click on Column Chart in the Switch Visualization group.

Step 14 – Click on Stacked Column.



- You can have simple Pie Chart Visualizations in Power View.

Step 1 – Click on the Table Visualization as shown below.

Step 2 – Click on Other Chart in the Switch Visualization group.

Step 3 – Click on Pie as shown in the image given below.

