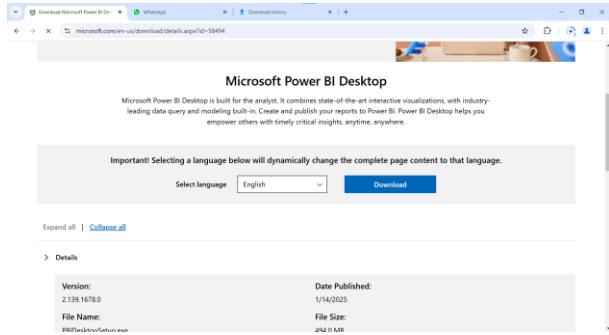


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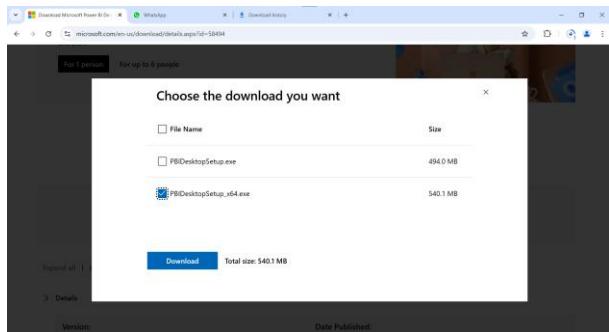
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Practical 1 A – Installation of PowerBi

1) Go to - <https://www.microsoft.com/en-us/download/details.aspx?id=58494>



2) Download 64-bit file



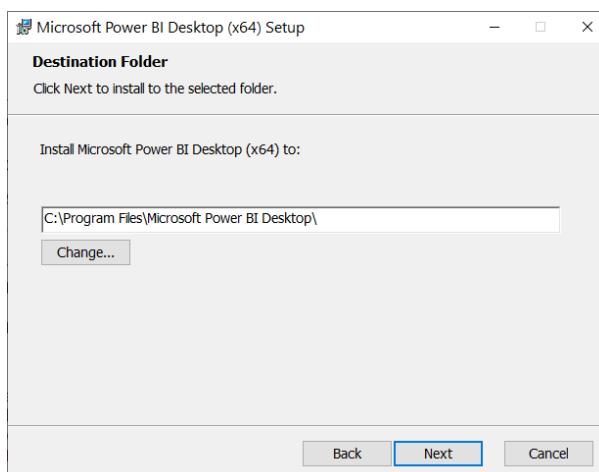
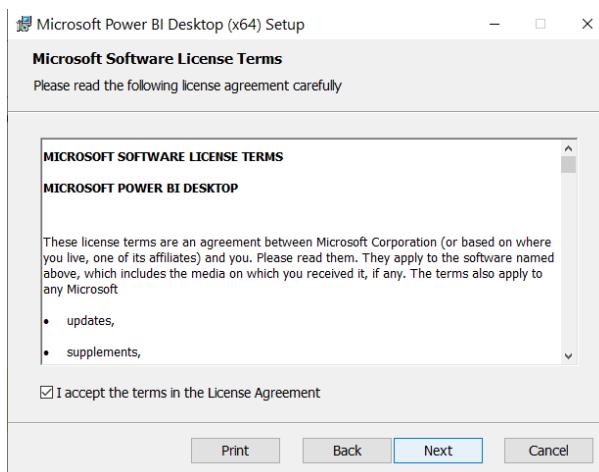
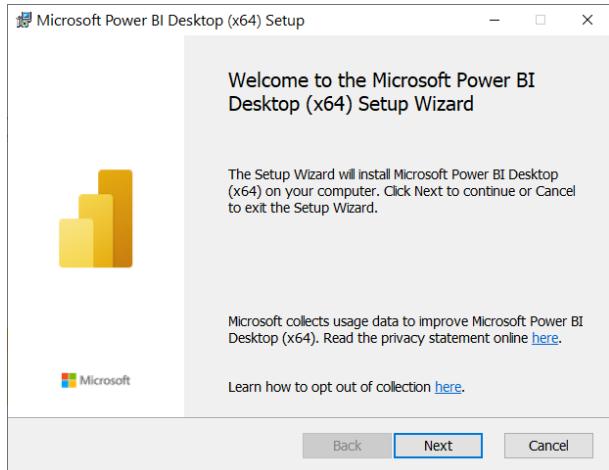
3) Run the installer



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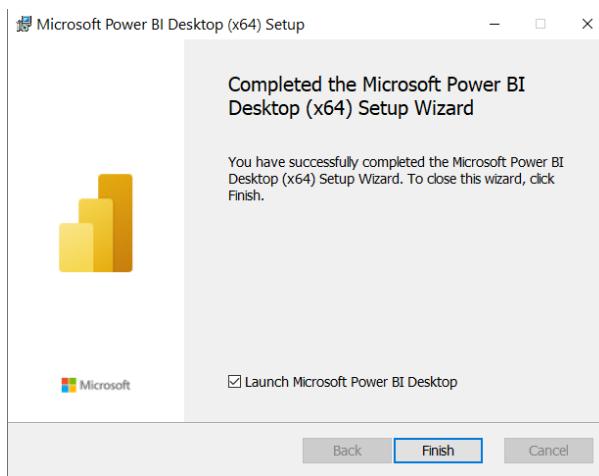
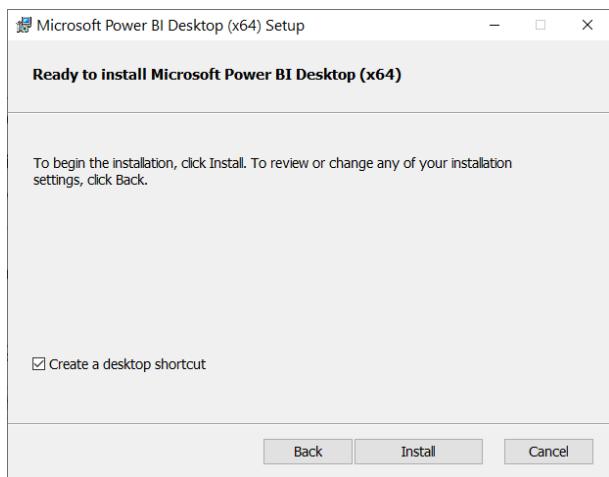
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4) Click next > next > accept > next > install > finish



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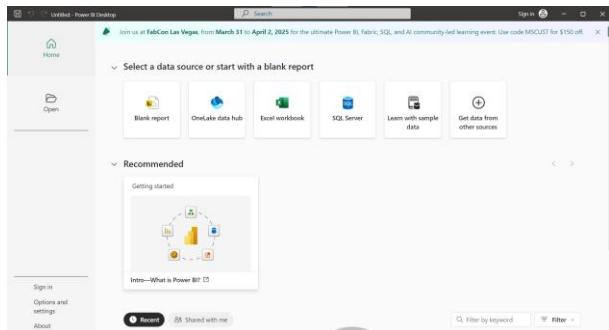


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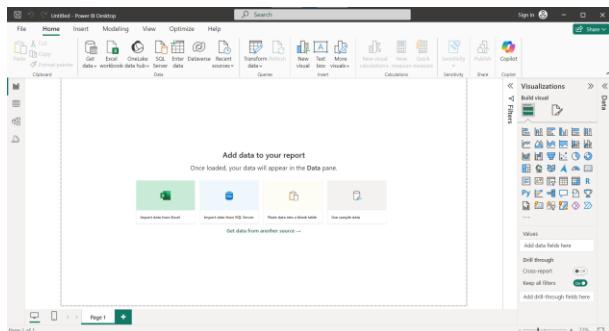
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Practical 1B – Import Legacy Data from Different Sources

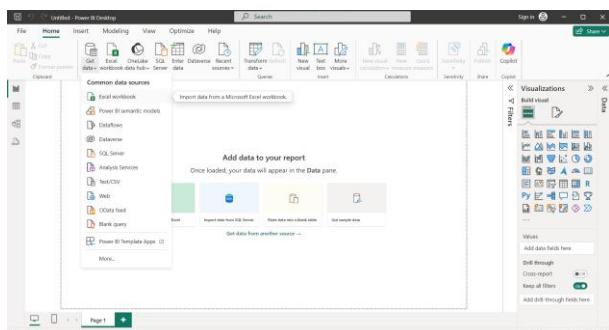
1) Open Power BI



2) Create Blank Report



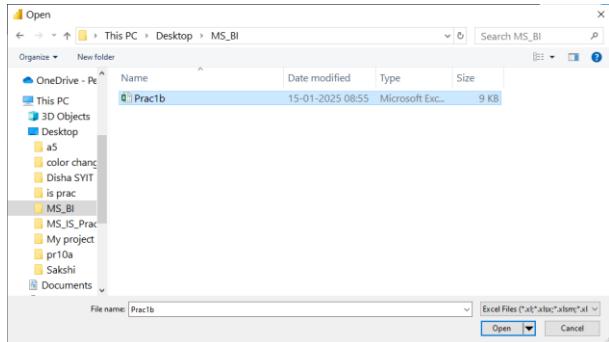
3) Select Excel workbook under get data option. Click on connect



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4) Browse your file and select it



5) Click on Sheet and Load

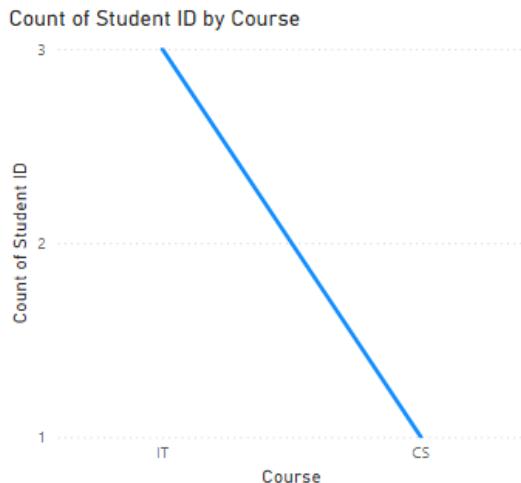
Student ID	Address	Contact Number	Course
1	Pune	9999999999	IT
2	Mumbai	8888888888	CS
3	Pune	7777777777	IT
4	Mumbai	9998887779	IT

6) The data will be shown

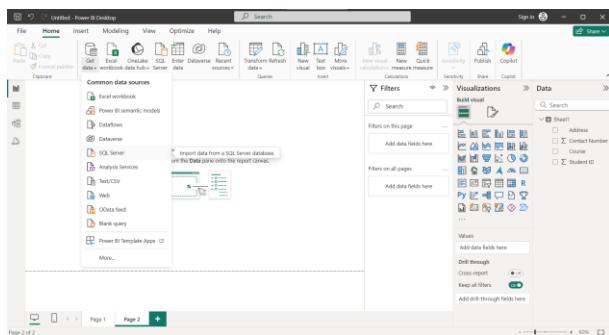
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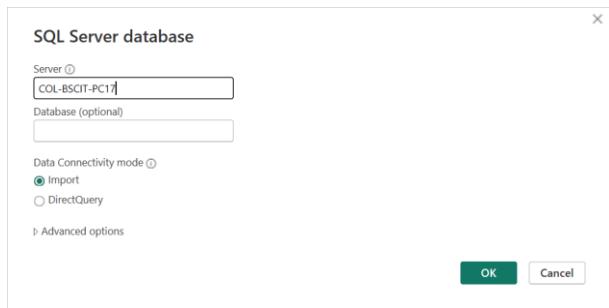
7) Create charts



8) Click on get data and select sql server



9) Add sever name > select database > select table



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The screenshot shows the Microsoft Power BI Navigator window. On the left, there's a tree view of the data source, 'COL-BSCT-PC17 [10]', which includes tables like 'dipen', 'dipen3', 'hiten.prac', 'Mt.BH [1]', 'ReportServer', 'ReportServerTempDB', 'ry', 'shiva', 'vanna', and 'VANNAAAA'. A specific table, 'Std', is selected and highlighted with a blue border. The main pane displays the contents of the 'Std' table:

Std_ID	Std_Name	Address
1	A	Mumbai
2	B	Mumbai
3	C	Pune

At the bottom of the window, there are three buttons: 'Load', 'Transform Data', and 'Cancel'.

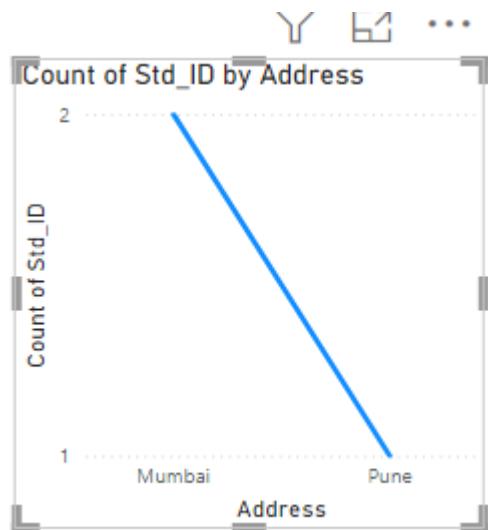
10) Data will be loaded

The screenshot shows the Microsoft Power BI Desktop interface. The top navigation bar includes 'File', 'Home', 'Help', and 'Table Tools'. The 'Table Tools' tab is selected, showing options like 'Manage relationships', 'New table', 'Measure column', and 'Calculated columns'. The main area is titled 'Data' and shows the 'Std' table with the same data as the previous screenshot:

Std_ID	Std_Name	Address
1	A	Mumbai
2	B	Mumbai
3	C	Pune

At the bottom left, it says 'Table Std (3 rows)'.

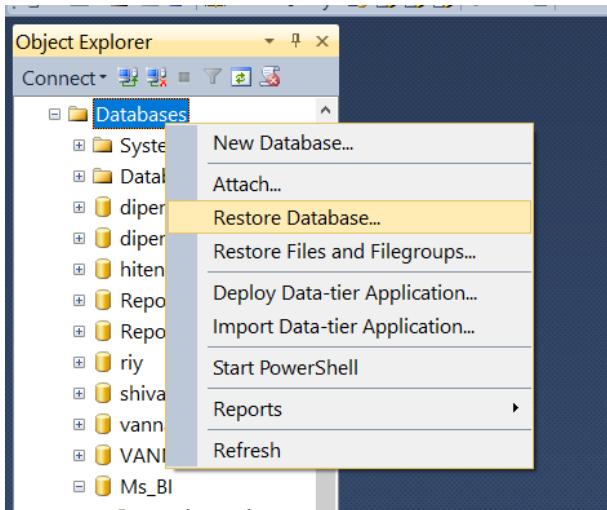
11) Create a chart



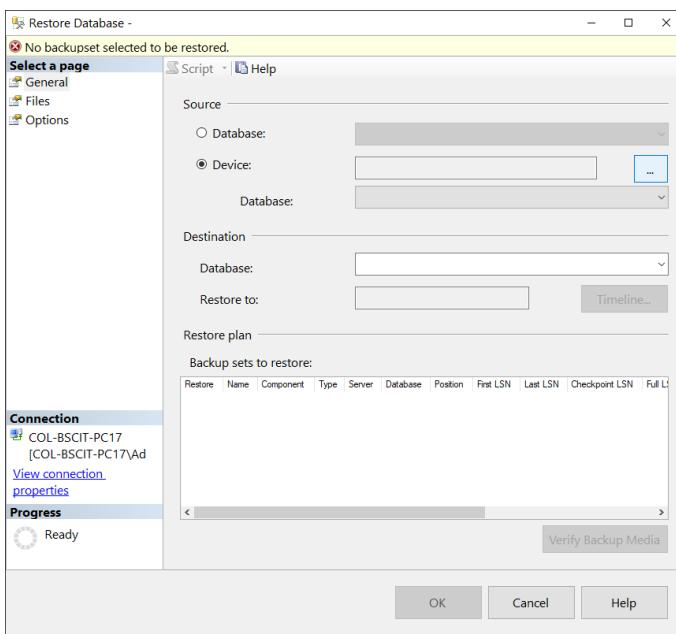
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12) In SSMS, restore database

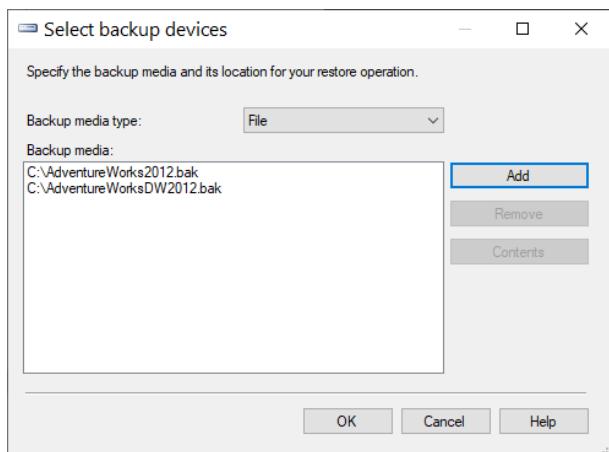
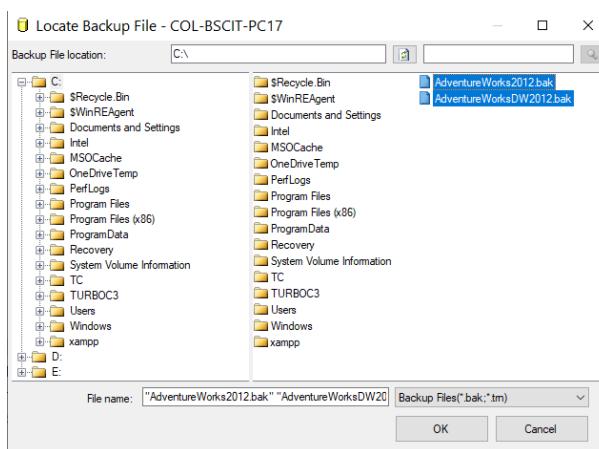
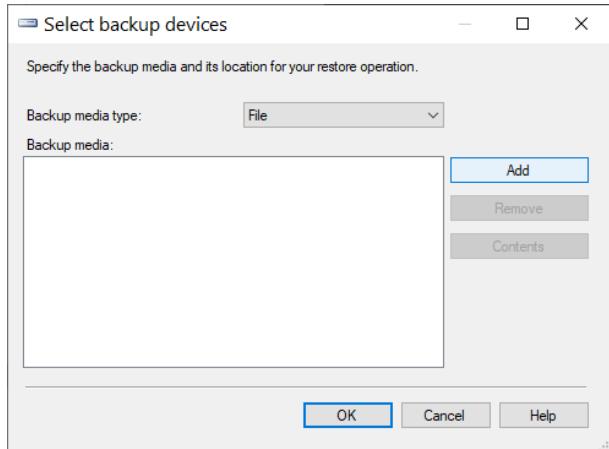


