

**KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20**  
**T.Y. B.Sc. I.T. Semester VI**

**INDEX**

Sr. No.	Topic	Date	Signature
Assignment			
1	Assignment 1	17 11 22	
2	Assignment 2	01 12 22	
Tutorial			
1	Test 1	19 12 22	
SLE & Project Report			
1	Business Intelligence Applications in Clickstream Mining	06 01 23	
2	Clickstream Data Mining using Google Analytics	06 01 23	
Practical			
1A	Installation of Power BI Desktop	31 01 23	
1B	Import the legacy data from different sources such as Excel, SQL Server and OData Field and load into the target system	31 01 23	
2A	Perform the ETL process to construct the database in SQL Server	31 01 23	
2B	Perform the ETL process in Power BI	31 01 23	
3A	Perform data visualization in Power BI and create the data staging area for the selected database	08 02 23	
3B	Create the data staging area for the selected database using Star Schema	08 02 23	
4A	Create the cube with corresponding dimension and fact table based on OLAP	08 02 23	
4B	Perform Multi-Dimensional Expressions (MDX) queries for OLAP database	08 02 23	

**KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20**  
**T.Y. B.Sc. I.T. Semester VI**

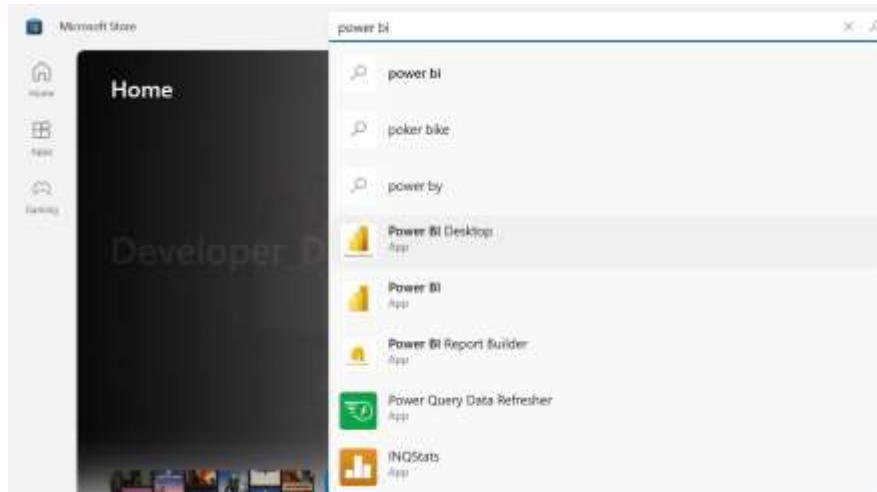
Sr. No.	Topic	Date	Signature
5A	Import the data warehouse in Microsoft Excel and create Pivot Table to perform Data Analytics	13 02 23	
5B	Import the cube in Microsoft Excel and create the Pivot Chart to perform Data Modelling	13 02 23	
6	Perform the What-If Analysis for Data Visualization	13 02 23	
7	Data Analysis using Time Series Analysis	13 02 23	
8	Implementation of Decision Tree using R Tool	13 02 23	
9	K – Means Clustering using R Programming	13 02 23	
10	Prediction using Linear Regression	13 02 23	

# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

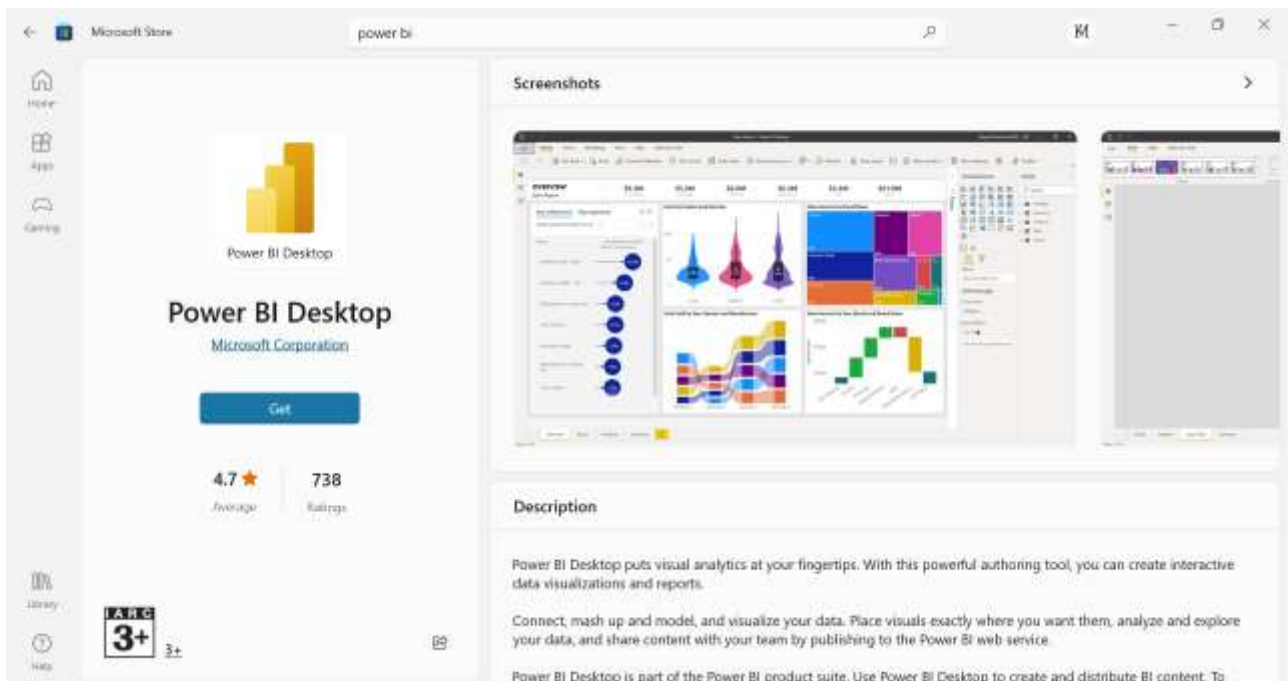
## T.Y. B.Sc. I.T. Semester VI

### Practical 1A – Installation of Power BI Desktop

Go to Microsoft Store and search for power bi, click on Power BI Desktop.



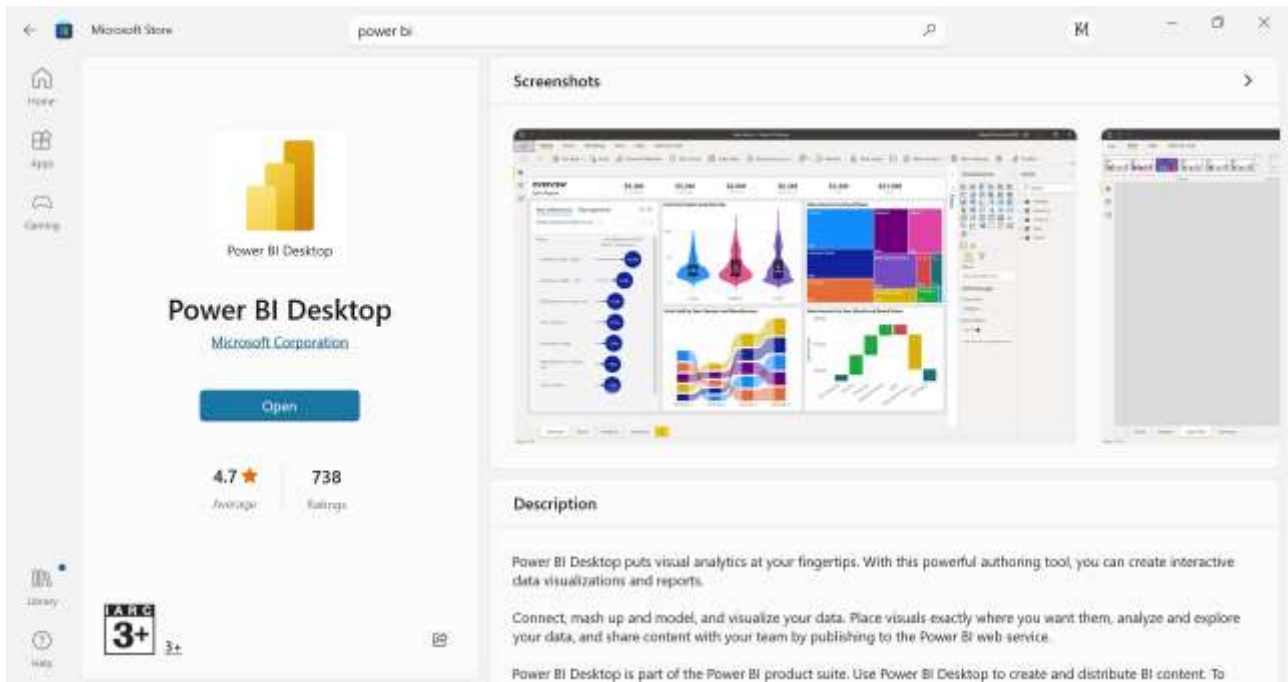
Click on Get button.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

The installation will start. Click on Open once the installation is complete and start working.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

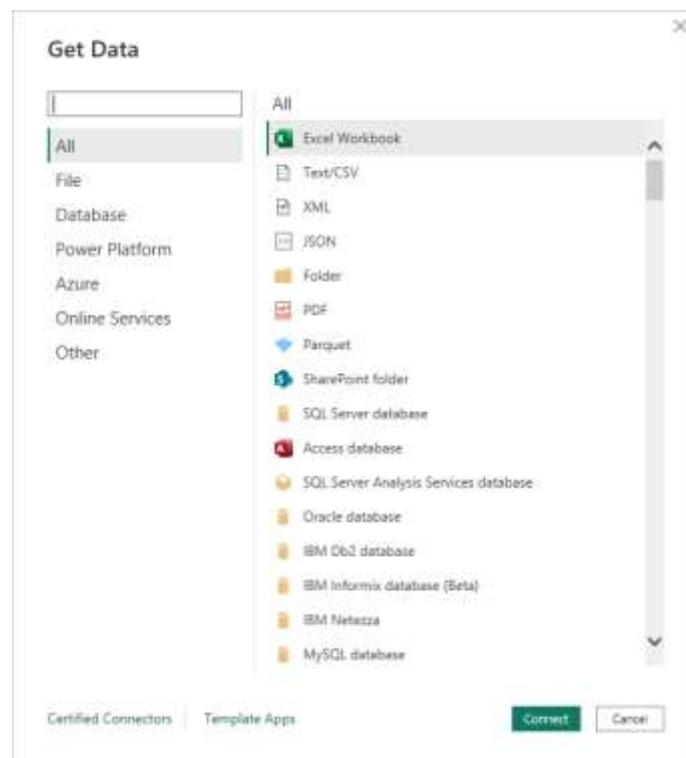
## T.Y. B.Sc. I.T. Semester VI

Practical 1B – Import the legacy data from different sources such as Excel, SQL Server and OData Field and load into the target system

Open Microsoft Power BI.



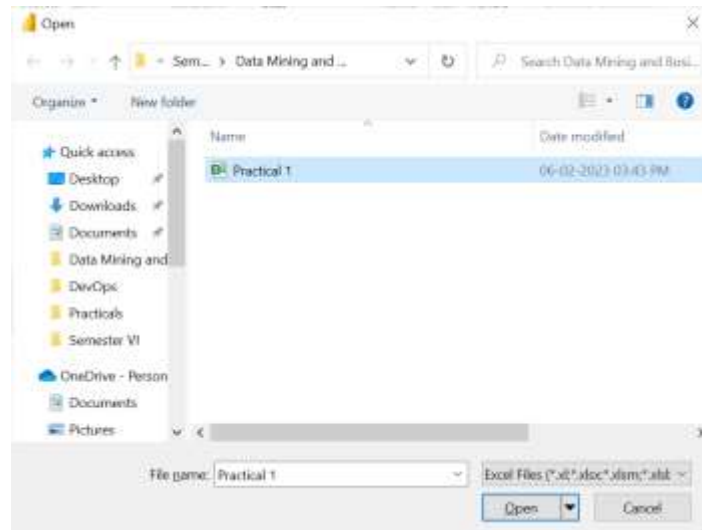
Select Excel Workbook under the Get Data option. Click on Connect.



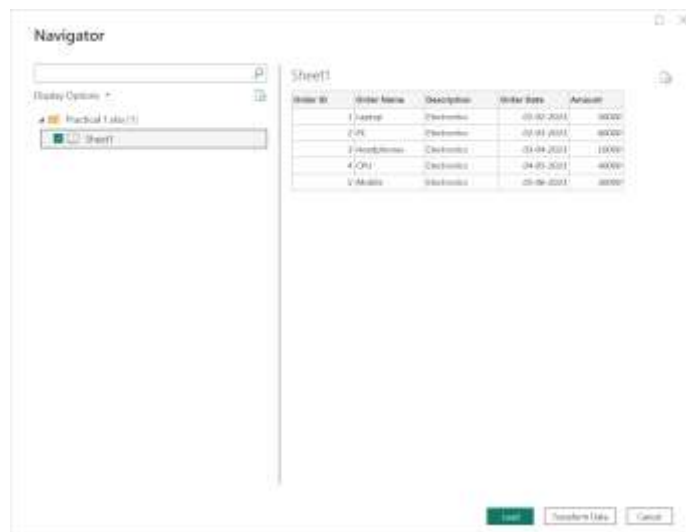
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

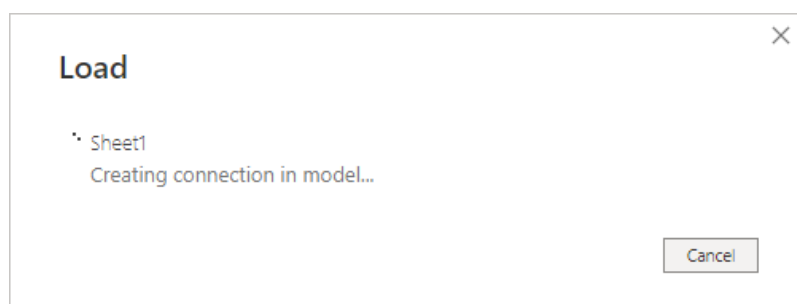
Browse your file and select it.



Select the sheet and click on Load once the table is displayed.



Wait for the loading to complete.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

The data will be shown on the screen once the loading is complete.

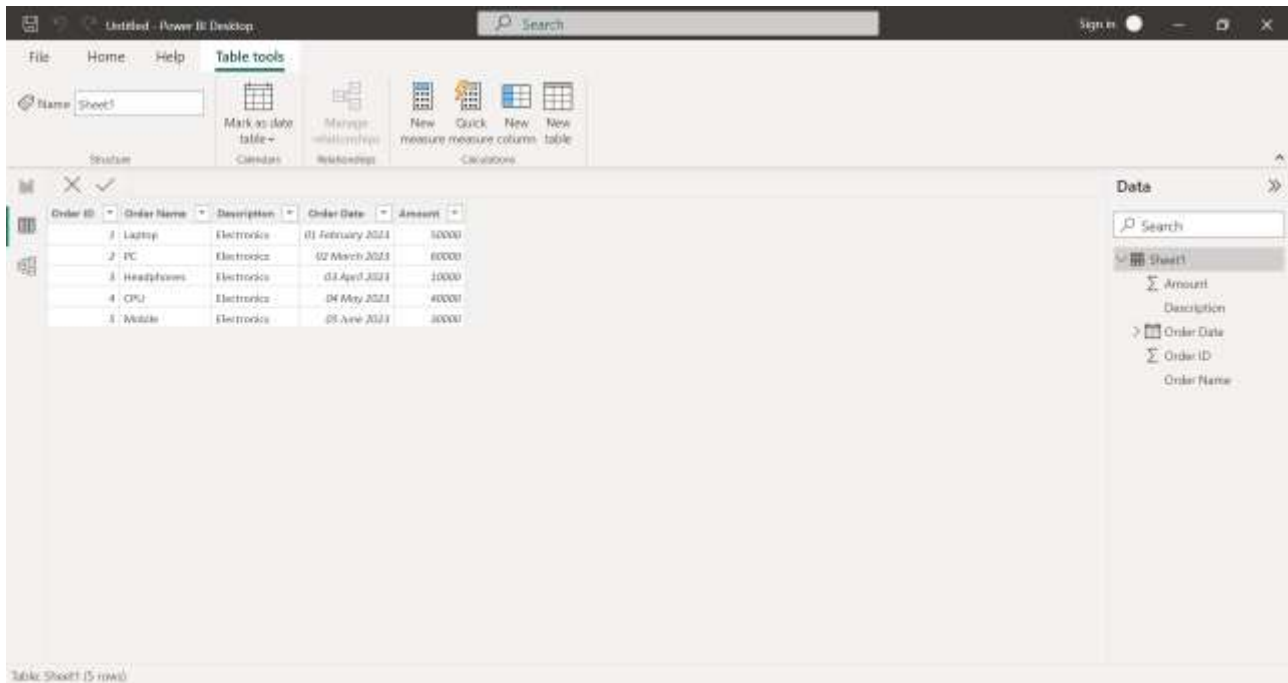
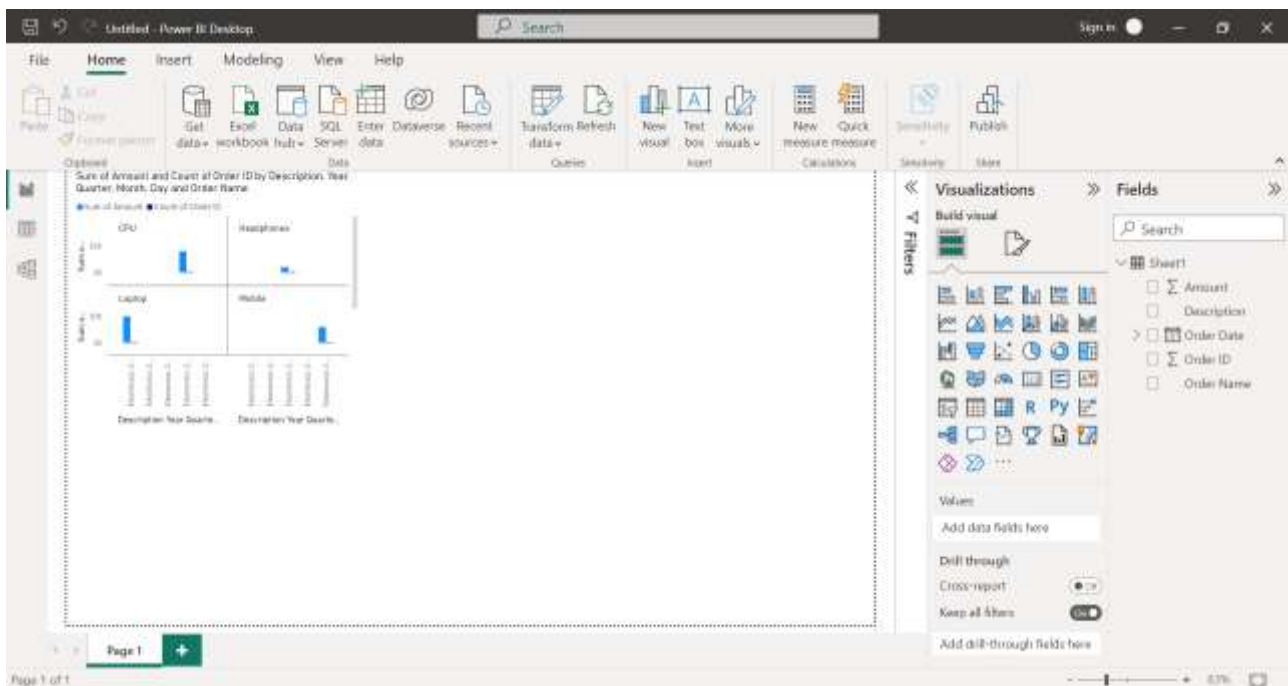


Table: Sheet1 (5 rows)

Order ID	Order Name	Description	Order Date	Amount
1	Laptop	Electronics	01 February 2021	50000
2	PC	Electronics	02 March 2021	60000
3	Headphones	Electronics	03 April 2021	10000
4	CPU	Electronics	04 May 2021	40000
5	Monitor	Electronics	05 June 2021	30000

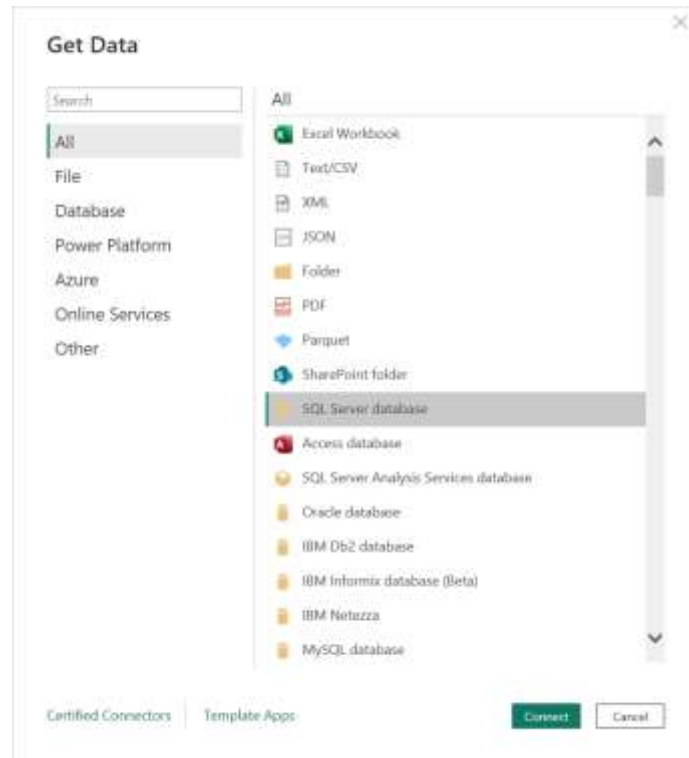
Click on the Charts icon to display the graphical representation of the data.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on Get Data and select SQL Server Database.



Copy the server name from Microsoft SQL Server Management Studio and paste it where the server is asked for connection between the two apps. Select Import and click on OK.

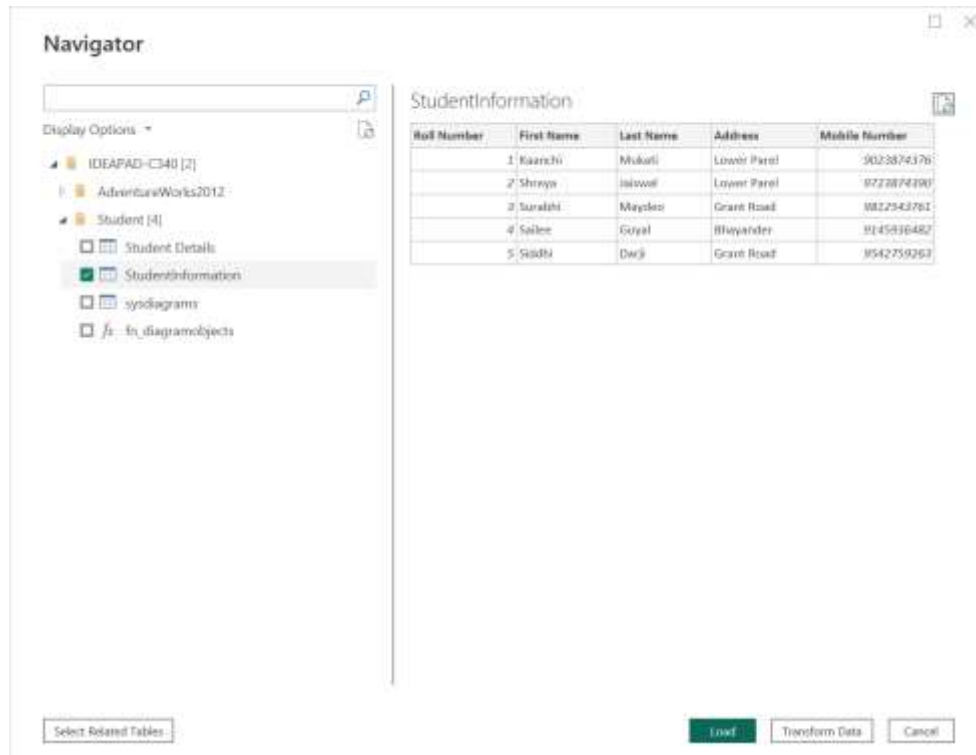




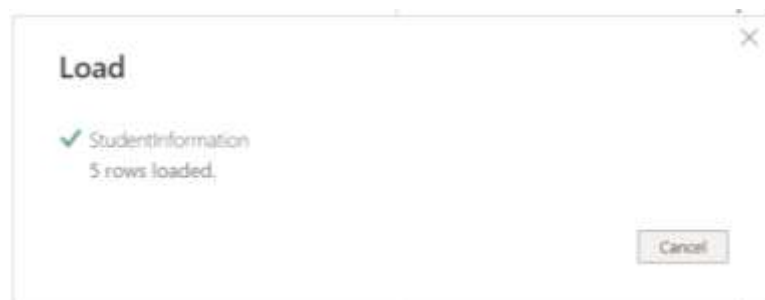
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select the table you wish to go ahead with and load it.



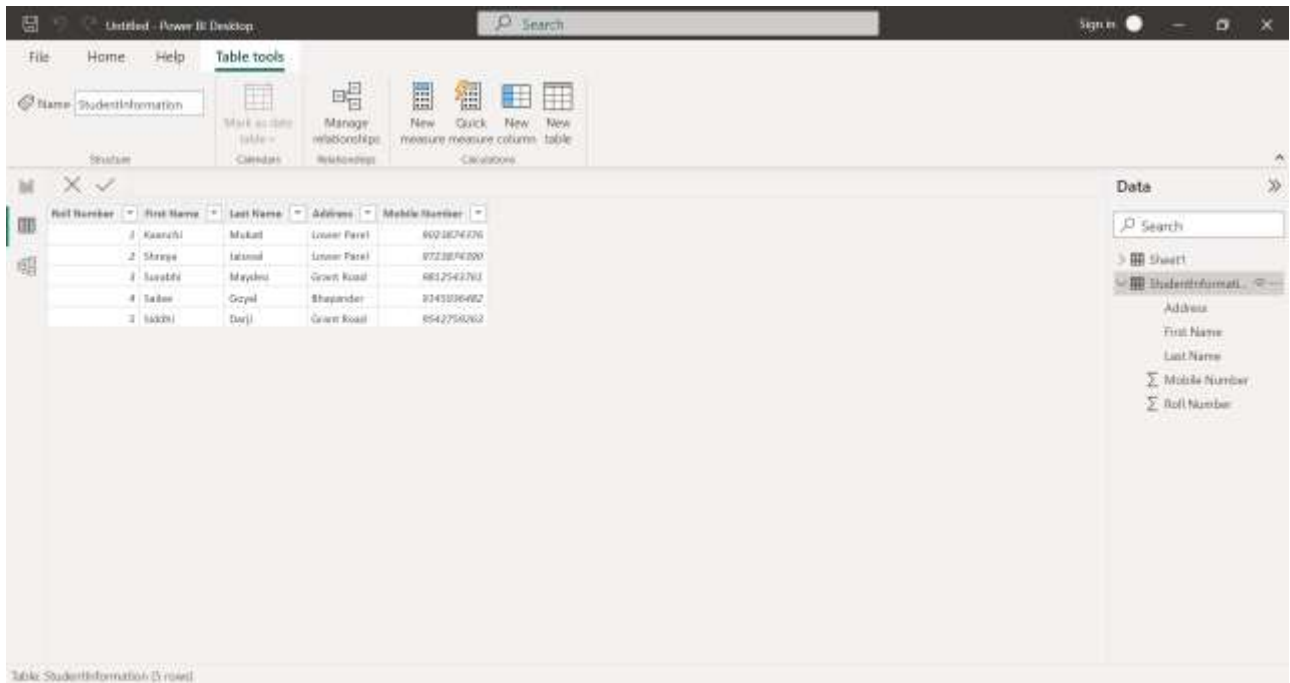
Once the data is loaded the following dialogue box will be displayed.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

The data will be displayed on the screen.

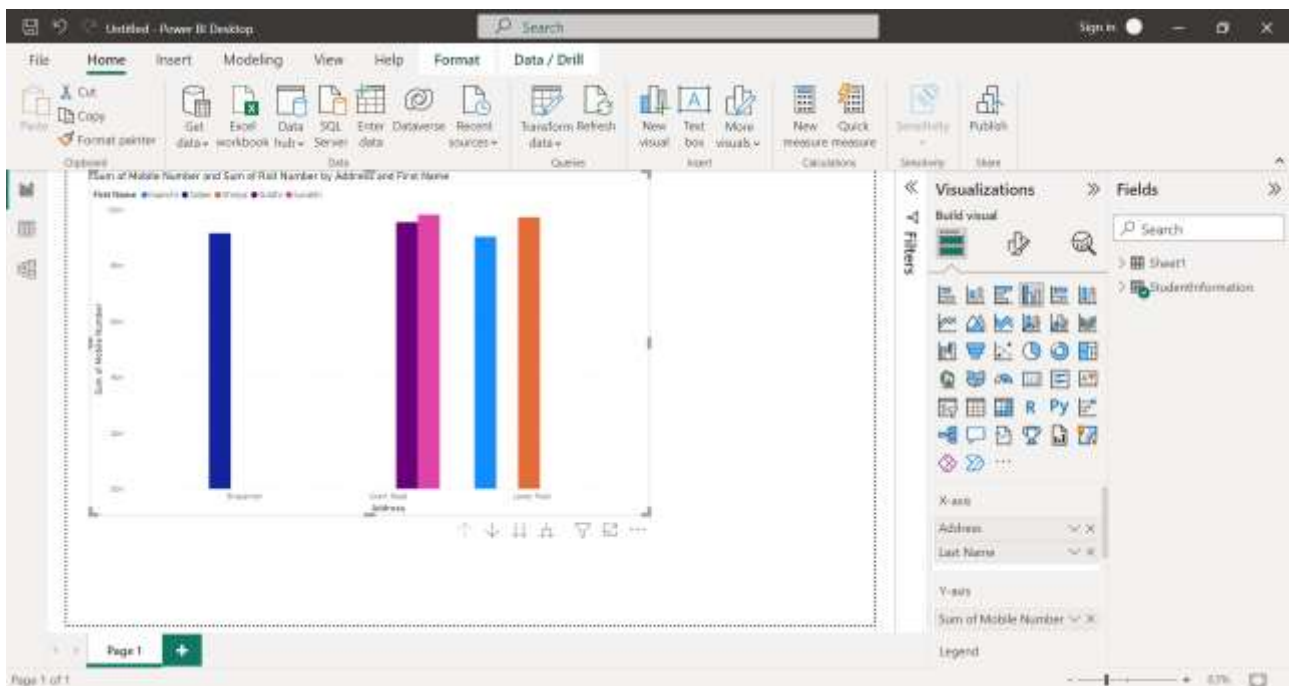


The screenshot shows the Microsoft Power BI Desktop interface. The 'Table tools' ribbon is active, and a table named 'StudentInformation' is displayed. The table has five columns: Roll Number, First Name, Last Name, Address, and Mobile Number. The data is as follows:

Roll Number	First Name	Last Name	Address	Mobile Number
1	Kaanchi	Mukati	Lower Panel	9021074776
2	Shreya	Salunke	Lower Panel	9721874290
3	Susmita	Majumdar	Green Road	9812543793
4	Sakshi	Goyal	Shapander	9343196492
5	Siddhi	Darji	Green Road	9542750262

The 'Data' pane on the right shows the 'StudentInformation' table selected, with fields like Address, First Name, Last Name, Mobile Number, and Roll Number listed below it.

