Class: MSC-I **SEM: I**

Subject: Data Mining & Data Warehousing (DMDW) **Paper: III**

Academic Year: 2022-2023 **Roll No: 539**

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Practical No 1

Aim : Creation of Dimensions and Fact tables.

Solution :

Open Application -> Microsoft SQL Server 2008 R2 -> SQL Server Management Studio

1. **Select Connect Tab -> Database Engine -> Select Server Name(local)**

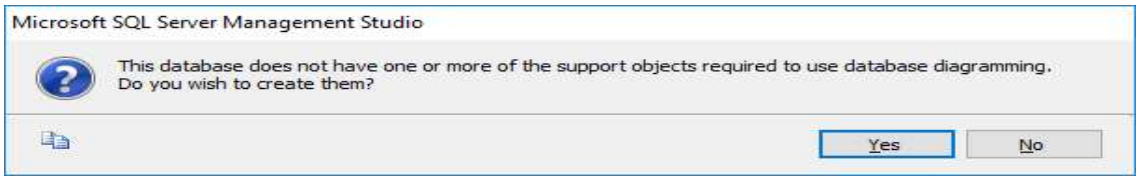
2. **Right Click the Database -> New Database**

3. **Types "SalesInformation" as the database name, click on OK to close the dialog box and to create the databse.**

Create a Database Diagrams

Expand the "SalesInformation" database folder.

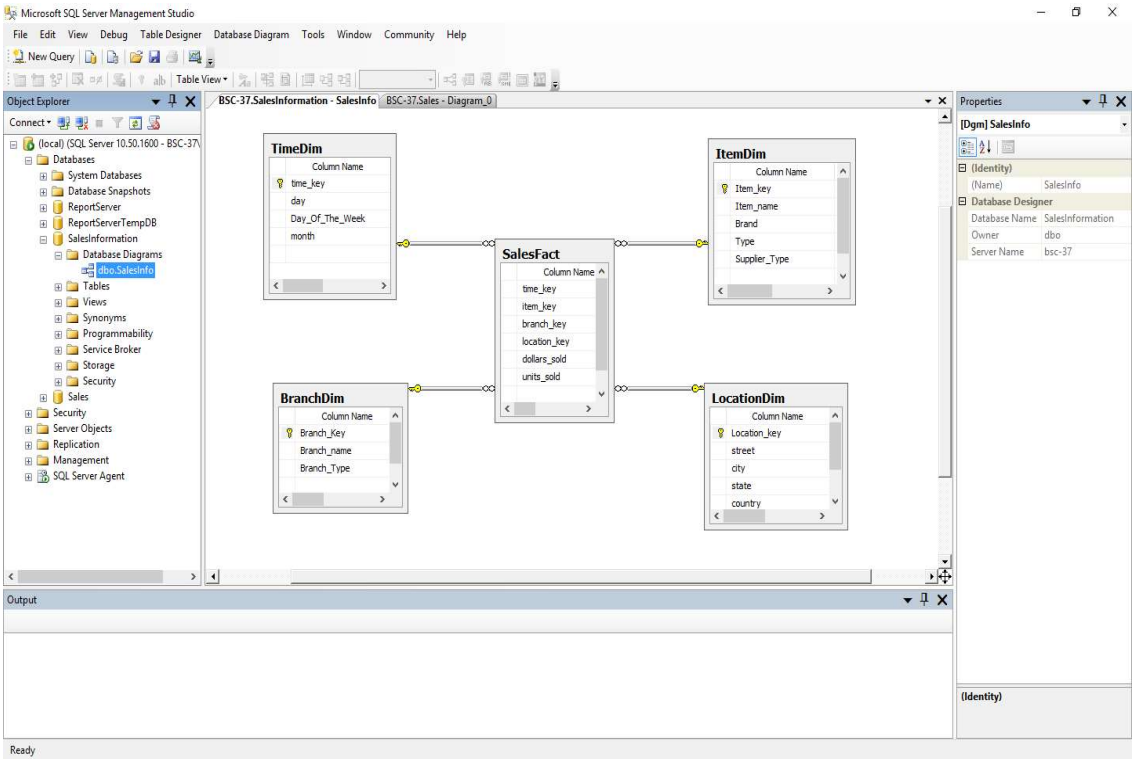
1. **Click on Database Diagrams to expand it**



   On click of it, above Dialog box appears, click on Yes to close it.