13) Select Device > ... > Add > Select Files > Ok > Ok



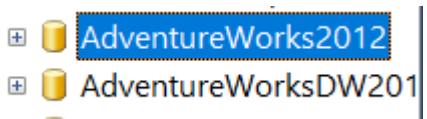
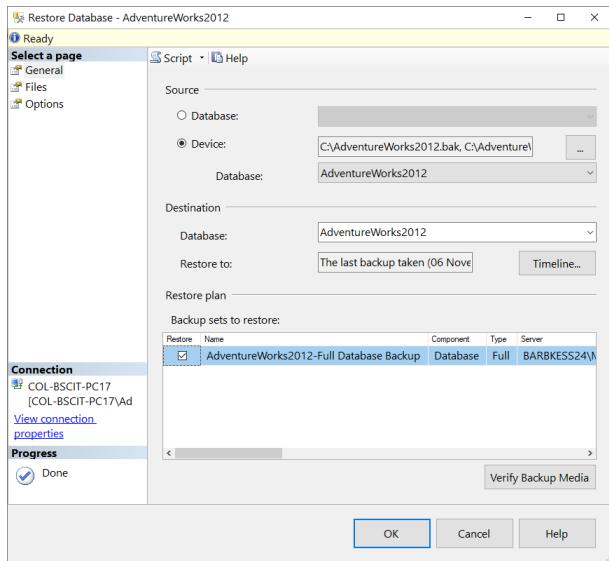
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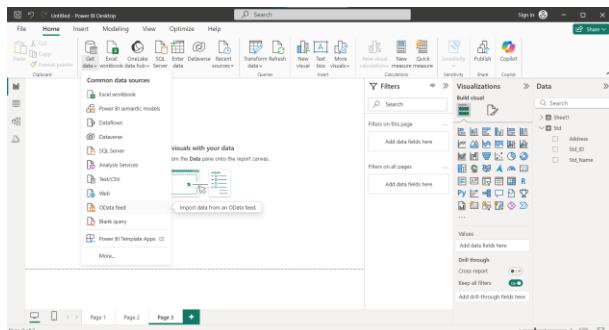


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14) Get – O Data Feed



15) Paste URL



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16) Select customer and product table

Navigator

Display Options		Filter
<input type="checkbox"/>	Alphabetical_list_of_products	▲
<input type="checkbox"/>	Categories	▲
<input type="checkbox"/>	Category_Sales_for_1997	▲
<input type="checkbox"/>	Current_Product_Lists	▲
<input type="checkbox"/>	Customer_and_Suppliers_by_Cities	▲
<input type="checkbox"/>	CustomerDemographics	▲
<input checked="" type="checkbox"/>	Customers	▲
<input type="checkbox"/>	Employees	▲
<input type="checkbox"/>	Invoices	▲
<input type="checkbox"/>	Order_Details	▲
<input type="checkbox"/>	Order_Details_Extendeds	▲
<input type="checkbox"/>	Order_Subtotals	▲
<input type="checkbox"/>	Orders	▲
<input type="checkbox"/>	Orders_Qries	▲
<input type="checkbox"/>	Product_Sales_for_1997	▲
<input checked="" type="checkbox"/>	Products	▼
<input type="checkbox"/>	Products_Above_Average_Prices	▼
<input type="checkbox"/>	Products_By_Categories	▼
<input type="checkbox"/>	Regions	▼
<input type="checkbox"/>	Sales_By_Categories	▼

Products				
ProductID	ProductName	SupplierID	CategoryID	Quan
1	Chai	1	1	1 10
2	Chantilly Syrup	1	1	1 10
3	Aniseed Syrup	1	2	2 12
4	Chef Anton's Cajun Seasoning	2	2	2 40
5	Chef Anton's Gumbo Mix	2	2	2 30
6	Grandma's Boysenberry Spread	3	2	2 12
7	Uncle Bob's Organic Dried Pears	3	3	7 12
8	Northwoods Cranberry Sauce	3	3	2 12
9	Mishi Kofu Niku	4	0	0 10
10	Aura	4	0	0 12
11	Queso Cabrales	5	0	0 1
12	Queso Manchego La Pastorita	5	0	0 1
13	Konbu	6	0	0 2
14	Tofu	6	0	0 40
15	Gember Shoushu	6	0	0 24
16	Pavlova	7	0	0 32
17	Alice Mutton	7	0	0 20
18	Carmarvon Tigers	7	0	0 16
19	Teatime Chocolate Biscuits	8	0	0 16
20	Sir Rodney's Marmalade	8	0	0 30
21	Sir Rodney's Scones	8	0	0 24
22	Gustaf's Knäckebrot	9	0	0 24
23	Tumbribird	9	0	0 12

Select Related Tables
Load
Transform Data
Cancel

17) Tables are shown

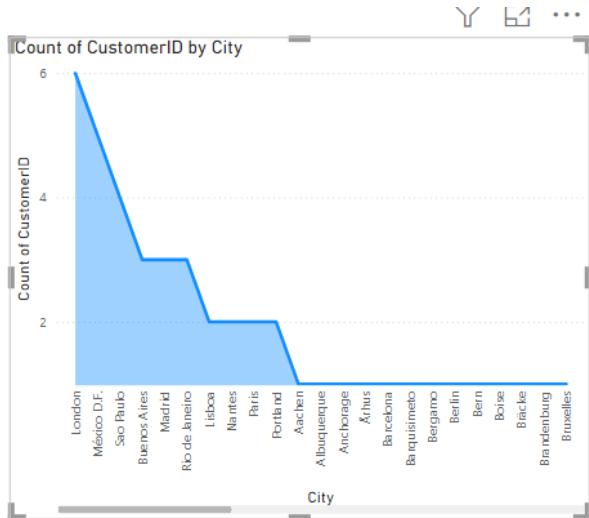
Customer Data									
CustomerID	CustomerName	ContactName	ContactTitle	Address	City	Region	PostalCode	Country	Data
ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Oberstraße 42	Adler-Bechtel	2023	99002	Germany	
ANATR	Antonio Trujillo Empedrado y Laredo	Antonio Trujillo	Owner	Avenida de la Constitución, 222	Andrea-Carlsson	2023	99004	Spain	
AROUT	Around the Horn	Anthony Williams	Sales Representative	120 Hanover Street	Bergström B	2023	99001	UK	
BERGS	Berglunds snabbköp	Christina Berglund	Order Administrator	Ångatan 53	Bergström B	2023	99001	Sweden	
BODEN	Bodens Limfridhof	Hanso Blom	Marketing Manager	12, rue de la Boucherie	C' Antipal	47	6700	France	
BOLEA	Boletín Comercial presidente	Maria Söderberg	Owner	Obstmarkt 12	C' Antipal	47	6700	France	
CAKES	Całek Węgiel Mączka	Laura Claudio	Marketing Manager	Facultad de Ciencias	Carrasco Alvaro	99001	Spain	Spain	
ESBYT	Esbjörn's Brygga	Vilma Väistö	Sales Representative	Kungsstr. 10	Carrasco Alvaro	99001	Spain	Spain	
FRESC	Francesinha e Cia.	Francisco Chang	Marketing Manager	Straße der Freundschaft 39	Carrasco Alvaro	99001	Spain	Spain	
GRENZ	Grenzenlos e.K.	Jens Wang	Sales Representative	Heumarkt 29	Carrasco Alvaro	99001	Spain	Spain	
GRHIC	Großes Hartmann	Elisabeth Hartmann	Owner	Obstmarkt 12	Carrasco Alvaro	99001	Spain	Spain	
GRHIC	Großes Hartmann	Elisabeth Hartmann	Sales Representative	Berkeley Gardens 12, Bremen	Carrasco Alvaro	99001	Spain	Spain	
GRHIC	Großes Hartmann	Elisabeth Hartmann	Order Administrator	Waldemarstr. 21	Carrasco Alvaro	99001	Spain	Spain	
HAKON	Hakon Sjømat	Asbjørn Krogstad	Sales Representative	Engorgo 12	Carrasco Alvaro	99001	Spain	Spain	
HAKON	Hakon Sjømat	Asbjørn Krogstad	Sales Agent	35 King George	Carrasco Alvaro	99001	Spain	Spain	
HESFO	Haus Foerster	Roland Mandler	Marketing Manager	Kirchstraße 8	Carrasco Alvaro	99001	Spain	Spain	
HILAA	Hilaa Uusimaa Oy	Ilkka Halila	Design Rep.	Alma-Päiväkatu 90	Carrasco Alvaro	99001	Spain	Spain	
HOLUB	Holub Gourmandise	Martine Royot	Assistant Sales Agent	104, chaussée de Tournai	Carrasco Alvaro	99001	Spain	Spain	

Detailed Product Inventory Analysis										
Product ID	Product Name	Supplier Info		Category ID	Quantity Available	Unit Price	Unshipped Stock	Unshipped Orders	Reserve Level	Discontinued
		Supplier Name	Address							
1	Cherry Pie	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz bottles	\$10.00	17	40	25	No
2	Chang	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz bottles	\$10.00	13	70	25	No
3	Apple Turnip	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz bottles	\$10.00	25	0	0	No
4	Asian Grilled Salmon	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz bottles	\$10.00	0	0	0	No
5	Chef Anton's Gourmet Mix	J. D. Cakes	123 Main St, Anytown, USA	1	36 boxes	\$25.00	0	0	0	No
6	Garden's Buttercream Spread	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$7.00	100	0	0	No
7	Grandma's Old Fashioned Dried Peas	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$8.00	0	0	0	No
8	Hempworks Chocolate Nibs	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$9.00	40	6	0	No
9	Milkin Koko Nuts	J. D. Cakes	123 Main St, Anytown, USA	1	18 - 10 oz tubs	\$8.00	0	0	0	No
10	Nuts	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$10.00	25	25	0	No
11	Queso Cabrales	J. D. Cakes	123 Main St, Anytown, USA	1	4 - kg bags	\$21.00	21	22	30	No
12	Queso Manchego y Pecorino	J. D. Cakes	123 Main St, Anytown, USA	1	40 - 100 g packages	\$8.00	86	0	0	No
13	Ranchito	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$10.00	24	0	0	No
14	Tofu	J. D. Cakes	123 Main St, Anytown, USA	1	70 - 100 g packages	\$23.00	35	0	0	No
15	Green Shoppie	J. D. Cakes	123 Main St, Anytown, USA	1	24 - 250 ml bottles	\$10.50	39	0	0	No
16	Mac N' Cheese	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$10.00	20	0	0	No
17	Alba Muffin	J. D. Cakes	123 Main St, Anytown, USA	1	20 - 1 kg bags	\$9.00	0	0	0	No
18	Cinnamon Toffee	J. D. Cakes	123 Main St, Anytown, USA	1	16 kg bags	\$62.00	42	0	0	No
19	Mr. Noodlehouse Ramen	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$10.00	24	0	0	No
20	Sgt. Rooney's Hamadama	J. D. Cakes	123 Main St, Anytown, USA	1	30 - 50 boxes	\$8.00	40	0	0	No
21	Dr. Rooney's Sausage	J. D. Cakes	123 Main St, Anytown, USA	1	24 - 4 kg packages	\$10.00	7	40	0	No
22	Organic Kale	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$10.00	104	0	0	No
23	Turbofood	J. D. Cakes	123 Main St, Anytown, USA	1	50 - 250 g packages	\$9.00	51	0	0	No
24	Organic Kale	J. D. Cakes	123 Main St, Anytown, USA	1	12 - 16 oz jars	\$10.00	104	0	0	No

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18) Create Chart

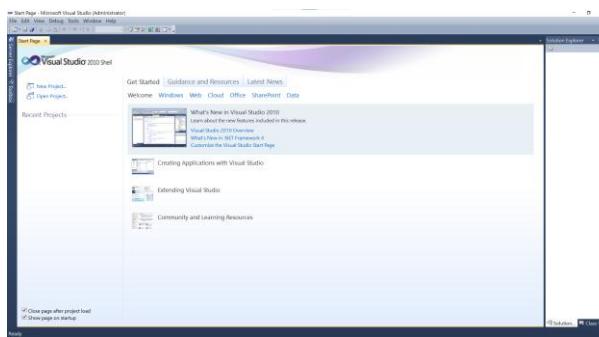
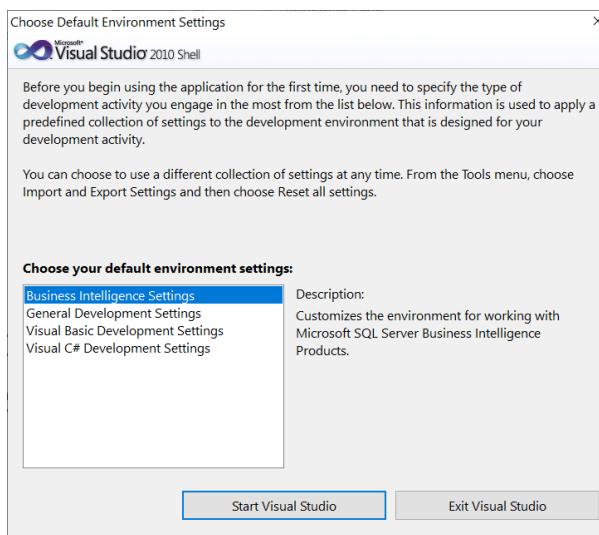


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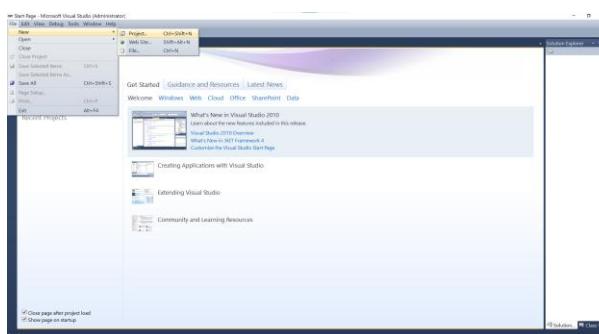
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Practical 2A – Perform ETL Process to construct the database in SQL Server

1) Open SQL Server Data Tools



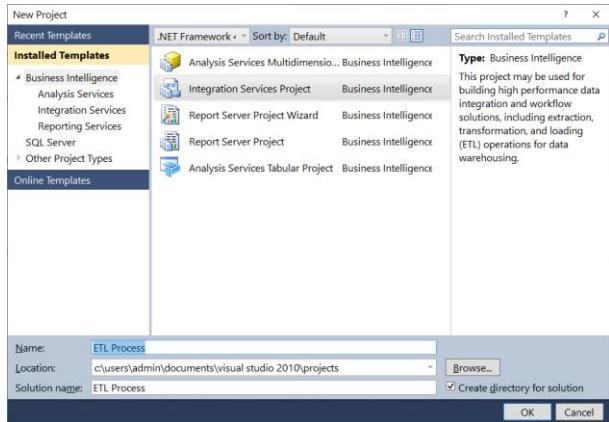
2) Go to File and create new project



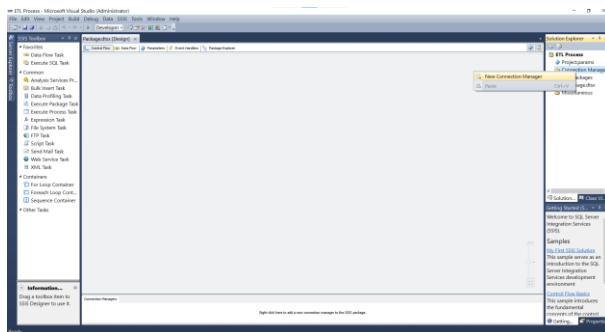
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3) Select Integration Services Project and name it “ETL Process”



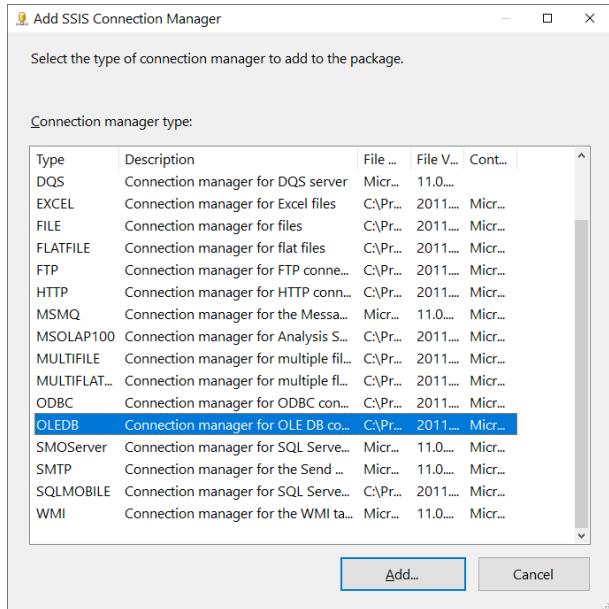
4) Right Click Connection Managers and select new Connection Manager