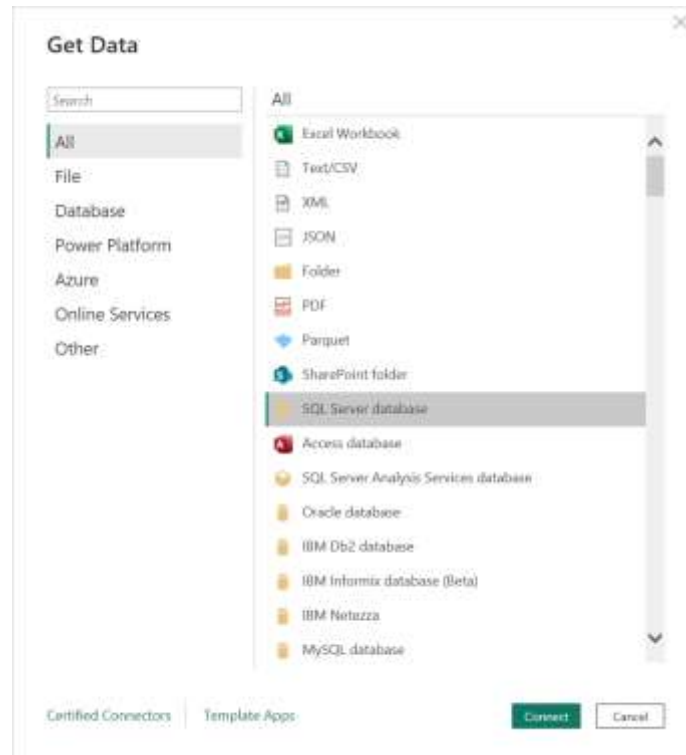
On clicking the charts icon the graphical representation of the data will be displayed.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select SQL Server Database under Get Data and connect.



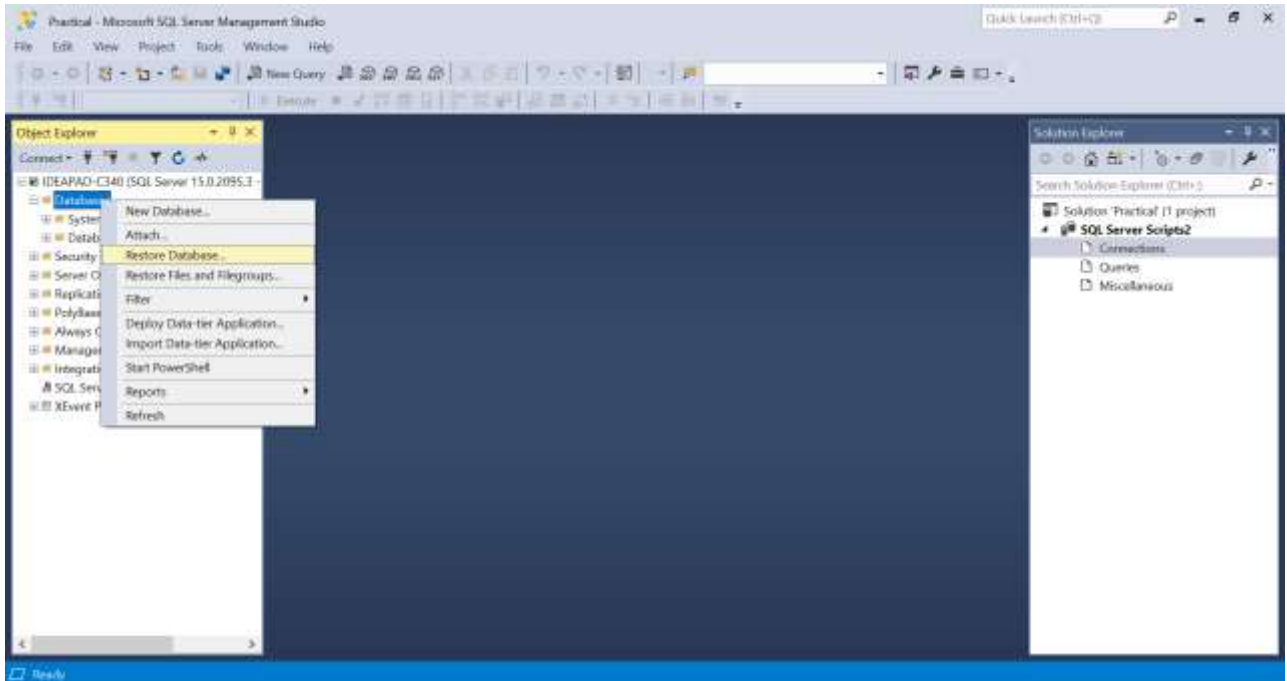
Enter the server name and the file name with .bak extension. Click on Import and OK.



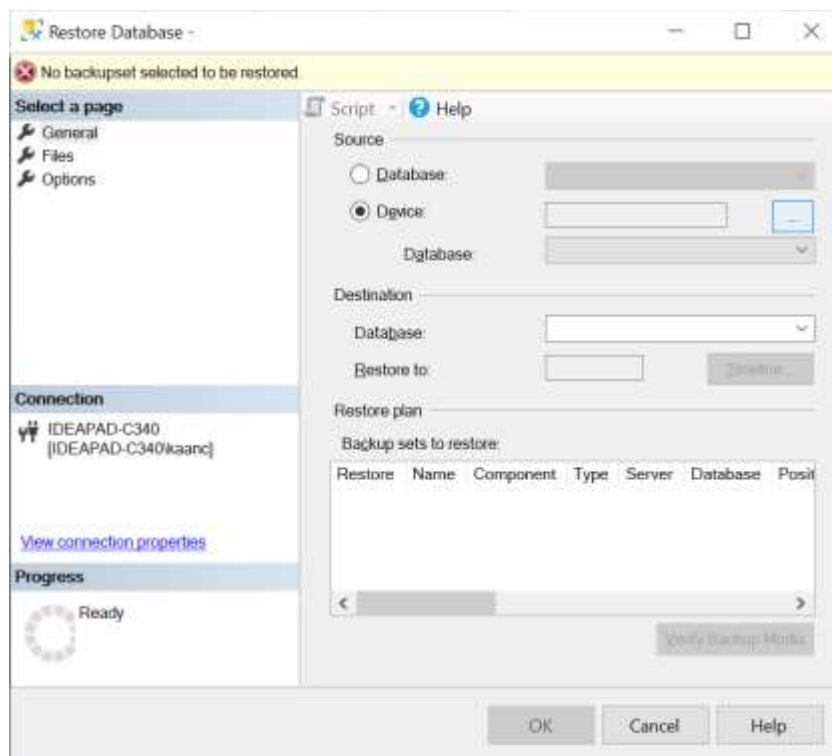
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Open Microsoft SQL Server Management Studio. Right click on Databases and click on Restore Database...



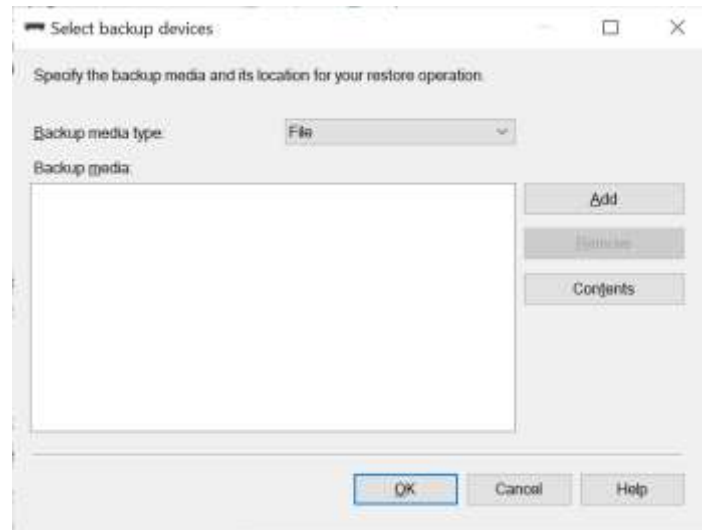
Select Device and click on the button next to it for additional steps.



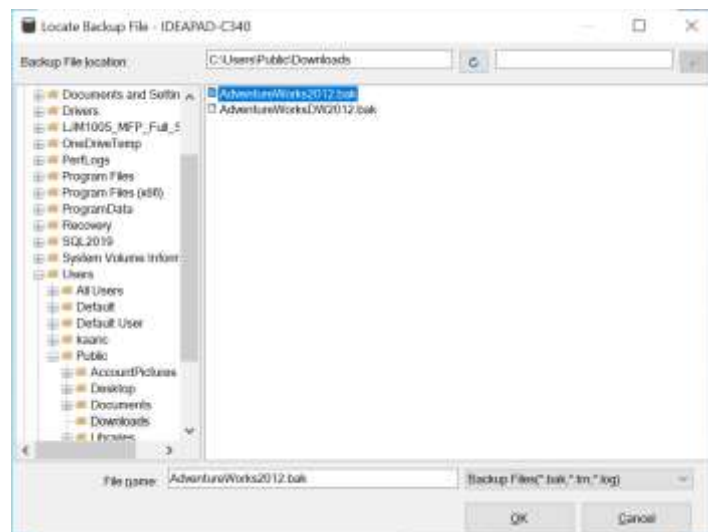
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on Add.



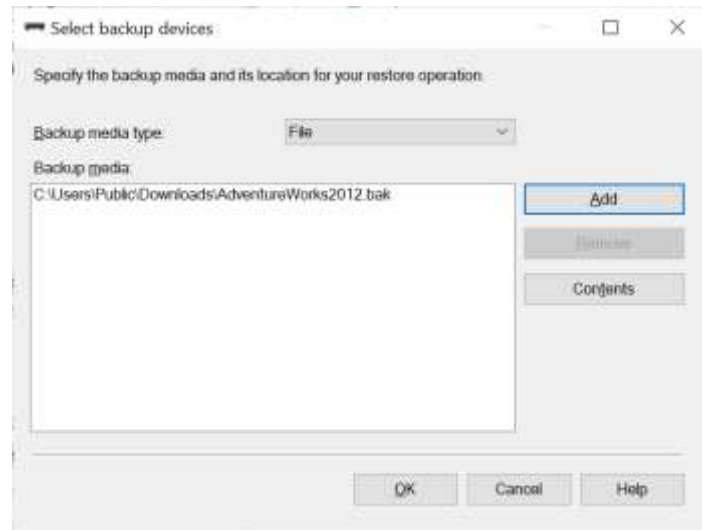
Search for your file with .bak extension and select it.



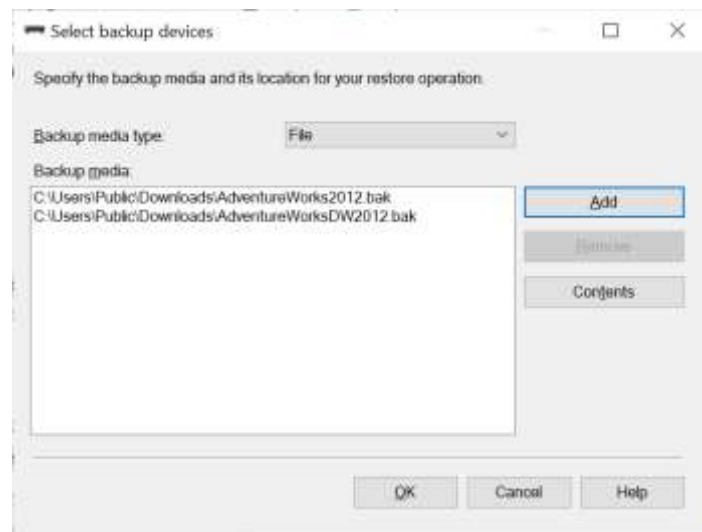
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on Add.



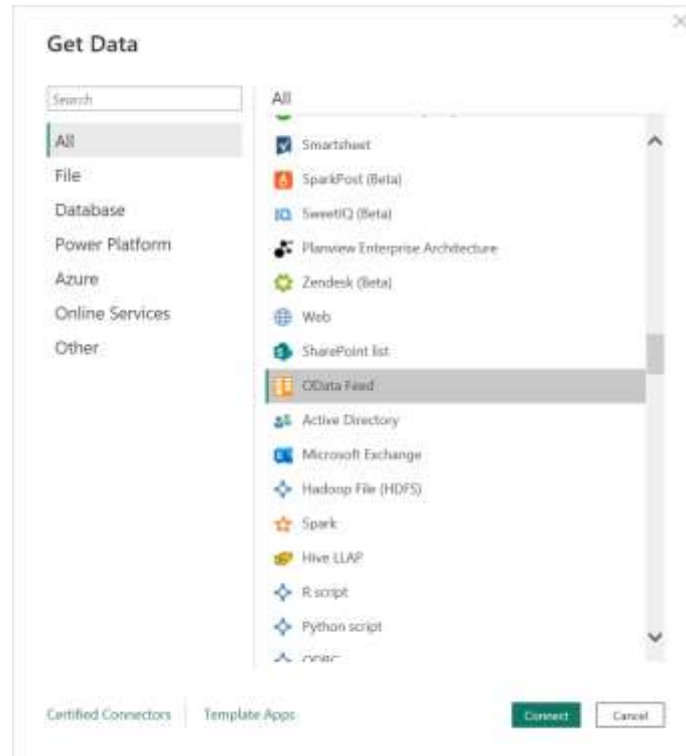
Search for another file and add it as well.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

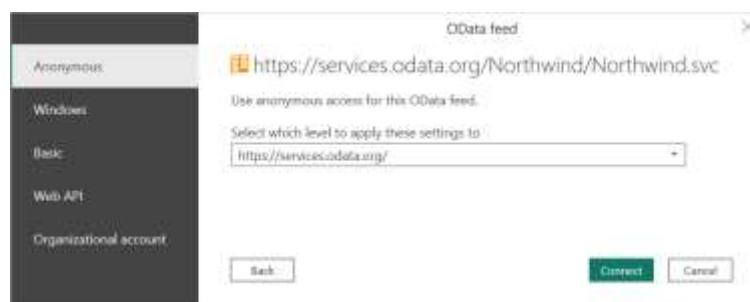
Get Data – O Data Feed



Paste the URL.



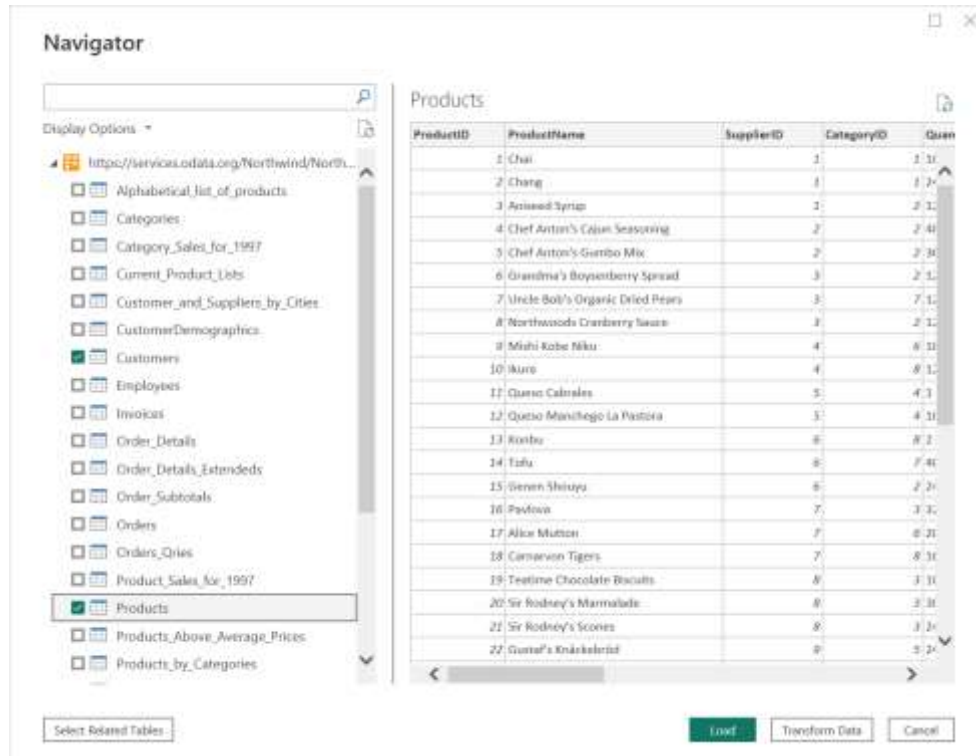
Select the services level to apply the settings to and connect.



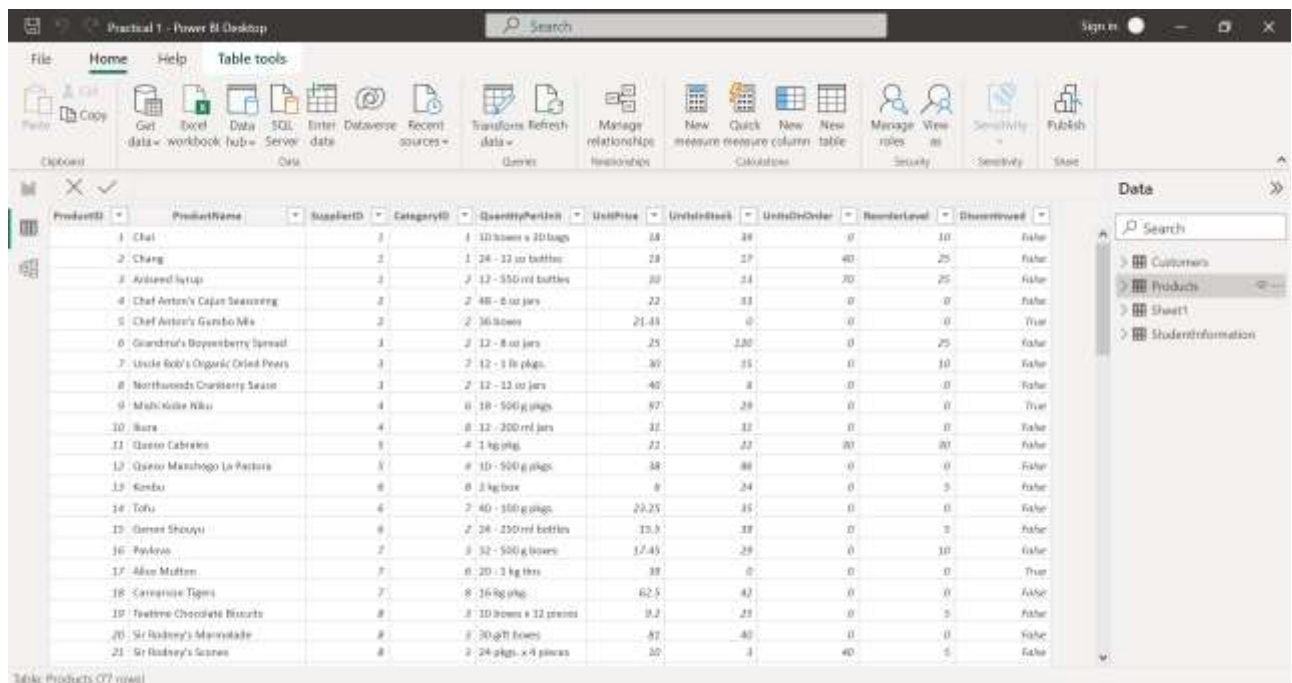
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select two tables that are Customers and Products table and load them.



Select the Products table.

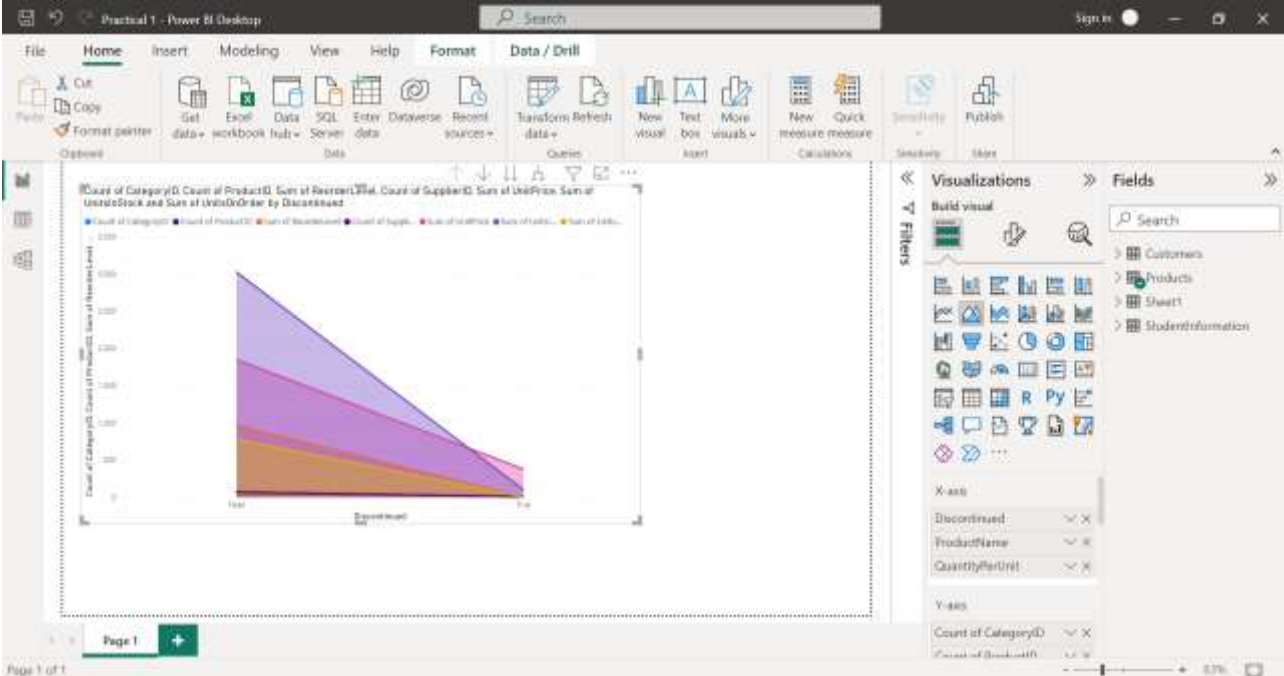




**KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20**

**T.Y. B.Sc. I.T. Semester VI**

Click on the charts icon and select the type of graph to be displayed

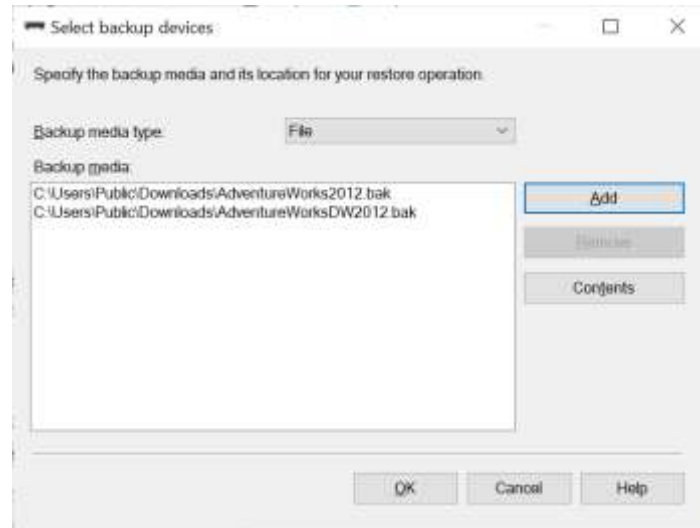


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

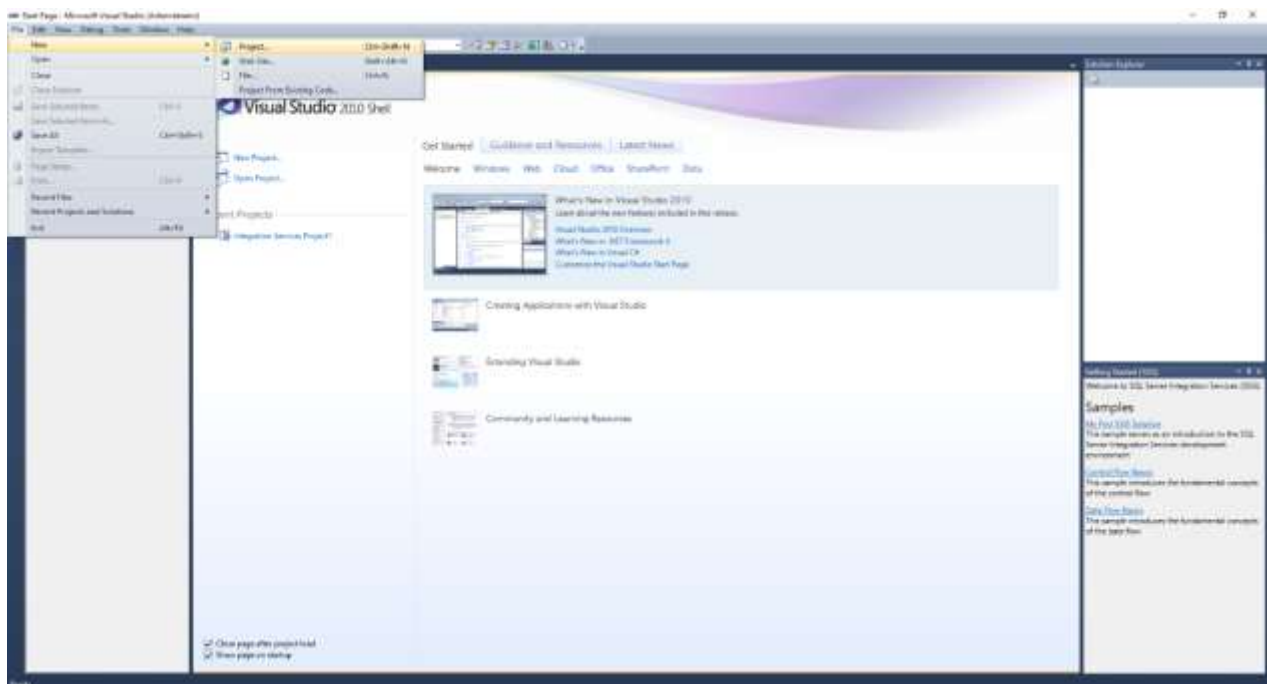
## T.Y. B.Sc. I.T. Semester VI

Practical 2A - Perform the ETL process to construct the database in SQL Server

Add the AdventureWorks file in SQL Server Management Database.



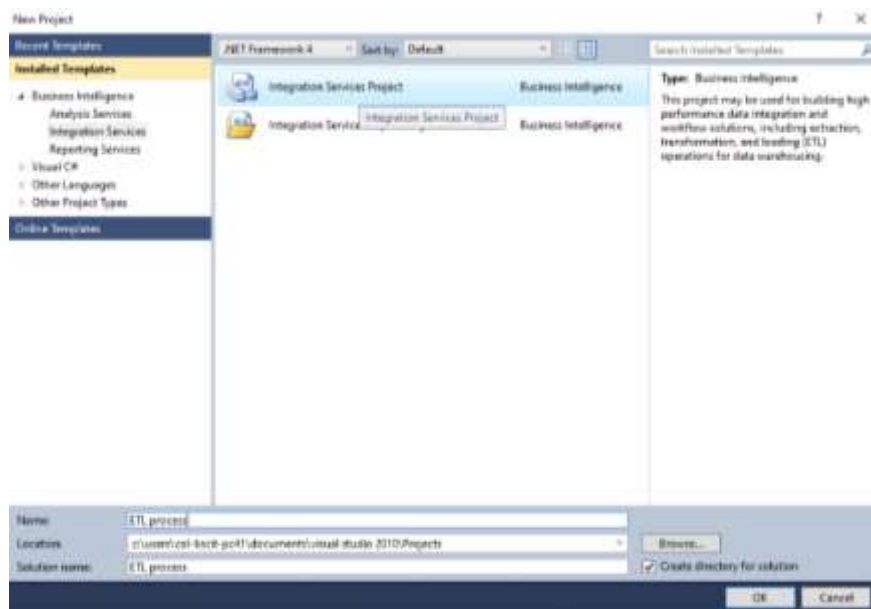
Open SQL Server Data Tools. Go to File then New and then Project



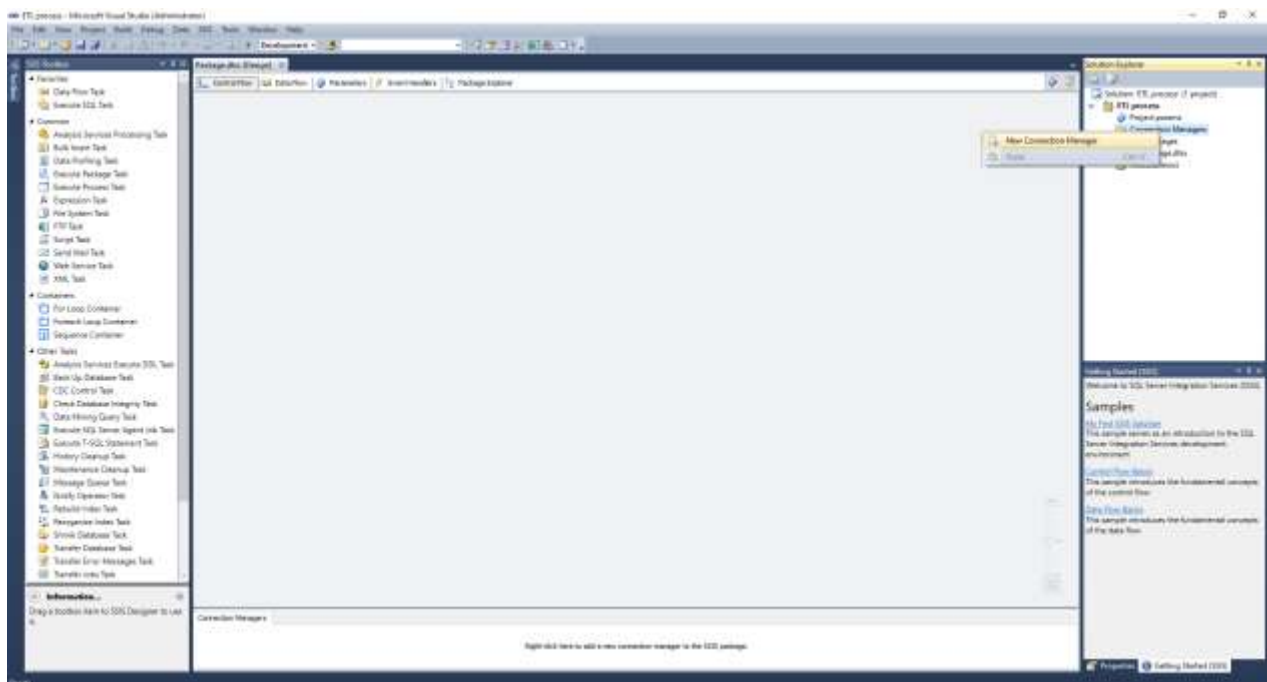
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select Integration Services and select Integration Services Project, rename it as ETL Process.



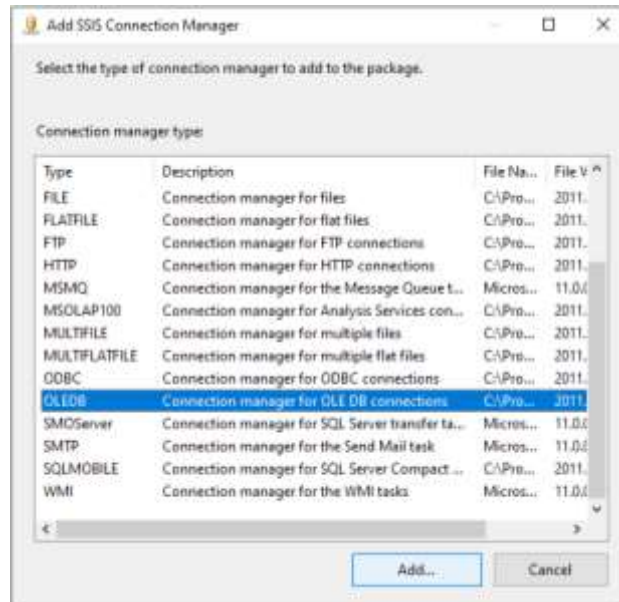
In the Solution Explorer right click on Connection Managers under ETL Process the file name and select the New Connection Manager.