2. **Right Click on Database Diagrams -> New Database Diagrams**

3. **Create fact and Dimension Tables. (Right click on surface, choose New Table to add tables on Database Diagrams.)**



4. **Establish relationship between fact and dimension tables.**
5. **Save Database Diagrams with name as "SalesInfo". (After saving Database Diagrams fact and dimension tables are automatically placed in Table tab.)**

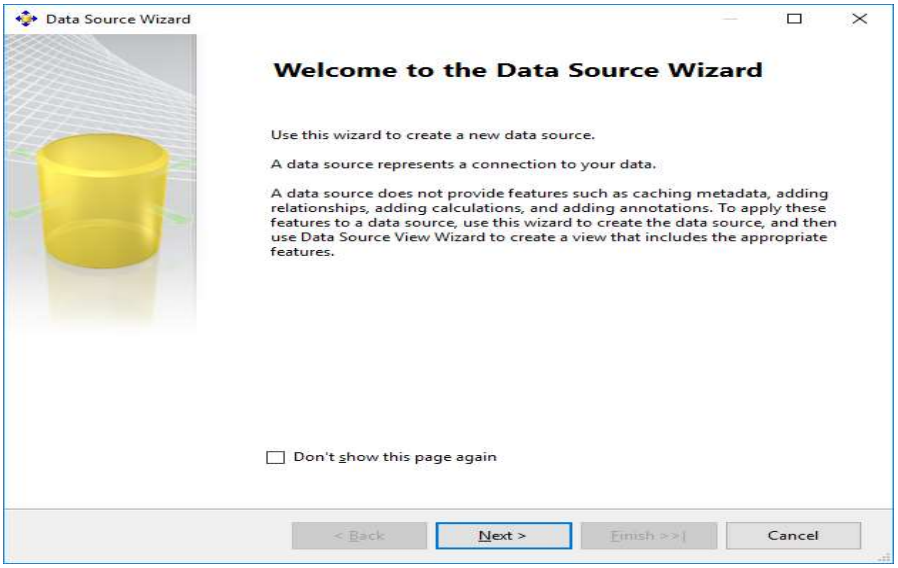
Practical No 2

Aim : Create Data Source using SSAS(SQL Server Analysis Services.)

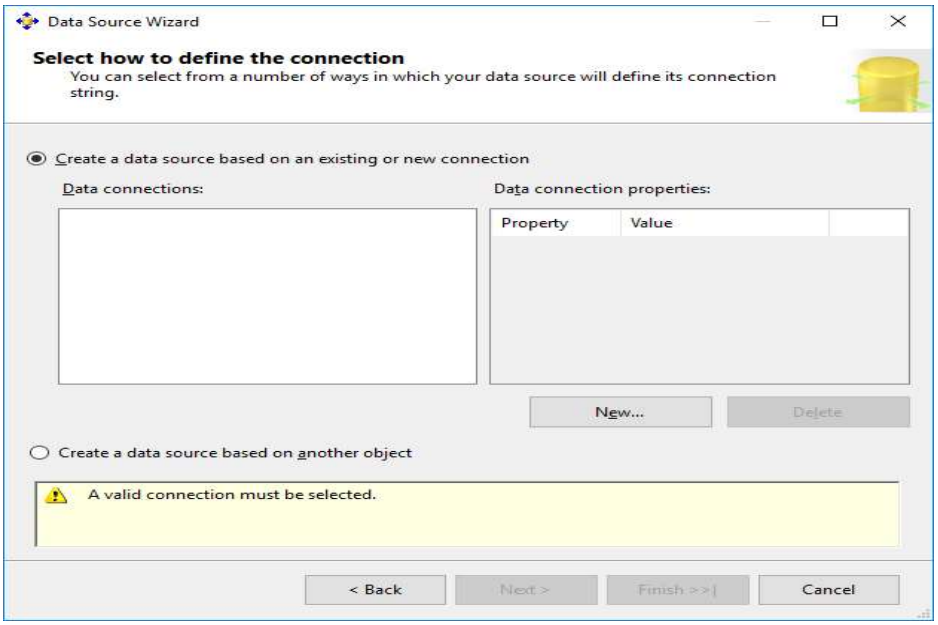
Solution :

Open Application -> Microsoft SQL Server 2008 R2 -> SQL Server Business Intelligence Development Studio

1. **Select File -> New Project -> Choose Analysis Service Project -> Name it as "SalesInfo_BIPrj" and click on OK.**
2. **Right Click on Data Sources -> New Data Source**