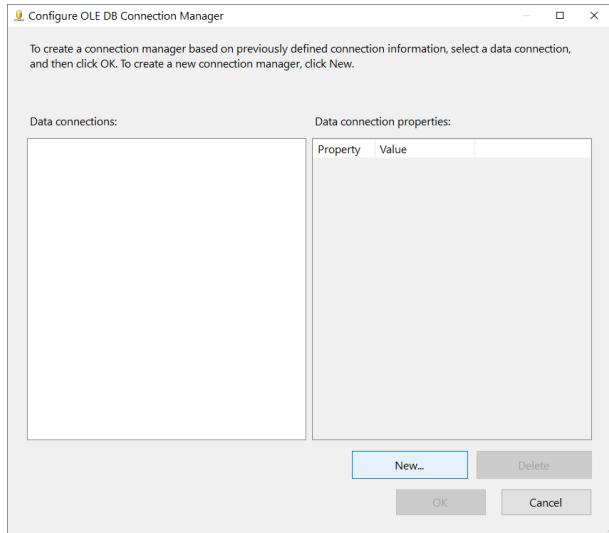
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5) Add OLEDB



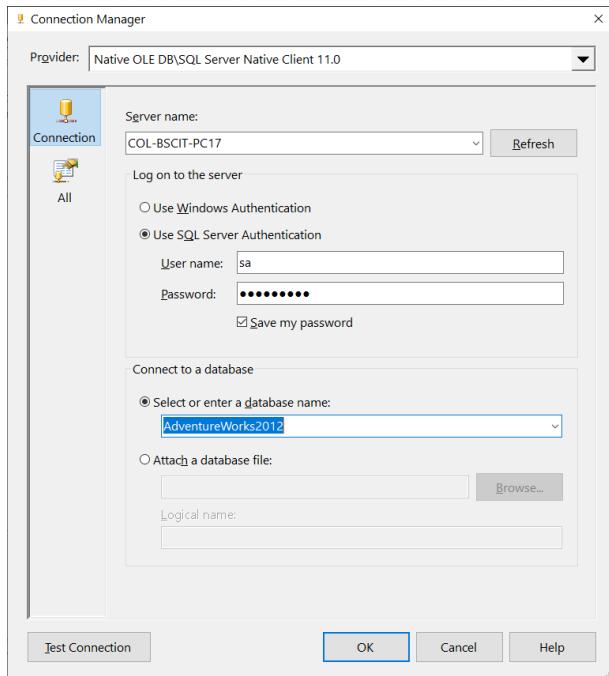
6) Click New



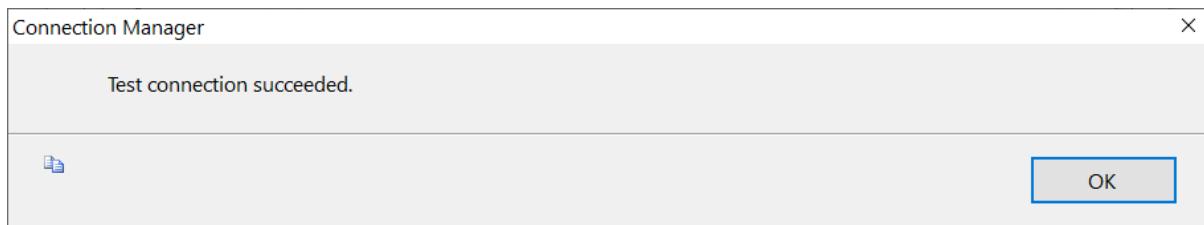
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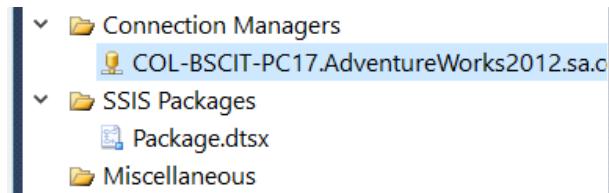
7) Enter server name and select database AdventureWorks



8) Test Connection



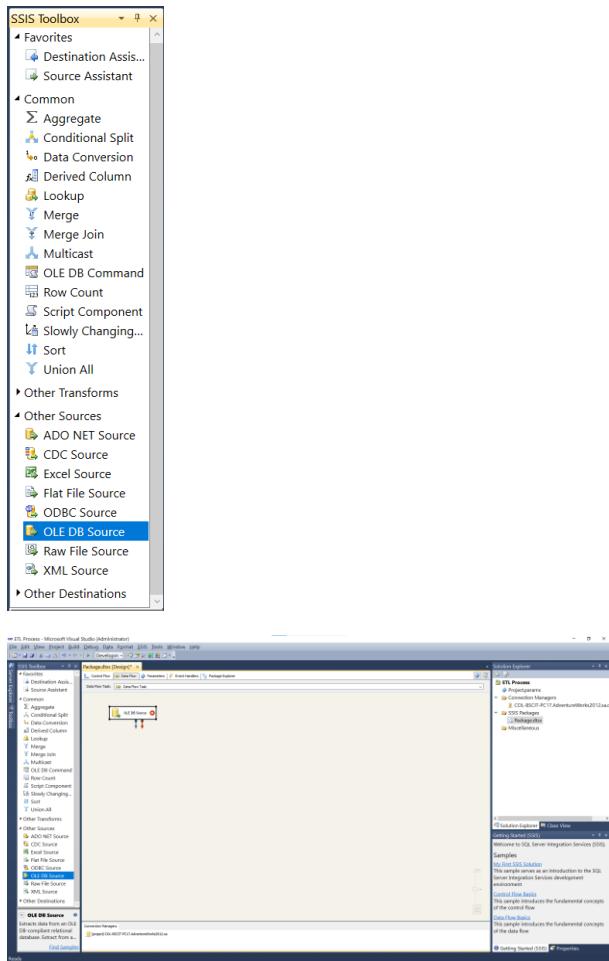
9) Click OK



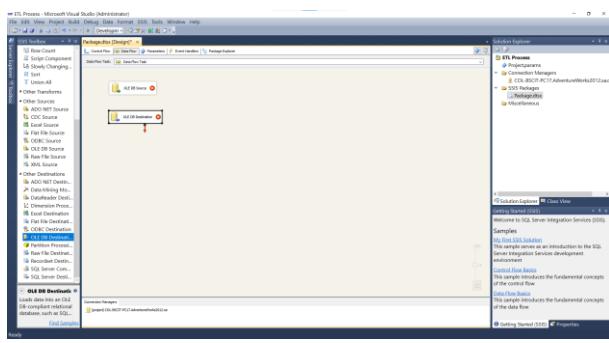
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10) In Data Flow Task, In SSIS Tool box, Drag and drop the Data Source



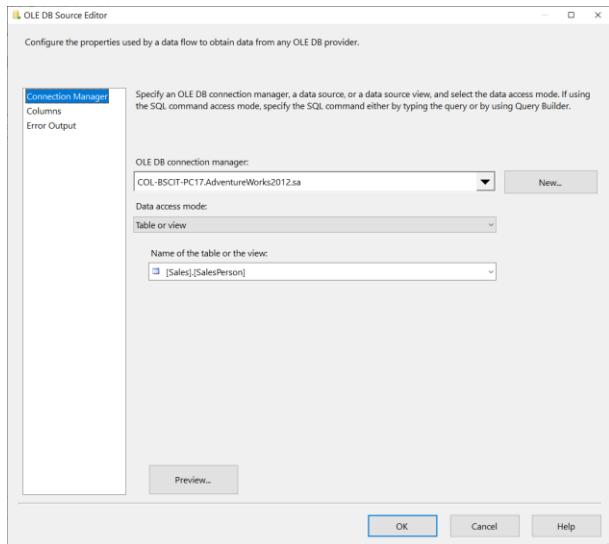
11) Similarly Drag and Drop OLEDB Destination



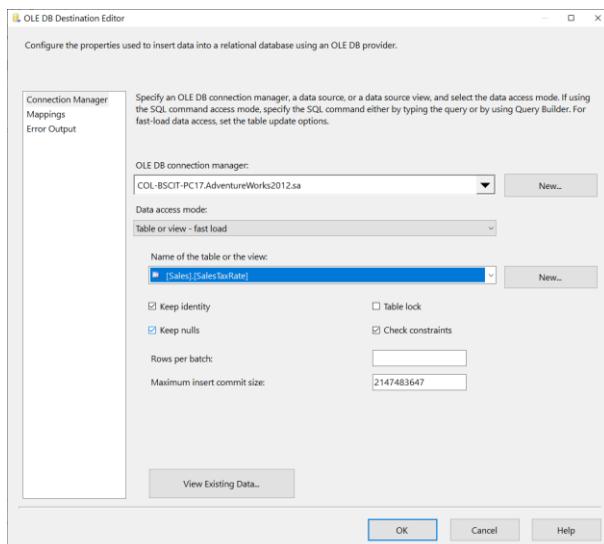
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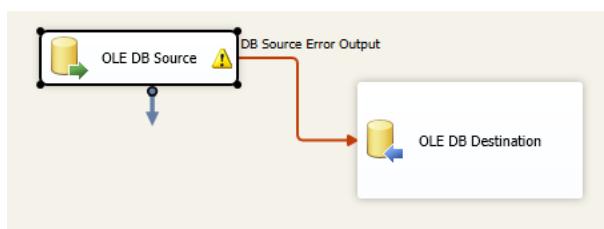
12) Double Click OLEDB Source, Select SalesPerson



13) Double Click OLEDB Destination, select Sales SalesTaxRate Table



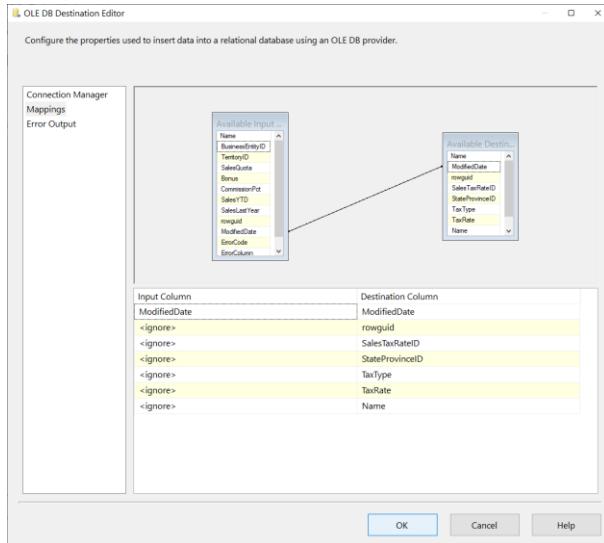
14) Connect Orange Line from Source to Destination



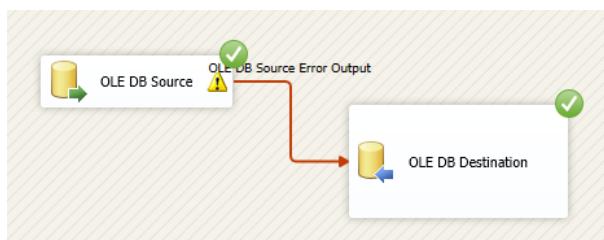
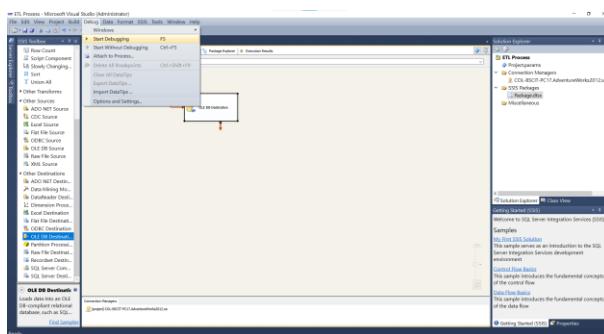
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15) In OLE DB Destination check mappings



16) Start Debugging



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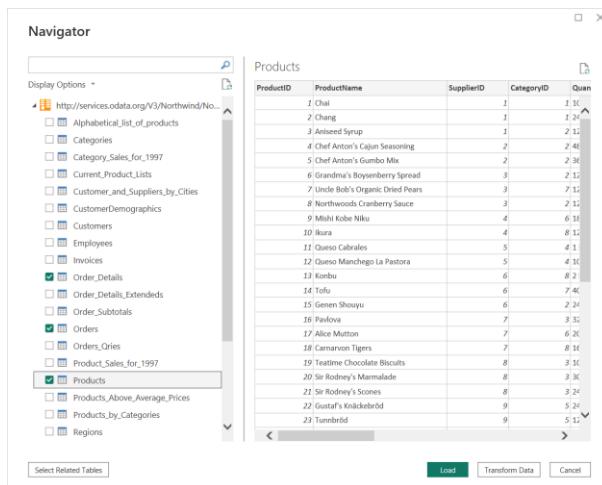
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Practical 2B – Perform ETL Process in Power BI

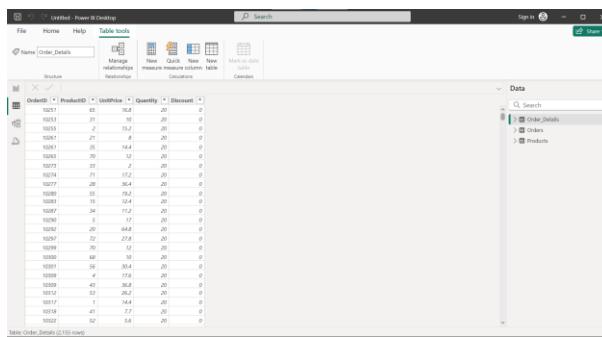
- 1) Select ODATA from Get Data and enter URL



- 2) Select Order_Details, Orders, Products and load



- 3) Tables will be loaded



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4) Right Click any column and select edit query

The screenshot shows the Power BI Desktop interface. A context menu is open over a column named 'Quantity'. The menu path 'Edit query' is highlighted. Other options visible include 'Sort ascending', 'Sort descending', 'Clear filter', 'Copy table', 'New measure', 'New column', 'Edit driven data', 'Edit query', 'Rename', 'Delete', 'Hide in report view', 'Show in report view', 'New group', and 'Insert row'. The main workspace shows a table with columns 'OrderID', 'UnitPrice', 'Quantity', and 'Discount'. The 'Quantity' column has values like 20, 0, 0, 0, etc. The bottom status bar indicates '7 COLUMNS, 999+ ROWS'.

5) Click on Add > Custom Column

The screenshot shows the Power Query Editor. A new column 'LineTotal' is being added to the 'Order_Details' table. The formula is set to `= [UnitPrice]*[Quantity]`. The 'APPLIED STEPS' pane shows the step 'Added Custom'. The bottom status bar indicates '8 COLUMNS, 999+ ROWS'.

6) Name it LineTotal, add formula $[UnitPrice]*[Quantity]$

The screenshot shows the 'Custom Column' dialog box. It asks to add a column computed from other columns. A new column name 'LineTotal' is entered. The formula is set to `= [UnitPrice]*[Quantity]`. The 'Available columns' list includes 'OrderID', 'ProductID', 'UnitPrice', 'Quantity', 'Discount', 'Order', and 'Product'. The bottom status bar indicates 'No syntax errors have been detected.'

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7) Line Total Column is added

The screenshot shows the Power Query Editor interface. A table named 'Order_Details' is being modified. A new column 'LineTotal' is being added, calculated as the product of 'UnitPrice' and 'Quantity'. The 'Advanced Steps' pane shows the formula: `=Table.AddColumn(Order_Details, "LineTotal", each [UnitPrice]*[Quantity])`. The 'Properties' pane shows the column name as 'LineTotal' and its type as 'Number'. The preview pane shows the updated table with the new 'LineTotal' column.

8) In Power BI Select Order Tables and in Table tools select Manage Relationships

The screenshot shows the Power BI Data View interface. A context menu is open over a table named 'Orders'. The 'Manage Relationships' option is selected, opening a dialog box titled 'Manage relationships'. This dialog lists existing relationships between tables like 'Order_Details' and 'Products', and provides options to 'New relationship', 'Autodetect', 'Edit', 'Delete', and 'Filter'.

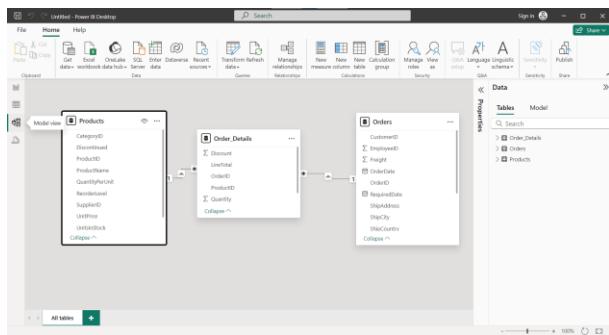
9) Select the columns

The screenshot shows the 'Manage relationships' dialog. It displays two existing relationships: one from 'Order_Details' (Column 'OrderID') to 'Orders' (Column 'OrderID') with status 'Active', and another from 'Order_Details' (Column 'ProductID') to 'Products' (Column 'ProductID') with status 'Active'. There are buttons for 'New relationship', 'Autodetect', 'Edit', 'Delete', and 'Filter'.