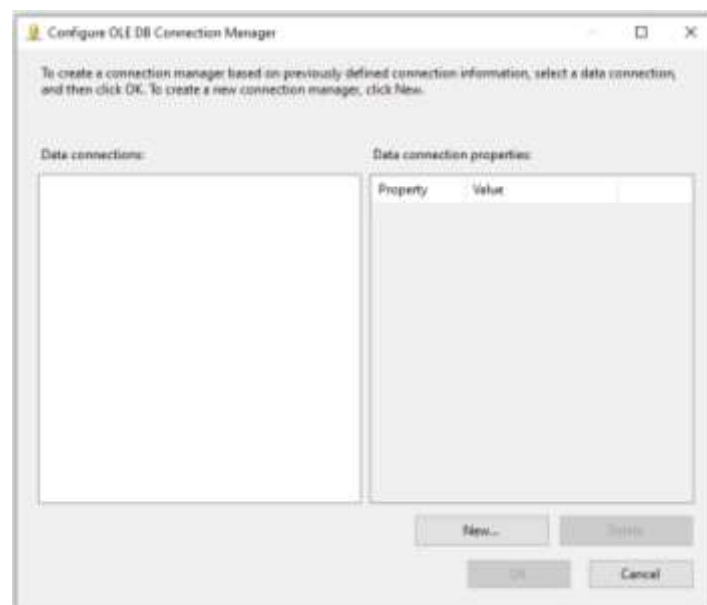
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Add OLEDB as the Connection Manager.



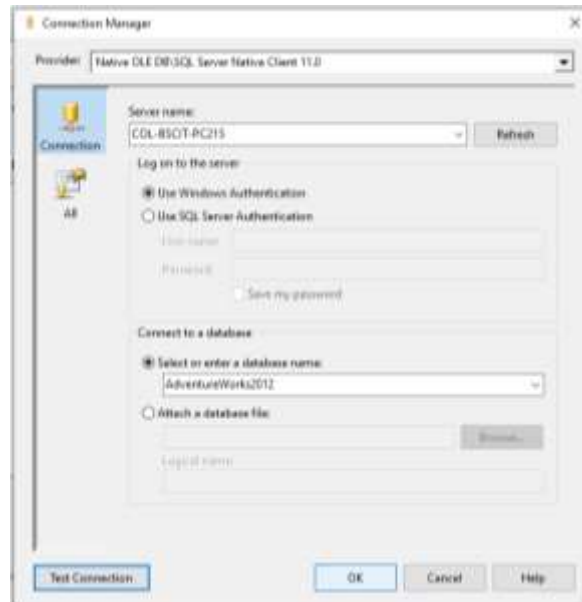
After adding the Connection Manager the following dialogue box will open. Click on New.



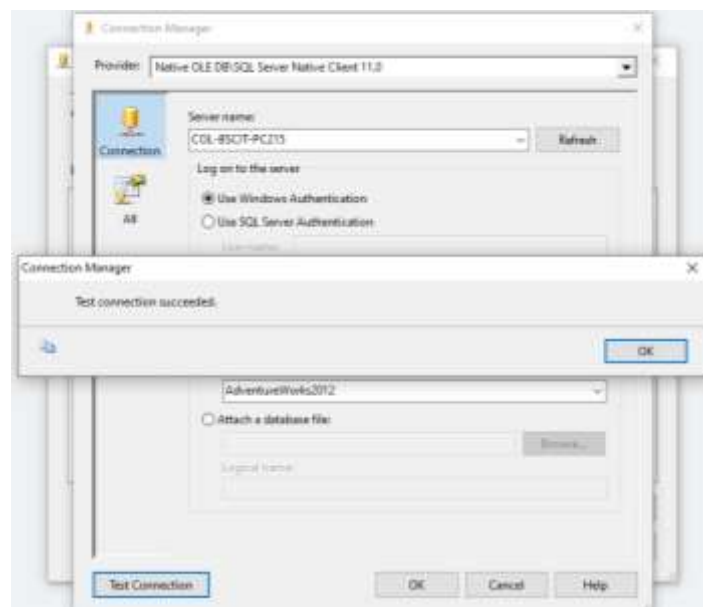
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Enter the Server Name and select the database that is AdventureWorks file.



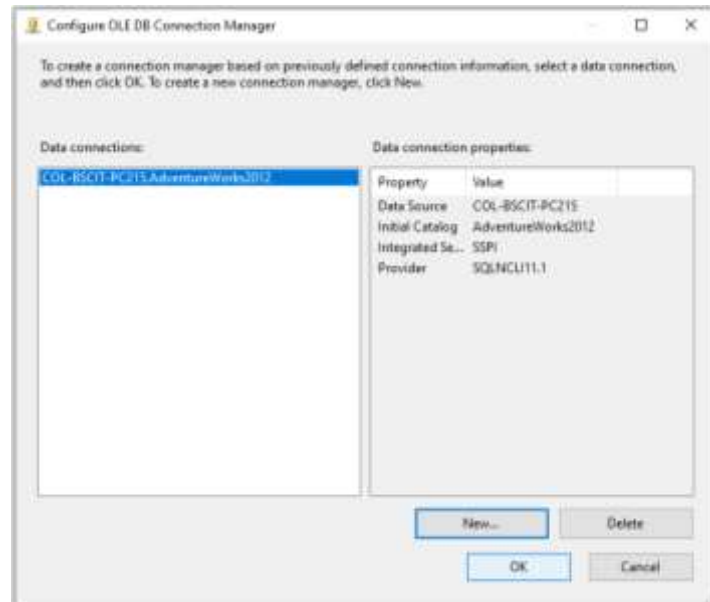
Test the connection, it should succeed.



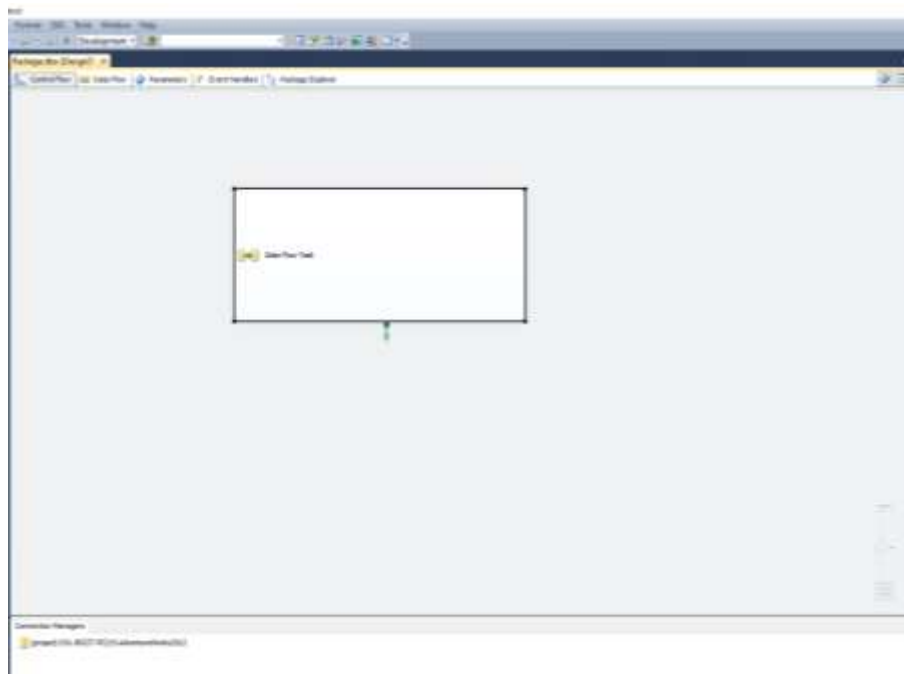
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on OK.



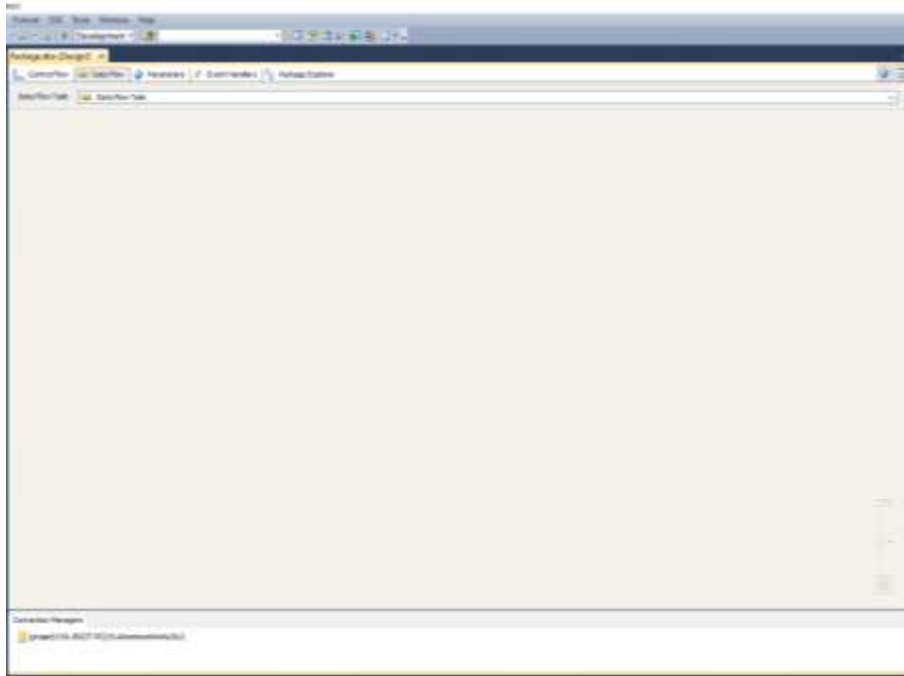
The following will be displayed on the main screen in the Control Flow view.



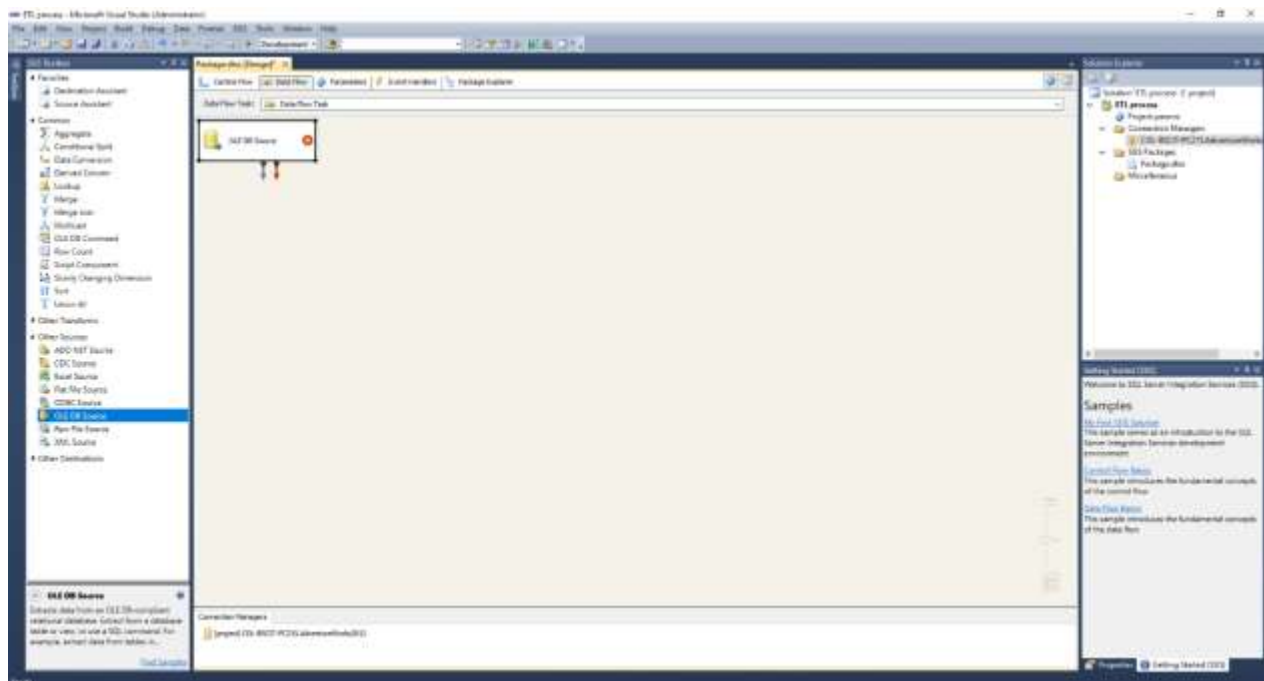
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

In the Data Flow task, the following will be displayed.



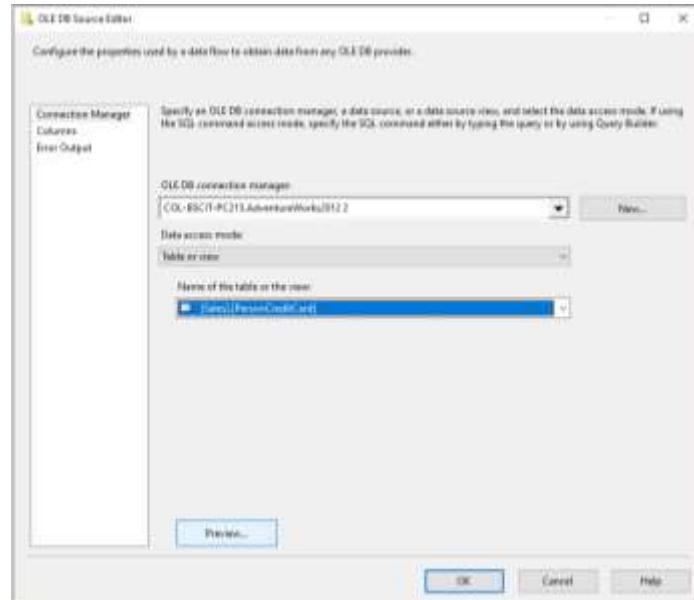
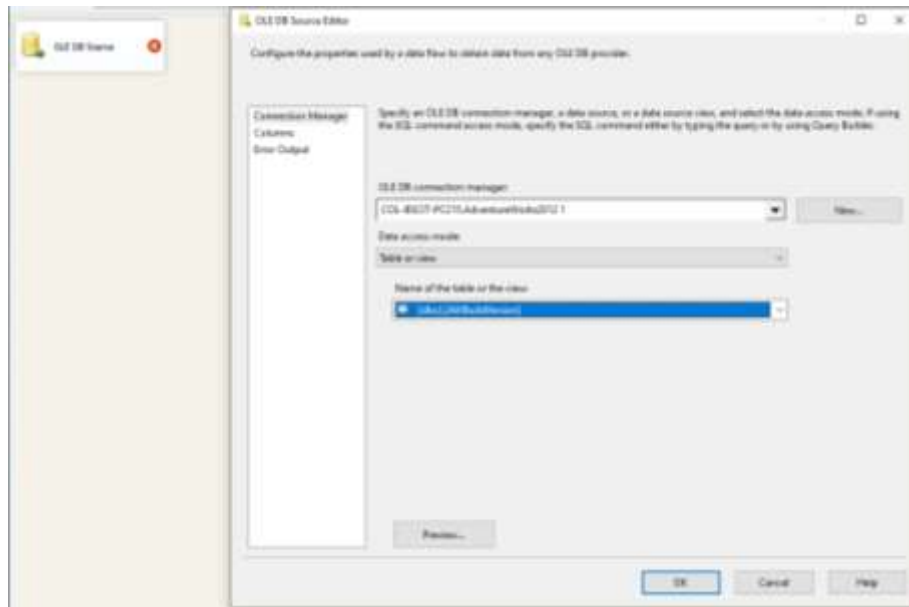
Under Other Sources in the SSIS Toolbox drag and drop OLE DB Source to the screen.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

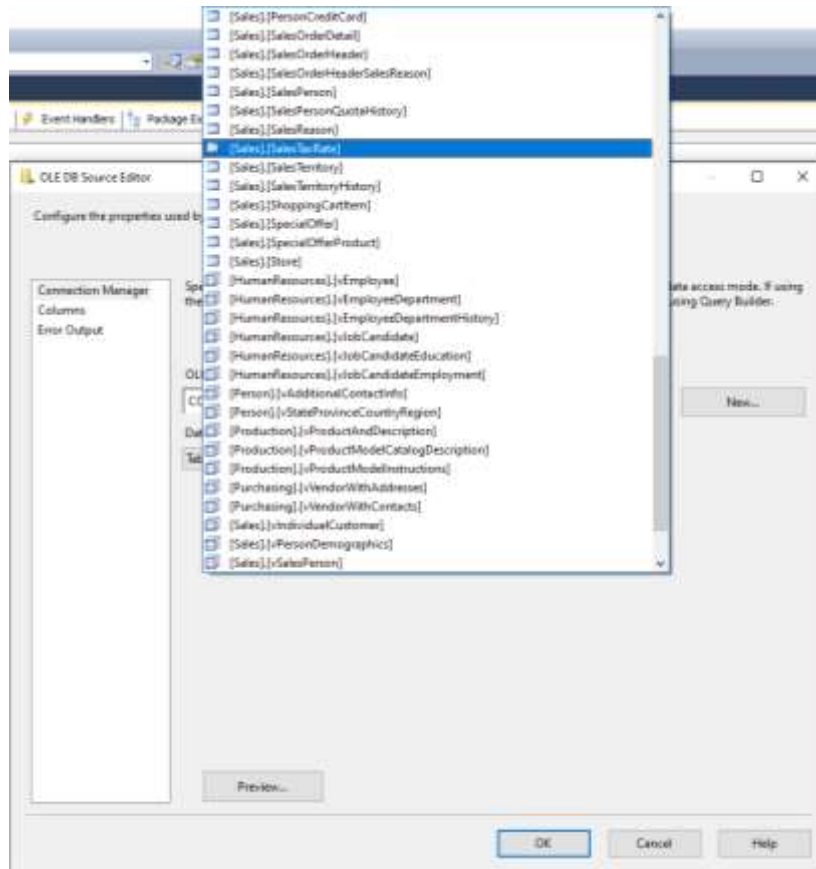
Right click on OLE DB Source. Under Connection Manager enter the OLE DB Connection Manager and the name of the tables by clicking on New.



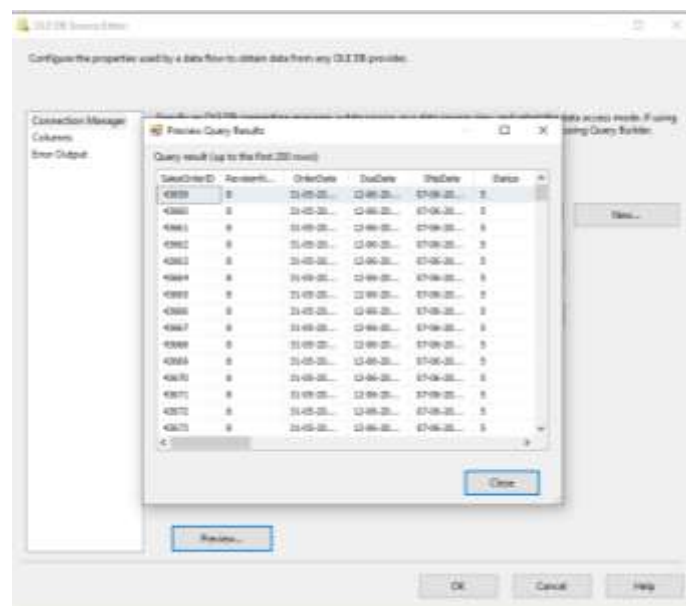


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI



Select Preview to see the query results.

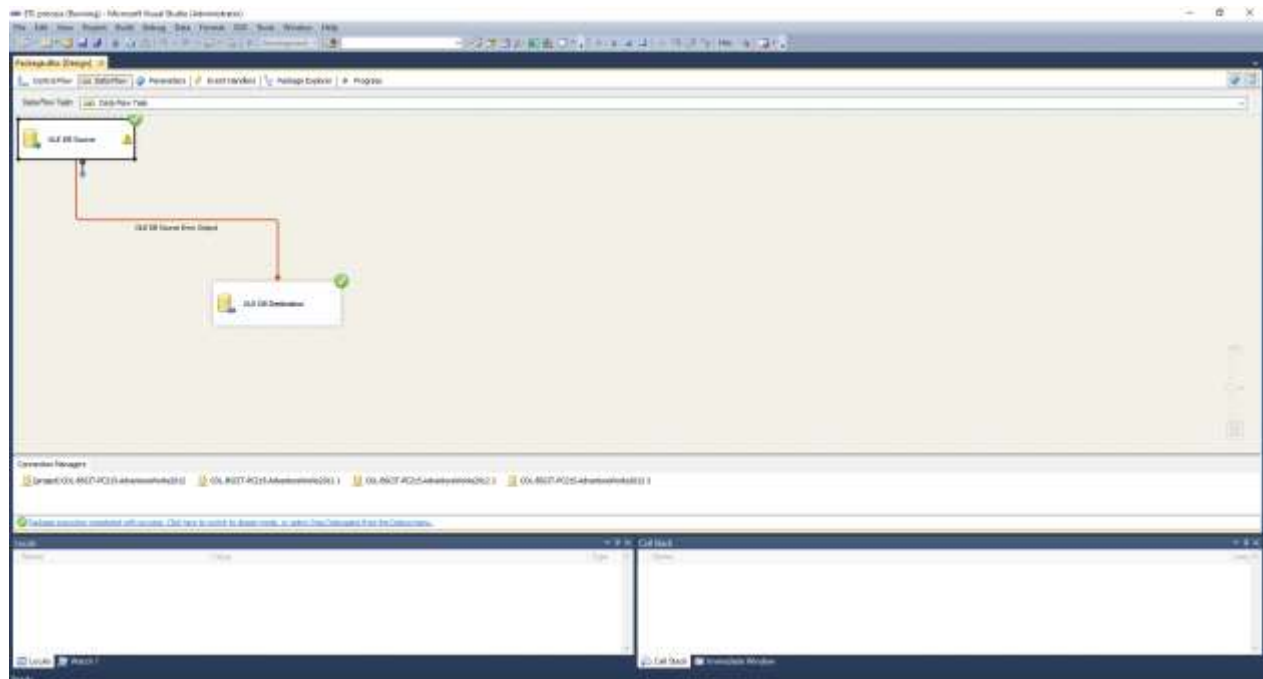


Click on OK.

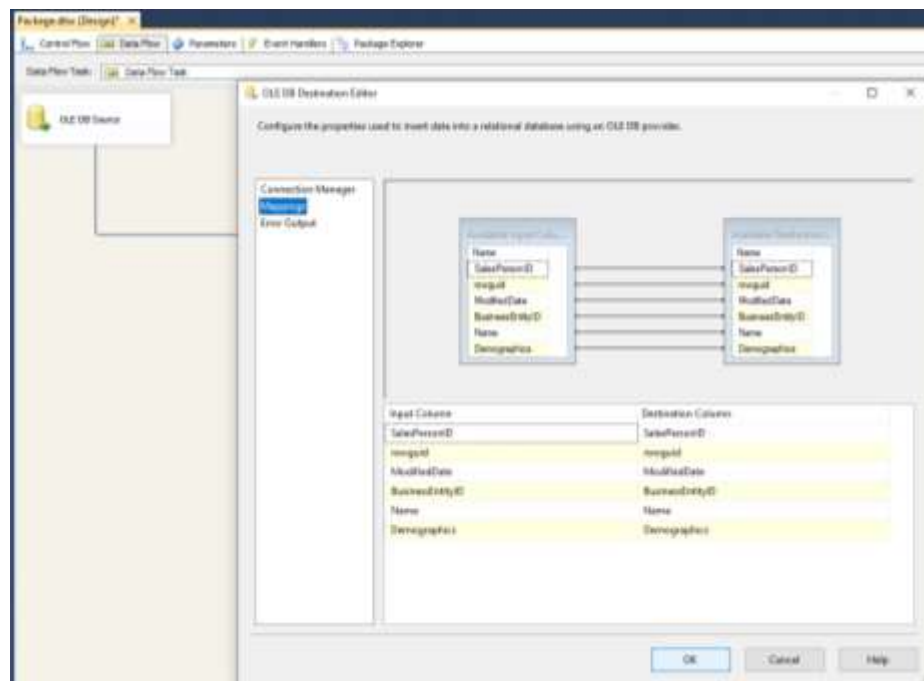


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI



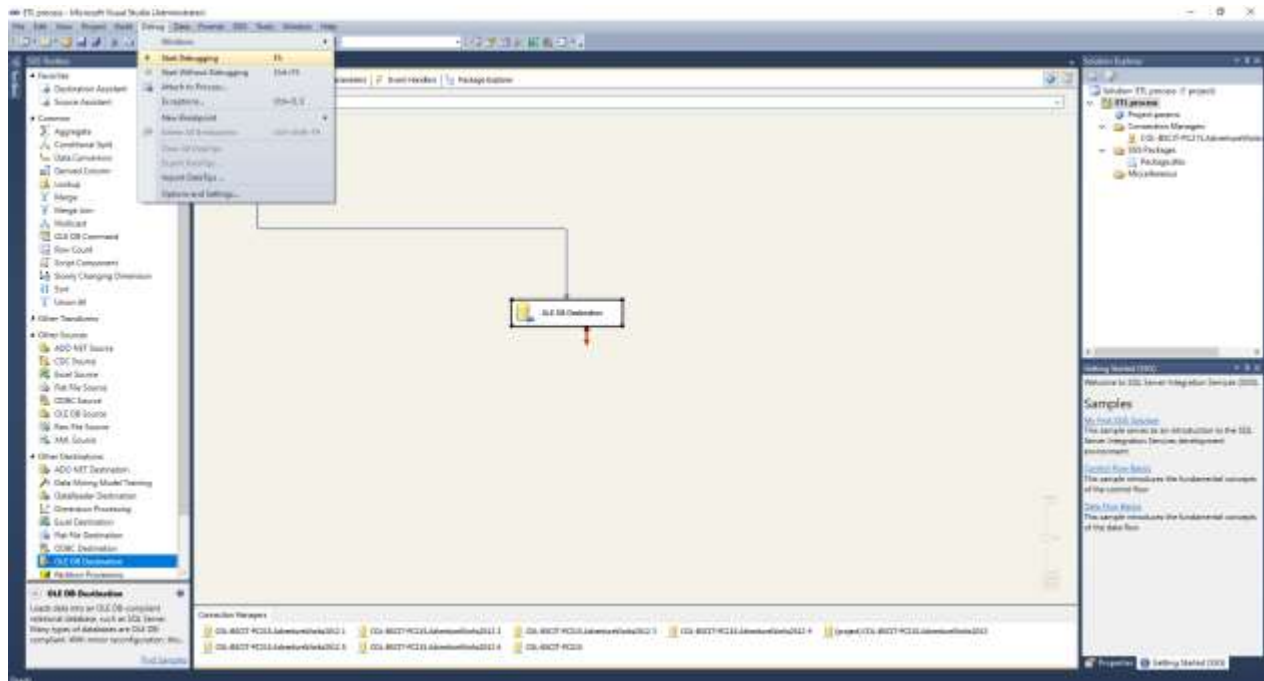
In OLE DB Destination Editor check the Mappings.



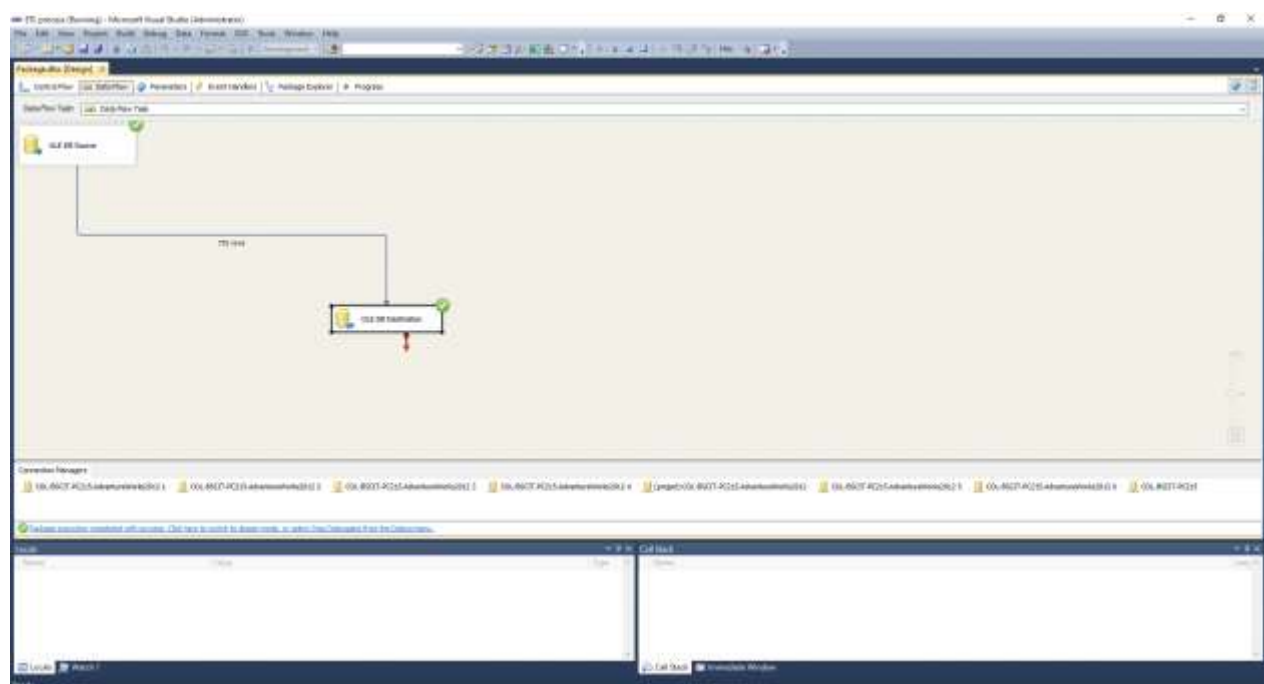
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Start the debugging.



It should be successful.

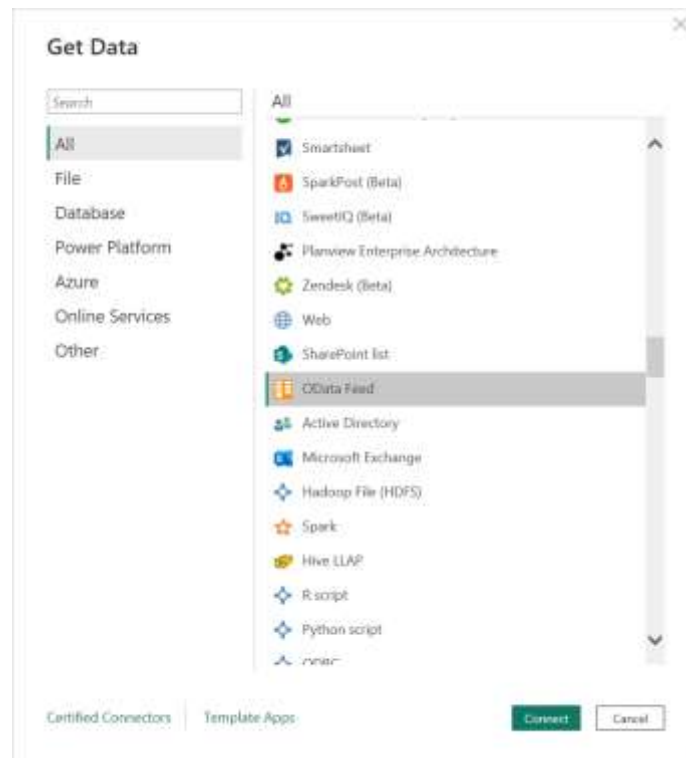


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

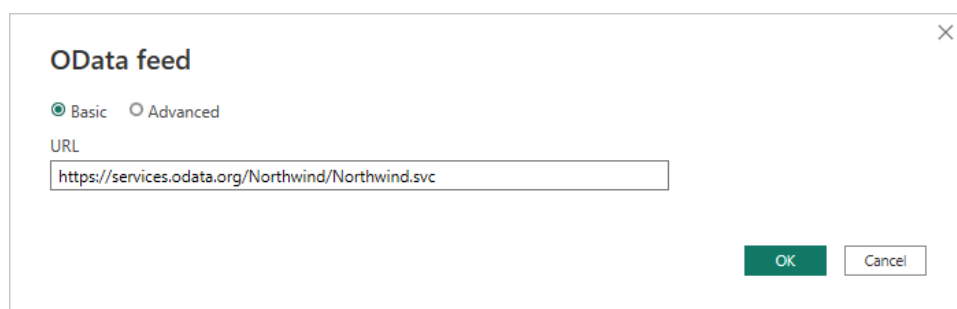
## T.Y. B.Sc. I.T. Semester VI

### Practical 2B – Perform the ETL process in Power BI

Select OData Feed from Get Data and click on Connect.