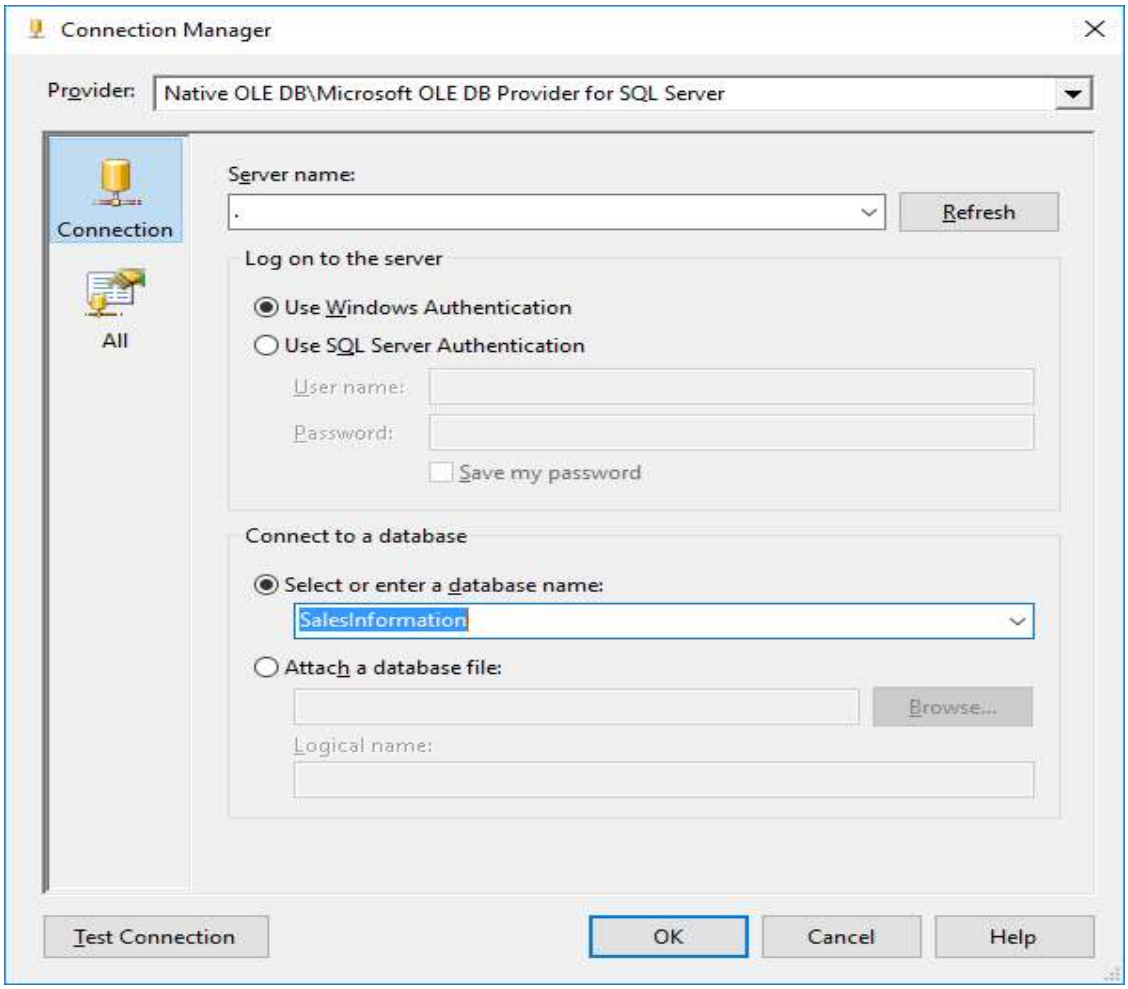


Click on Next.

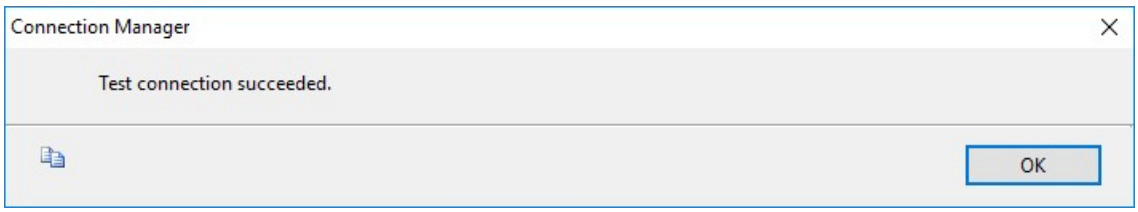


Click on New.