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10) Click on Model View

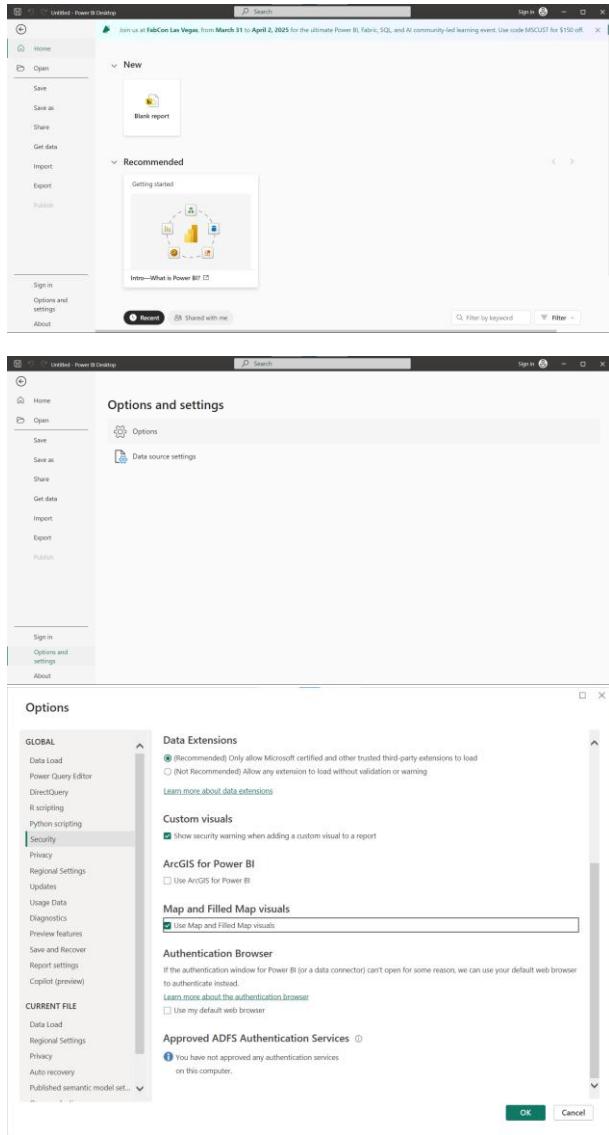


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Practical 3A – Perform Data Visualization and Create the Data Staging Area

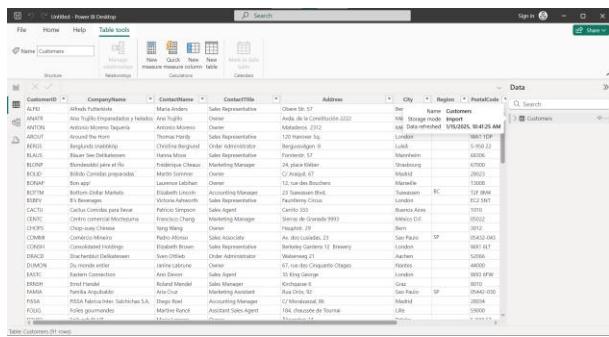
- 1) Go to File > Options and Settings > Options > Security > Use Map and Filled Maps



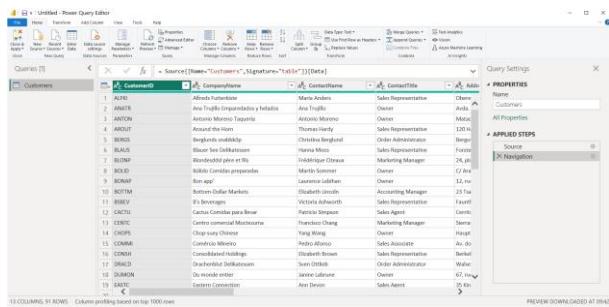
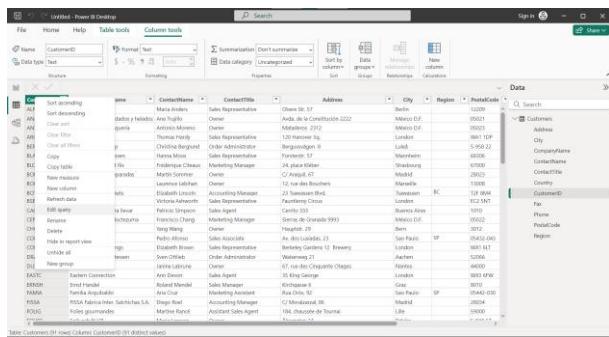
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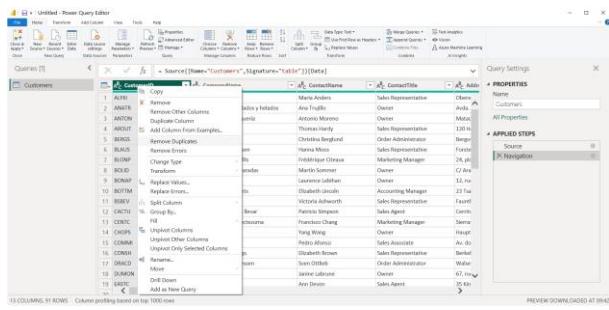
2) Open Customers Table



3) Right click CustomerId > Edit Query



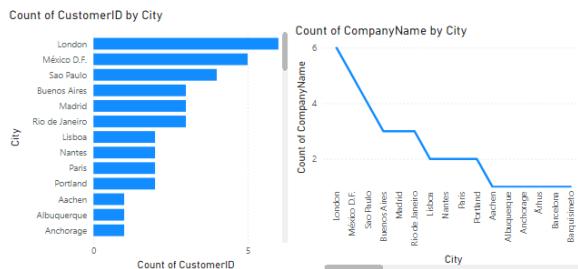
4) Remove Duplicate Entries and save



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5) Create charts



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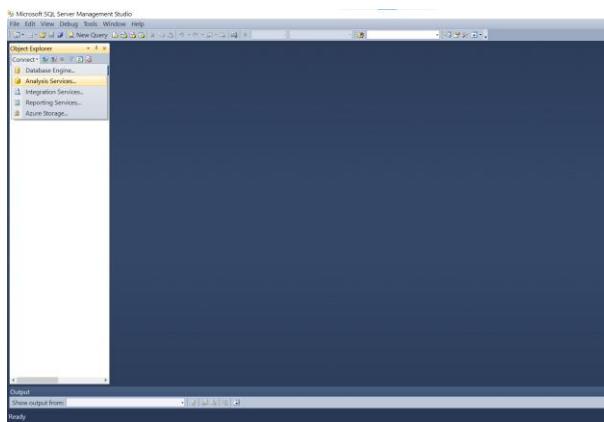
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Practical 3B – Create Staging Area for Selected Database using Star Schema

1) Open SSMS and Connect



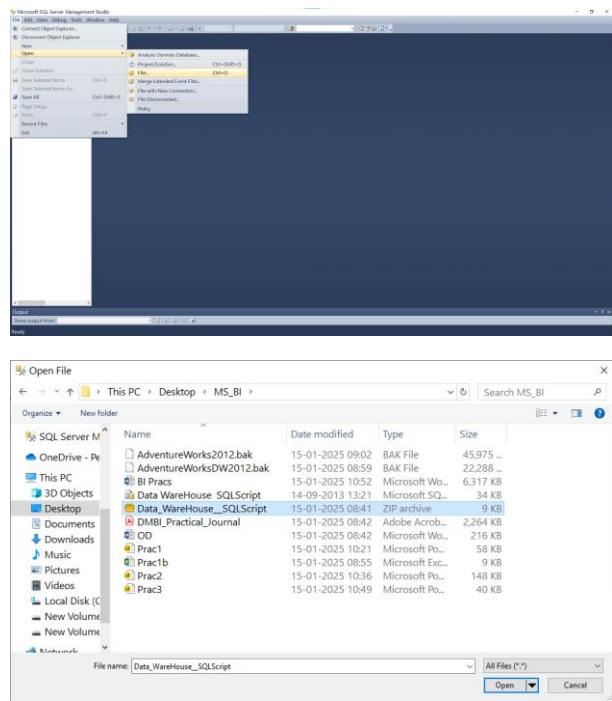
2) Click Connect > Analysis Server



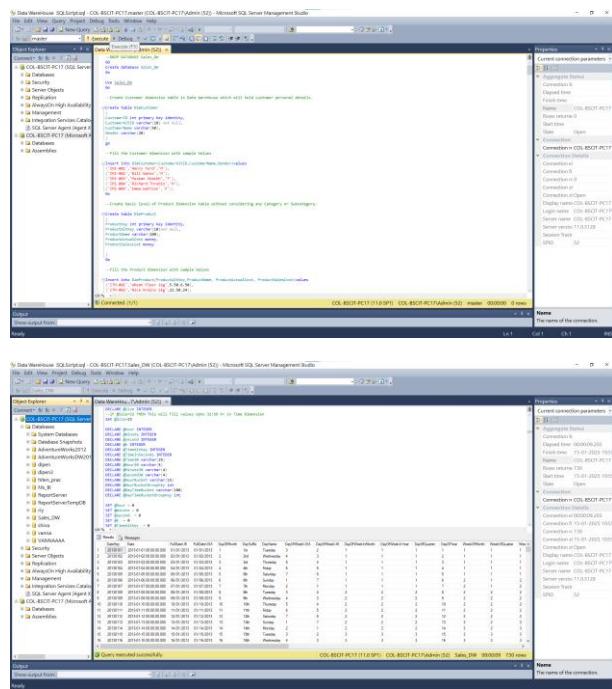
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3) Click on File > Open > File> Select Data_Warehouse_SQLScript.zip



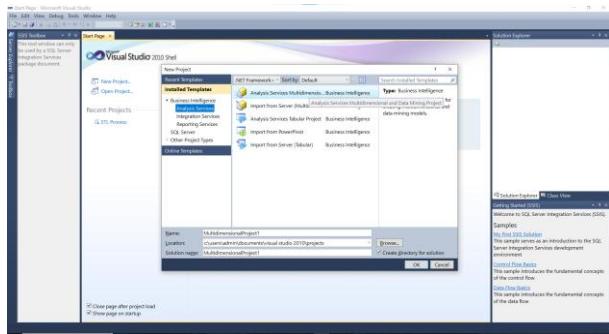
4) Click Execute



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5) Open Server Data Tools > NewProject > Select Analysis Multidimensional

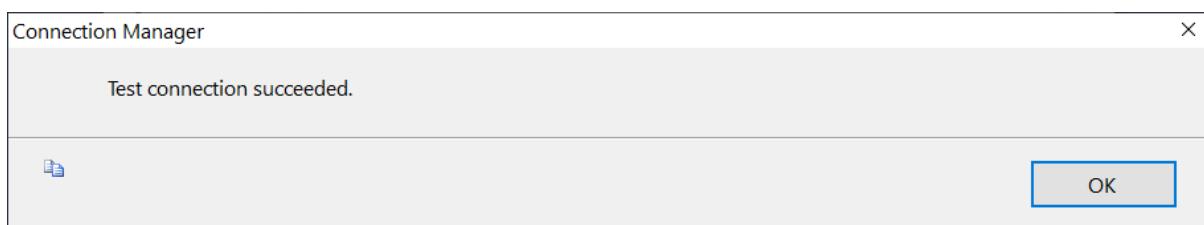
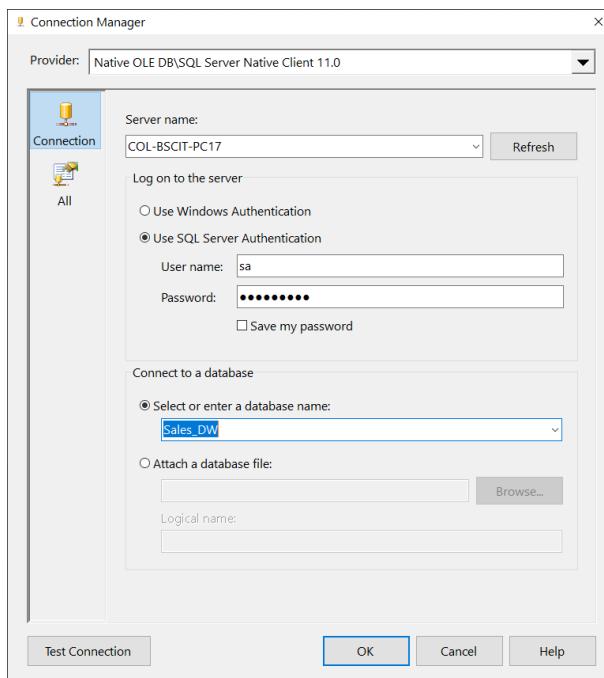
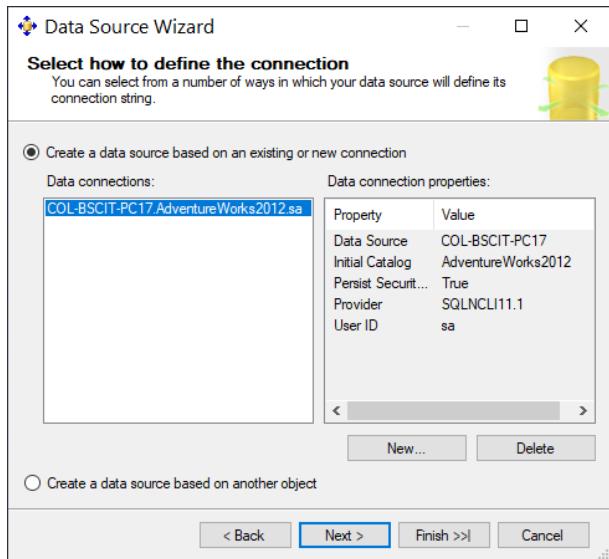


6) Right click Data sources > Data Source Wizard > Next > New > Enter Login and Database > Test Connection > Ok > Next > Inherit > Finish



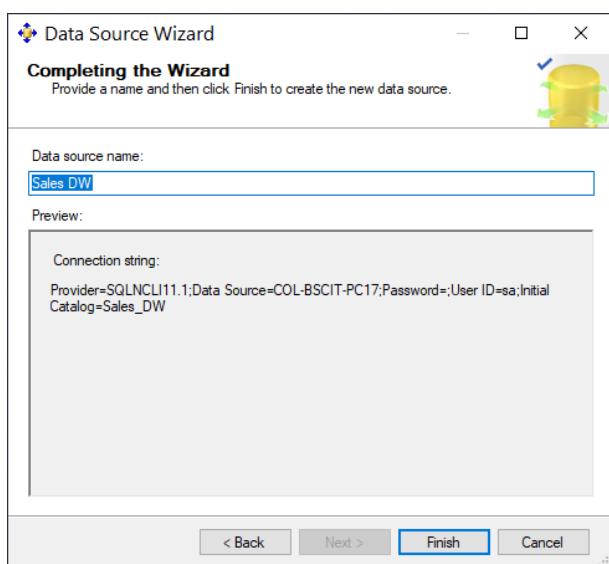
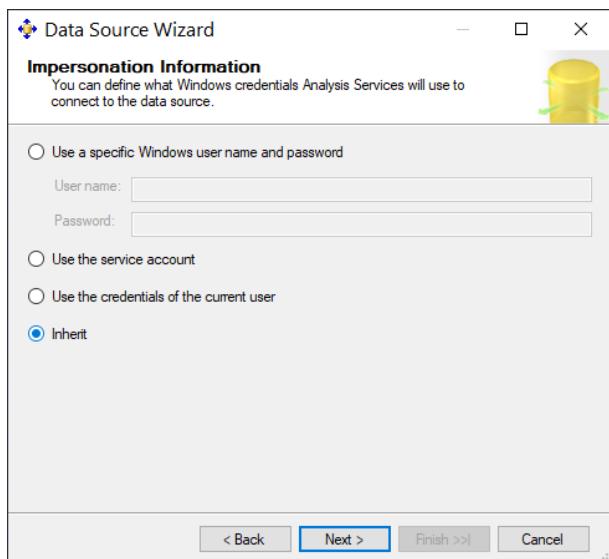
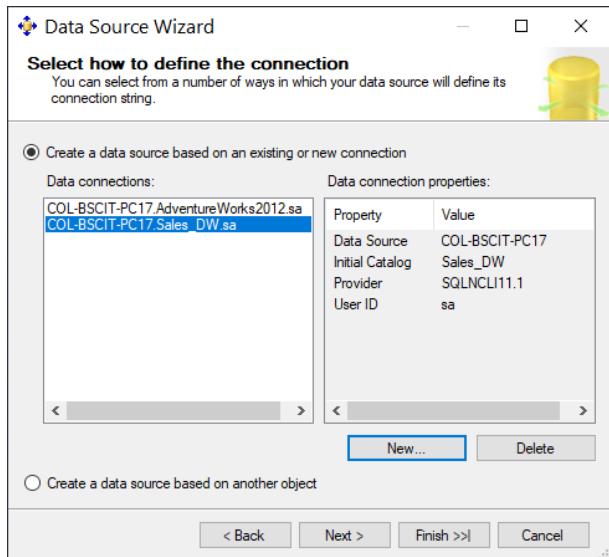
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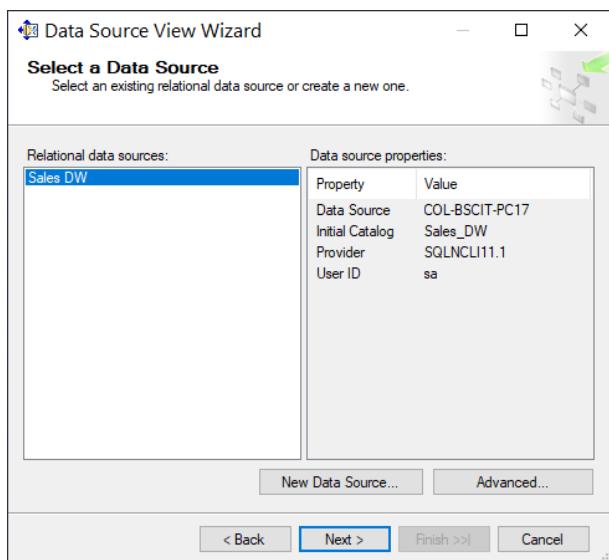
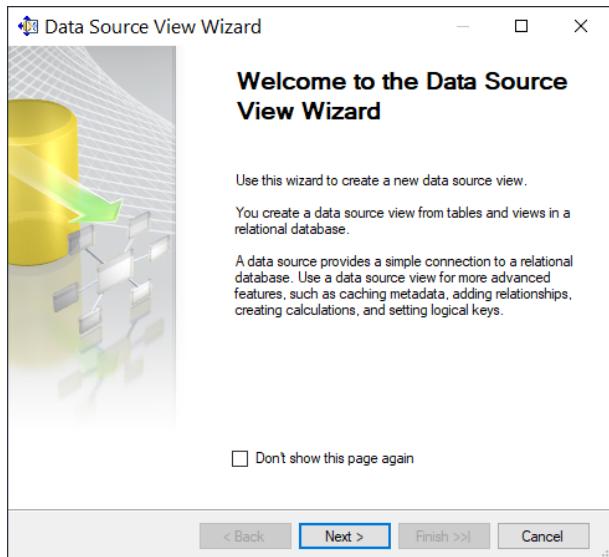
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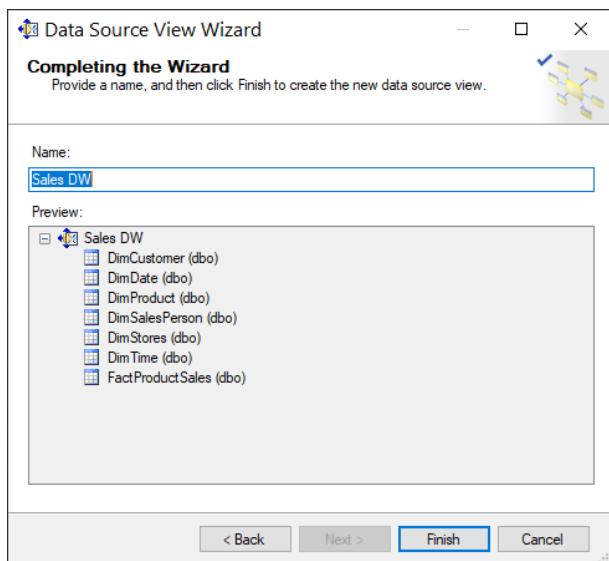
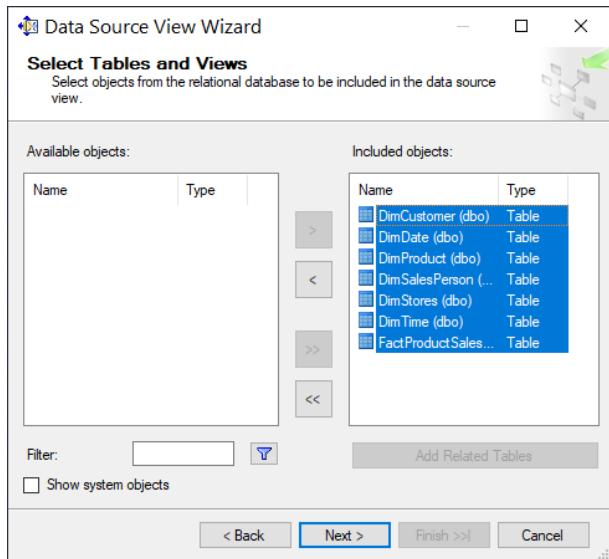
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- 7) Right Click Data Source View > New Data Source View > Next > Select SalesDW > Add all tables > Finish