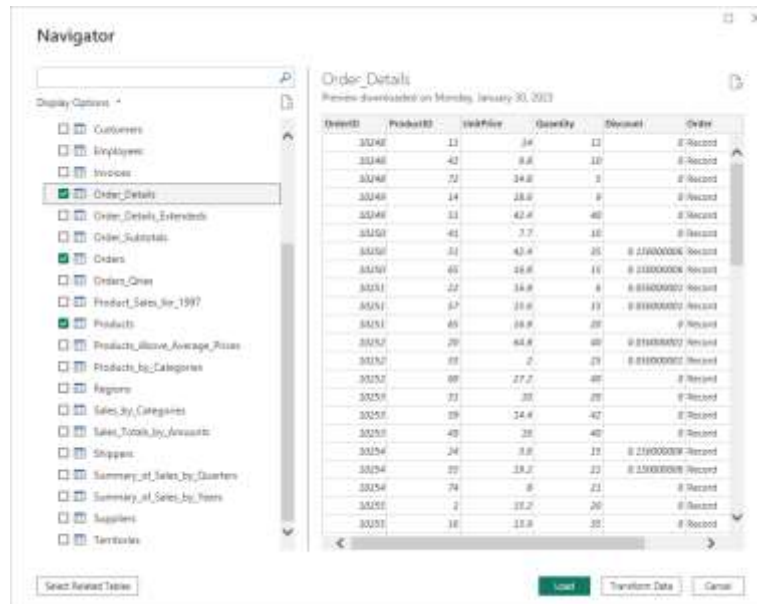
Enter the URL provided that is <https://services.odata.org/Northwind/Northwind.svc> and click on OK.



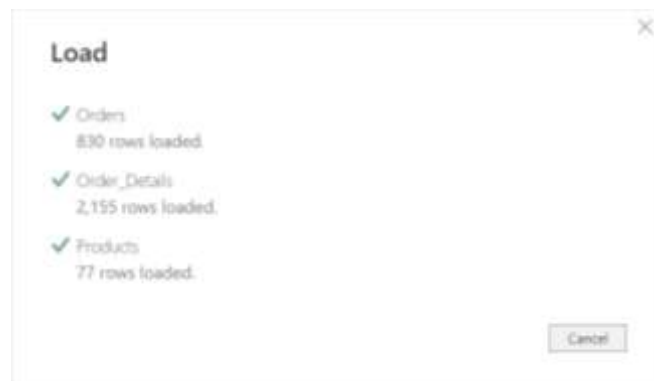
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select the tables – Orders, Order\_Details and Products and load them.



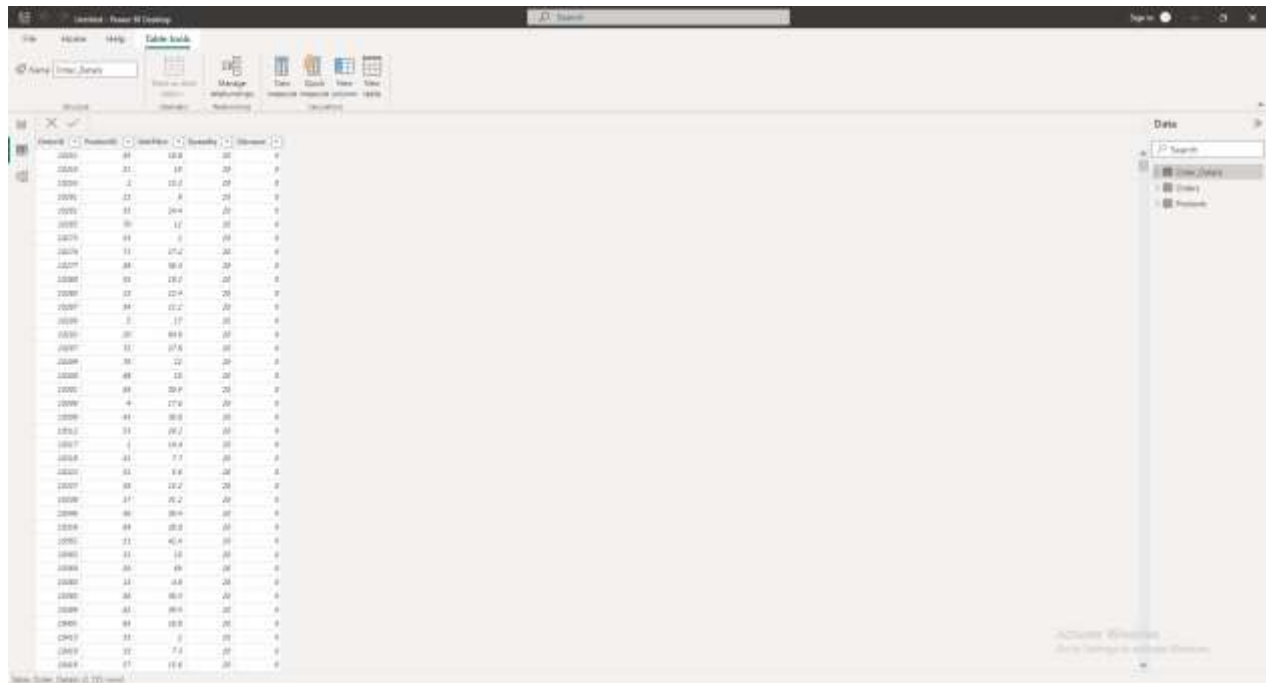
The loading process takes a bit of time.



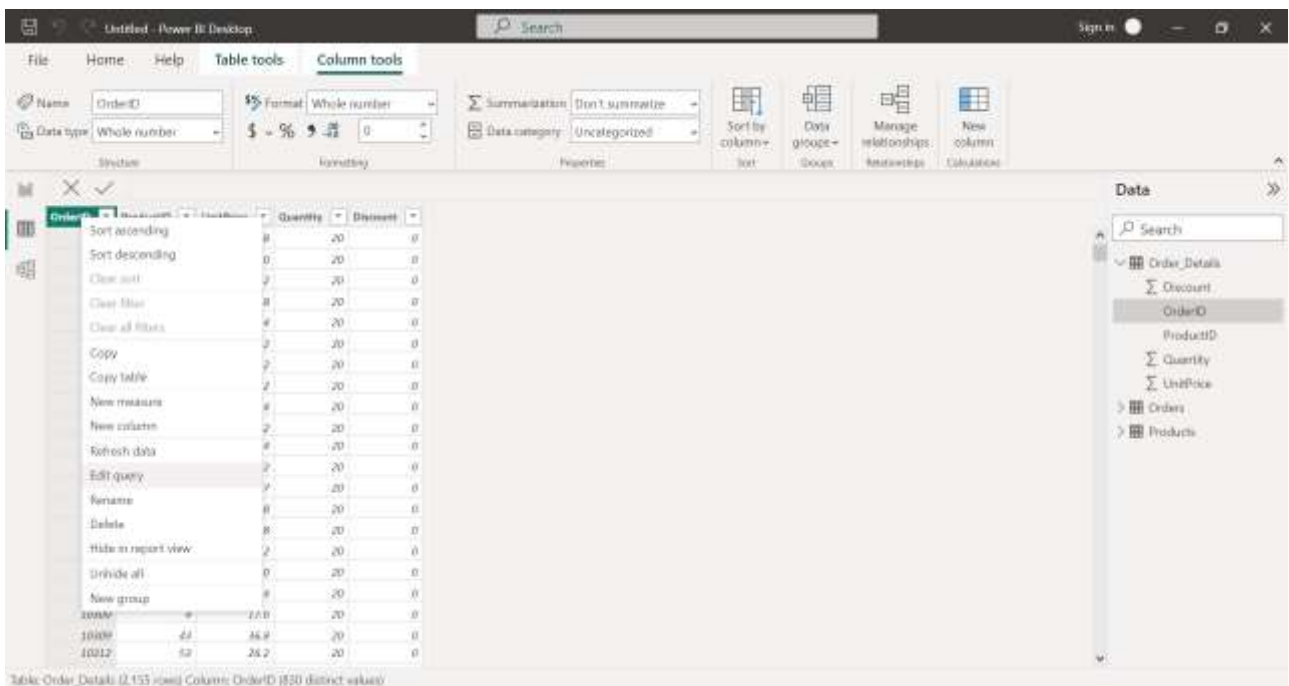
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

The data will be displayed of the tables selected once the loading is complete.



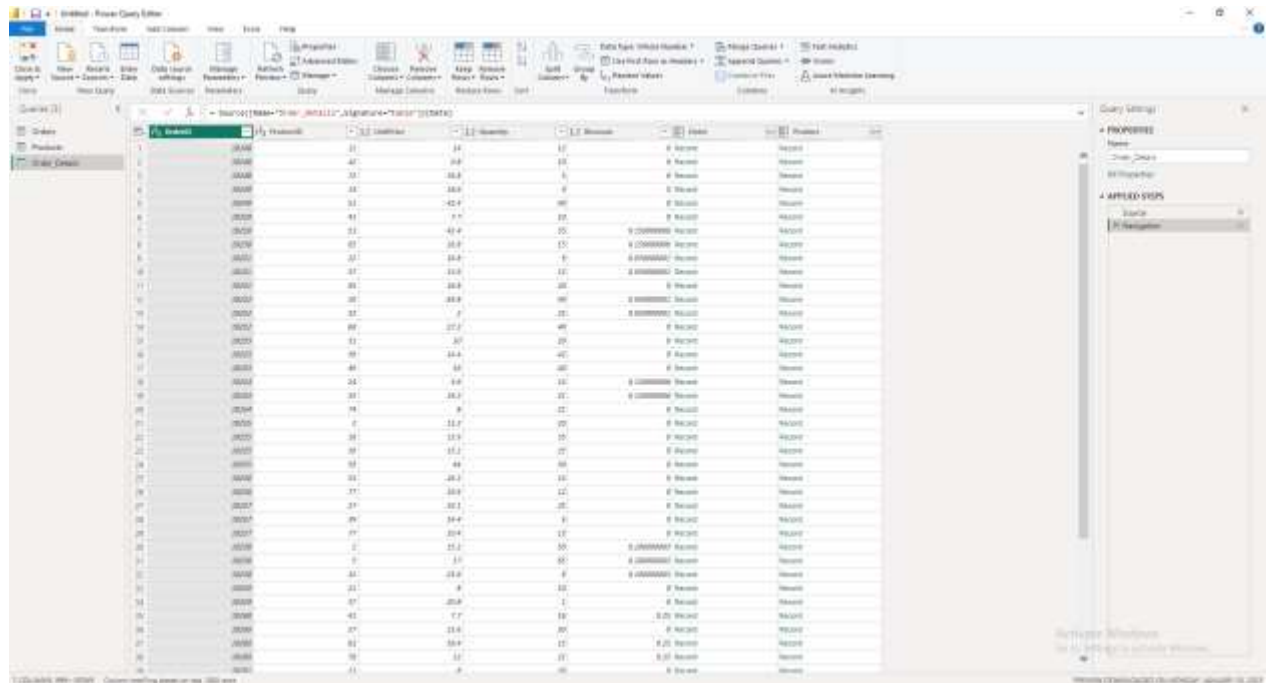
Right click on any of the column and select Edit Query.



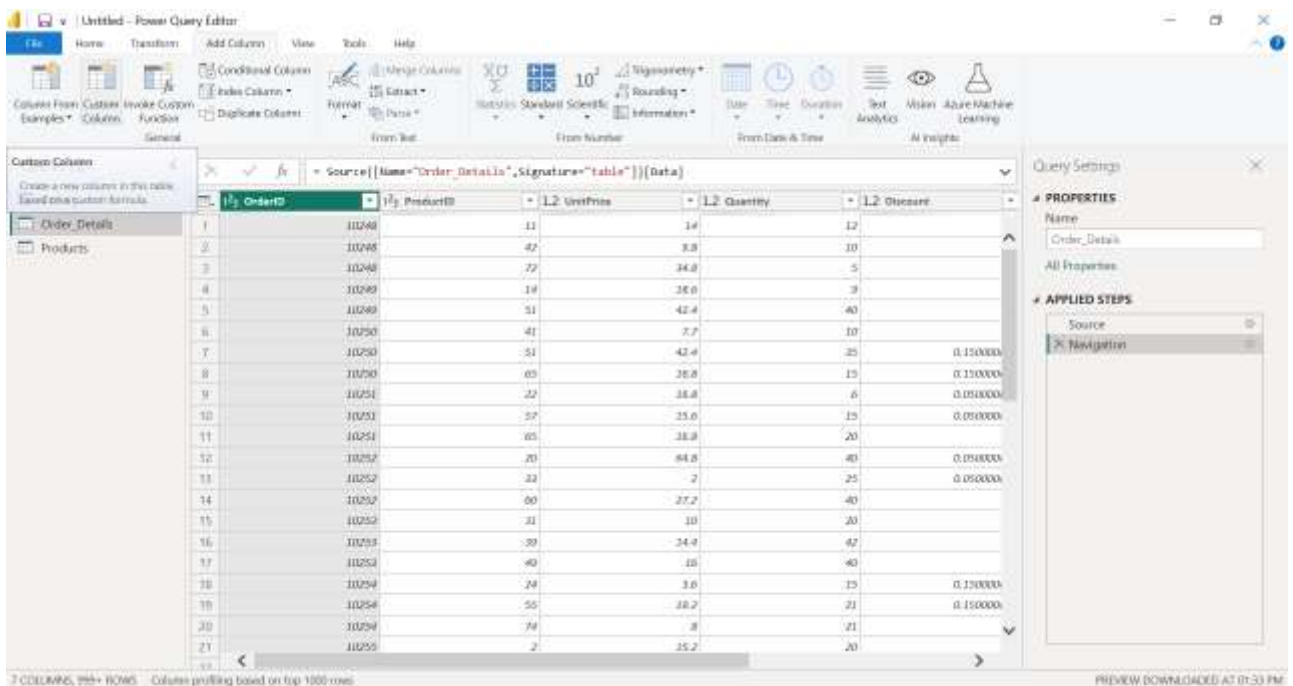
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

A new window will be opened.



Click on Custom Column.





# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Name the column name as LineTotal and enter the formula by inserting the columns as the variables and then click on OK.

Custom Column

Add a column that is computed from the other columns.

New column name: LineTotal

Custom column formula: = [UnitPrice]\*[Quantity]

Available columns: OrderID, ProductID, UnitPrice, Quantity, Discount, Order, Product

Learn about Power Query formulas

No syntax errors have been detected.

OK Cancel

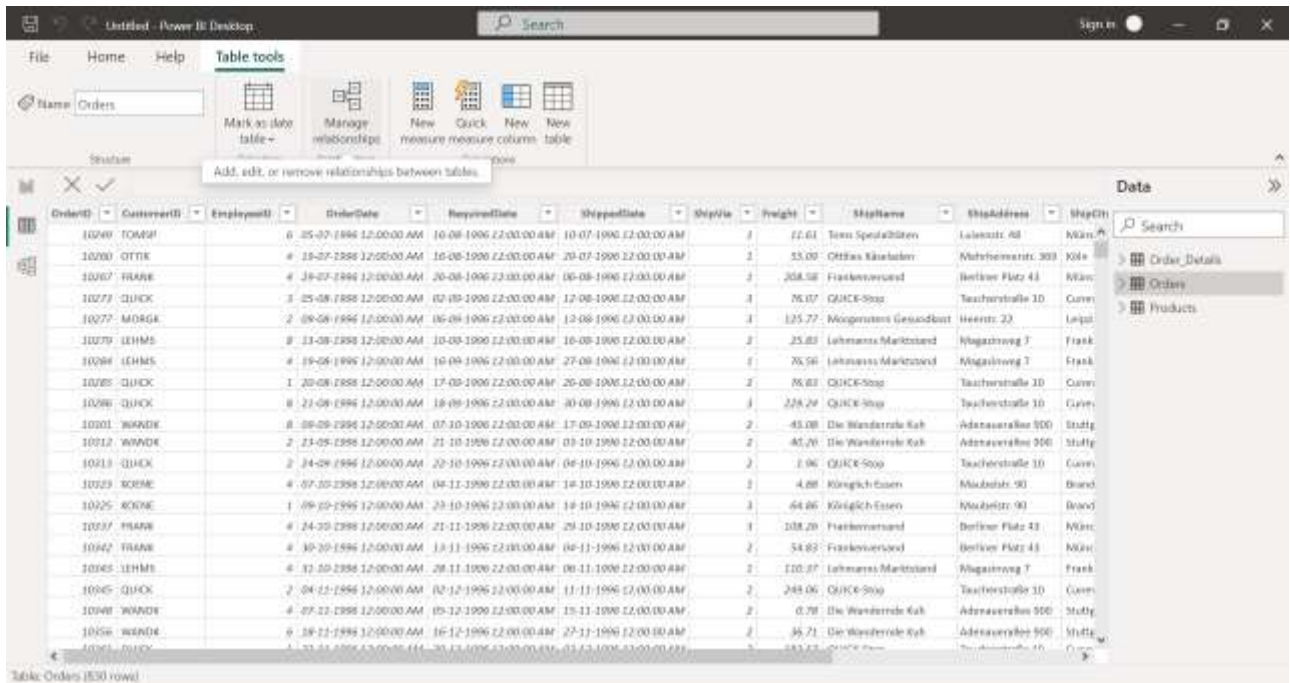
The LineTotal column will be added.

OrderID	ProductID	UnitPrice	Quantity	Discount	Order	LineTotal
1	1	10	1	0	1	10
1	2	20	1	0	1	20
1	3	30	1	0	1	30
1	4	40	1	0	1	40
1	5	50	1	0	1	50
1	6	60	1	0	1	60
1	7	70	1	0	1	70
1	8	80	1	0	1	80
1	9	90	1	0	1	90
1	10	100	1	0	1	100
1	11	110	1	0	1	110
1	12	120	1	0	1	120
1	13	130	1	0	1	130
1	14	140	1	0	1	140
1	15	150	1	0	1	150
1	16	160	1	0	1	160
1	17	170	1	0	1	170
1	18	180	1	0	1	180
1	19	190	1	0	1	190
1	20	200	1	0	1	200
1	21	210	1	0	1	210
1	22	220	1	0	1	220
1	23	230	1	0	1	230
1	24	240	1	0	1	240
1	25	250	1	0	1	250
1	26	260	1	0	1	260
1	27	270	1	0	1	270
1	28	280	1	0	1	280
1	29	290	1	0	1	290
1	30	300	1	0	1	300

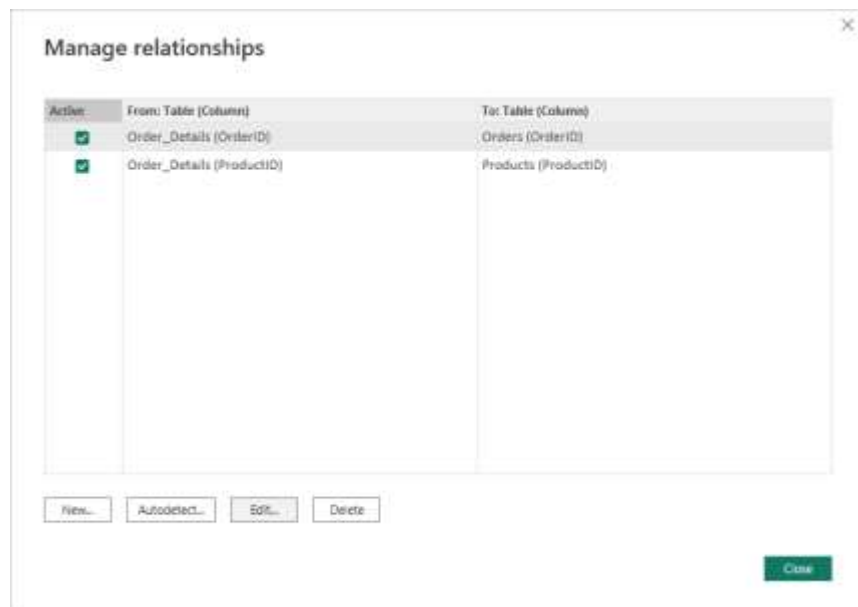
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select the Orders table and under Table tools select Manage Relationships.



The columns will come pre-selected.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Edit the details according to the requirement.

**Edit relationship**

Select tables and columns that are related.

Order\_Details

OrderID	ProductID	UnitPrice	Quantity	Discount
10248	43	16.8	20	0
10249	41	20	20	0
10250	2	15.2	20	0

Orders

OrderID	CustomerID	EmployeeID	OrderDate	RequiredDate	ShippedDate	Status
10248	TONSP	8	7/7/1996 12:00:00 AM	8/16/1996 12:00:00 AM	7/10/1996 12:00:00 AM	
10249	OTTI	4	7/13/1996 12:00:00 AM	8/16/1996 12:00:00 AM	7/19/1996 12:00:00 AM	
10250	FRANK	4	7/24/1996 12:00:00 AM	8/16/1996 12:00:00 AM	8/6/1996 12:00:00 AM	

Cardinality: Many to one (":1")

Cross filter direction: Single

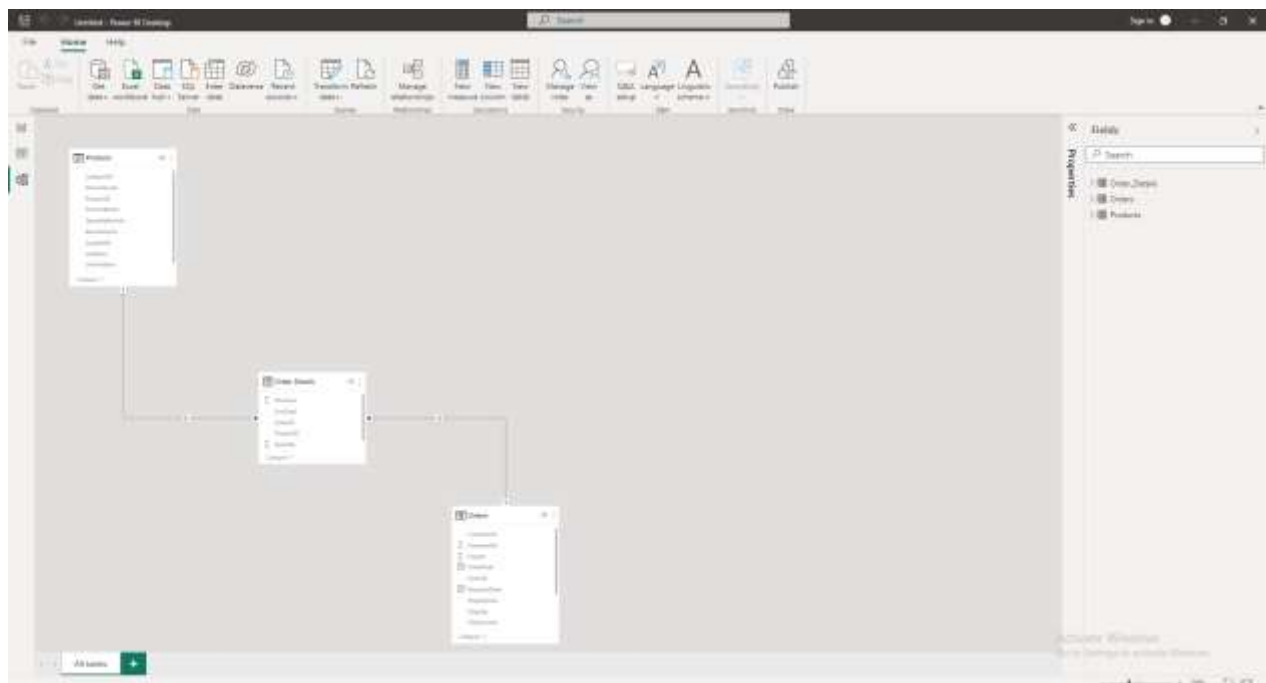
☒ Make this relationship active

☐ Assume referential integrity

☐ Apply security filter in both directions

OK Cancel

Click on the relationships icon.

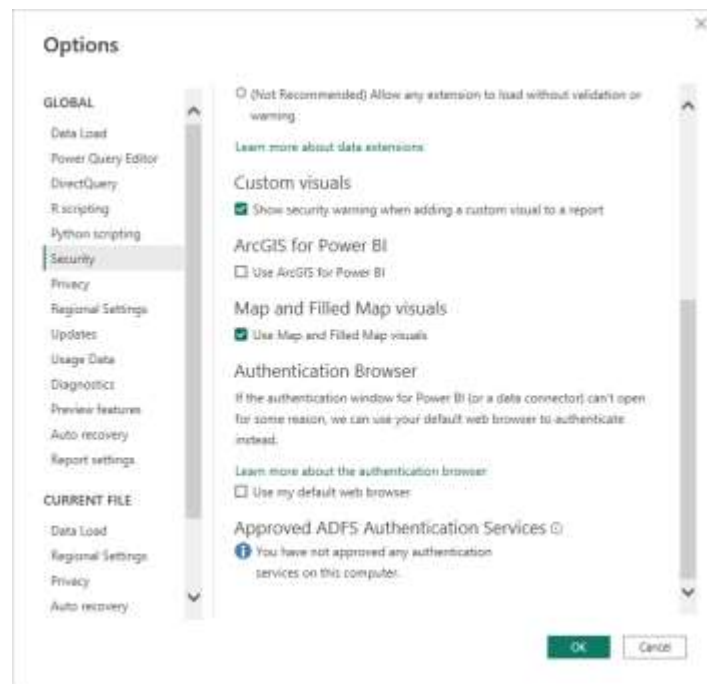


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

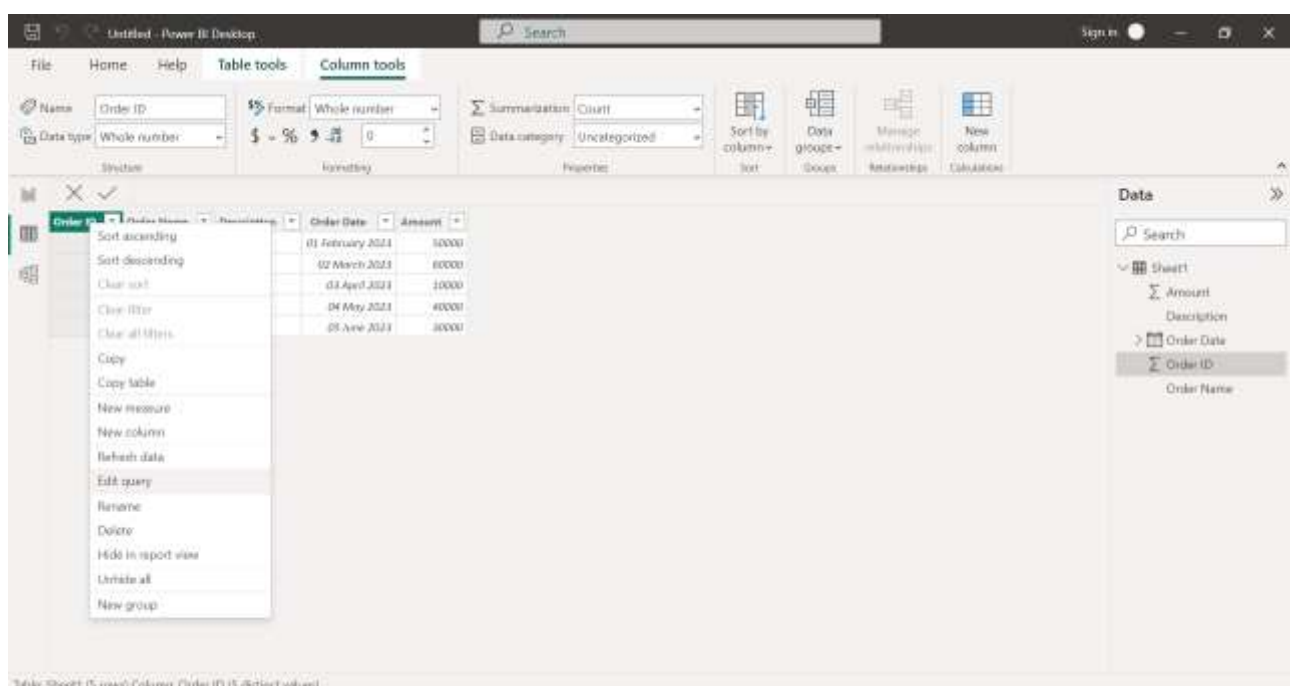
## T.Y. B.Sc. I.T. Semester VI

Practical 3A – Perform data visualization in Power BI and create the data staging area for the selected database

In Power BI click on File then go to Options and Settings click on Options and check Map and Filled Map Visuals. Click on OK.



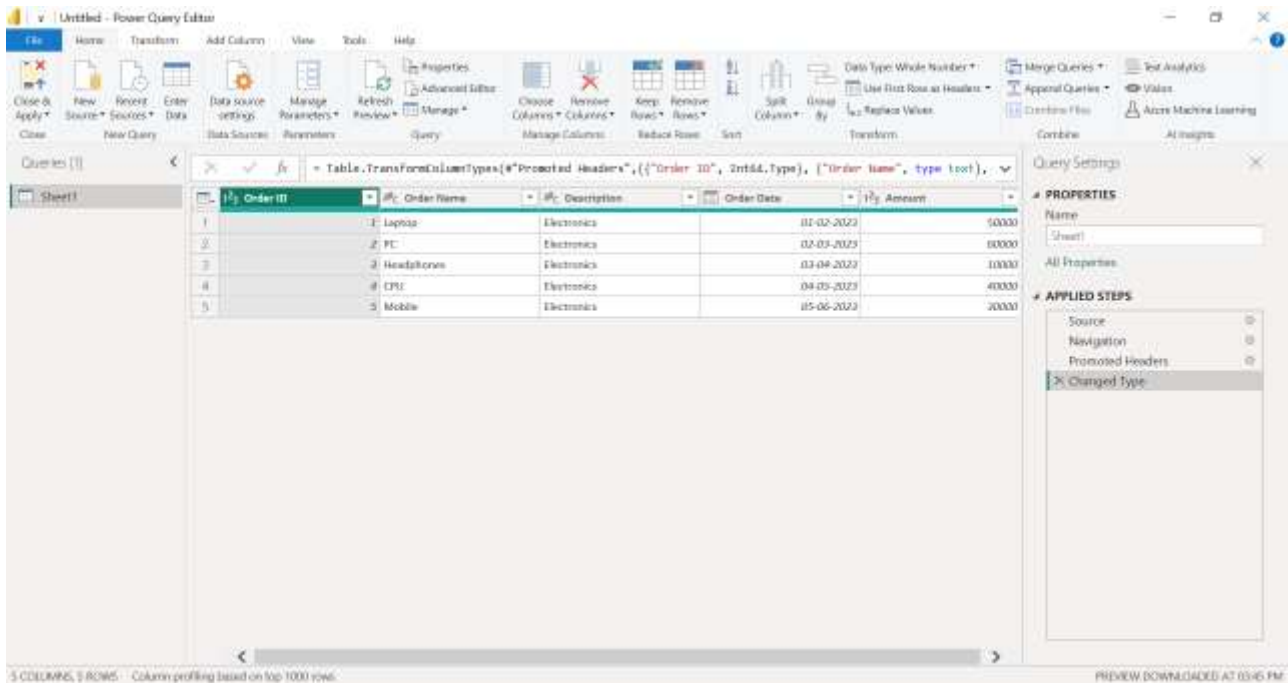
Open a table. Right click on any column and select Edit query.