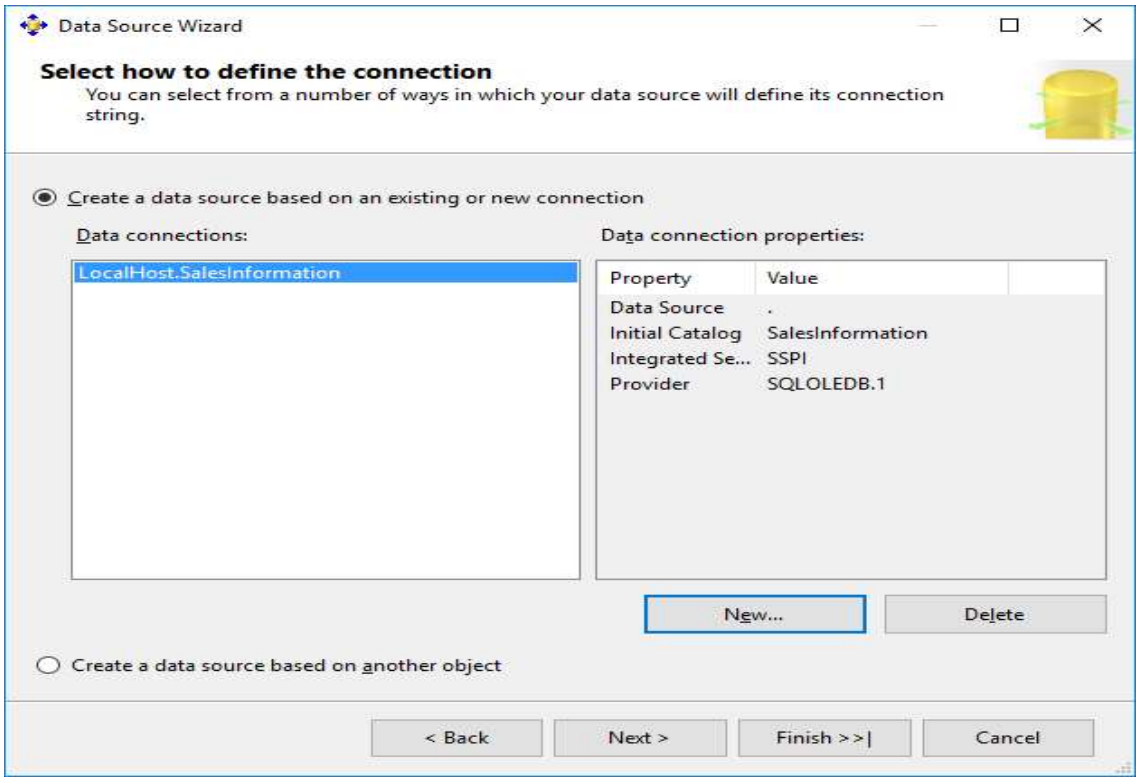
3. **Choose Provider as "Microsoft OLEDB Provider for SQL Server" , Server Name as "." , Select database name as "SalesInformation".(Created in SQL Server Management studio).**



4. **Click on Test Connection.**

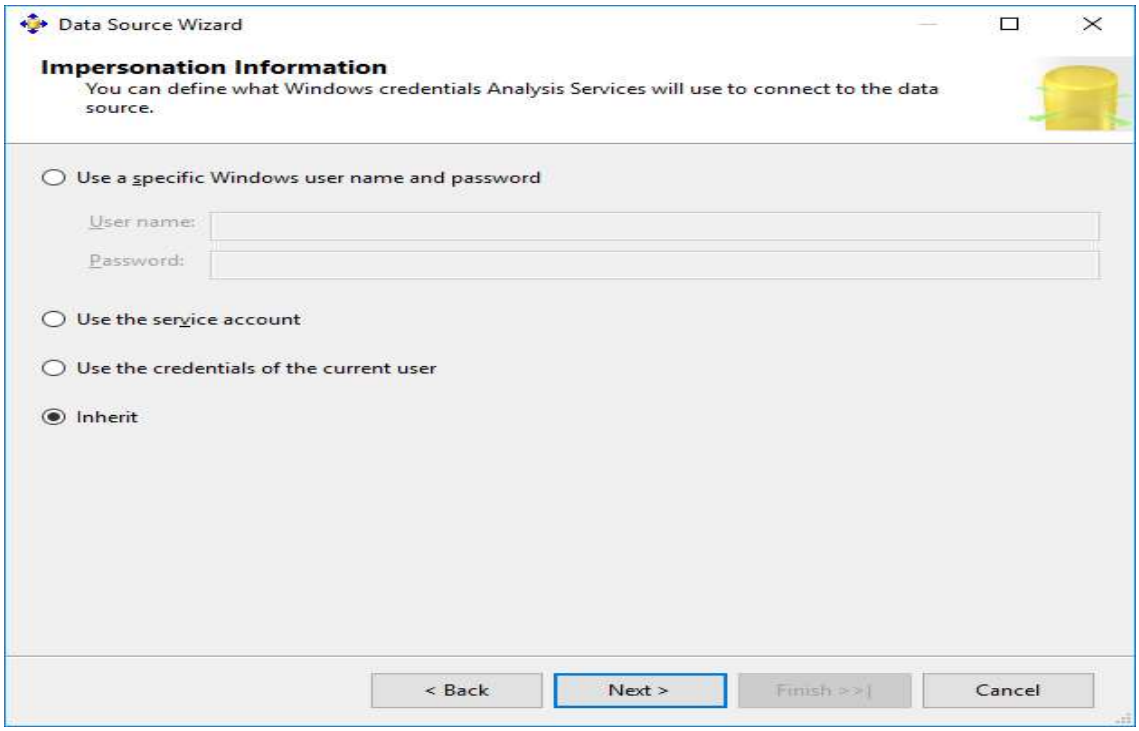


Click on OK.