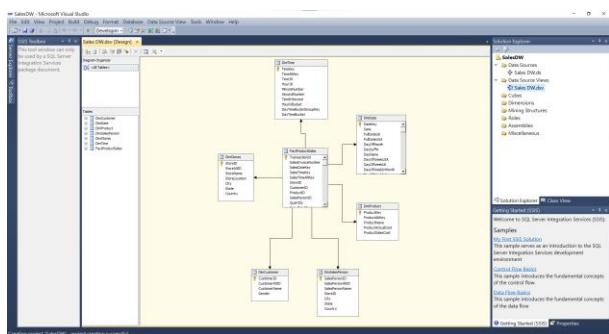


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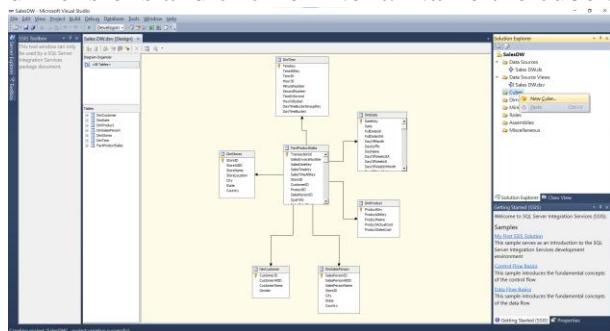


8) Relationship Chart is shown



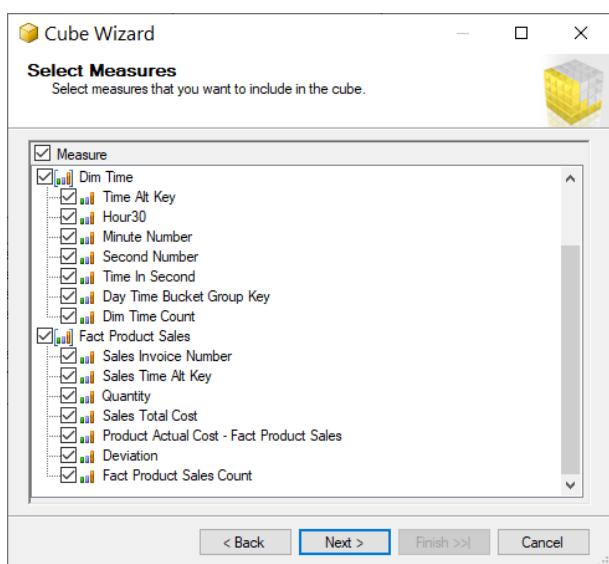
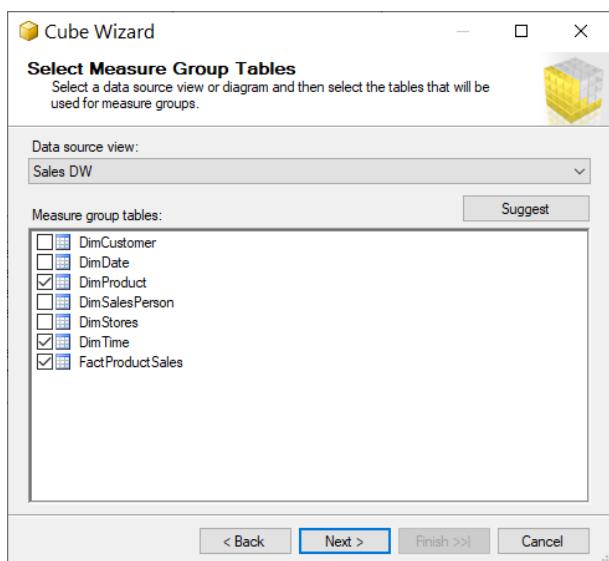
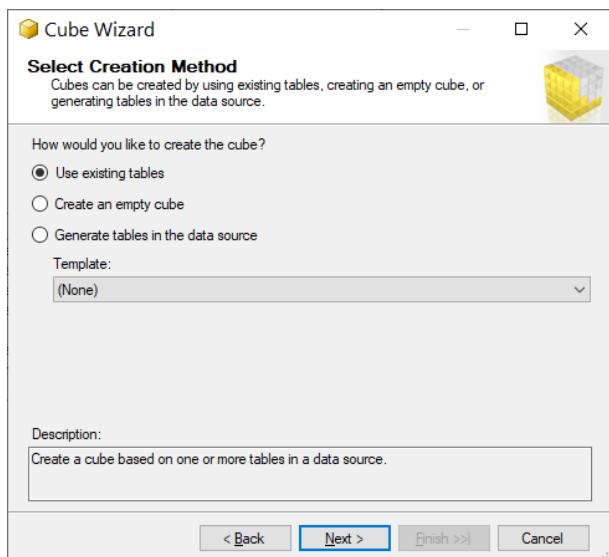
Practical 4A - Create the cube with corresponding dimension and fact table based on OLAP

1) Continue from the above practical. In Solution Explorer select Cube which opens a dialogue box. Select the tables – FactProductSales, DimProduct, DimTime and click on Next. Select all the measures to include in the cube and click on Next. Select all the new dimensions and click on Next. Name the cube as Sales DW and click on Finish.



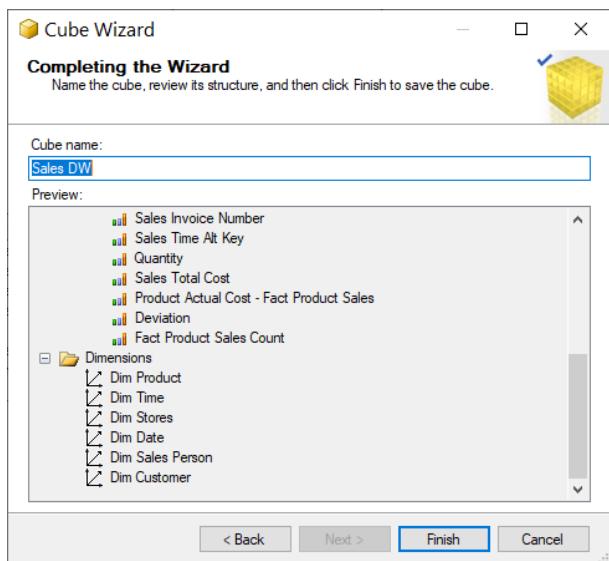
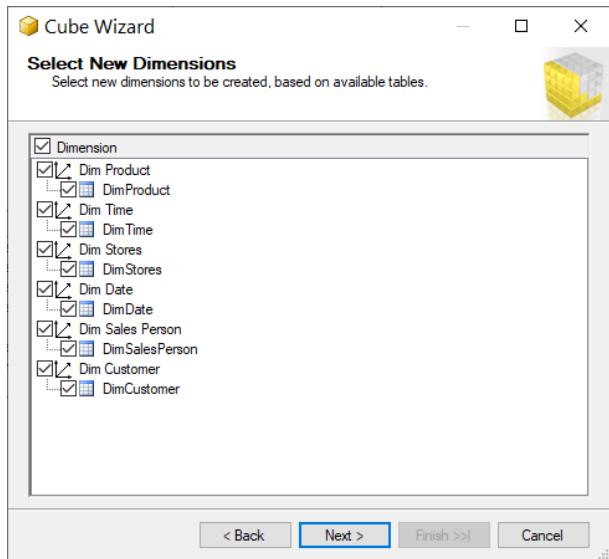
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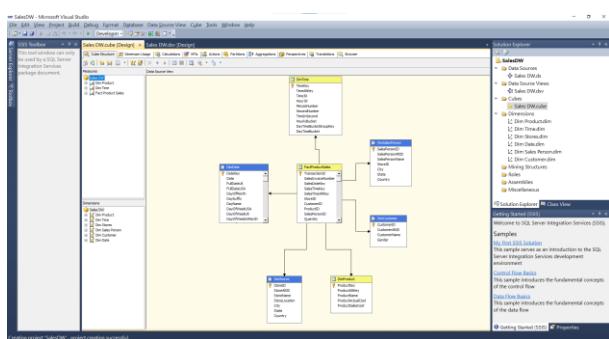


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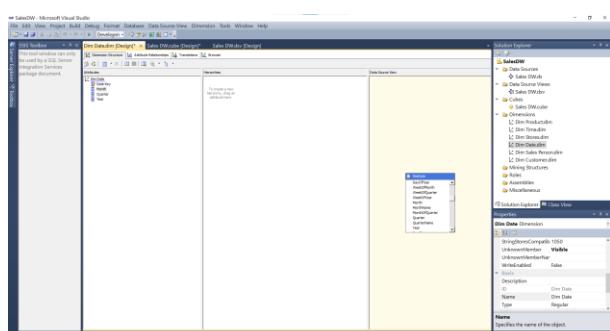
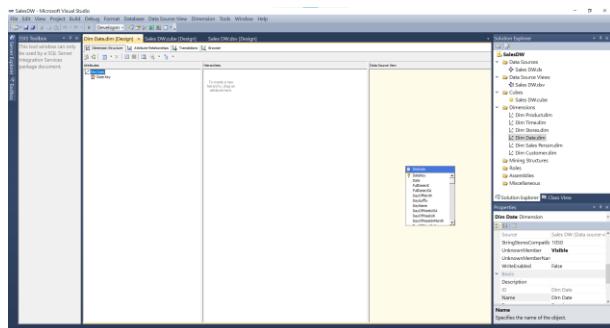
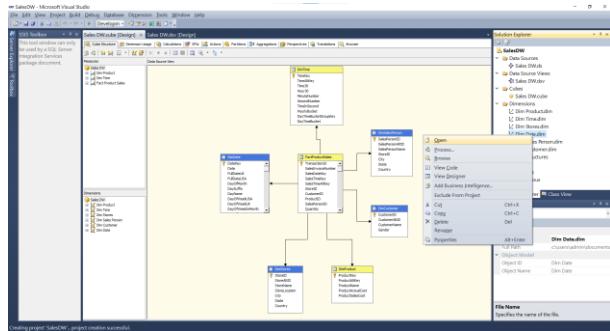
2) The relationship will be displayed on the screen.



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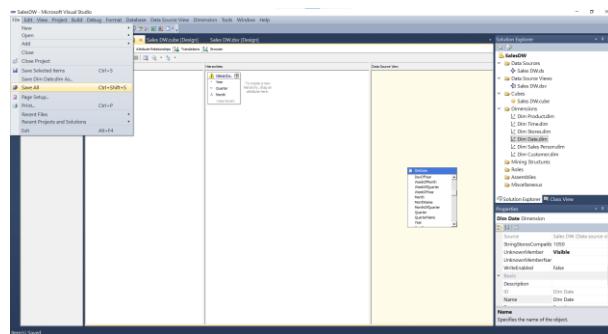
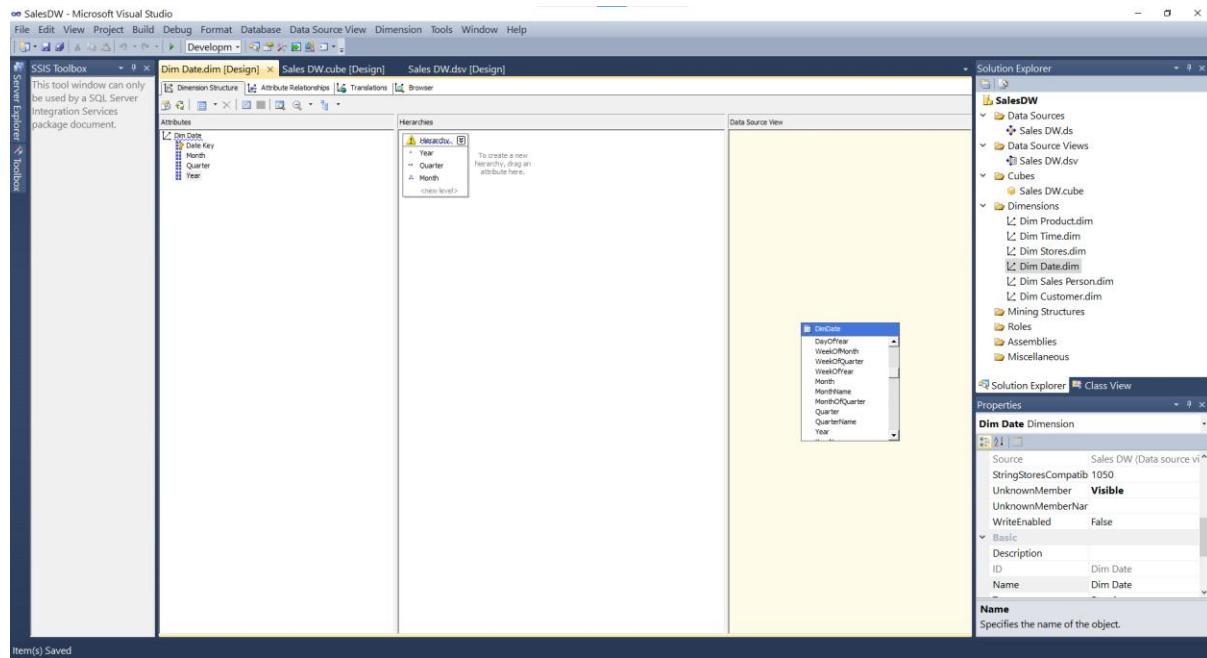
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- 3) In Dimensions > Right Click Dim Date and Open. Drag and drop Year, Quarter and Month to the Attributes. Drag and drop the attributes into the same Hierarchy. Save the progress and click on OK.