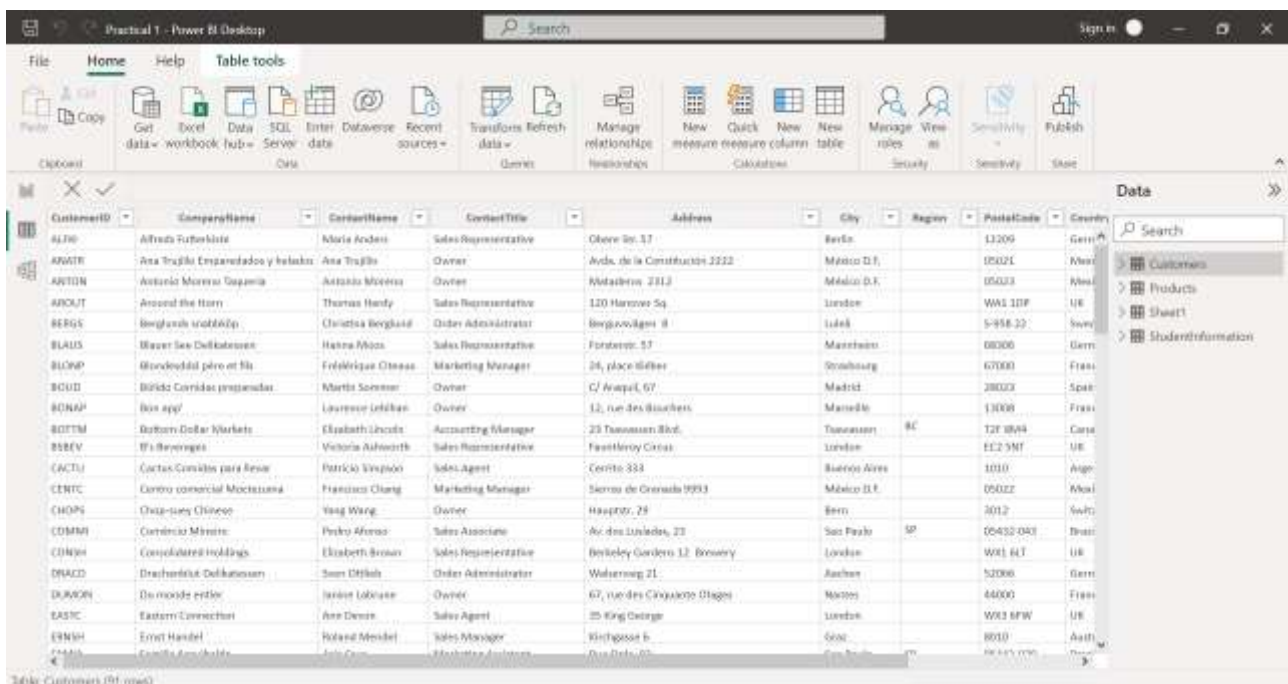
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Another window will be opened which look like below.



The tables will be now loaded. Select the Customers table.

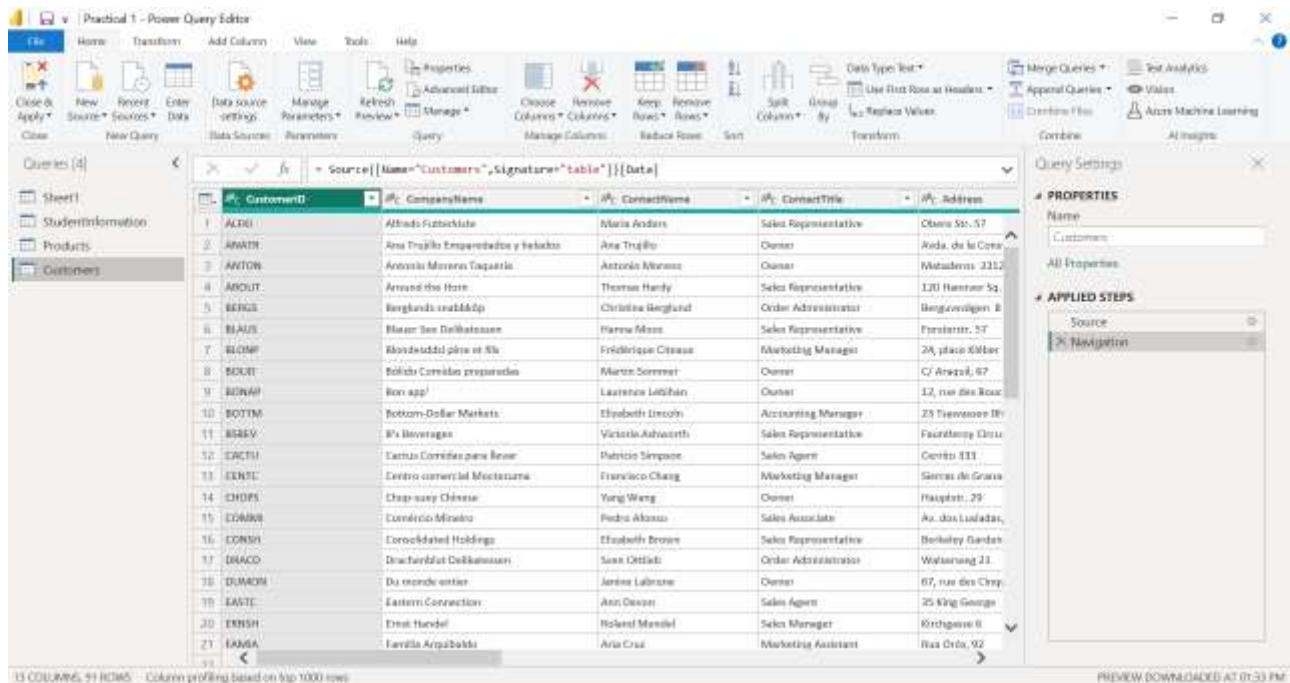




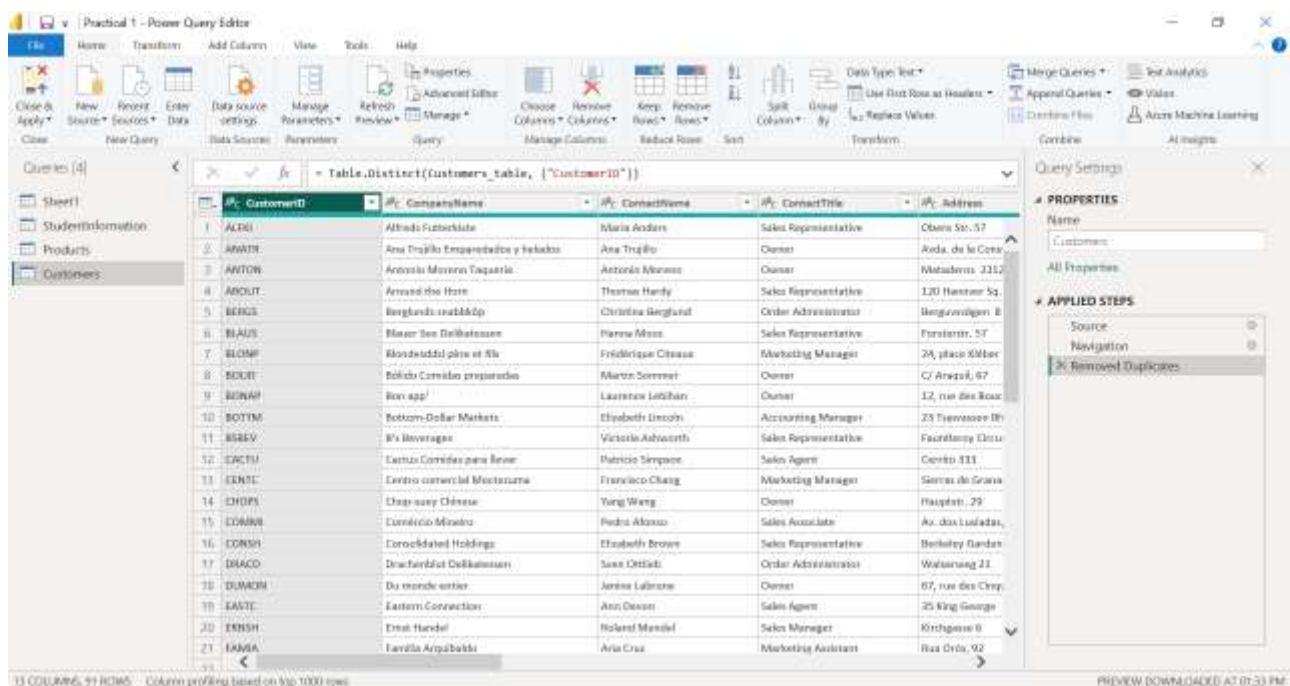
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select any column and right click to select Edit Query. New window will open.



Remove duplicate entries by right clicking on the column and selecting Remove Duplicates.

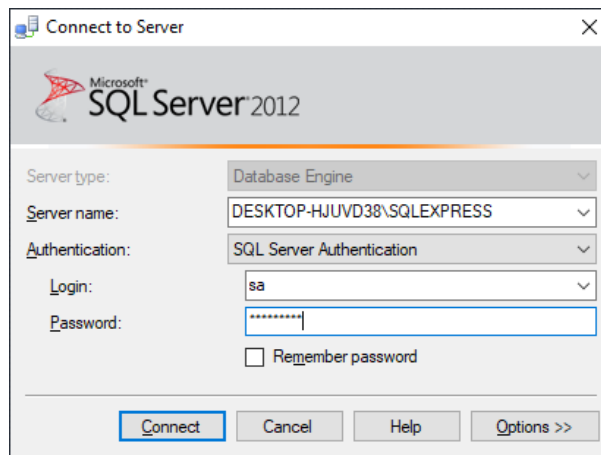


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

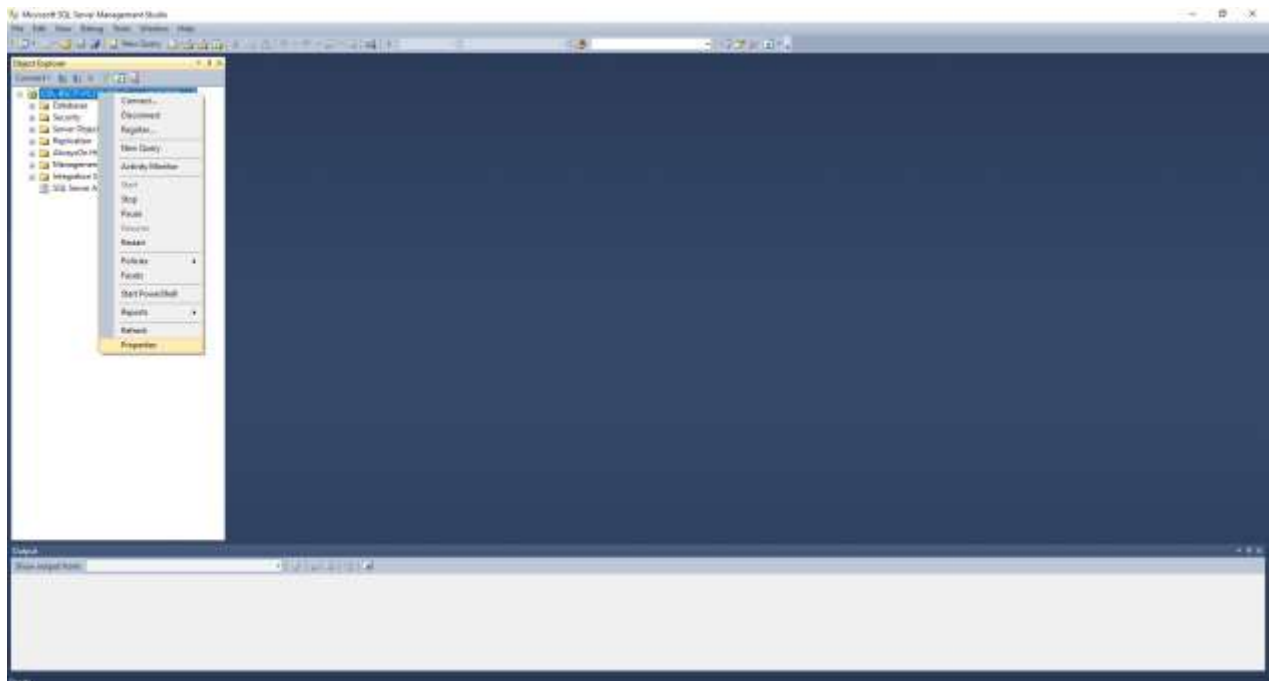
## T.Y. B.Sc. I.T. Semester VI

Practical 3B – Create the data staging area for the selected database using Star Schema

Open SQL Server Management Studio. Authentication will be SQL Server Authentication. Login username is sa and password is bscit@123.



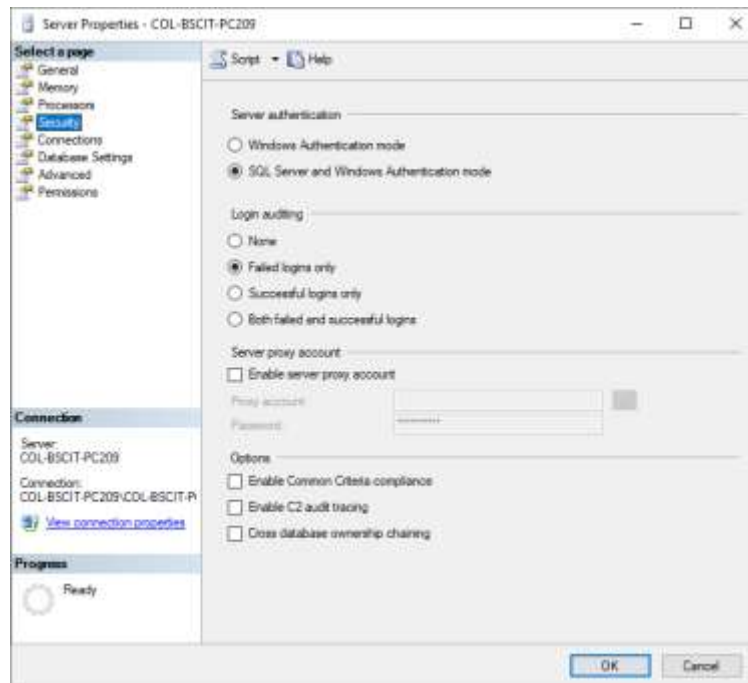
In the Object Explorer, right click on the server and click on Properties.



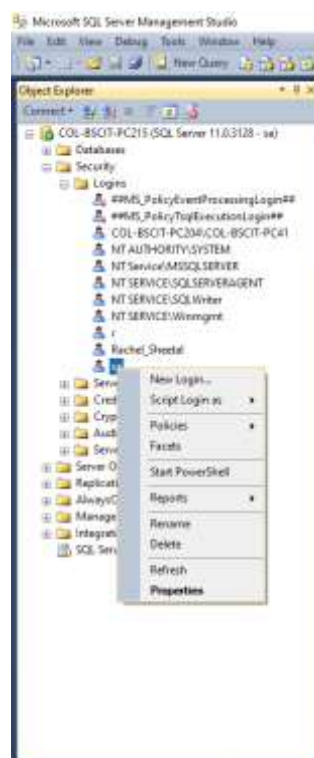
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Open Security under Server Properties and check if everything is proper.



Under Security and then under Logins there is a folder named sa that is the login username, right click on it and select New Login.

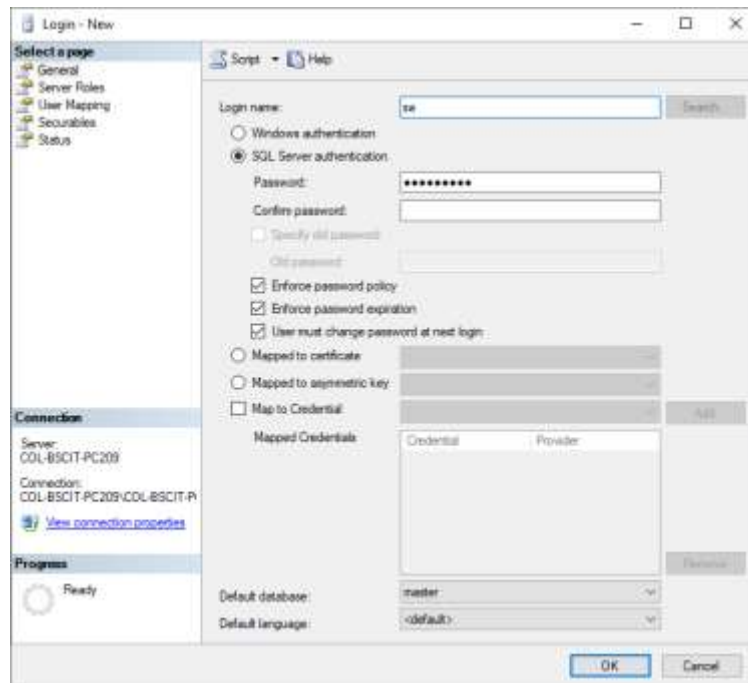




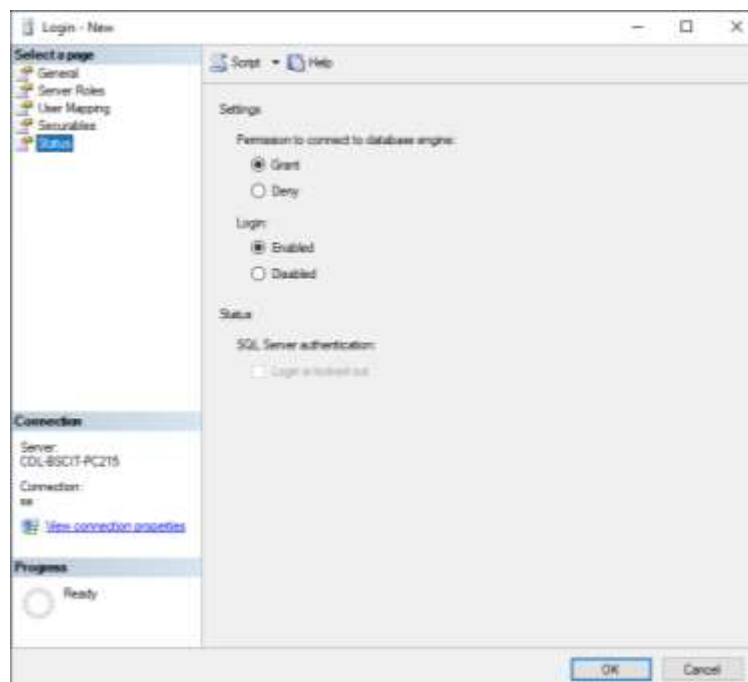
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Check the enforcement of passwords.



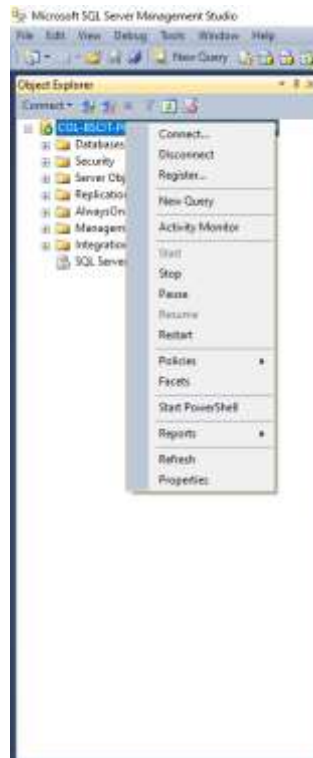
Enable the login in Status.



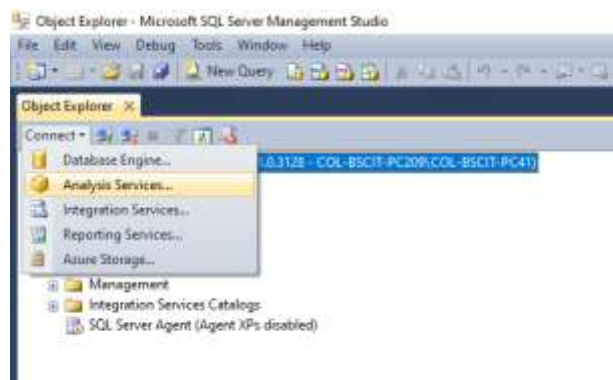
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Right click on the server name and click on Restart.



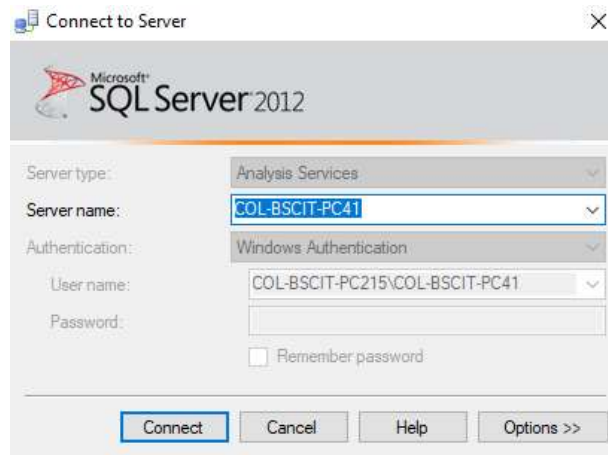
Click on Connect and select Analysis Services.



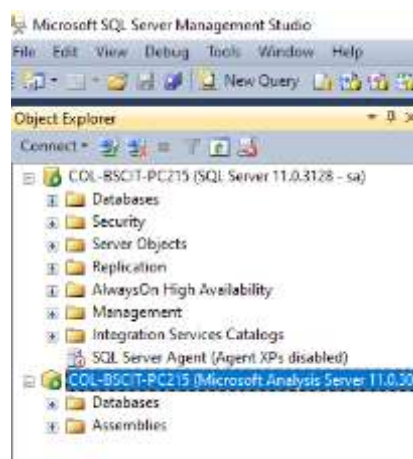
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

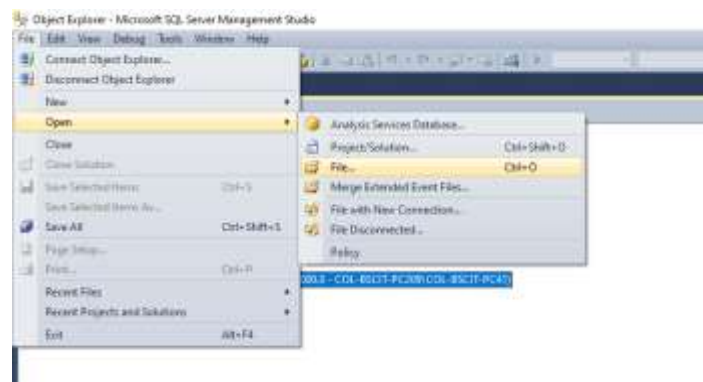
Enter the credentials.



The Analysis Server will now be added in the Object Explorer.



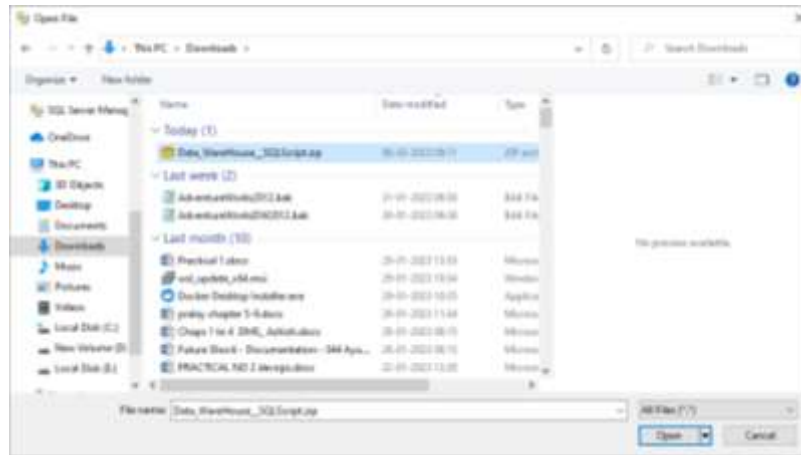
In Microsoft SQL Server Management, click on File then Open and then File.



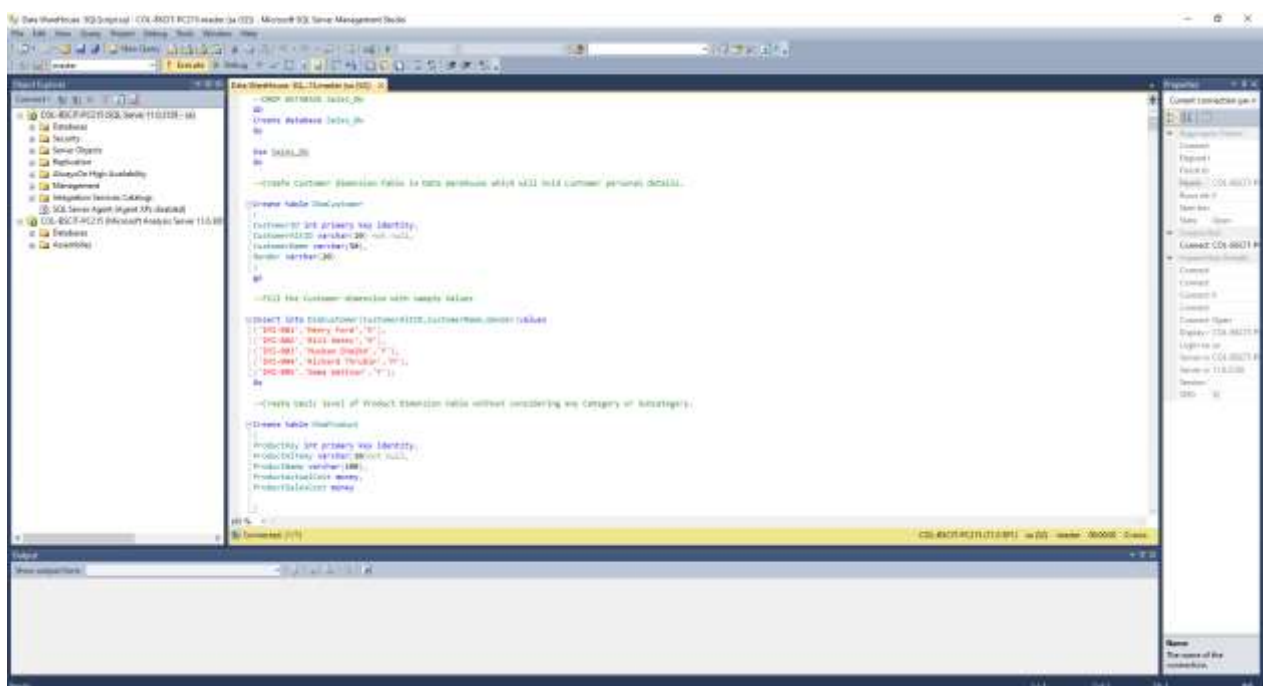
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Search for the file Data\_WareHouse\_SQLScript.zip.



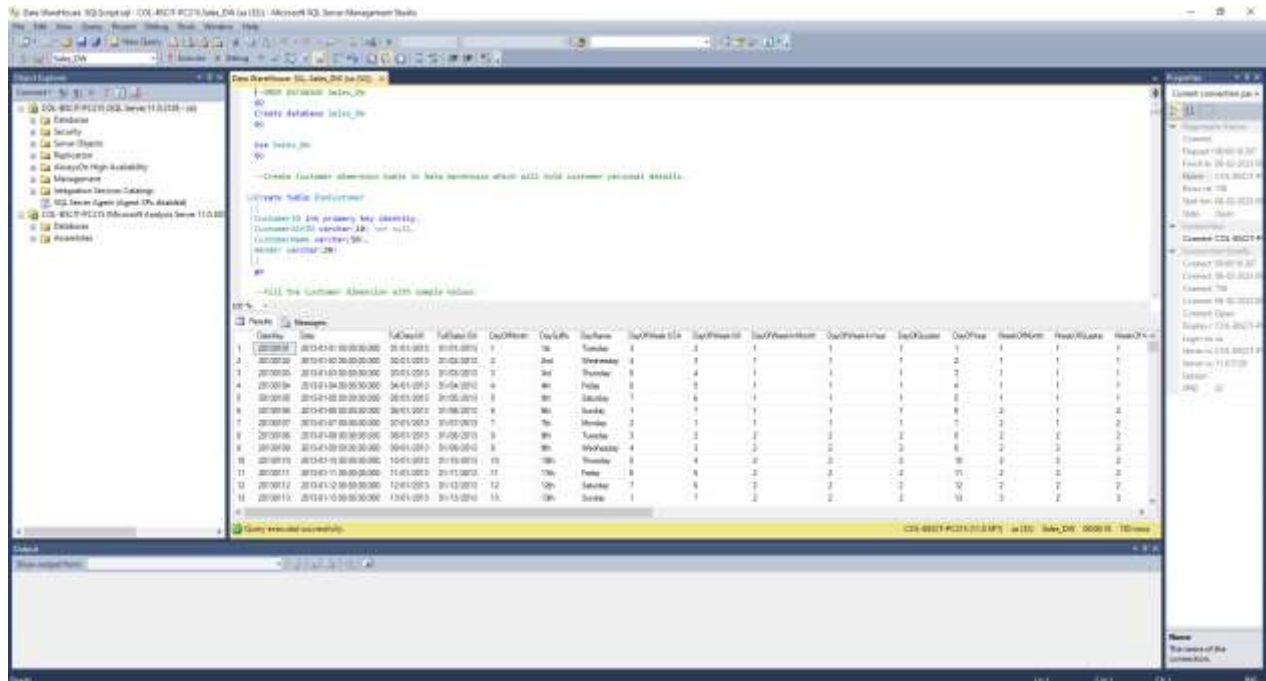
Click on Execute after importing the file. The following screen is displayed.



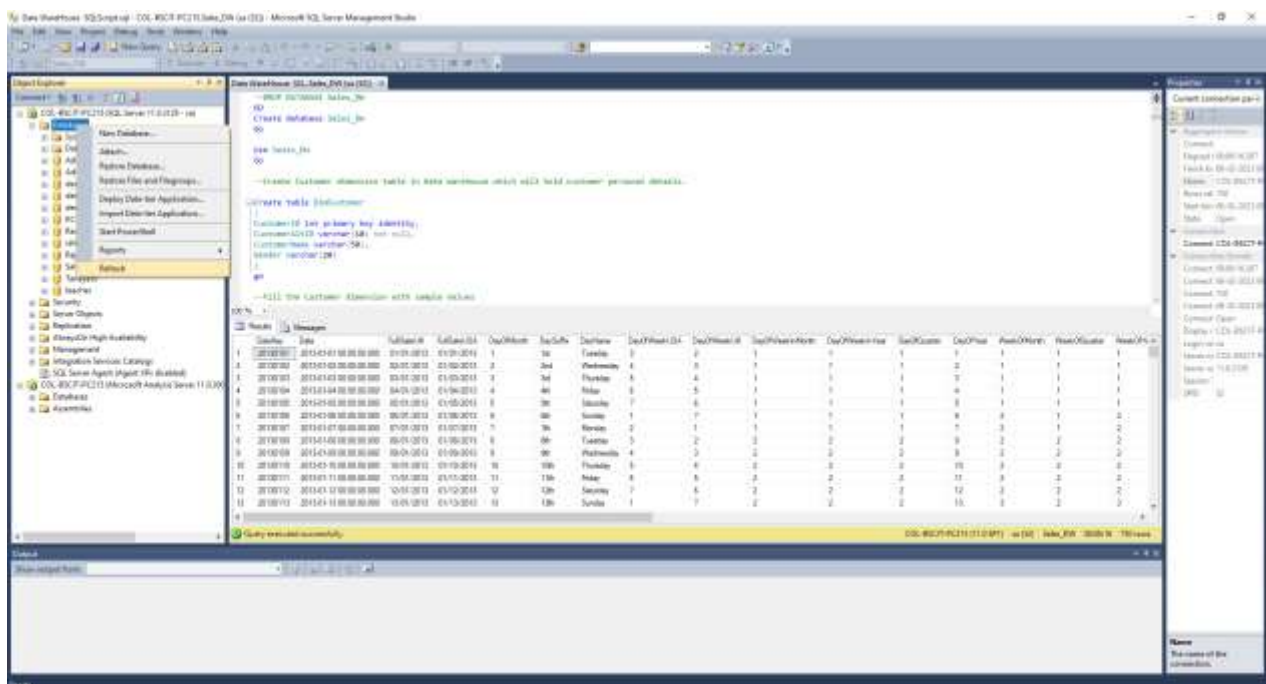
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Query executed successfully message will be displayed at the bottom of the screen.