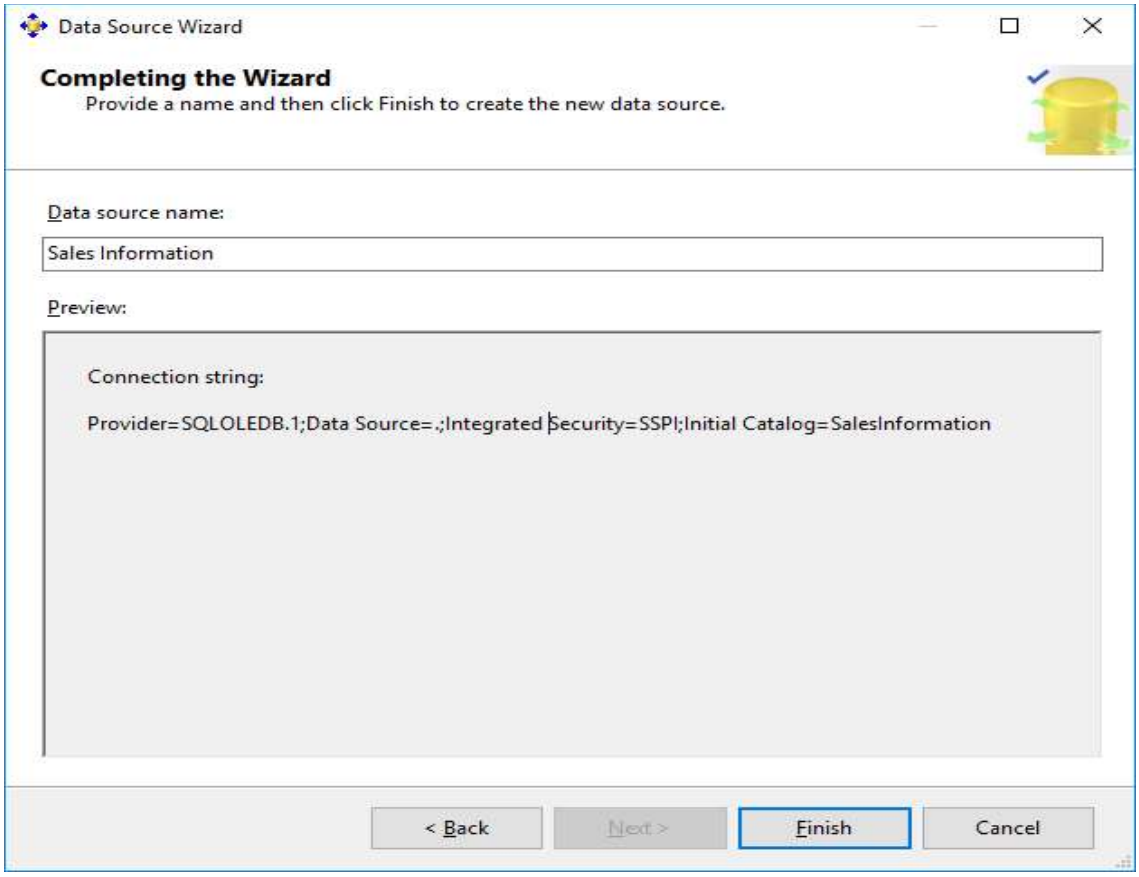
Click on Next

5. **Choose "Inherit" option.**



Click on Next.

6. **Click on Finish.**



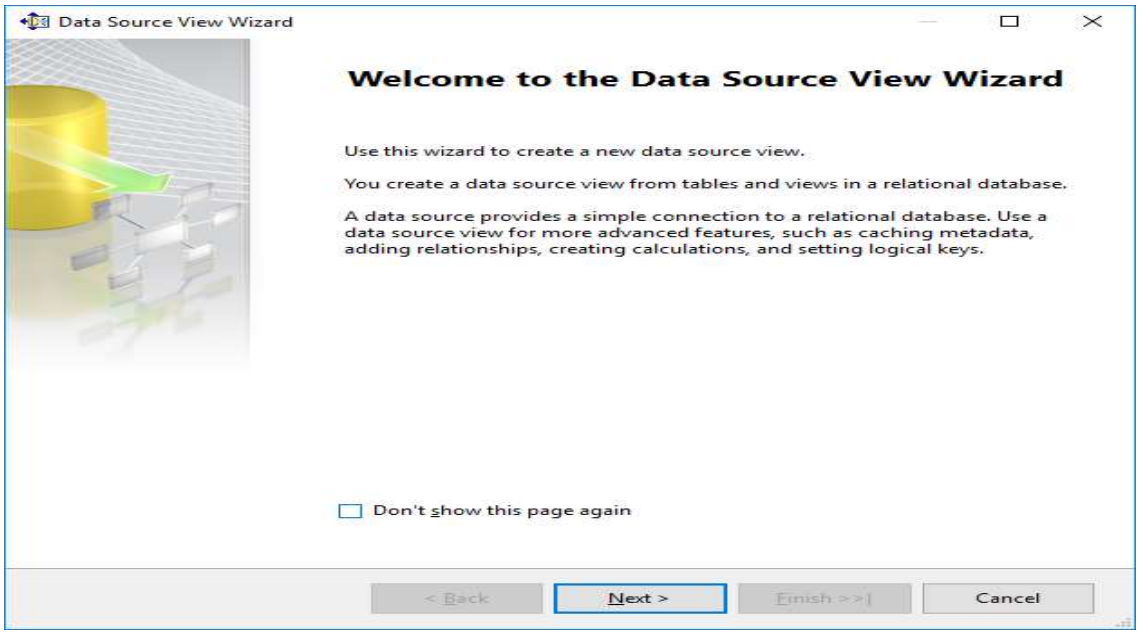
Name Data Source as “Sales Information”.