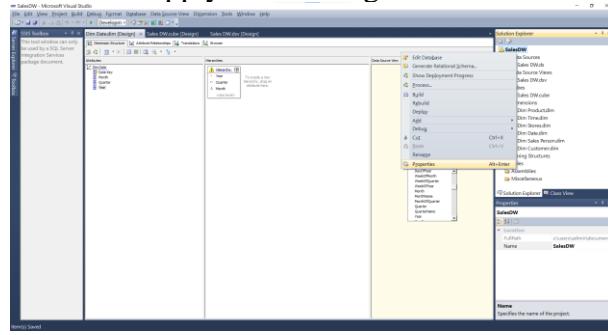


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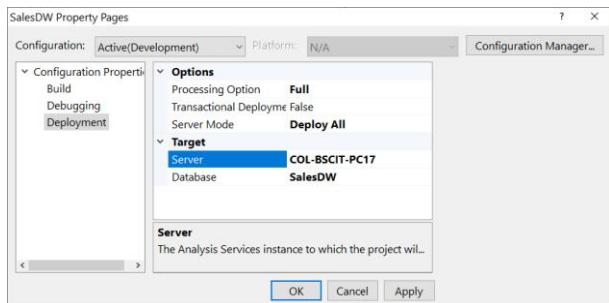
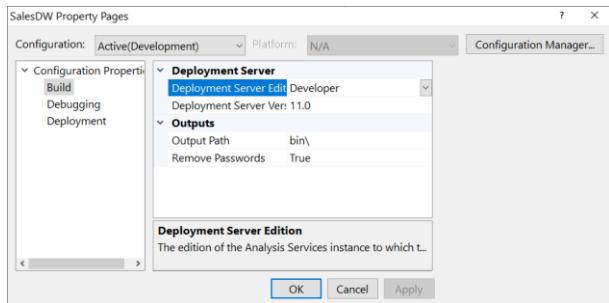


4) Right click on the file name and select Properties. In Build make sure everything is correct. In Deployment, make Processing Option as Full instead of Default. Server Mode as Deploy All instead of Deploy Changes Only. Server as the server name used till now instead of localhost. Apply these changes.

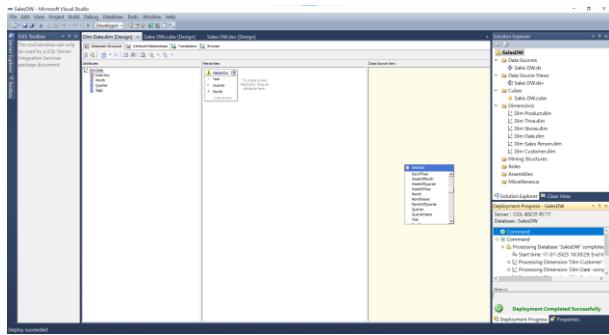
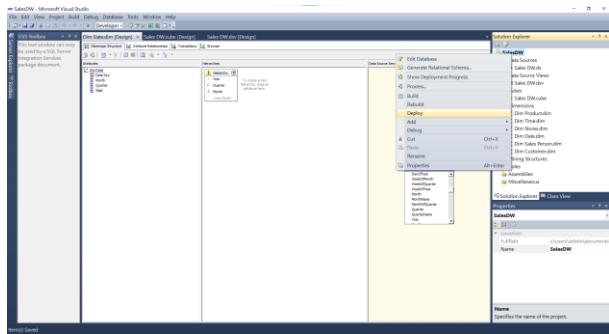


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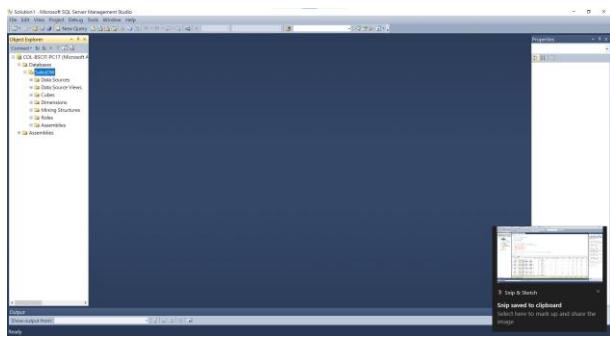
5) Right click on the file name and click on Deploy to deploy the project.



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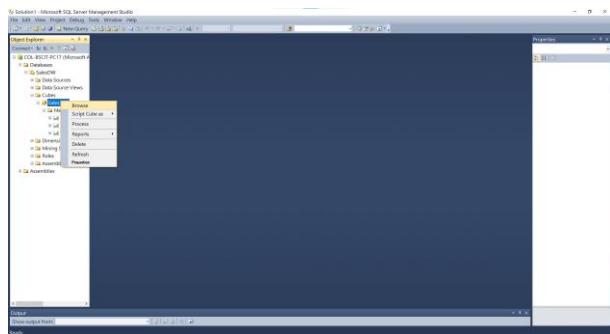
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6) SalesDW is Shown in Analysis Server in SSMS.

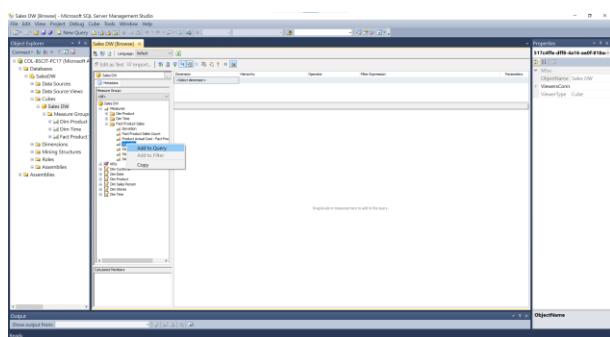


Practical 4B – Perform Multi-Dimensional Expressions (MDX) queries for OLAP database

- 1) Continue from the above practical. To verify, in SQL Server Management right click on the file name in Object Explorer and click on Browse. Enlarge the Measures of SalesDW.

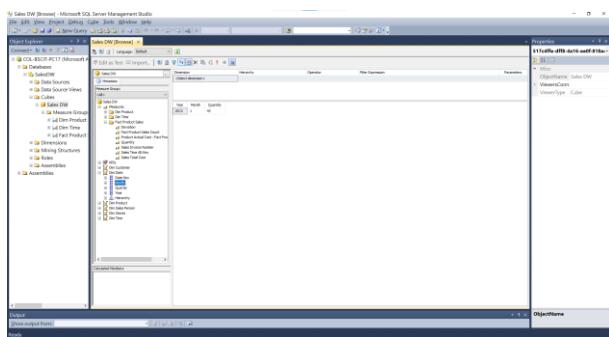
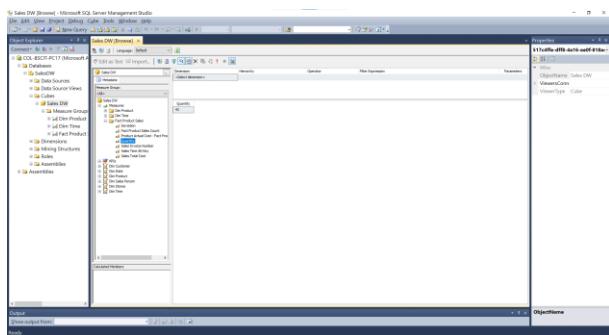


- 2) On selecting Quantity under Fact Product Sales the value shown will be 43. Select Month and Year as well from Dim Date.

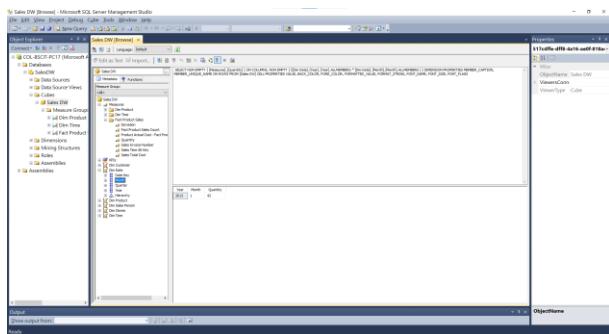
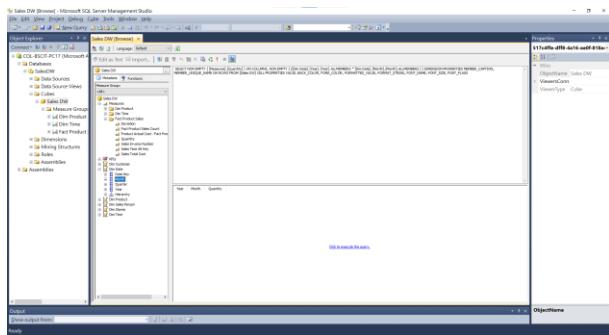


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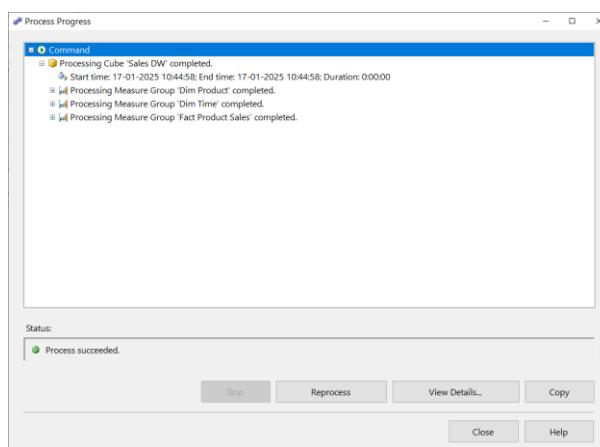
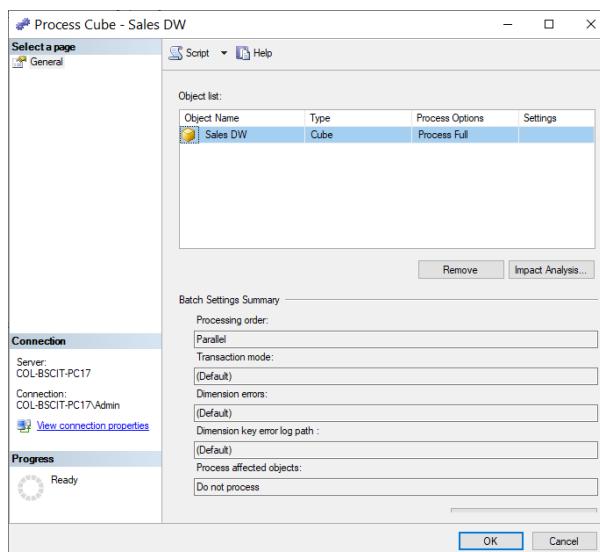
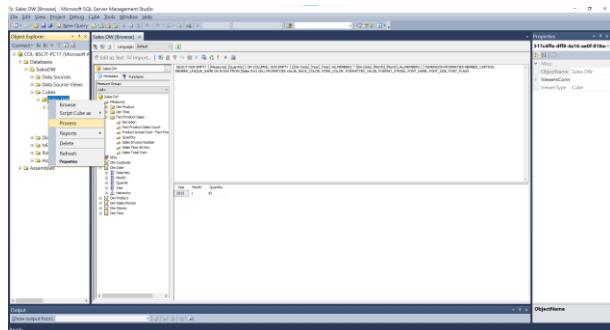
- 3) Go in Design Mode and click on the line that says ‘Click to execute the query.’ The entries will be shown on the screen.



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- 4) Right click on the file name and select Process. Select the file and click on Run. Process succeeded is the status.

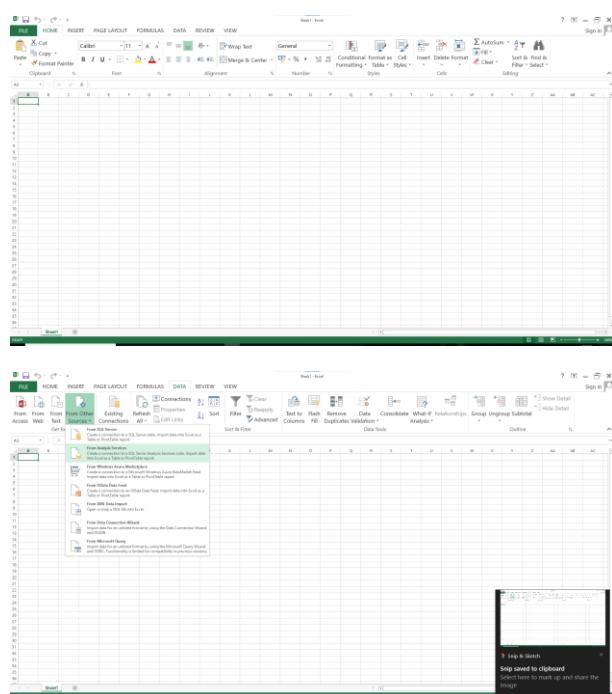


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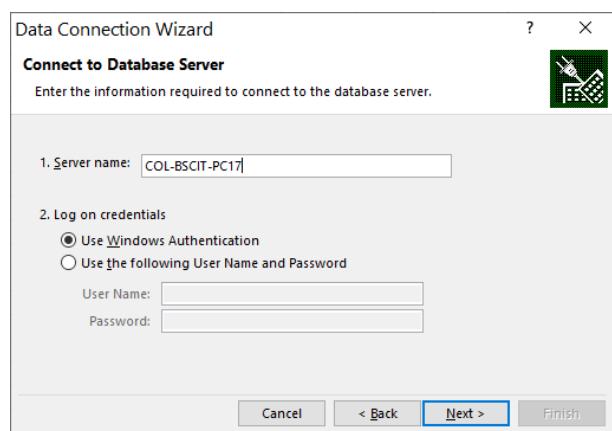
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Practical 5A – Import the data warehouse in Microsoft Excel and create Pivot Table to perform Data Analytics

- 1) Open Excel > Data > From Other Sources > Analysis Services

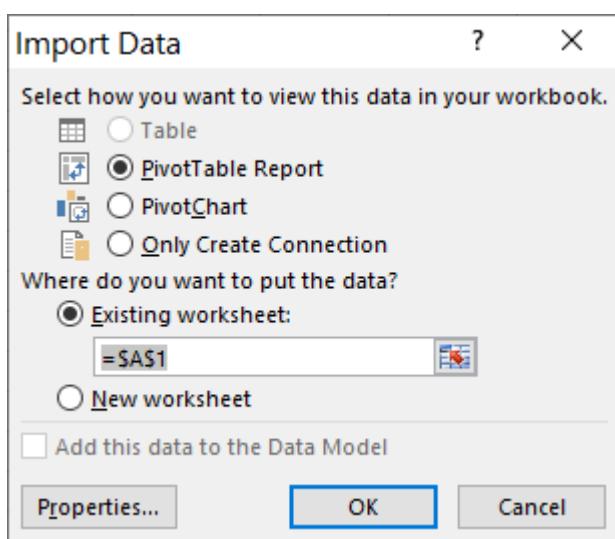
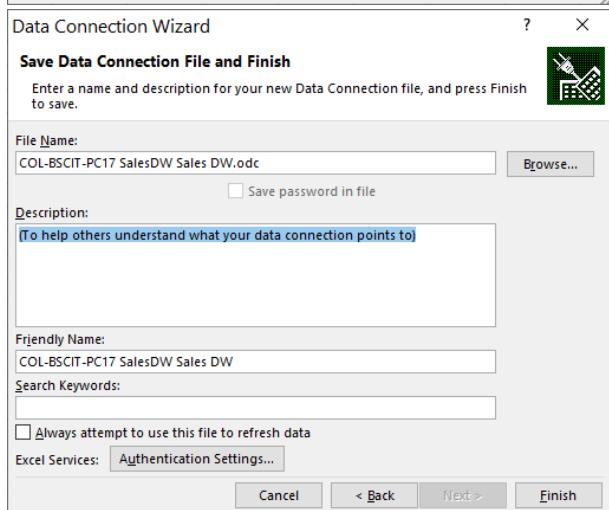
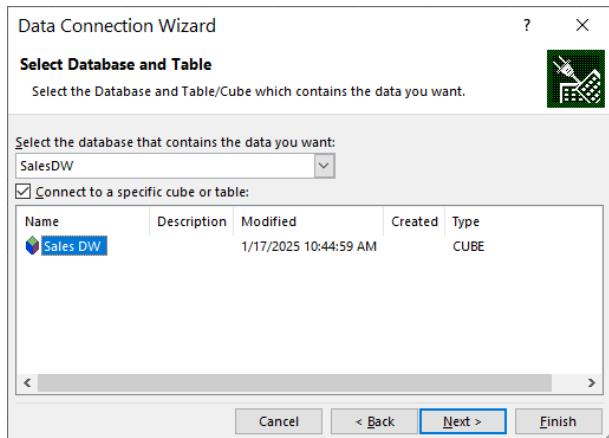


- 2) Enter Server Name > Next > Select Database > Next > Finish > Pivot Table Report > Ok



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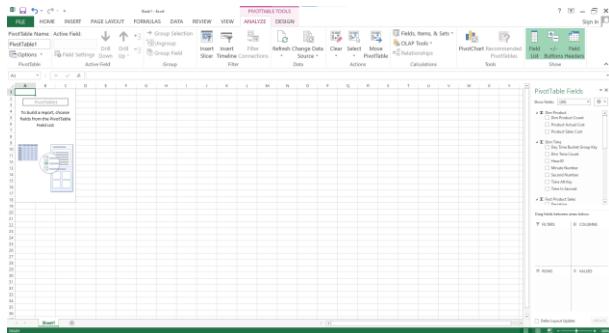
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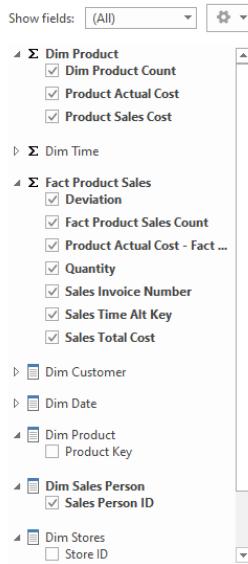
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3) Select Fields to show



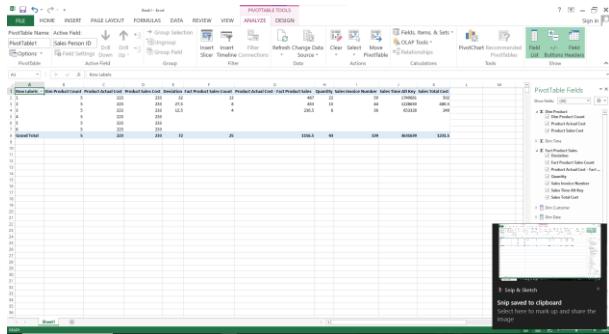
PivotTable Fields



Show fields: (All)