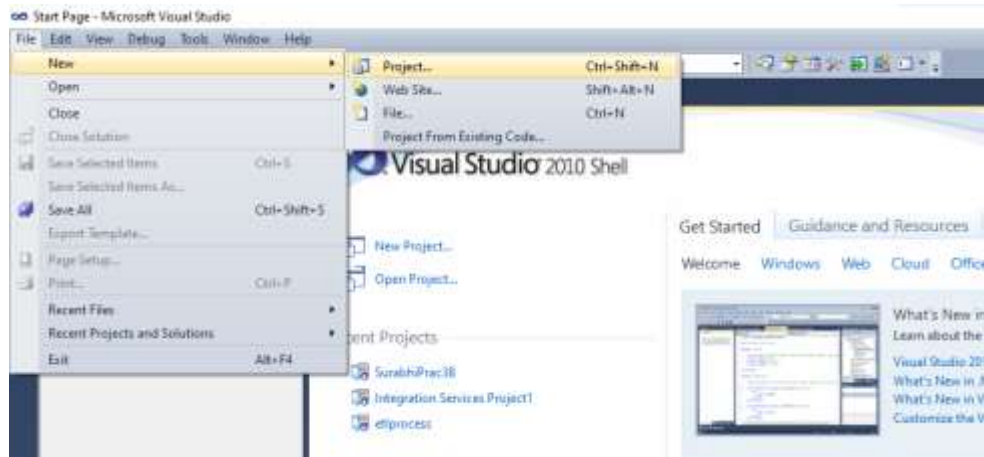
Right click on Databases and click on Refresh.



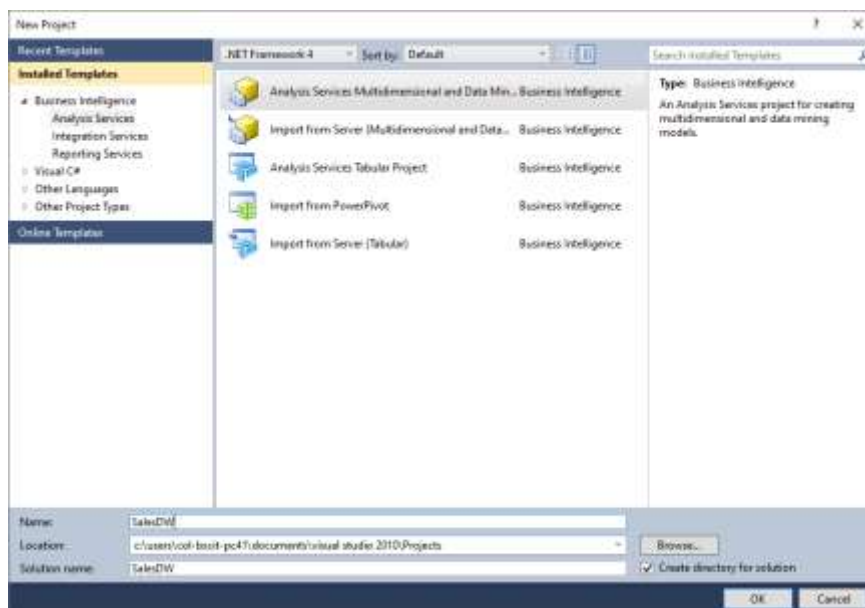
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Open Microsoft Server Data Tools, click on File then New and Project.



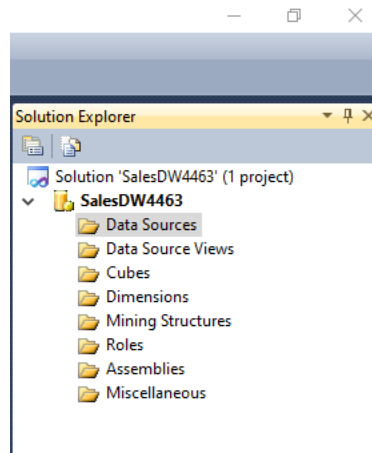
Under Business Intelligence and Analysis Services, select Multidimensional and Data Mining, name the file as SalesDW.



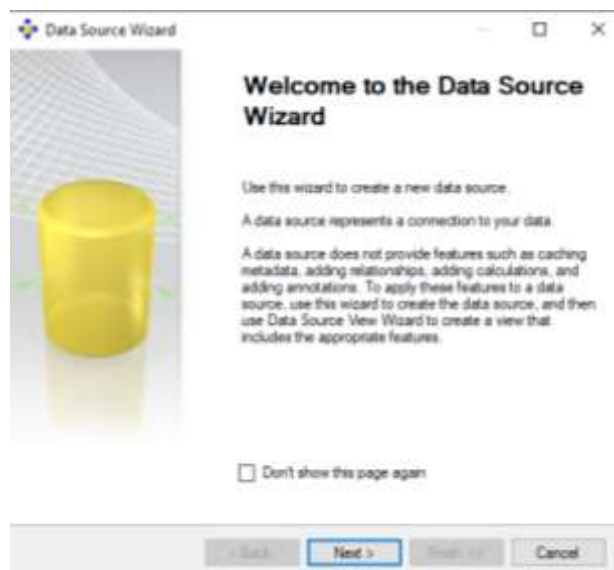
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

In the Solution Explorer, right click on Data Sources and select Data Source View Wizard.



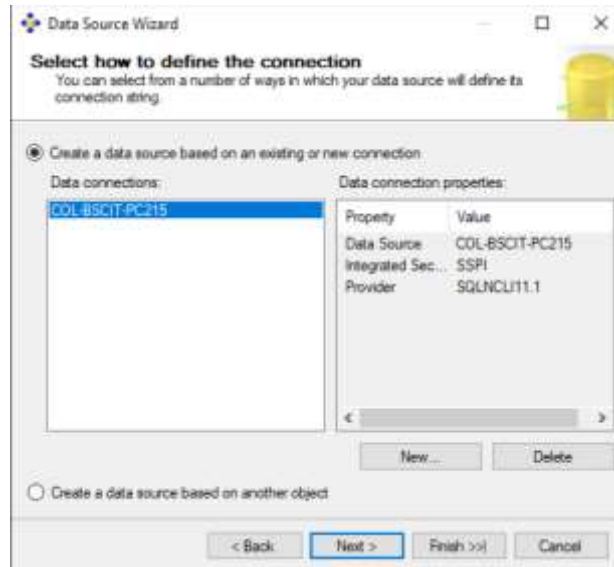
Click on Next.



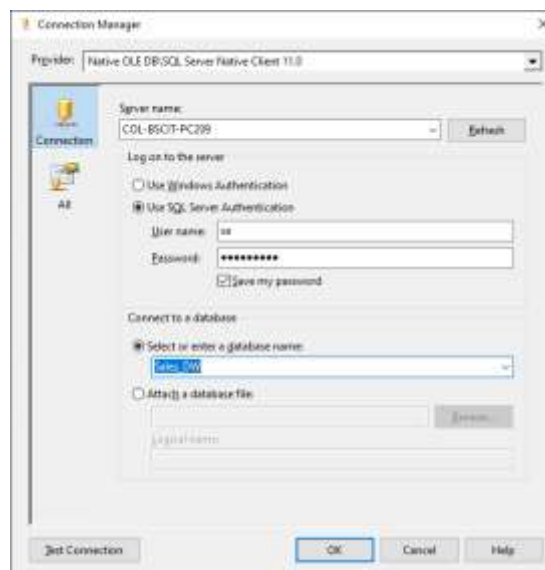
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

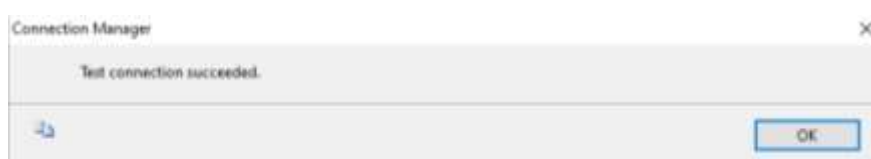
Delete the current if any and add a new one and click on Next.



Enter the username and password and enter the database that is SalesDW.



Test the connection it should succeed.

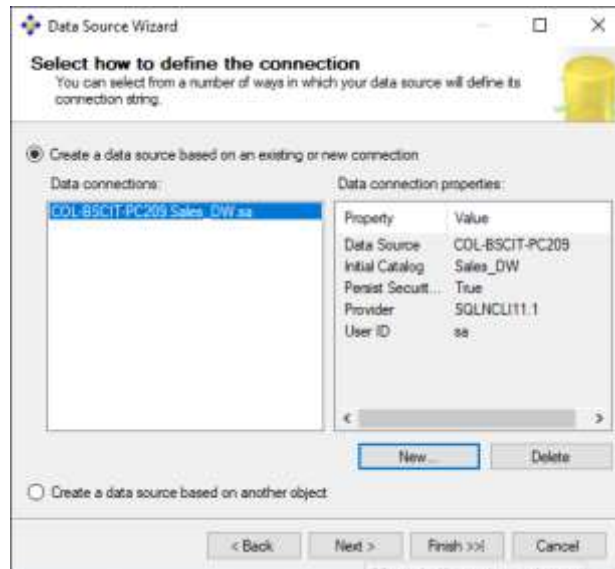




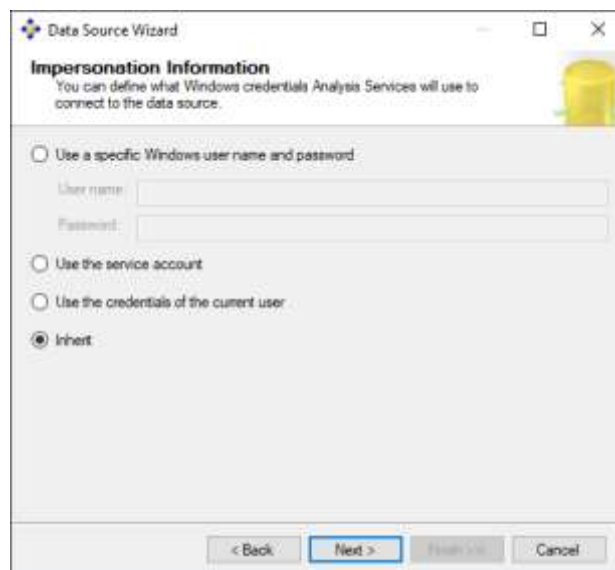
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on Next.



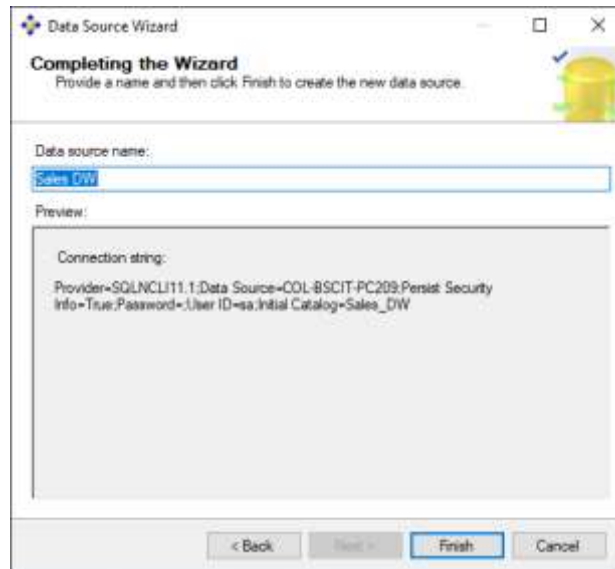
Check Inherit.



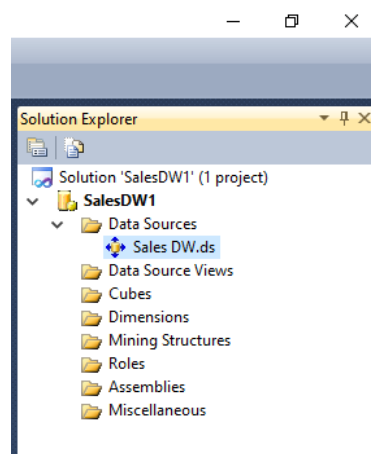
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on Finish.



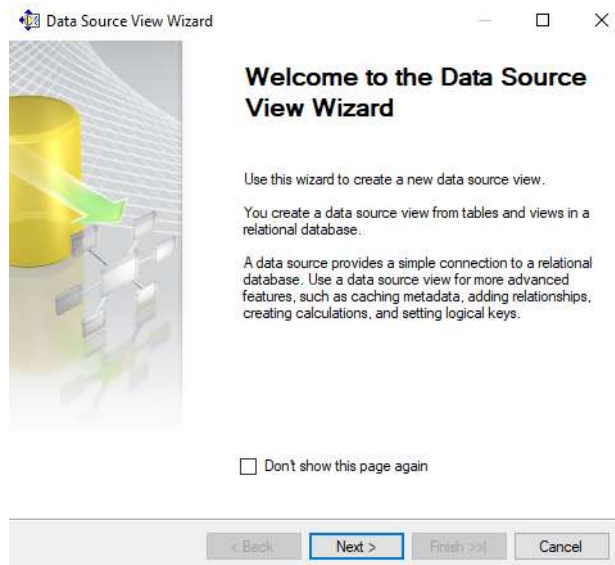
The data source is added in the Solution Explorer.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Again, open Data Source View Wizard click on Next.



Click on Next.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select Add Related Tables.



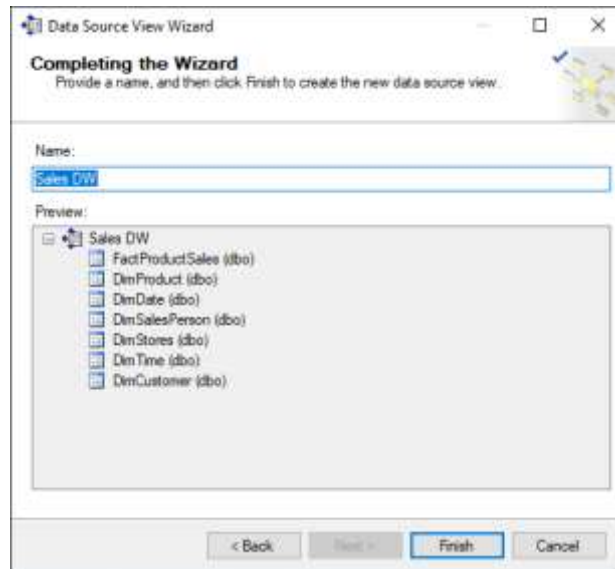
Click on Next.



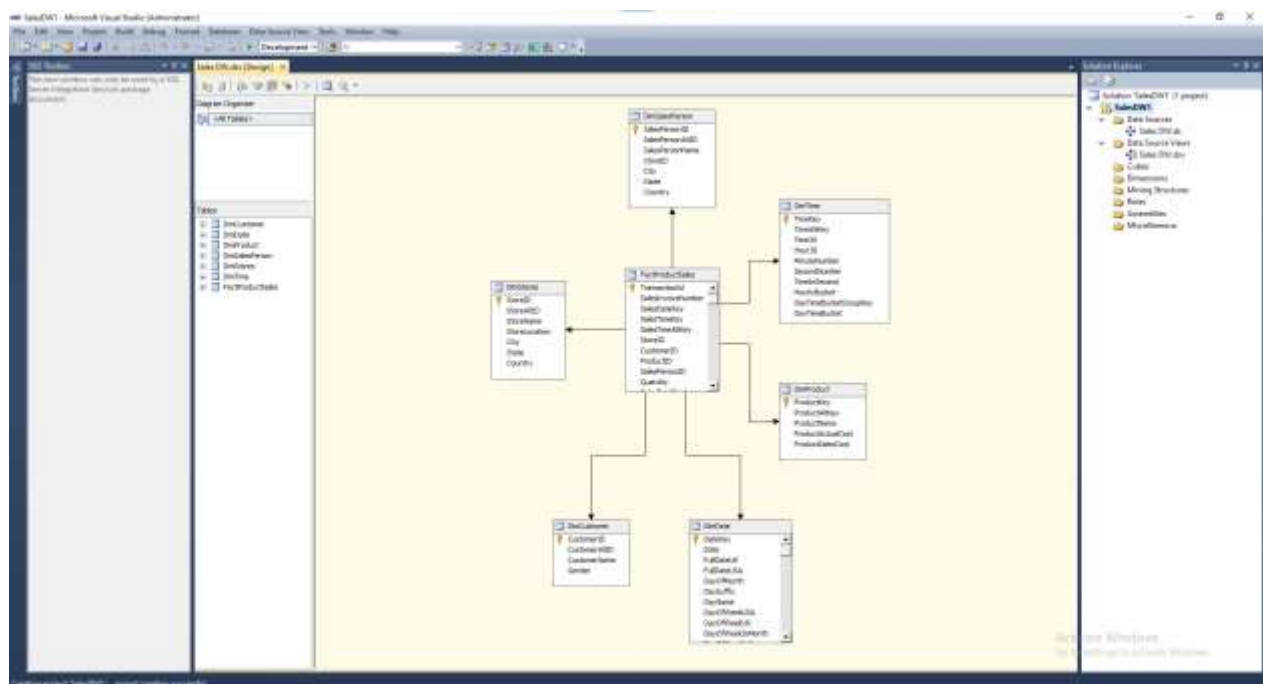
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on Finish.



The relationship chart is now shown.



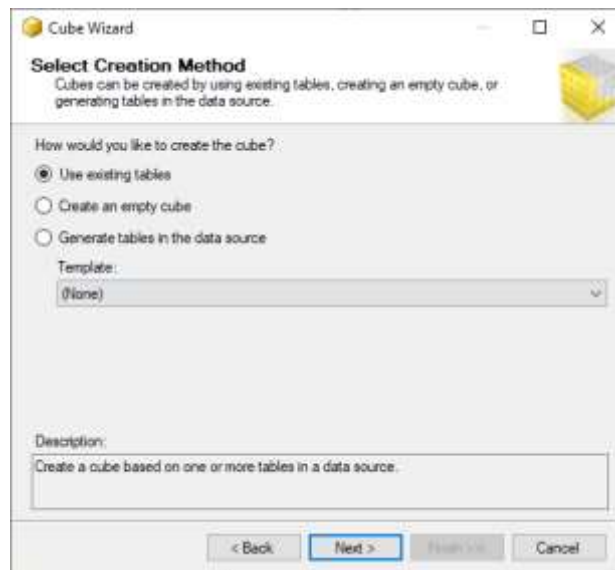
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

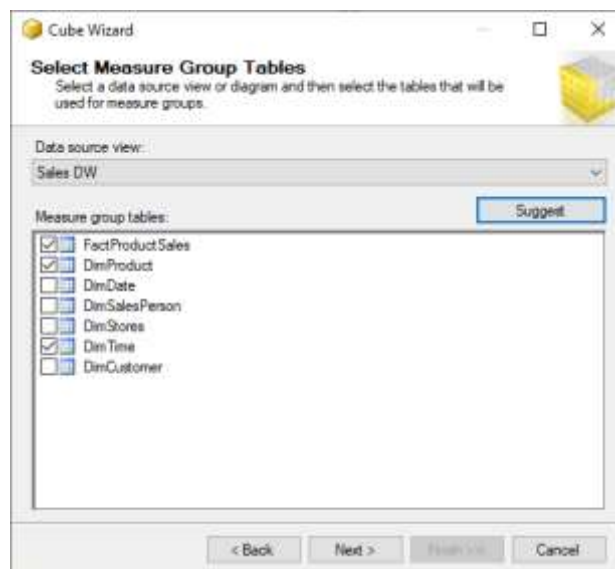
Practical 4A – Create the cube with corresponding dimension and fact table based on OLAP

Continue from the above practical.

In Solution Explorer select Cube which opens a dialogue box.



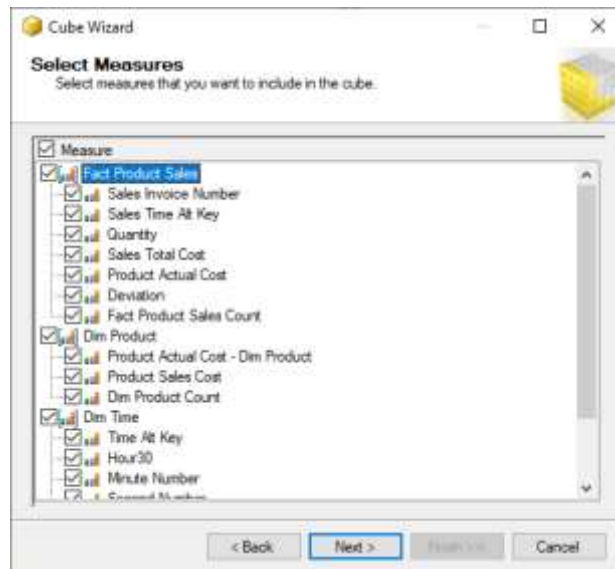
Select the tables – FactProductSales, DimProduct, DimTime and click on Next.



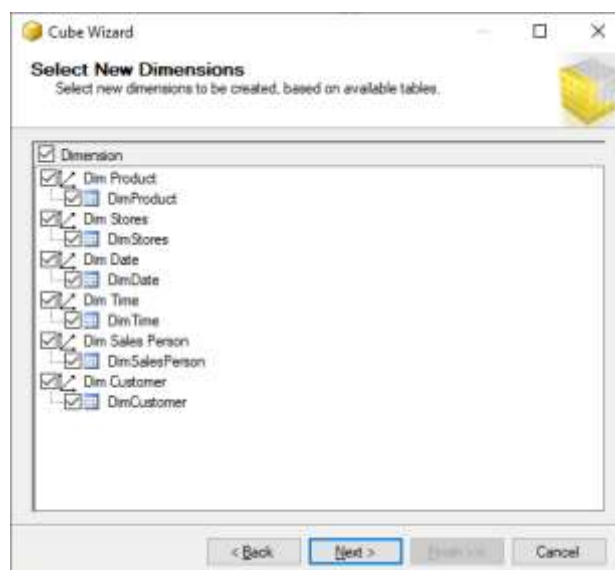
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Select all the measures to include in the cube and click on Next.



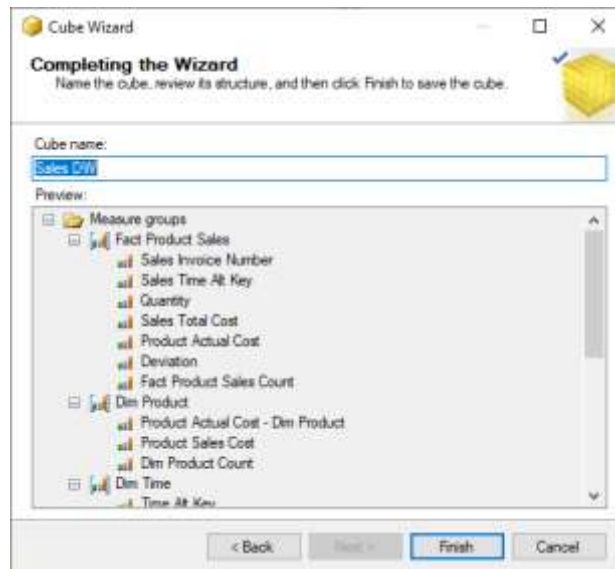
Select all the new dimensions and click on Next.



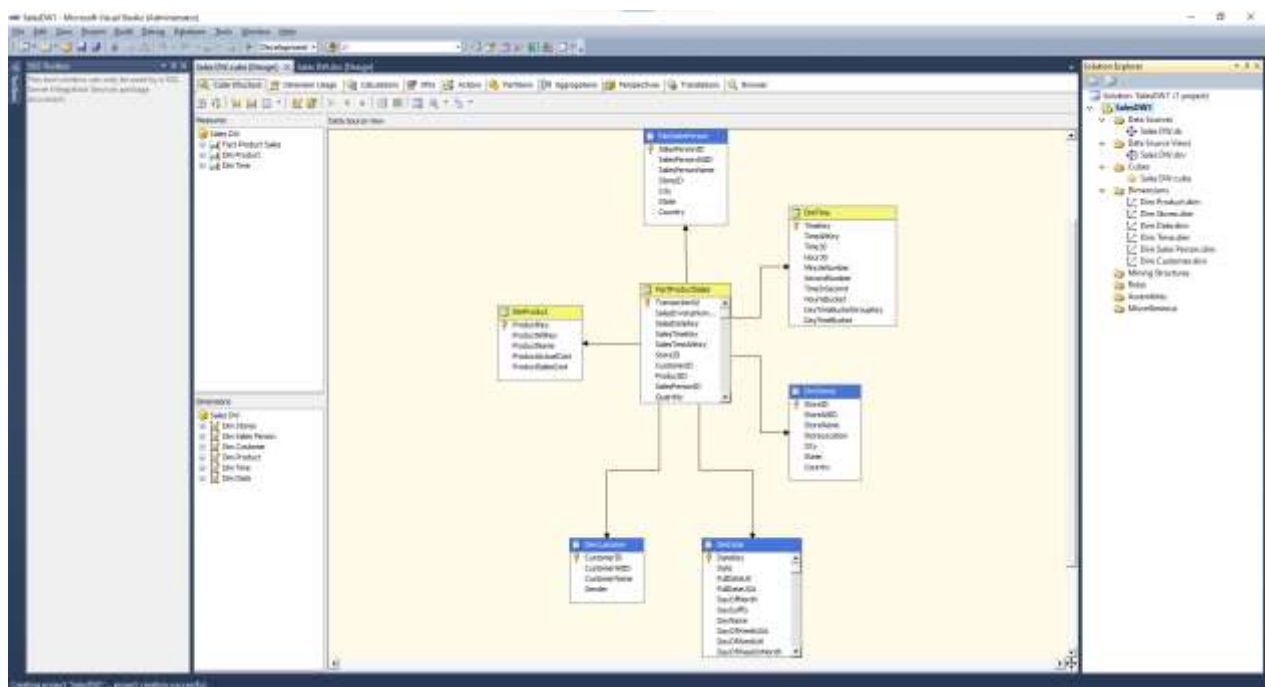
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Name the cube as Sales DW and click on Finish.



The relationship will be displayed on the screen.

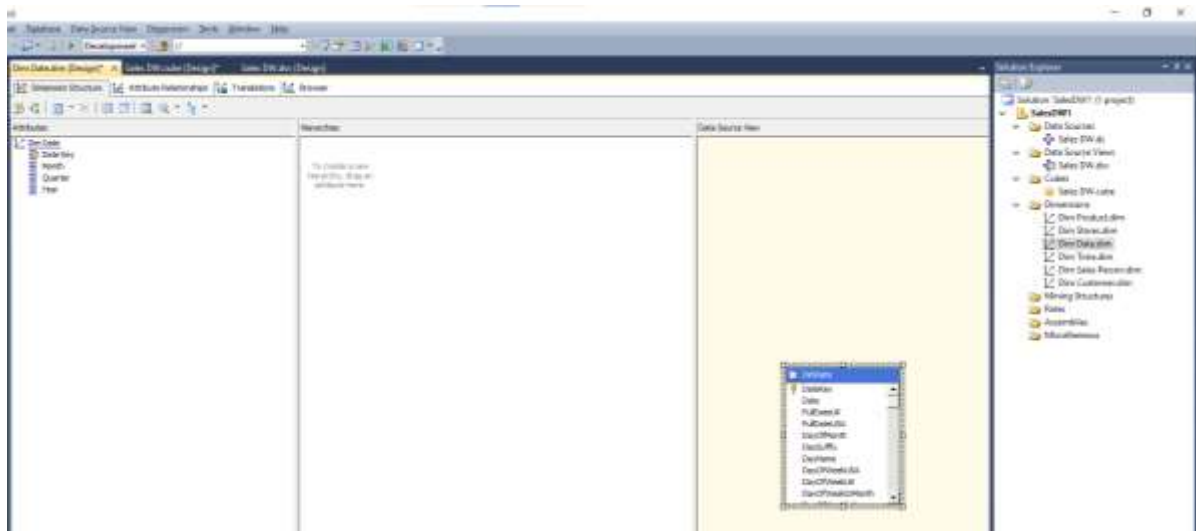




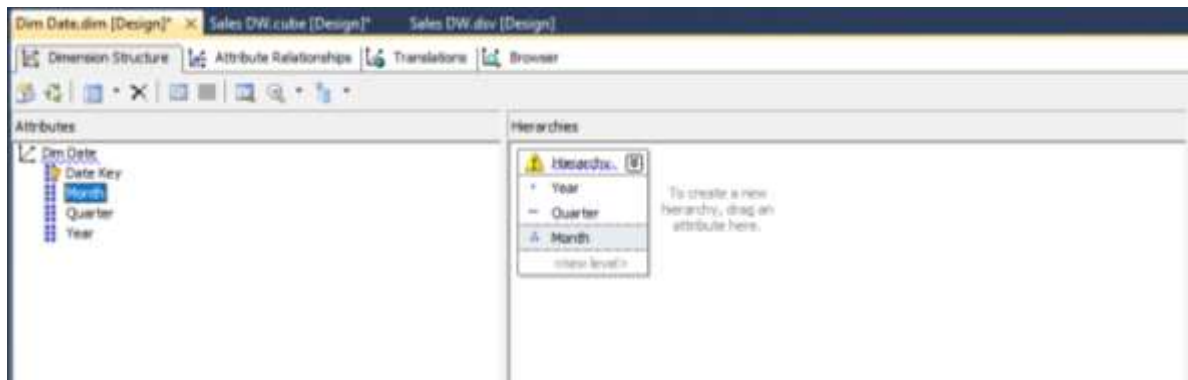
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Drag and drop Year, Quarter and Month to the Attributes.



Drag and drop the attributes into the same Hierarchy.



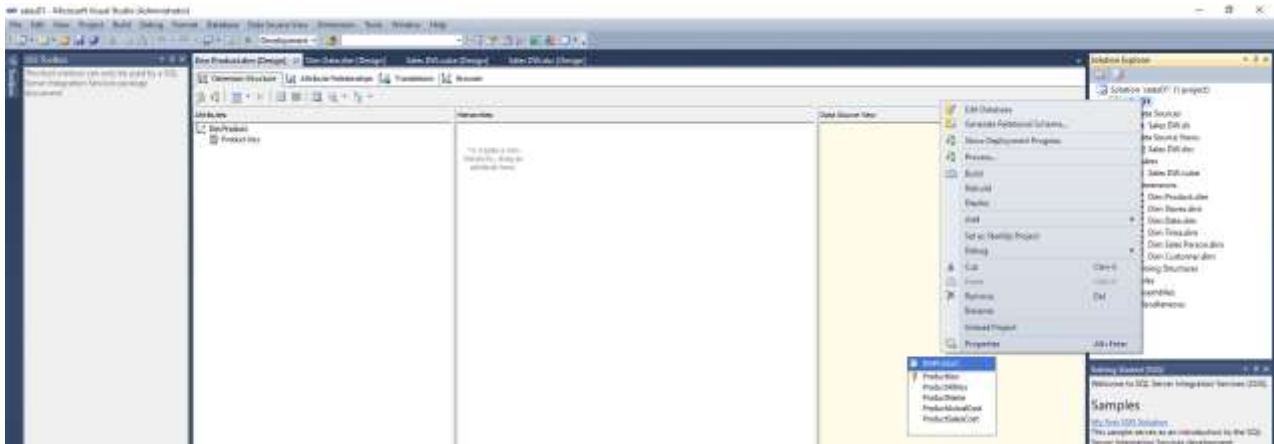
Save the progress and click on OK.



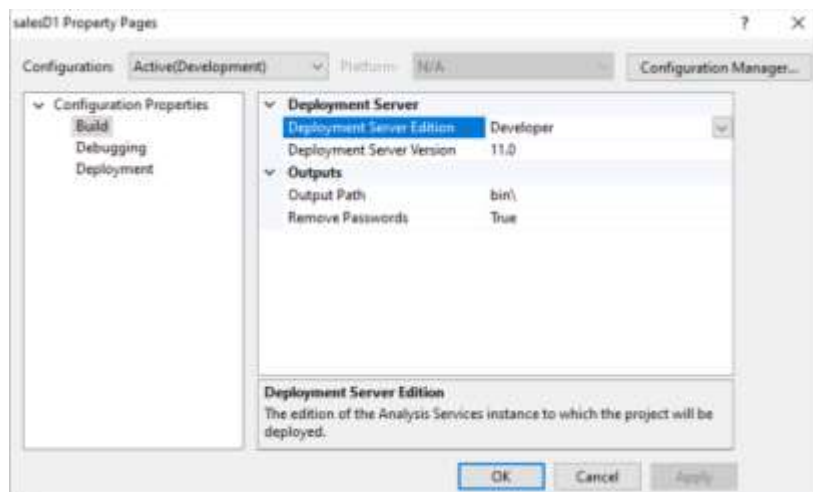
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Right click on the file name and select Properties.