Practical No 3

Aim : Create Data Source View using SSAS(SQL Server Analysis Services.)

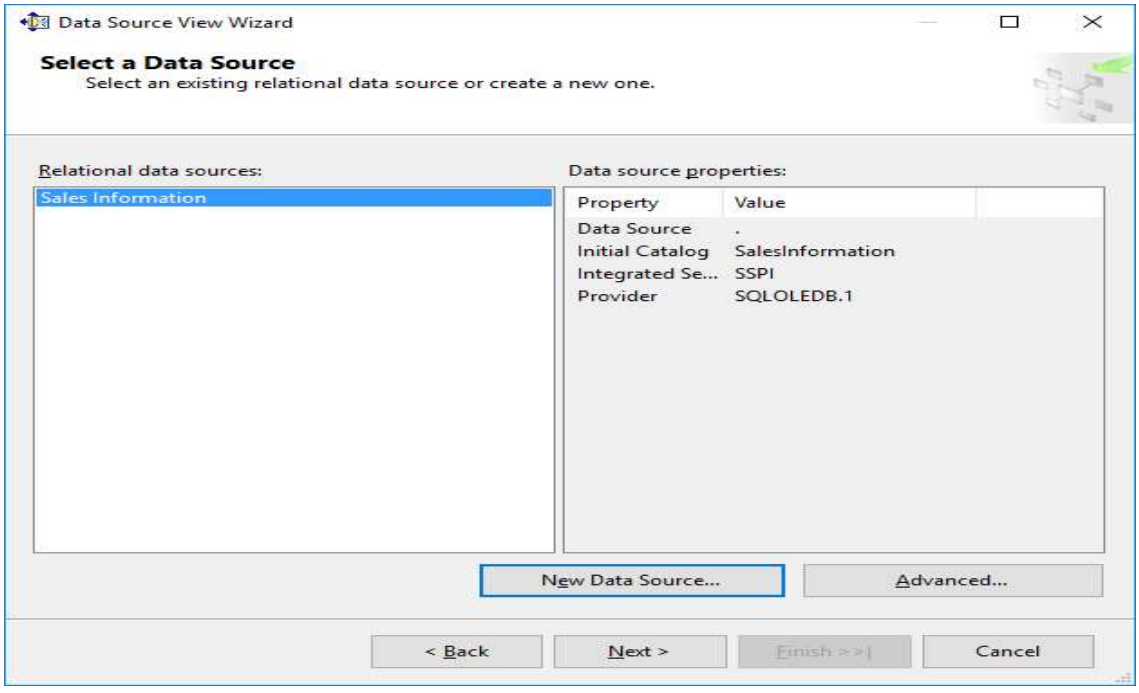
Solution :