- Dim Product
 - Dim Product Count
 - Product Actual Cost
 - Product Sales Cost
- Dim Time
- Fact Product Sales
 - Deviation
 - Fact Product Sales Count
 - Product Actual Cost - Fact ...
 - Quantity
 - Sales Invoice Number
 - Sales Time Alt Key
 - Sales Total Cost
- Dim Customer
- Dim Date
- Dim Product
 - Product Key
- Dim Sales Person
 - Sales Person ID
- Dim Stores
 - Store ID

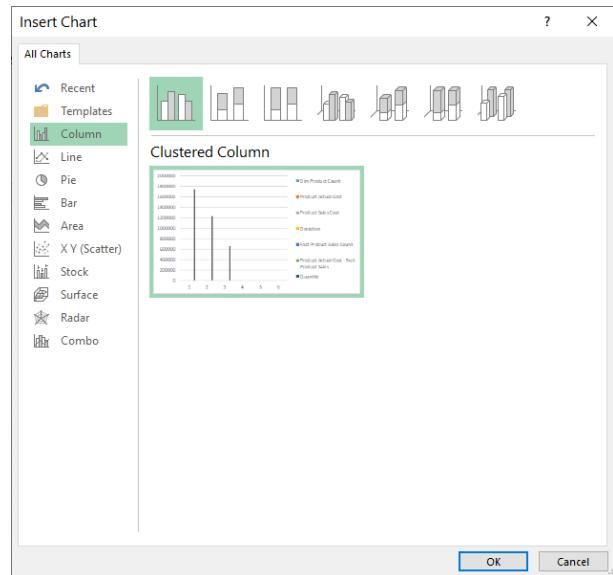
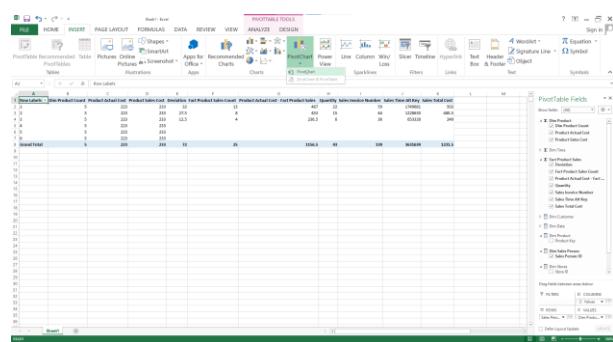
4) Pivot Table is shown



Sales Person ID	Product Category	Sales Amount	Sales Count	Sales Total Cost
1	Electronics	400	200	400.0
2	Electronics	300	150	300.0
3	Electronics	200	100	200.0
4	Electronics	100	50	100.0
5	Electronics	200	100	200.0
6	Electronics	300	150	300.0
7	Electronics	400	200	400.0
8	Electronics	500	250	500.0
9	Electronics	600	300	600.0
10	Electronics	700	350	700.0
11	Electronics	800	400	800.0
12	Electronics	900	450	900.0
13	Electronics	1000	500	1000.0
14	Electronics	1100	550	1100.0
15	Electronics	1200	600	1200.0
16	Electronics	1300	650	1300.0
17	Electronics	1400	700	1400.0
18	Electronics	1500	750	1500.0
19	Electronics	1600	800	1600.0
20	Electronics	1700	850	1700.0
21	Electronics	1800	900	1800.0
22	Electronics	1900	950	1900.0
23	Electronics	2000	1000	2000.0
24	Electronics	2100	1050	2100.0
25	Electronics	2200	1100	2200.0
26	Electronics	2300	1150	2300.0
27	Electronics	2400	1200	2400.0
28	Electronics	2500	1250	2500.0
29	Electronics	2600	1300	2600.0
30	Electronics	2700	1350	2700.0
31	Electronics	2800	1400	2800.0
32	Electronics	2900	1450	2900.0
33	Electronics	3000	1500	3000.0
34	Electronics	3100	1550	3100.0
35	Electronics	3200	1600	3200.0
36	Electronics	3300	1650	3300.0
37	Electronics	3400	1700	3400.0
38	Electronics	3500	1750	3500.0
39	Electronics	3600	1800	3600.0
40	Electronics	3700	1850	3700.0
41	Electronics	3800	1900	3800.0
42	Electronics	3900	1950	3900.0
43	Electronics	4000	2000	4000.0
44	Electronics	4100	2050	4100.0
45	Electronics	4200	2100	4200.0
46	Electronics	4300	2150	4300.0
47	Electronics	4400	2200	4400.0
48	Electronics	4500	2250	4500.0
49	Electronics	4600	2300	4600.0
50	Electronics	4700	2350	4700.0
51	Electronics	4800	2400	4800.0
52	Electronics	4900	2450	4900.0
53	Electronics	5000	2500	5000.0
54	Electronics	5100	2550	5100.0
55	Electronics	5200	2600	5200.0
56	Electronics	5300	2650	5300.0
57	Electronics	5400	2700	5400.0
58	Electronics	5500	2750	5500.0
59	Electronics	5600	2800	5600.0
60	Electronics	5700	2850	5700.0
61	Electronics	5800	2900	5800.0
62	Electronics	5900	2950	5900.0
63	Electronics	6000	3000	6000.0
64	Electronics	6100	3050	6100.0
65	Electronics	6200	3100	6200.0
66	Electronics	6300	3150	6300.0
67	Electronics	6400	3200	6400.0
68	Electronics	6500	3250	6500.0
69	Electronics	6600	3300	6600.0
70	Electronics	6700	3350	6700.0
71	Electronics	6800	3400	6800.0
72	Electronics	6900	3450	6900.0
73	Electronics	7000	3500	7000.0
74	Electronics	7100	3550	7100.0
75	Electronics	7200	3600	7200.0
76	Electronics	7300	3650	7300.0
77	Electronics	7400	3700	7400.0
78	Electronics	7500	3750	7500.0
79	Electronics	7600	3800	7600.0
80	Electronics	7700	3850	7700.0
81	Electronics	7800	3900	7800.0
82	Electronics	7900	3950	7900.0
83	Electronics	8000	4000	8000.0
84	Electronics	8100	4050	8100.0
85	Electronics	8200	4100	8200.0
86	Electronics	8300	4150	8300.0
87	Electronics	8400	4200	8400.0
88	Electronics	8500	4250	8500.0
89	Electronics	8600	4300	8600.0
90	Electronics	8700	4350	8700.0
91	Electronics	8800	4400	8800.0
92	Electronics	8900	4450	8900.0
93	Electronics	9000	4500	9000.0
94	Electronics	9100	4550	9100.0
95	Electronics	9200	4600	9200.0
96	Electronics	9300	4650	9300.0
97	Electronics	9400	4700	9400.0
98	Electronics	9500	4750	9500.0
99	Electronics	9600	4800	9600.0
100	Electronics	9700	4850	9700.0
101	Electronics	9800	4900	9800.0
102	Electronics	9900	4950	9900.0
103	Electronics	10000	5000	10000.0
104	Electronics	10100	5050	10100.0
105	Electronics	10200	5100	10200.0
106	Electronics	10300	5150	10300.0
107	Electronics	10400	5200	10400.0
108	Electronics	10500	5250	10500.0
109	Electronics	10600	5300	10600.0
110	Electronics	10700	5350	10700.0
111	Electronics	10800	5400	10800.0
112	Electronics	10900	5450	10900.0
113	Electronics	11000	5500	11000.0
114	Electronics	11100	5550	11100.0
115	Electronics	11200	5600	11200.0
116	Electronics	11300	5650	11300.0
117	Electronics	11400	5700	11400.0
118	Electronics	11500	5750	11500.0
119	Electronics	11600	5800	11600.0
120	Electronics	11700	5850	11700.0
121	Electronics	11800	5900	11800.0
122	Electronics	11900	5950	11900.0
123	Electronics	12000	6000	12000.0
124	Electronics	12100	6050	12100.0
125	Electronics	12200	6100	12200.0
126	Electronics	12300	6150	12300.0
127	Electronics	12400	6200	12400.0
128	Electronics	12500	6250	12500.0
129	Electronics	12600	6300	12600.0
130	Electronics	12700	6350	12700.0
131	Electronics	12800	6400	12800.0
132	Electronics	12900	6450	12900.0
133	Electronics	13000	6500	13000.0
134	Electronics	13100	6550	13100.0
135	Electronics	13200	6600	13200.0
136	Electronics	13300	6650	13300.0
137	Electronics	13400	6700	13400.0
138	Electronics	13500	6750	13500.0
139	Electronics	13600	6800	13600.0
140	Electronics	13700	6850	13700.0
141	Electronics	13800	6900	13800.0
142	Electronics	13900	6950	13900.0
143	Electronics	14000	7000	14000.0
144	Electronics	14100	7050	14100.0
145	Electronics	14200	7100	14200.0
146	Electronics	14300	7150	14300.0
147	Electronics	14400	7200	14400.0
148	Electronics	14500	7250	14500.0
149	Electronics	14600	7300	14600.0
150	Electronics	14700	7350	14700.0
151	Electronics	14800	7400	14800.0
152	Electronics	14900	7450	14900.0
153	Electronics	15000	7500	15000.0
154	Electronics	15100	7550	15100.0
155	Electronics	15200	7600	15200.0
156	Electronics	15300	7650	15300.0
157	Electronics	15400	7700	15400.0
158	Electronics	15500	7750	15500.0
159	Electronics	15600	7800	15600.0
160	Electronics	15700	7850	15700.0
161	Electronics	15800	7900	15800.0
162	Electronics	15900	7950	15900.0
163	Electronics	16000	8000	16000.0
164	Electronics	16100	8050	16100.0
165	Electronics	16200	8100	16200.0
166	Electronics	16300	8150	16300.0
167	Electronics	16400	8200	16400.0
168	Electronics	16500	8250	16500.0
169	Electronics	16600	8300	16600.0
170	Electronics	16700	8350	16700.0
171	Electronics	16800	8400	16800.0
172	Electronics	16900	8450	16900.0
173	Electronics	17000	8500	17000.0
174	Electronics	17100	8550	17100.0
175	Electronics	17200	8600	17200.0
176	Electronics	17300	8650	17300.0
177	Electronics	17400	8700	17400.0
178	Electronics	17500	8750	17500.0
179	Electronics	17600	8800	17600.0
180	Electronics	17700	8850	17700.0
181	Electronics	17800	8900	17800.0
182	Electronics	17900	8950	17900.0
183	Electronics	18000	9000	18000.0
184	Electronics	18100	9050	18100.0
185	Electronics	18200	9100	18200.0
186	Electronics	18300	9150	18300.0
187	Electronics	18400	9200	18400.0
188	Electronics	18500	9250	18500.0
189	Electronics	18600	9300	18600.0
190	Electronics	18700	9350	18700.0
191	Electronics	18800	9400	18800.0
192	Electronics	18900	9450	18900.0
193	Electronics	19000	9500	19000.0
194	Electronics	19100	9550	19100.0
195	Electronics	19200	9600	19200.0
196	Electronics	19300	9650	19300.0
197	Electronics	19400	9700	19400.0
198	Electronics	19500	9750	19500.0
199	Electronics	19600	9800	19600.0
200	Electronics	19700	9850	19700.0
201	Electronics	19800	9900	19800.0
202	Electronics	19900	9950	19900.0
203	Electronics	20000	10000	20000.0
204	Electronics	20100	10050	20100.0
205	Electronics	20200	10100	20200.0
206	Electronics	20300	10150	20300.0
207	Electronics	20400	10200	20400.0
208	Electronics	20500	10250	20500.0
209	Electronics	20600	10300	20600.0
210	Electronics	20700	10350	20700.0
211	Electronics	20800	10400	20800.0
212	Electronics	20900	10450	20900.0
213	Electronics	21000	10500	21000.0
214	Electronics	21100	10550	21100.0
2				

Practical 5B – Import the cube in Microsoft Excel and create the Pivot Chart to perform Data Modelling

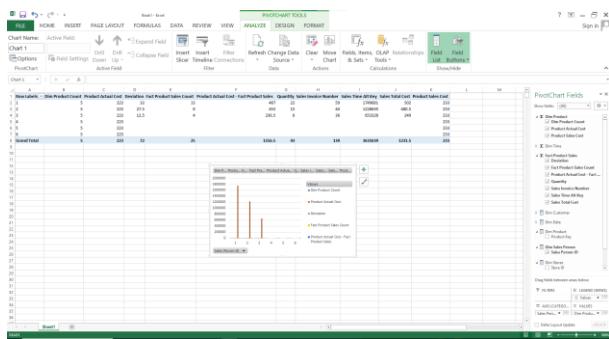
- 1) Open Microsoft Excel containing a Pivot Table > Insert > PivotChart > Clustered Column Chart



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2) Chart is shown



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Practical 6 – Perform the What-If Analysis for Data Visualization

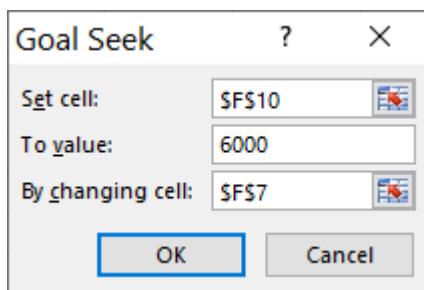
1) Create a Excel Sheet > Create a Table

A screenshot of Microsoft Excel showing a table in the A1:D5 range. The table has four columns: Product, Rate, QTY, and Total. The 'Total' column contains the formula =B2*C2. The 'Rate' column is formatted as currency (\$). The 'QTY' column is formatted as percentage (%).

Product	Rate	QTY	Total
Product A	\$10	10%	\$100
Product B	\$20	20%	\$400
Product C	\$30	30%	\$900
Product D	\$40	40%	\$1600
Total	\$600		

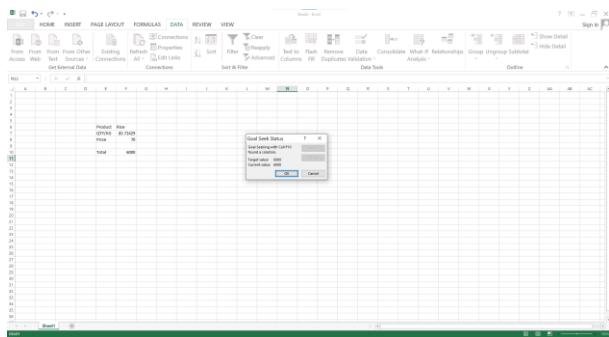
2) Go to Data > What-If Analysis > Goal Seek > Select Sells and Target Value. Values Change

A screenshot of Microsoft Excel showing the ribbon with the 'DATA' tab selected. In the 'What-If Analysis' group, the 'Goal Seek' button is highlighted. The same table from the previous step is visible in the background.

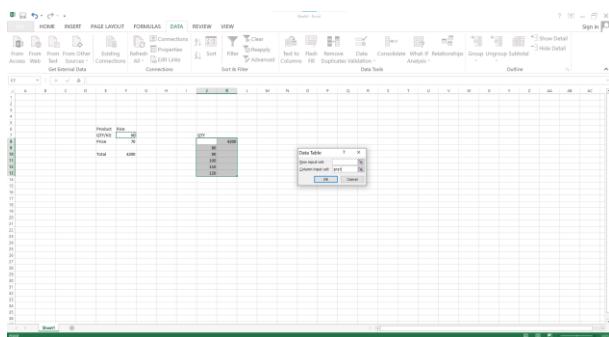
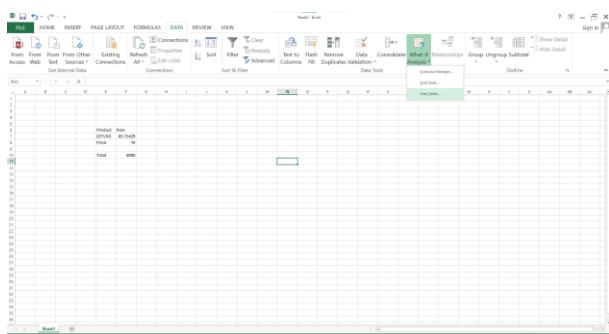
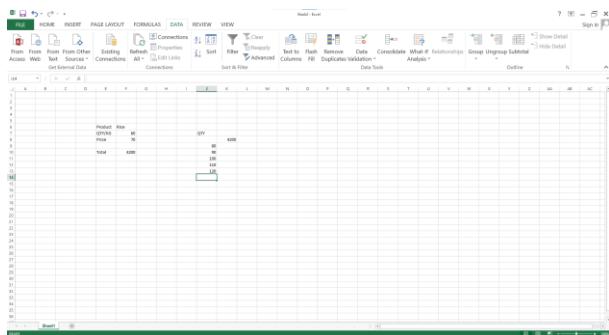


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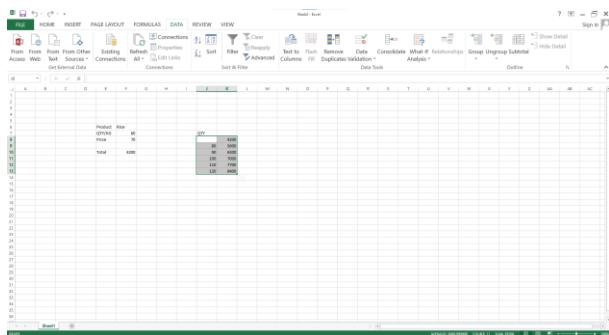


- 3) Create another table > Select Table Values > What-If Analysis > Data Table > Column Input > Select Original Quantity (F7) > OK. Values are shown.