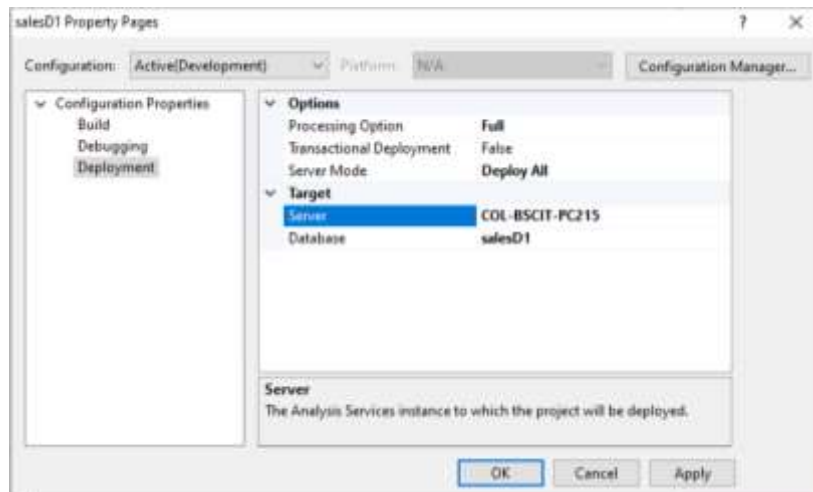
In Build make sure everything is correct.



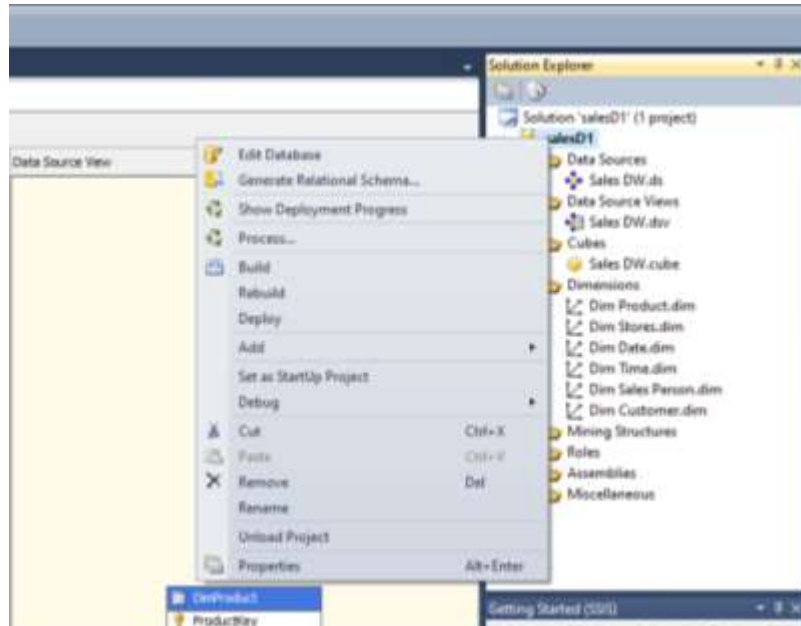
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

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.

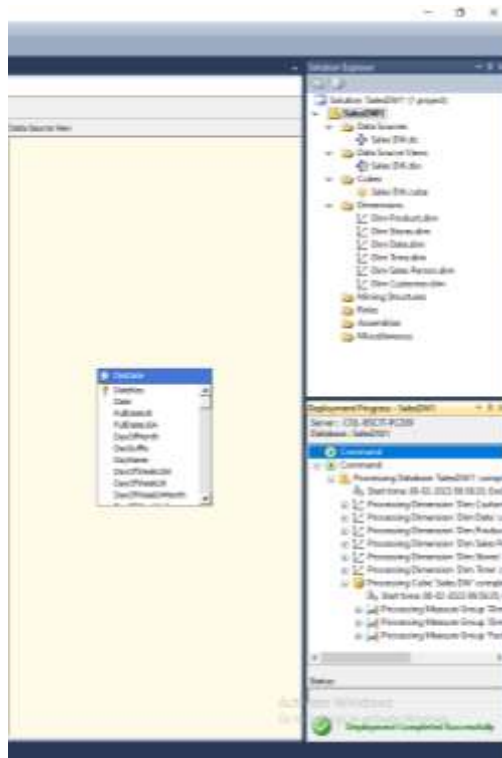


Right click on the file name and click on Deploy to deploy the project.



**T.Y. B.Sc. I.T. Semester VI**

At the bottom of the screen it is shown that the deployment is successful



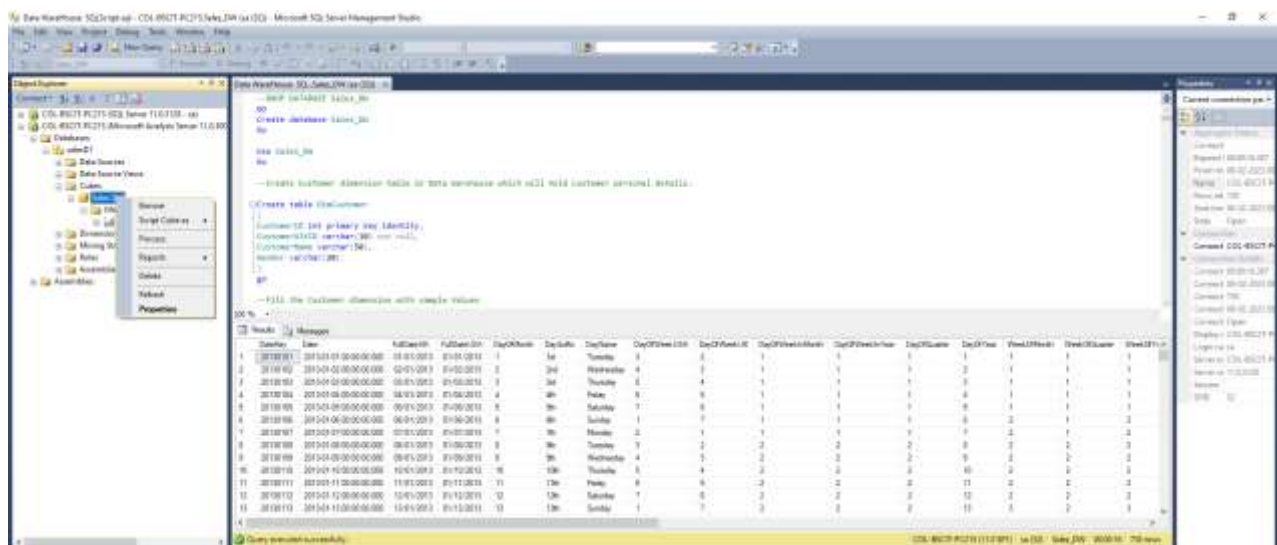
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

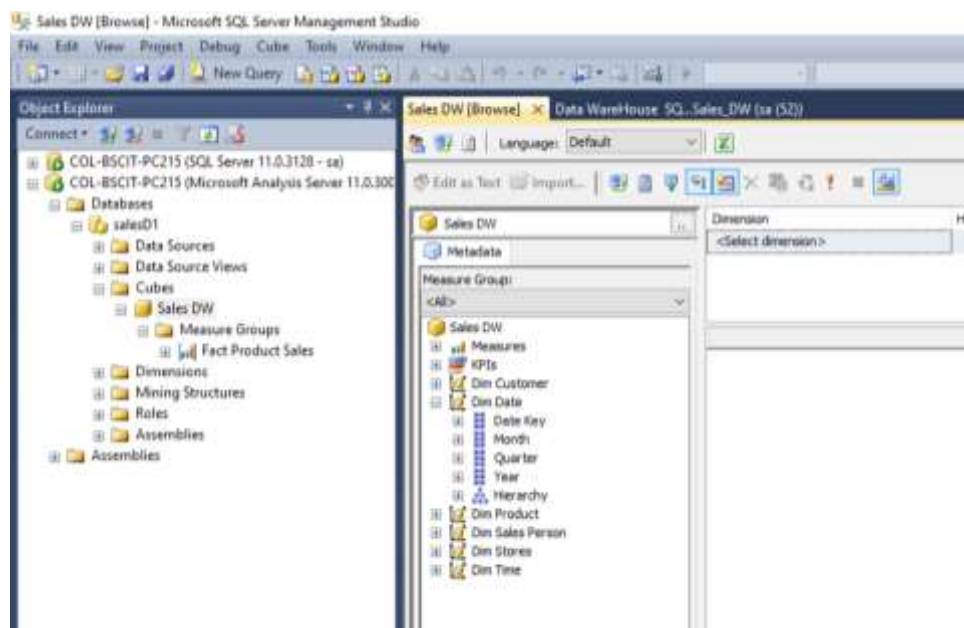
### Practical 4B – Perform Multi-Dimensional Expressions (MDX) queries for OLAP database

Continue from the above practical.

To verify, in SQL Server Management right click on the file name in Object Explorer and click on Browse.



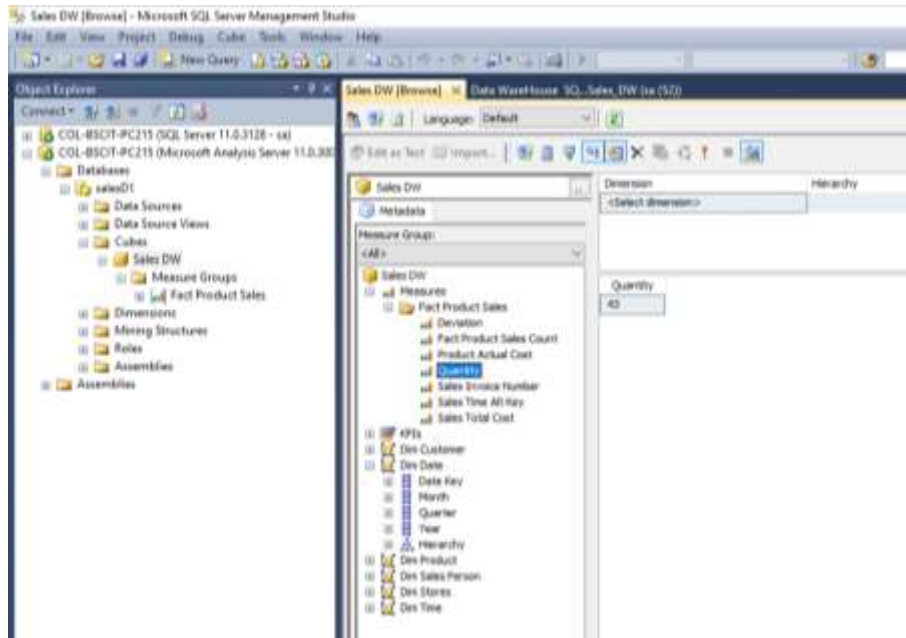
Enlarge the Measures of SalesDW.



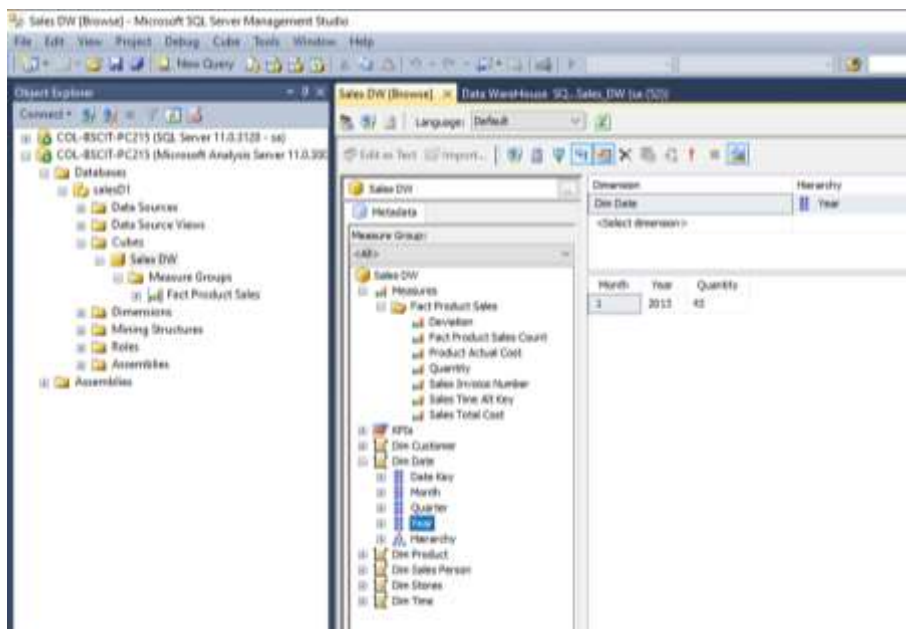
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

On selecting Quantity under Fact Product Sales the value shown will be 43.



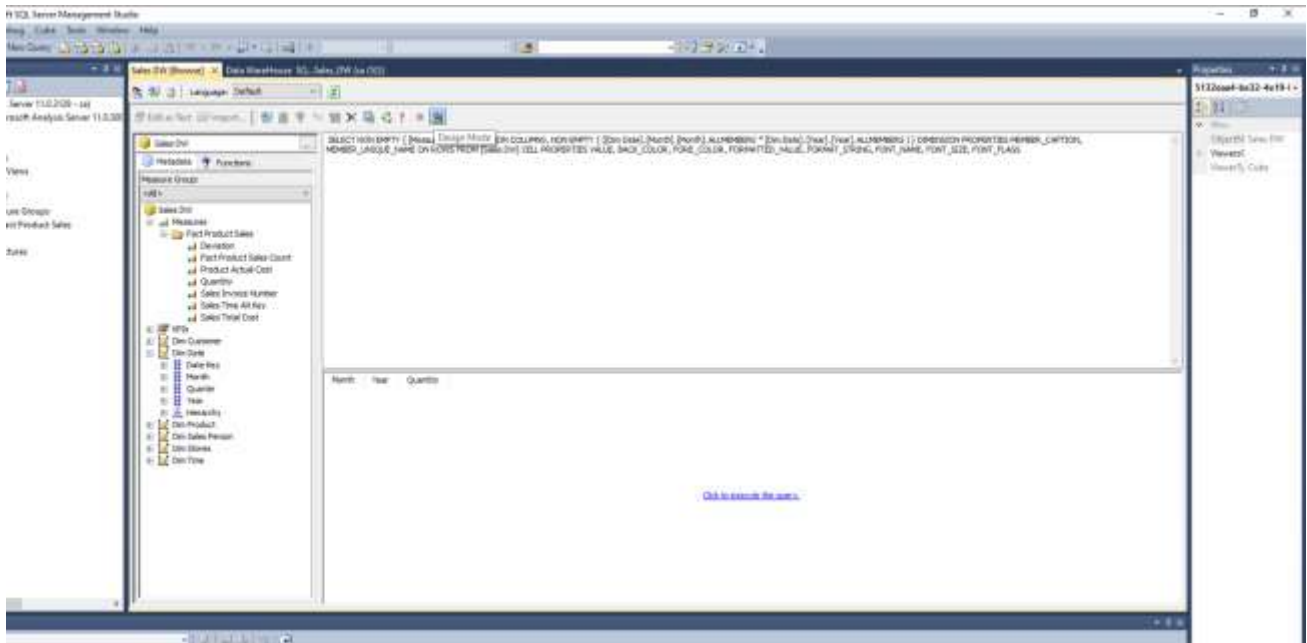
Select Month and Year as well from Dim Date.



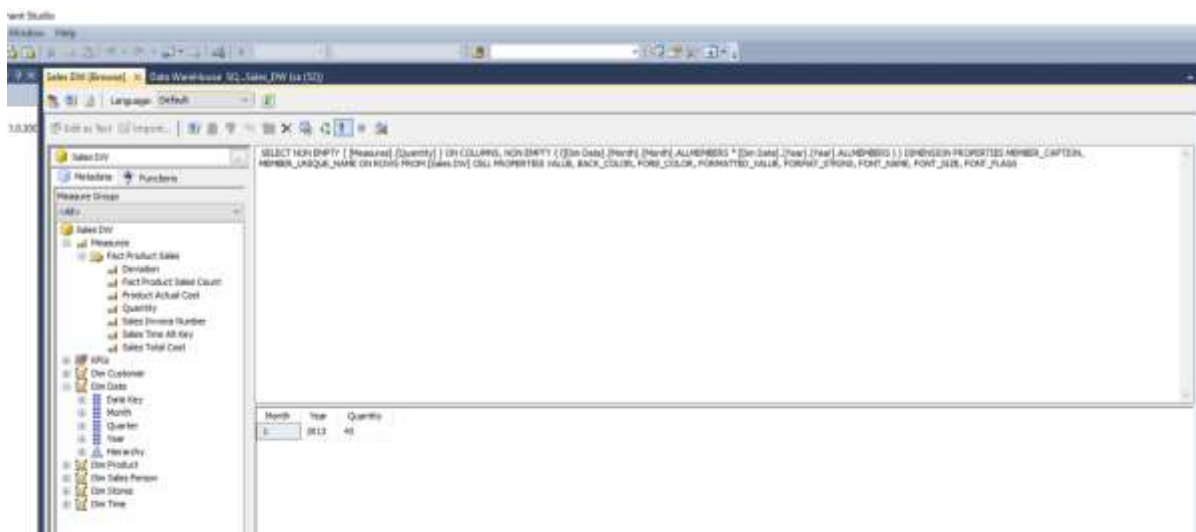
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Go in Design Mode and click on the line that says 'Click to execute the query.'



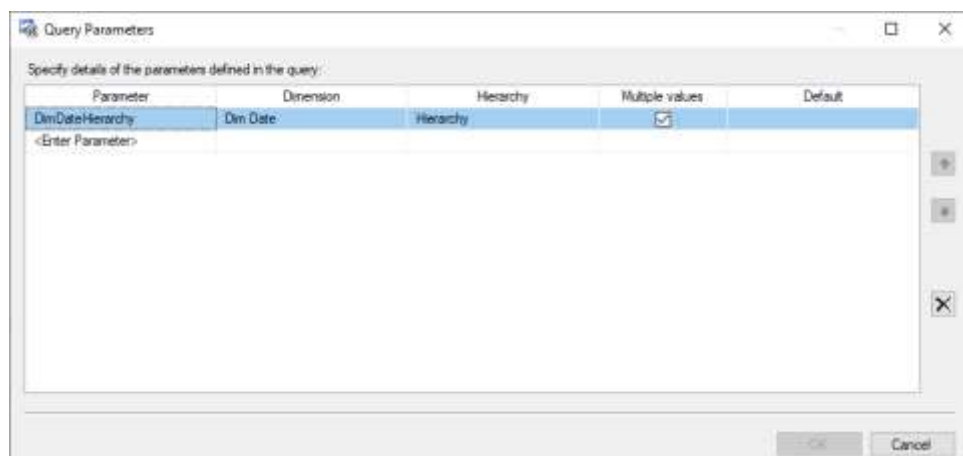
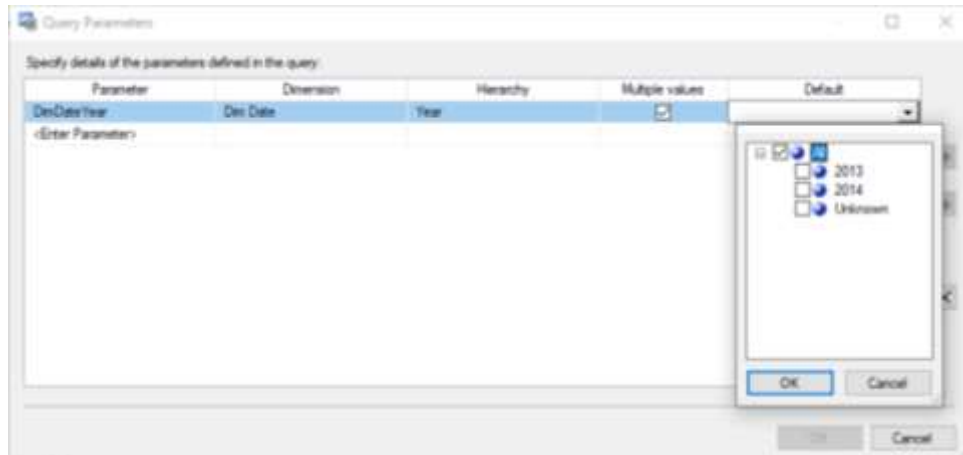
Click on the error symbol.



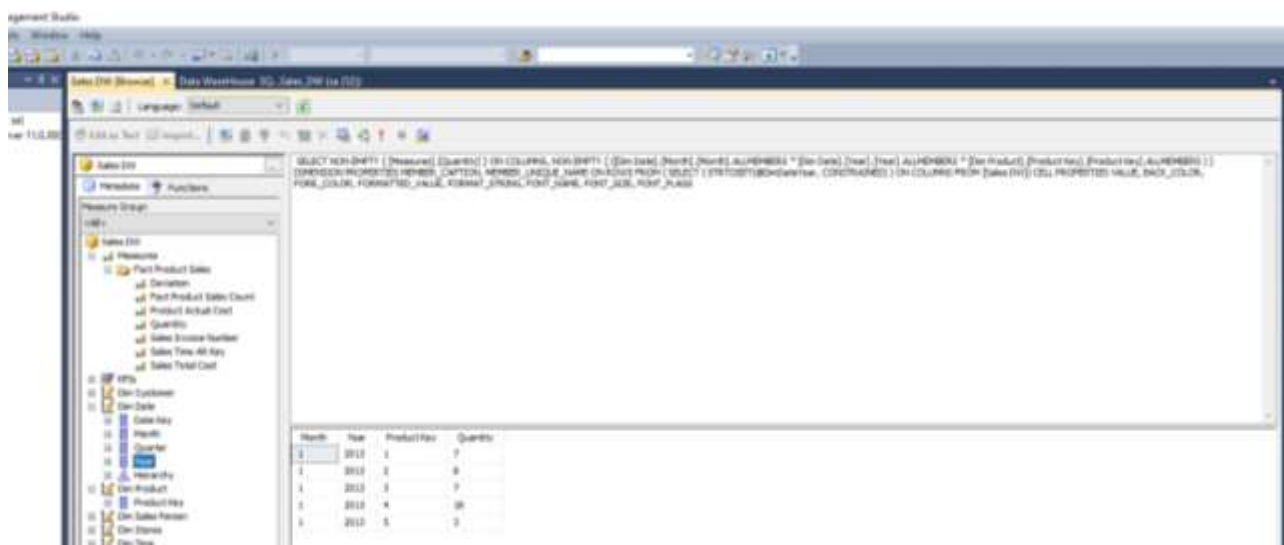
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Click on OK.



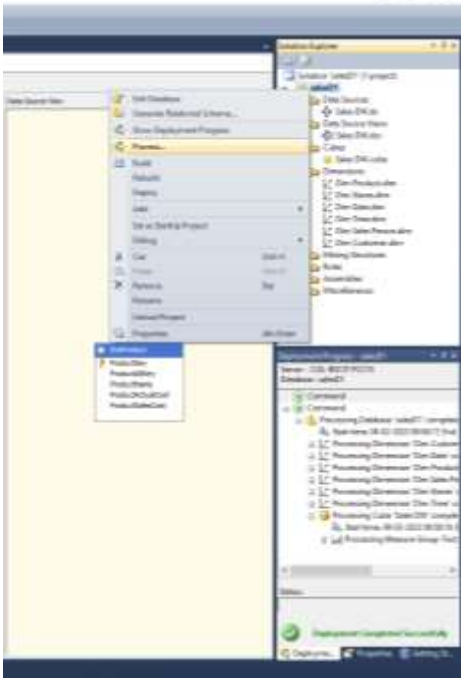
The entries will be shown on the screen.



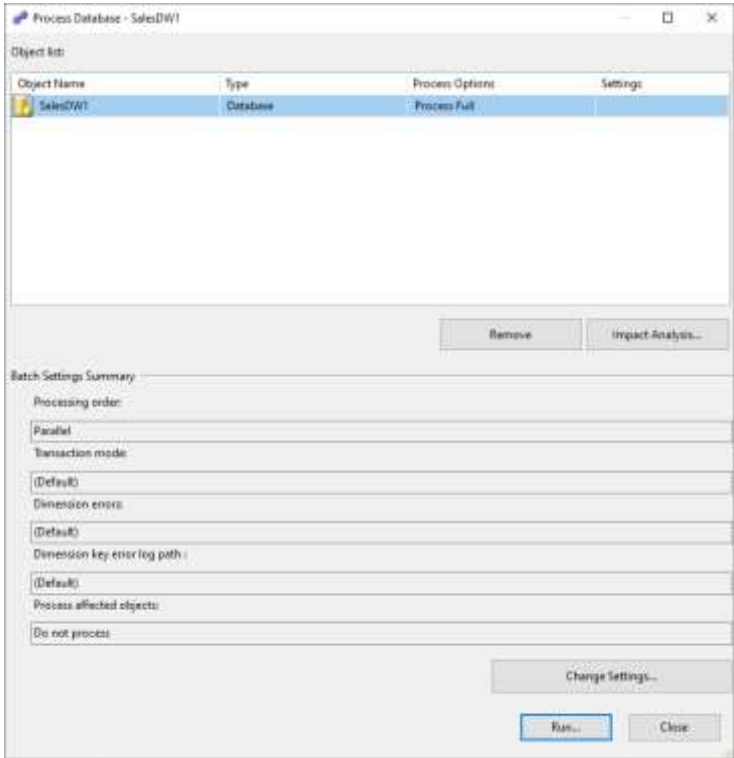


**T.Y. B.Sc. I.T. Semester VI**

Right click on the file name and select Process.



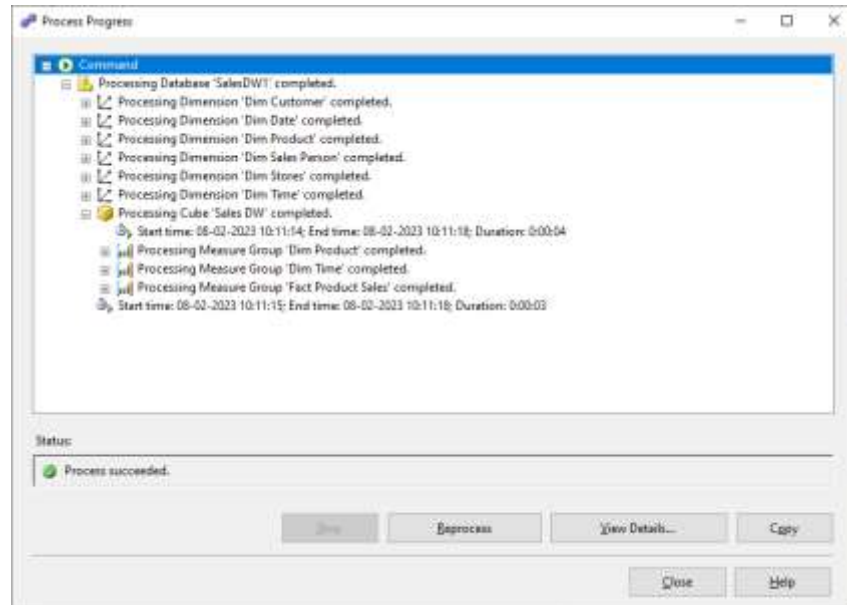
Select the file and click on Run.



# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Process succeeded is the status.

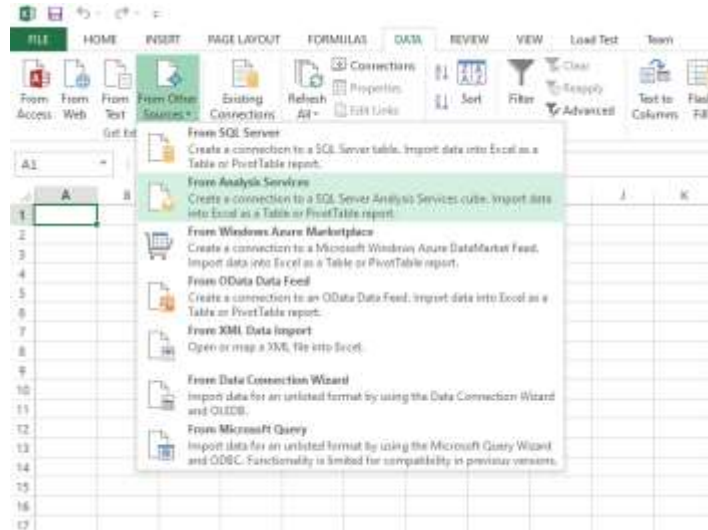


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

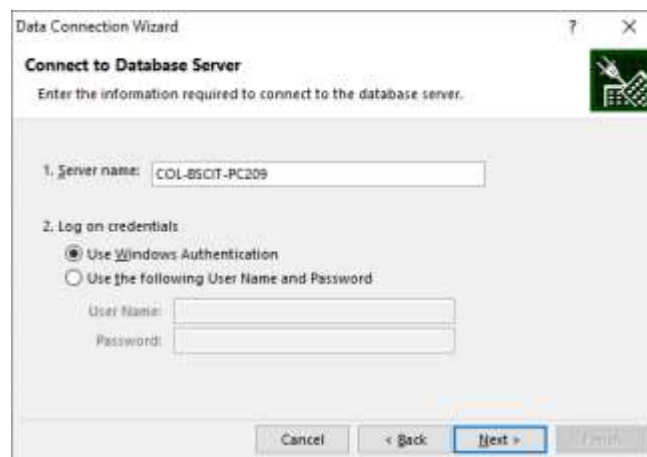
## T.Y. B.Sc. I.T. Semester VI

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

Open Microsoft Excel, go to Data, in From Other Sources select From Analysis Services.



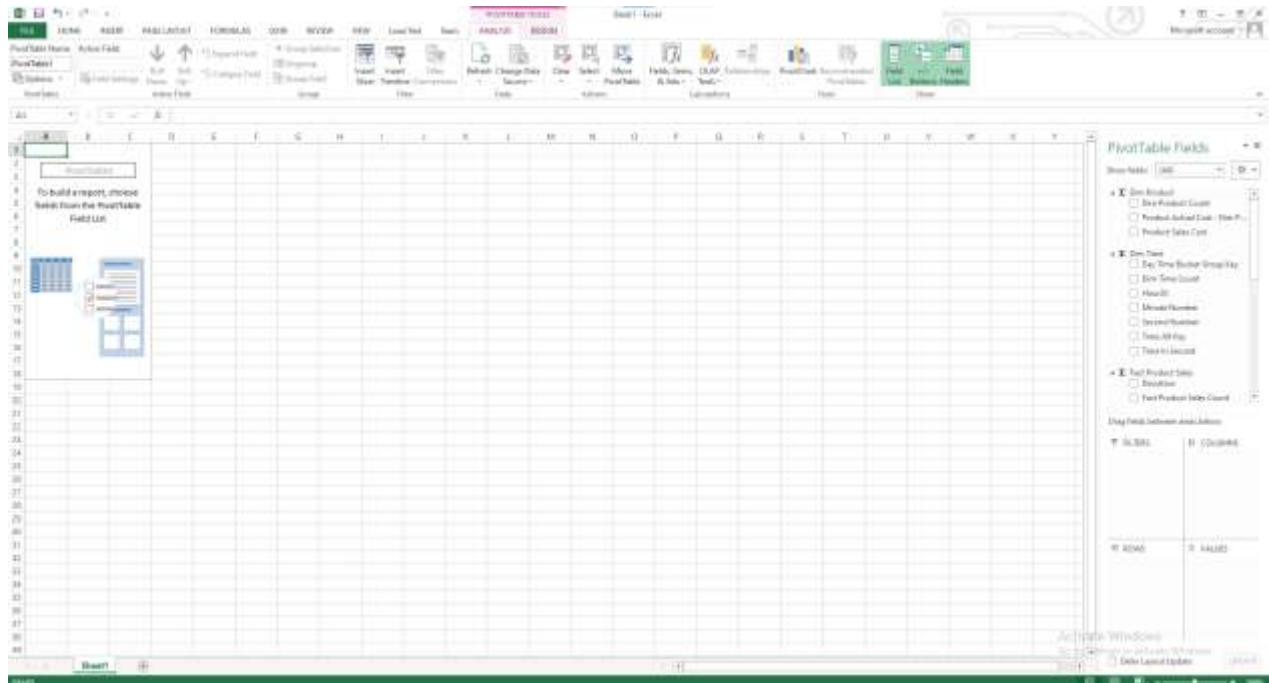
Enter your Server name and click on Next.