1. **Right click on Data Source View -> New Data Source View**

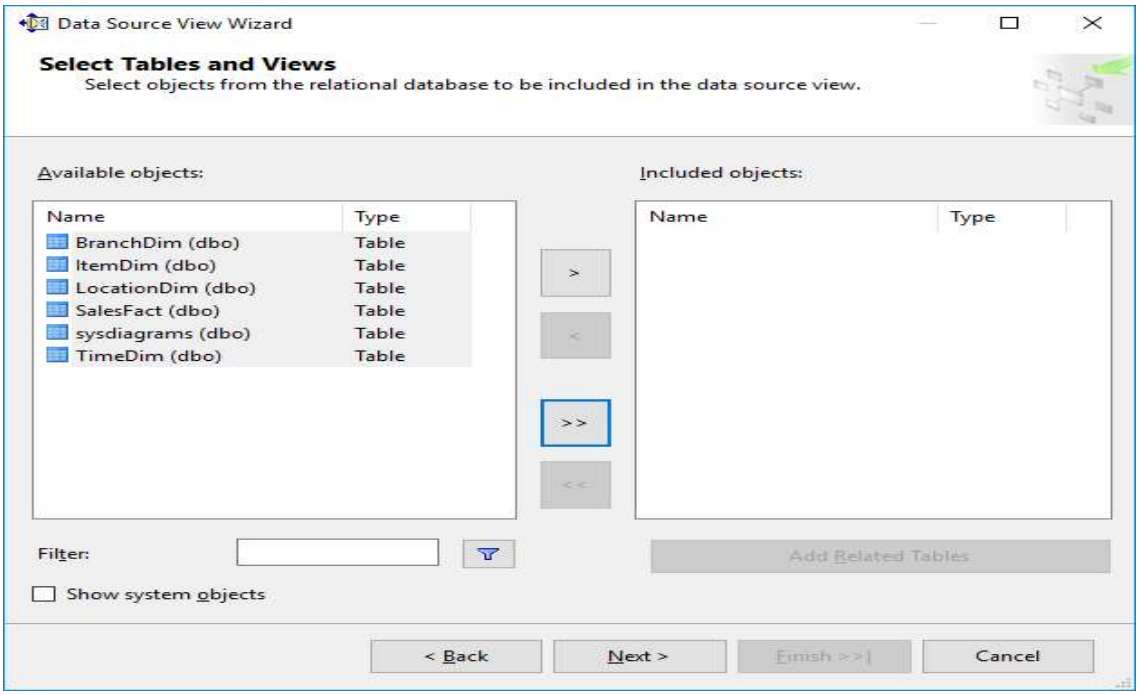


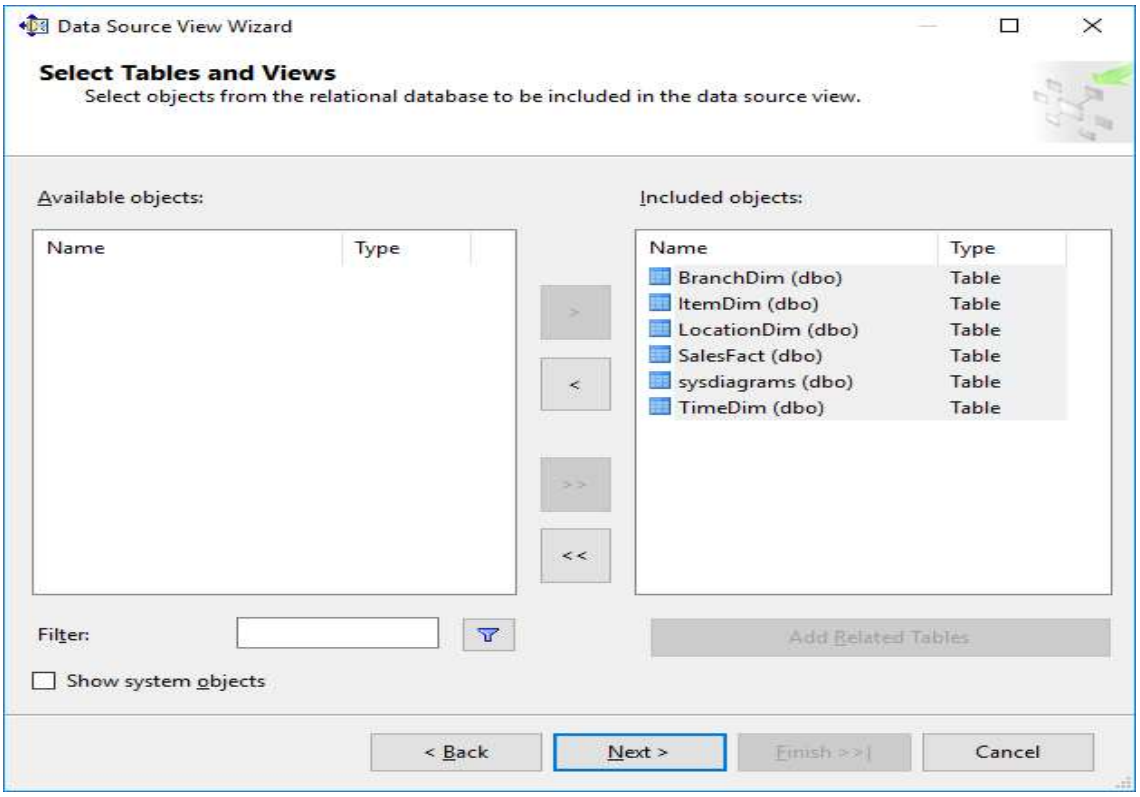
Click on Next.