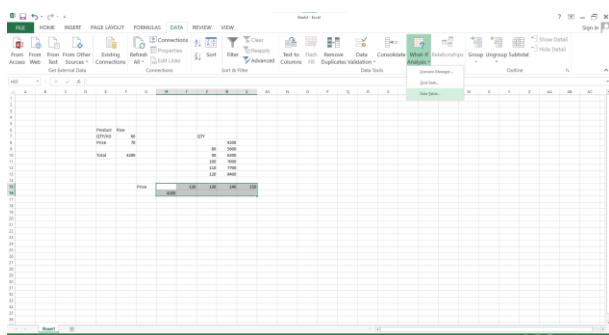
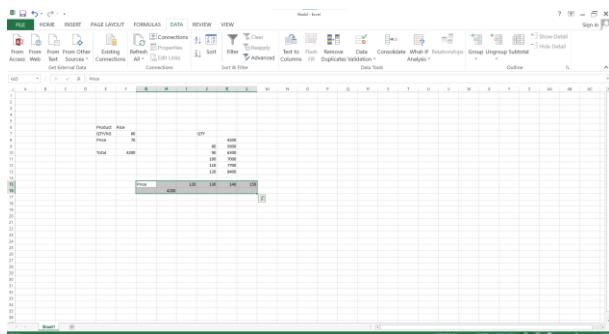


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- 4) Create another table > Select Table Values > What-If Analysis > Data Table > Row Input > Select Original Price (F8) > OK. Values are shown.



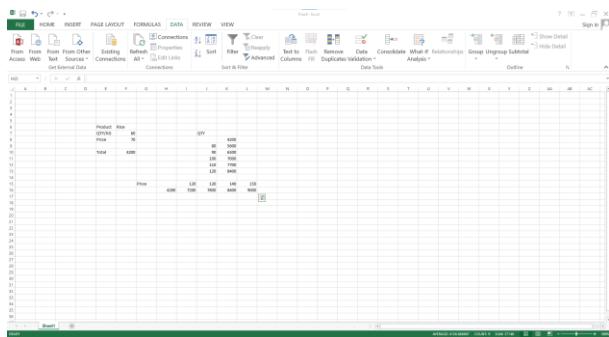
Data Table

Row input cell:

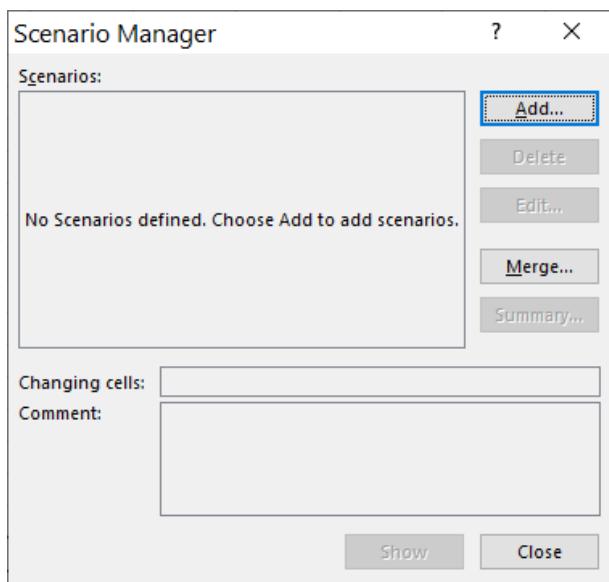
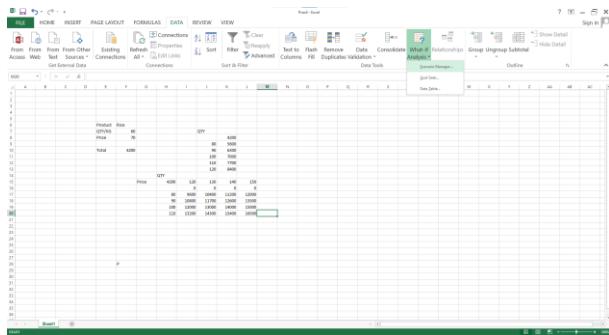
Column input cell:

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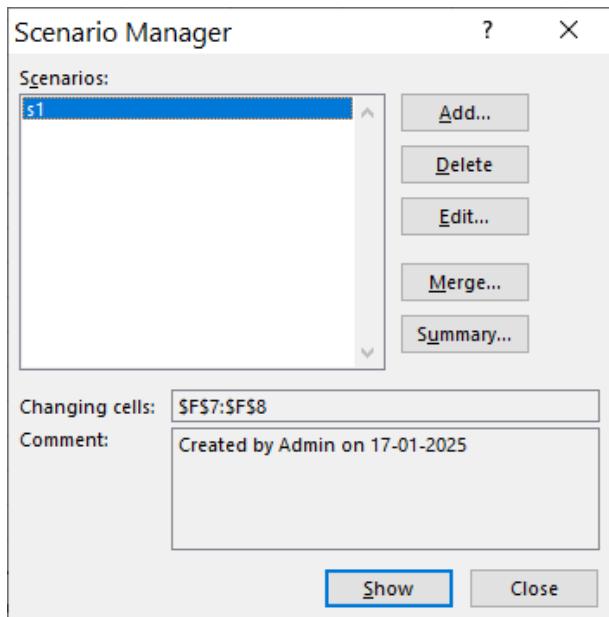
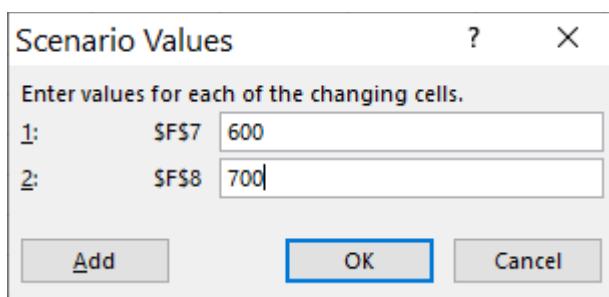
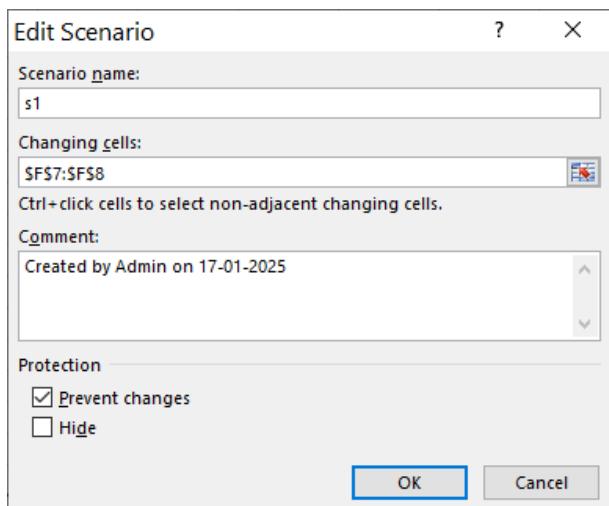


5) What-If Analysis > Scenario Manager > Add > Name and Cells > Change Value > Ok > Show. Values Change



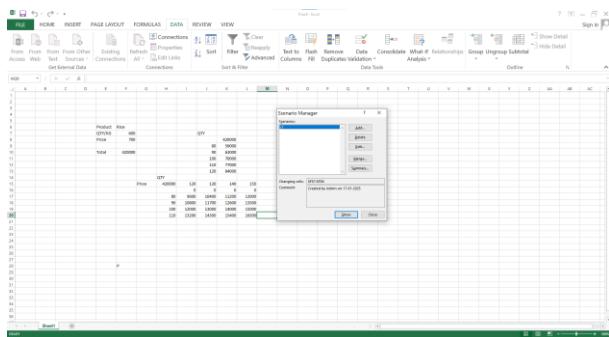
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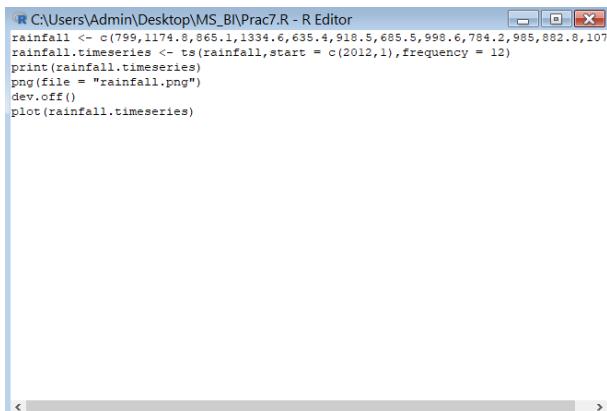
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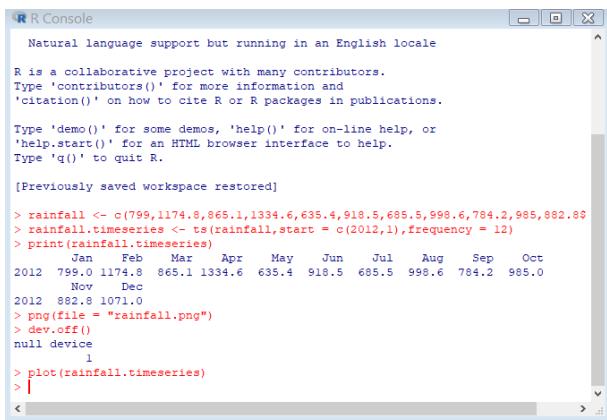
Practical 7 – Data Analysis using Time Series Analysis

- 1) Open RGui. Type the code and run it.



```
R C:\Users\Admin\Desktop\MS_BI\Prac7.R - R Editor
rainfall <- c(799,1174.8,865.1,1334.6,635.4,918.5,685.5,998.6,784.2,985,882.8,107
rainfall.timeseries <- ts(rainfall,start = c(2012,1),frequency = 12)
print(rainfall.timeseries)
png(file = "rainfall.png")
dev.off()
plot(rainfall.timeseries)
```

- 2) The output will be shown as this.

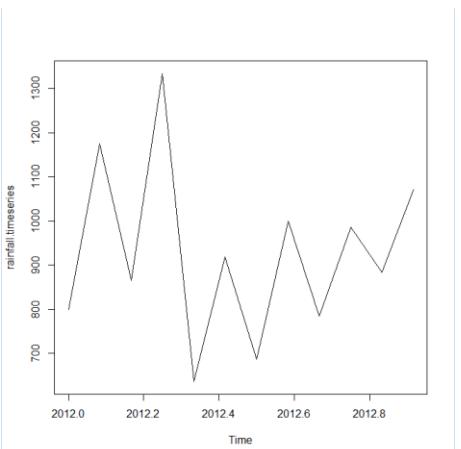


```
R Console
Natural language support but running in an English locale
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

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]

> rainfall <- c(799,1174.8,865.1,1334.6,635.4,918.5,685.5,998.6,784.2,985,882.8
> rainfall.timeseries <- ts(rainfall,start = c(2012,1),frequency = 12)
> print(rainfall.timeseries)
  Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct
2012 799.0 1174.8 865.1 1334.6 635.4 918.5 685.5 998.6 784.2 985.0
  Nov   Dec
2012 882.8 1071.0
> png(file = "rainfall.png")
> dev.off()
null device
  1
> plot(rainfall.timeseries)
> |
```



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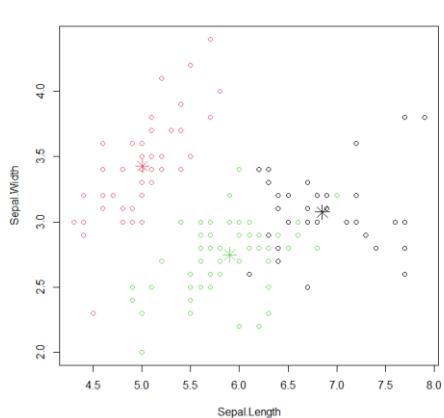
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Practical 8 – K-Means Clustering using R Programming

1) Open RGui. Type the code and run it.

```
R C:\Users\Admin\Desktop\MS_B\Prac8.R - R Editor
newiris <- iris
newiris$Species <- NULL
(kc <- kmeans(newiris,3))
print(kc)
table (iris$Species,kc$cluster)
plot(newiris[c("Sepal.Length","Sepal.Width")],col=kc$cluster)
points(kc$centers[,c("Sepal.Length","Sepal.Width")],col=1:3,pch=8,cex=2)
```

2) The output will be shown as this.

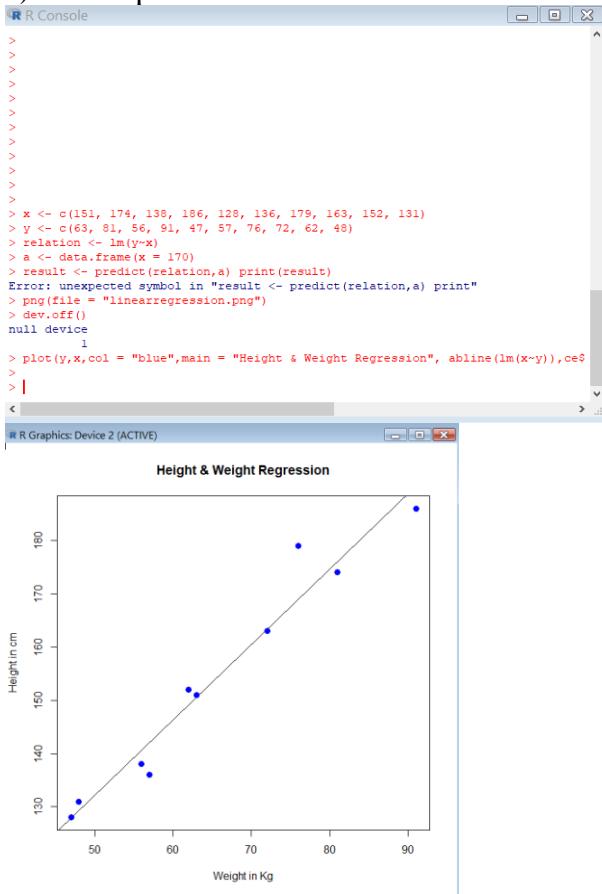


Practical 9 – Prediction using Linear Regression

- 1) Open RGui. Type the code and run it.

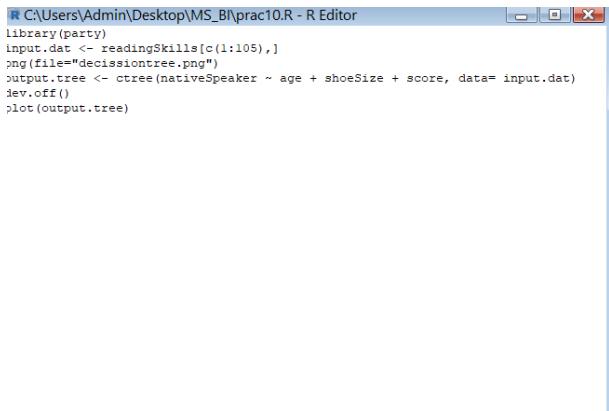
```
R C:\Users\Admin\Desktop\MS_B\Prac9.R - R Editor
> x <- c(151, 174, 138, 186, 128, 136, 179, 163, 152, 131)
> y <- c(63, 81, 56, 91, 47, 57, 76, 72, 62, 48)
> relation <- lm(y~x)
> a <- data.frame(x = 170)
> result <- predict(relation,a) print(result)
> png(file = "linearregression.png")
> dev.off()
> plot(y,x,col = "blue",main = "Height & Weight Regression", abline(lm(x~y)),cex =
```

- 2) The output will be shown as this.



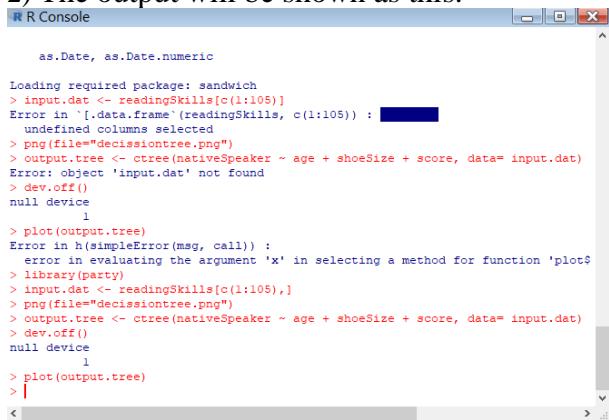
Practical 10 – Implementation of Decision Tree using R Tool

- 1) Open RGui. Type the code and run it.



```
R C:\Users\Admin\Desktop\MS_BI\prac10.R - R Editor
library(party)
input.dat <- readingSkills[c(1:105)]
png(file="decisiontree.png")
output.tree <- ctree(nativeSpeaker ~ age + shoeSize + score, data= input.dat)
dev.off()
plot(output.tree)
```

- 2) The output will be shown as this.



```
R R Console
as.Date, as.Date.numeric

Loading required package: sandwich
> input.dat <- readingSkills[c(1:105]
Error in '[.data.frame' (readingSkills, c(1:105)) : 
  undefined columns selected
> png(file="decisiontree.png")
> output.tree <- ctree(nativeSpeaker ~ age + shoeSize + score, data= input.dat)
Error: object 'input.dat' not found
> dev.off()
null device
1
> plot(output.tree)
Error in h(simpleError(msg, call)) :
  error in evaluating the argument 'x' in selecting a method for function 'plot'
> library(party)
> input.dat <- readingSkills[c(1:105)]
> png(file="decisiontree.png")
> output.tree <- ctree(nativeSpeaker ~ age + shoeSize + score, data= input.dat)
> dev.off()
null device
1
> plot(output.tree)
> |
```

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