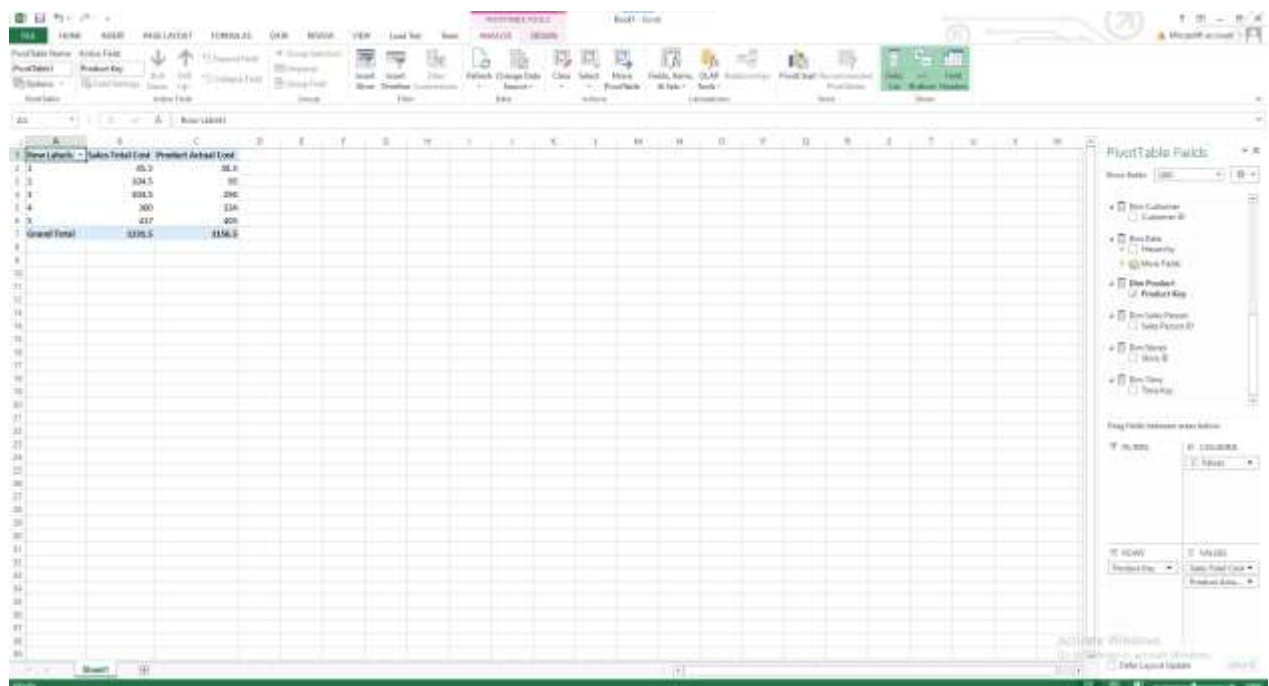
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

Insert a Pivot Table.



Select the row labels for the pivot table.



**T.Y. B.Sc. I.T. Semester VI**

Select the column labels for the pivot table.

The screenshot displays the Microsoft Excel interface. The main area shows a PivotTable with the following data:

	Product Actual Cost				Total Sales Total Cost		Total Product Actual Cost
Item Labels	A	B	C	D	E	F	G
1	40.0	80	200	370	270	940.0	600
2	6.5	40.0	10	34	10	240	230.0
<b>Grand Total</b>	<b>46.5</b>	<b>120.0</b>	<b>300.0</b>	<b>400</b>	<b>400</b>	<b>1180.0</b>	<b>830.0</b>

Below the PivotTable, a callout box contains the text: "Click in this area to work with the PivotTable report." It includes a small icon of a PivotTable and a diagram showing the relationship between the PivotTable and the PivotTable Fields task pane.

The PivotTable Fields task pane on the right shows the following settings:

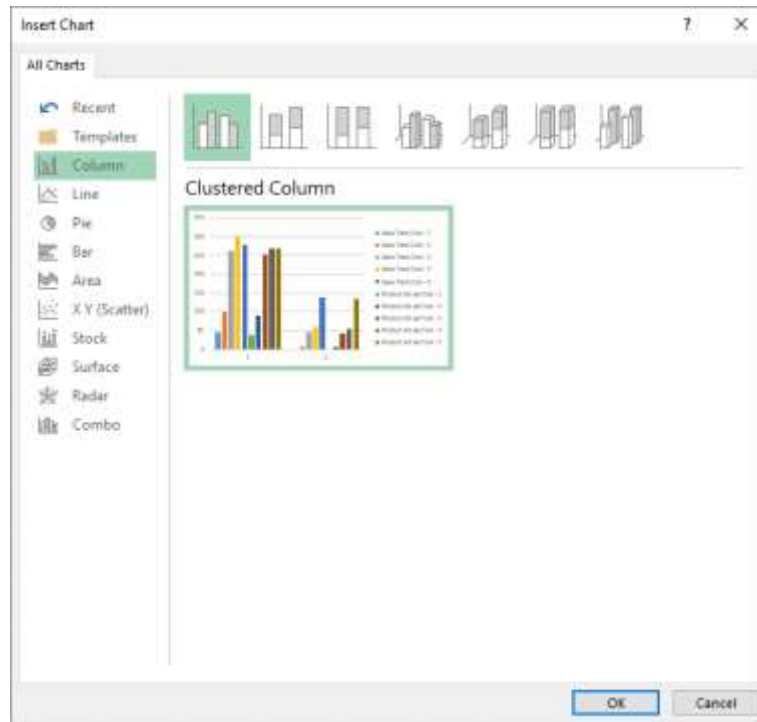
- Show Tables:** (Dropdown menu)
- Show Columns:**
  - ☒ Customer ID
  - ☒ Sales
  - ☒ Product ID
- Show Rows:**
  - ☒ Item Labels
  - ☒ Sales Person
  - ☒ Sales Amount
  - ☒ Sales Date
  - ☒ Sales Time
  - ☒ Sales Quantity
- Show Values:**
  - ☒ Sales Total Cost
  - ☒ Product Cost

# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

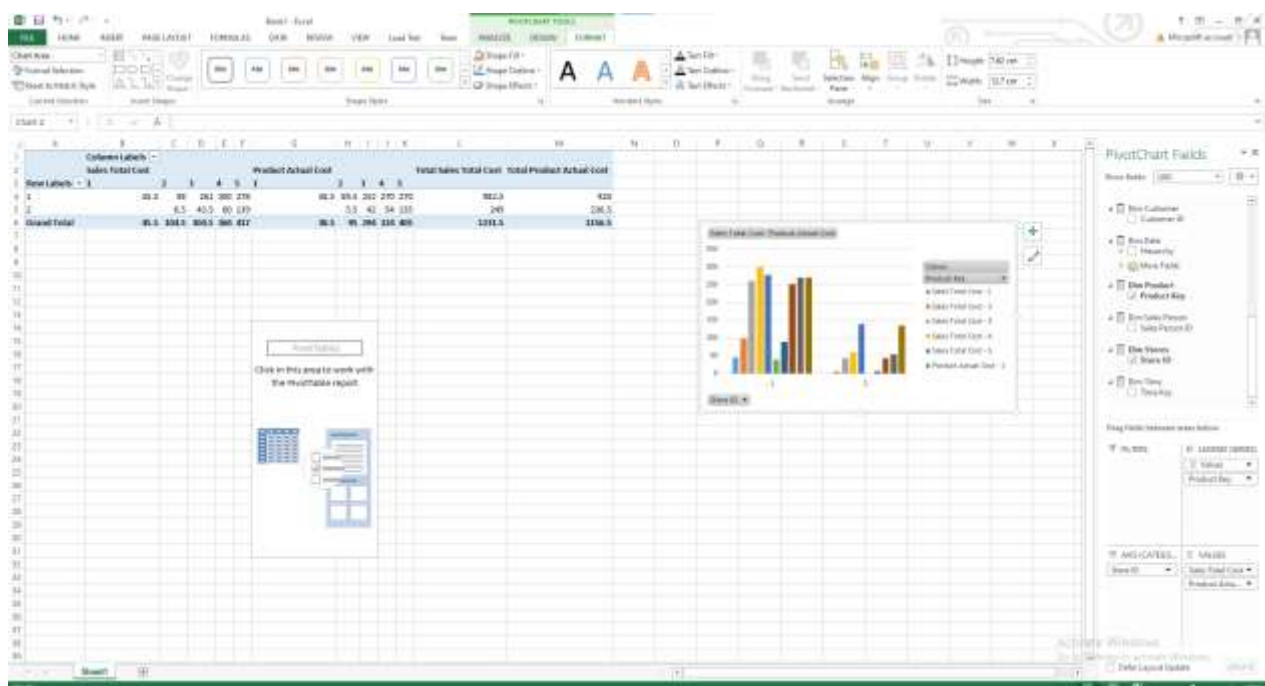
## T.Y. B.Sc. I.T. Semester VI

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

Open Microsoft Excel containing a Pivot Table and insert a clustered column chart.



The clustered column chart is shown with the selected database.

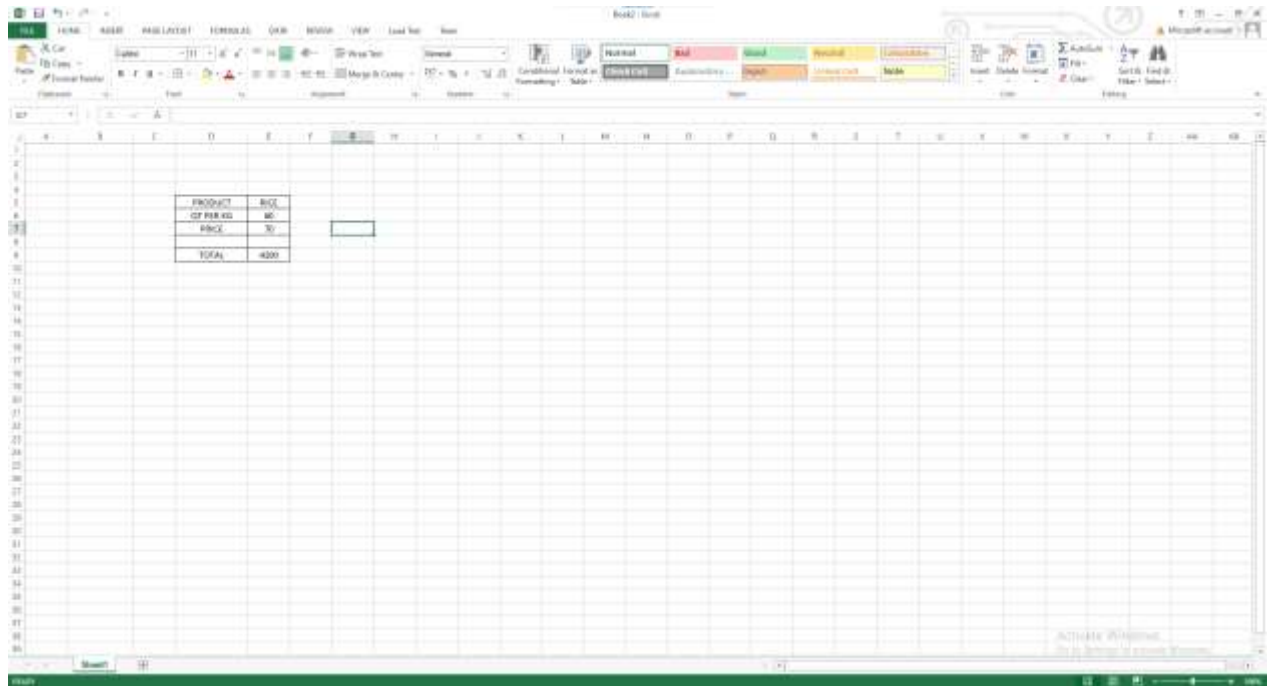


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

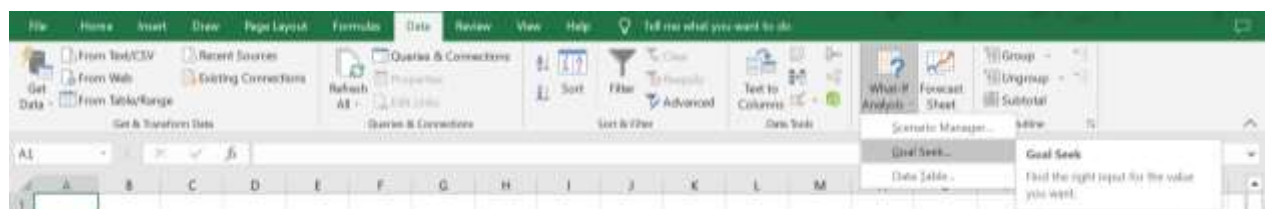
## T.Y. B.Sc. I.T. Semester VI

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

Open Microsoft Excel. Create a table.



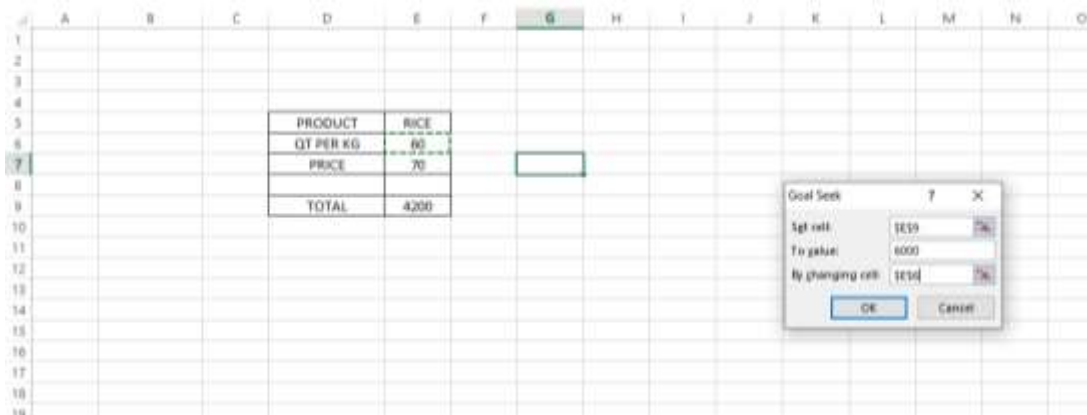
In Data tab, select Goal Seek under What-If Analysis.



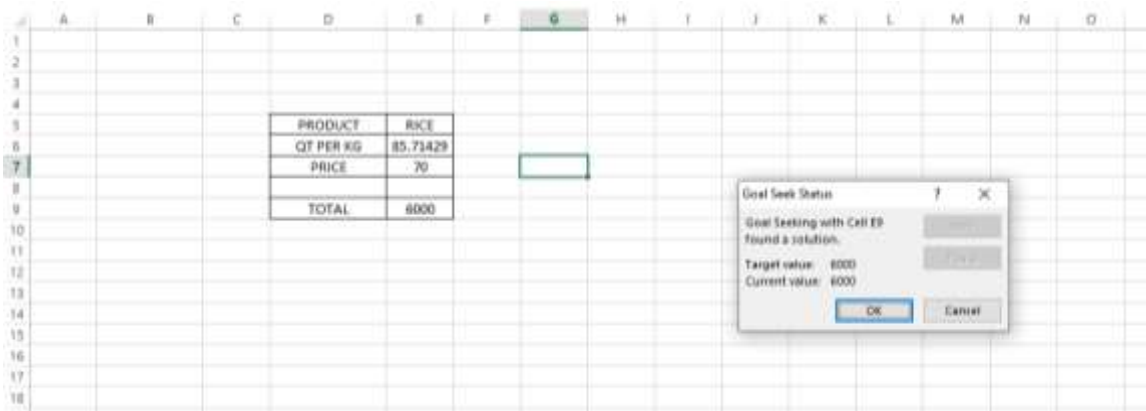
# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

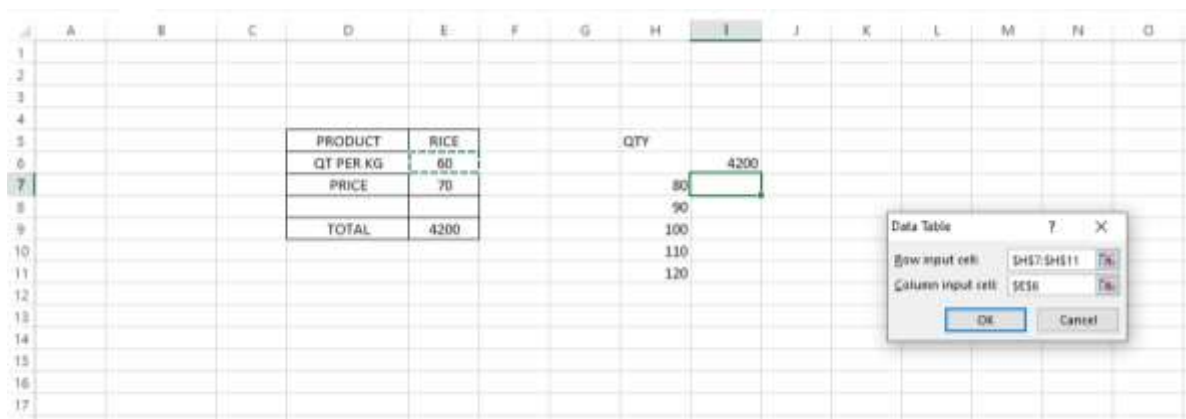
Enter the Set Cell value to where the changed value will be displayed. Enter the value that should be changed in To Value and the cell which should be changed in By changing cell.



Click on OK in Goal Seek Status.



Select Data Table under What-If Analysis.

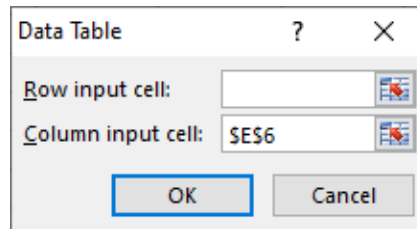




# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

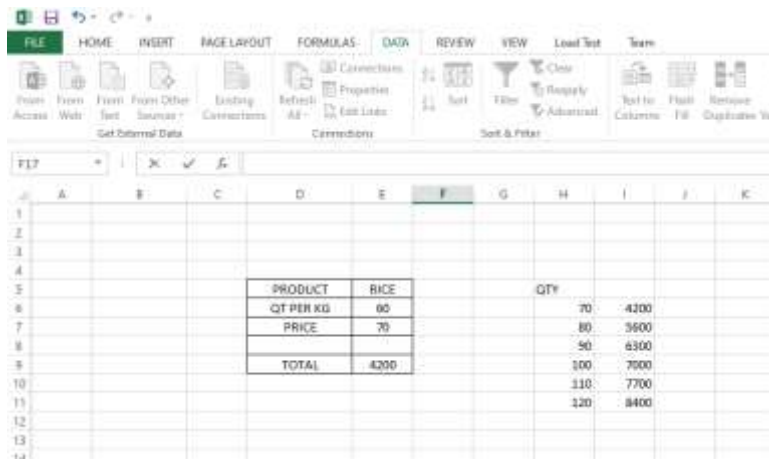
## T.Y. B.Sc. I.T. Semester VI

Enter the input cells and click on OK.



The image shows a 'Data Table' dialog box with a title bar containing a question mark and a close button. It has two input fields: 'Row input cell:' which is empty, and 'Column input cell:' which contains the text '\$E\$6'. Both fields have a small icon to their right. At the bottom, there are two buttons: 'OK' and 'Cancel'.

The result will be displayed.



The image shows an Excel spreadsheet with the 'DATA' tab selected in the ribbon. The spreadsheet contains a data table starting at cell D5. The table has two columns: 'PRODUCT' and 'PRICE'. The 'PRICE' column has a value of 70. The 'PRODUCT' column has a value of 'RICE'. The table is expanded to show a total of 4200. The data is as follows:

PRODUCT	PRICE
RICE	70
TOTAL	4200

The spreadsheet also shows a 'QTY' column with values 70, 80, 90, 100, 110, and 120. The corresponding values in the 'PRICE' column are 4200, 5600, 6300, 7000, 7700, and 8400.

# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

### Practical 7 – Data Analysis using Time Series Analysis

Open RGui. Type the code and run it.

```
RGui (64-bit) - [R Console]
File Edit View Misc Packages Windows Help

R version 4.2.2 (2022-10-31 x86_64) -- "Innocent and Trusting"
Copyright (C) 2022 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

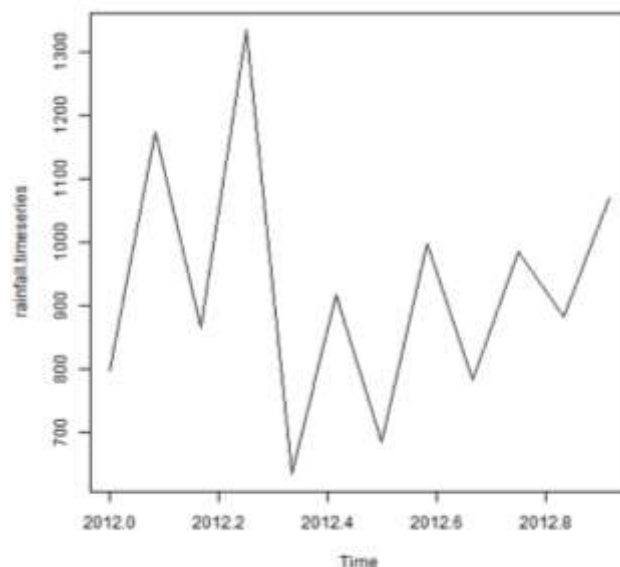
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

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.

Warning: namespace 'modeltools' is not available and has been replaced
by .GlobalEnv when processing object 'output.tree'
Warning: namespace 'party' is not available and has been replaced
by .GlobalEnv when processing object 'output.tree'
[Previously saved workspace restored]

> rainfall <-
+ c(1798.1174.8,882.1,1334.6,635.4,918.5,685.5,950.4,784.2,948.892.8,1071)
> rainfall.timeseries <- ts(rainfall, start = c(2012,1), frequency = 12)
> print(rainfall.timeseries)
      Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct
2012 1798.1 1174.8 882.1 1334.6 635.4 918.5 685.5 950.4 784.2 948.8
      Nov  Dec
2012 892.8 1071.0
> png(file = "rainfall.png")
> # Get the data points in form of a R vector.
> rainfall <-
+ c(1798.1174.8,882.1,1334.6,635.4,918.5,685.5,950.4,784.2,948.892.8,1071)
> # Convert it to a time series object.
> rainfall.timeseries <- ts(rainfall, start = c(2012,1), frequency = 12)
> # Print the timeseries data.
> print(rainfall.timeseries)
      Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct
2012 1798.1 1174.8 882.1 1334.6 635.4 918.5 685.5 950.4 784.2 948.8
      Nov  Dec
2012 892.8 1071.0
> # Give the chart file a name.
> png(file = "rainfall.png")
> # Plot a graph of the time series.
> plot(rainfall.timeseries)
> # Save the plot.
> dev.off()
png
>
> |
```

The output will be shown as this.

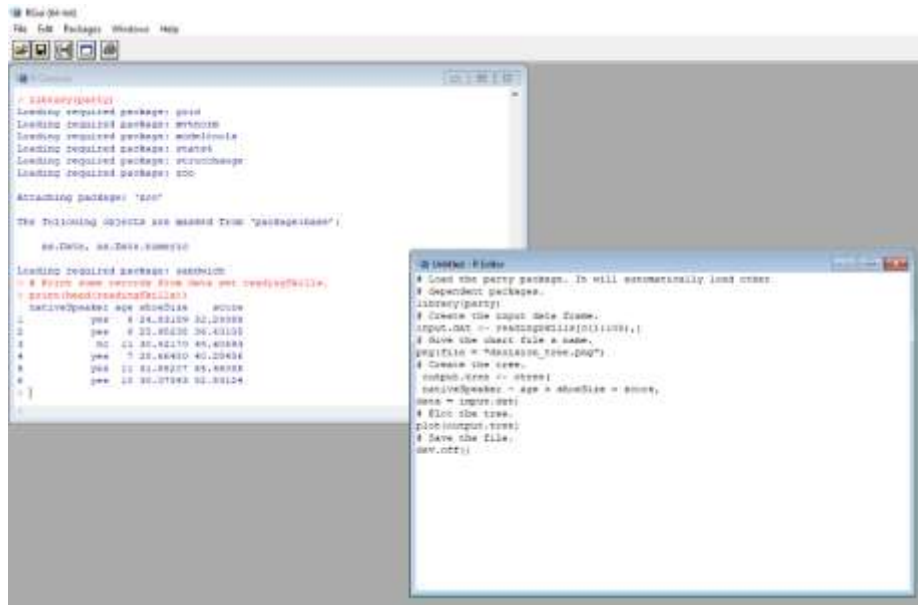


# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

### Practical 8 – Implementation of Decision Tree using R Tool

Open RGui. Type the code and run it.



```
> library(party)
Loading required package: grid
Loading required package: rpart
Loading required package: modeltools
Loading required package: statmod
Loading required package: strucchange
Loading required package: zoo

Attaching package: 'party'

The following objects are masked from 'package:base':

    as.Date, as.Date.numeric

Loading required package: sandwich
> # Print some records from data set readingSkills.
> print(head(readingSkills))
  nativeSpeaker age shoeSize score
1         yes   24.52109 32.29393
2         yes   25.96228 34.43103
3         no    30.42170 45.40593
4         yes   28.66450 40.20496
5         yes   31.35207 55.46095
6         yes   30.07843 52.53124

# Install R code
> # Load the party package. It will automatically load other
# dependent packages.
library(party)
> # Create the input data frame.
input.dat <- readingSkills[1:109,]
> # 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()
```



```
RGui [64-bit] - [R Console]
File Edit View Help Packages Windows Help

package 'matrixStats' successfully unpacked and MD5 sums checked
package 'multcomp' successfully unpacked and MD5 sums checked
package 'mvtnorm' successfully unpacked and MD5 sums checked
package 'modeltools' successfully unpacked and MD5 sums checked
package 'strucchange' successfully unpacked and MD5 sums checked
package 'zoo' successfully unpacked and MD5 sums checked
package 'sandwich' successfully unpacked and MD5 sums checked
package 'party' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\KCTYIT-PC41\AppData\Local\Temp\Rtmp4qyp/downloaded_packages
> # Load the party package. It will automatically load other
# dependent packages.
> library(party)
Loading required package: grid
Loading required package: rpart
Loading required package: modeltools
Loading required package: statmod
Loading required package: strucchange
Loading required package: zoo

Attaching package: 'party'

The following objects are masked from 'package:base':

    as.Date, as.Date.numeric

Loading required package: sandwich
> # Print some records from data set readingSkills.
> print(head(readingSkills))
  nativeSpeaker age shoeSize score
1         yes   24.52109 32.29393
2         yes   25.96228 34.43103
3         no    30.42170 45.40593
4         yes   28.66450 40.20496
5         yes   31.35207 55.46095
6         yes   30.07843 52.53124

> dev.off()
Error in dev.off() : cannot shut down device 1 (the null device)
> # Load the party package. It will automatically load other
# dependent packages.
> library(party)
> # Create the input data frame.
input.dat <- readingSkills[1:109,]
> # 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()
> dev.off()
null device
1
> #
```

# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

```

RStudio (64-bit) - [R Console]
File Edit View Misc Packages Windows Help

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.2/strucchange_1.2-3.zip'
Content type 'application/xip' length 947691 bytes (925 KB)
downloaded 925 KB

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.2/coin_1.4-2.zip'
Content type 'application/xip' length 1433672 bytes (1.4 MB)
downloaded 1.4 MB

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.2/sco_1.8-11.zip'
Content type 'application/xip' length 1513155 bytes (1.5 MB)
downloaded 1.5 MB

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.2/sandwich_3.0-2.zip'
Content type 'application/xip' length 1453564 bytes (1.4 MB)
downloaded 1.4 MB

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.2/party_1.8-11.zip'
Content type 'application/xip' length 896117 bytes (874 KB)
downloaded 874 KB

package 'TR.data' successfully unpacked and MD5 sums checked
package 'libcoin' successfully unpacked and MD5 sums checked
package 'matrixStats' successfully unpacked and MD5 sums checked
package 'multcomp' successfully unpacked and MD5 sums checked
package 'mvtnorm' successfully unpacked and MD5 sums checked
package 'modeltools' successfully unpacked and MD5 sums checked
package 'strucchange' successfully unpacked and MD5 sums checked
package 'coin' successfully unpacked and MD5 sums checked
package 'sco' successfully unpacked and MD5 sums checked
package 'sandwich' successfully unpacked and MD5 sums checked
package 'party' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\COL-BSCIT-PC\AppData\Local\Temp\StampE3pGw\downloaded_packages
> library(party)
Loading required package: grid
Loading required package: mvtnorm
Loading required package: modeltools
Loading required package: statmod
Loading required package: strucchange
Loading required package: sco

Attaching package: 'sco'

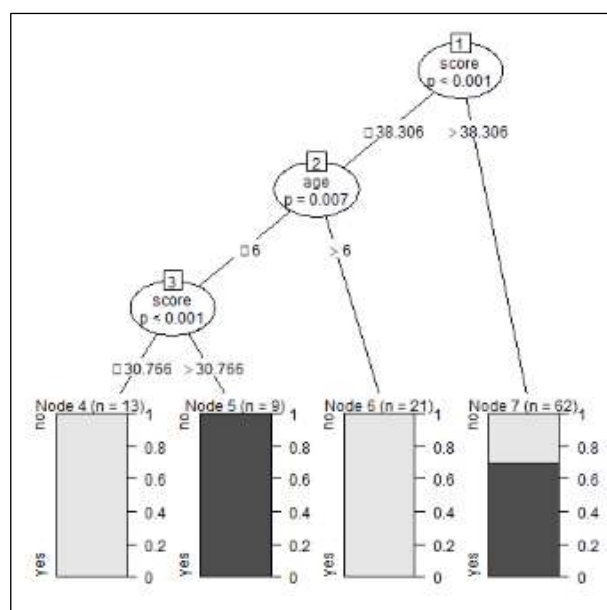
The following objects are masked from 'package:base':

    as.Date, as.Date.numeric

Loading required package: sandwich
> print(head(readings$kills))
  nativeSpeaker age shoeSize score
1         yes   1  24.93186  32.25488
2         yes   4  35.93136  34.43135
3         no   11  30.45170  49.40593
4         yes   7  35.64450  40.38414
5         yes  11  31.50207  15.44015
6         yes  10  30.07943  52.93124
>

```

The output will be shown as this.





# KISHINCHAND CHELLARAM COLLEGE, MUMBAI - 20

## T.Y. B.Sc. I.T. Semester VI

### Practical 10 – Prediction using Linear Regression

Open RGui. Type the code and run it.

```
RGui (64-bit)
File Edit View Misc Packages Windows Help

# R Console

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.253 on 8 degrees of freedom
Multiple R-squared:  0.9549,    Adjusted R-squared:  0.9481
F-statistic: 168.9 on 1 and 8 DF,  p-value: 1.166e-08

> # The predictor vector.
> x <- c(151, 174, 138, 156, 128, 136, 179, 163, 152, 131)
> # The response vector.
> y <- c(63, 61, 56, 61, 47, 57, 76, 72, 62, 46)
> # Apply the lm() function.
> relation <- lm(y~x)
> # Find weight of a person with height 170.
> x <- data.frame(x = 170)
> result <- predict(relation,x)
> print(result)
[1]
76.22869
> # Create the predictor and response variable.
> x <- c(151, 174, 138, 156, 128, 136, 179, 163, 152, 131)
> y <- c(63, 61, 56, 61, 47, 57, 76, 72, 62, 46)
> relation <- lm(y~x)
> # Give the chart file a name.
> png(file = "linearregression.png")
> # Plot the chart.
> plot(y,x,col = "blue",main = "Height & Weight Regression",
+ abline(lm(x~y)),cex = 1.5,pch = 15,xlab = "Weight in Kg",ylab = "Height in
+ cm")
> # Save the file.
> dev.off()
null device
1
>
```

The output will be shown as this.