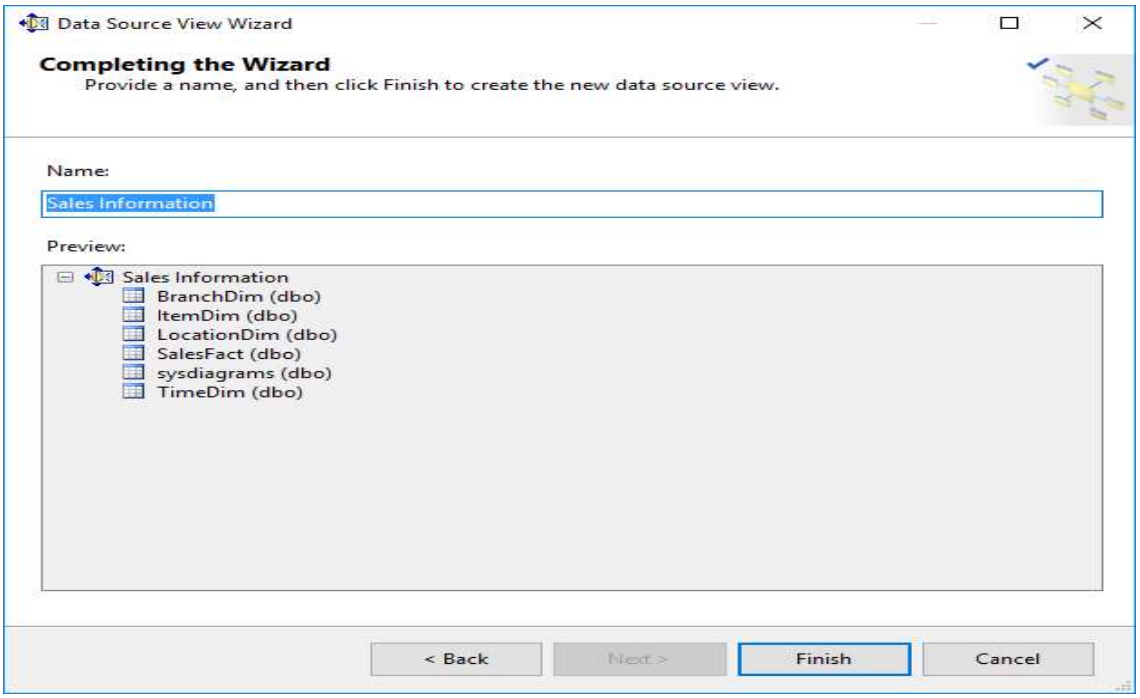
2. **Click on Next.**



3. **Select Tables and Views.**

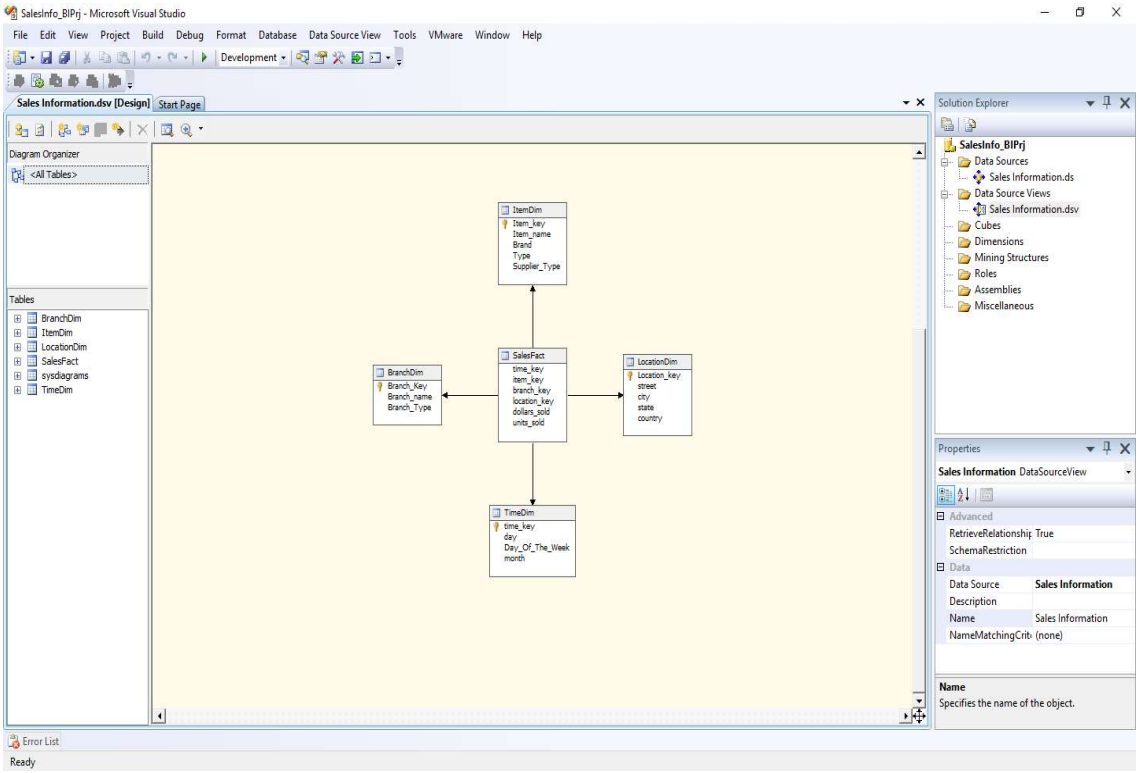






Click on Finish.

4. **Finally, we will get the Data Source View like :**

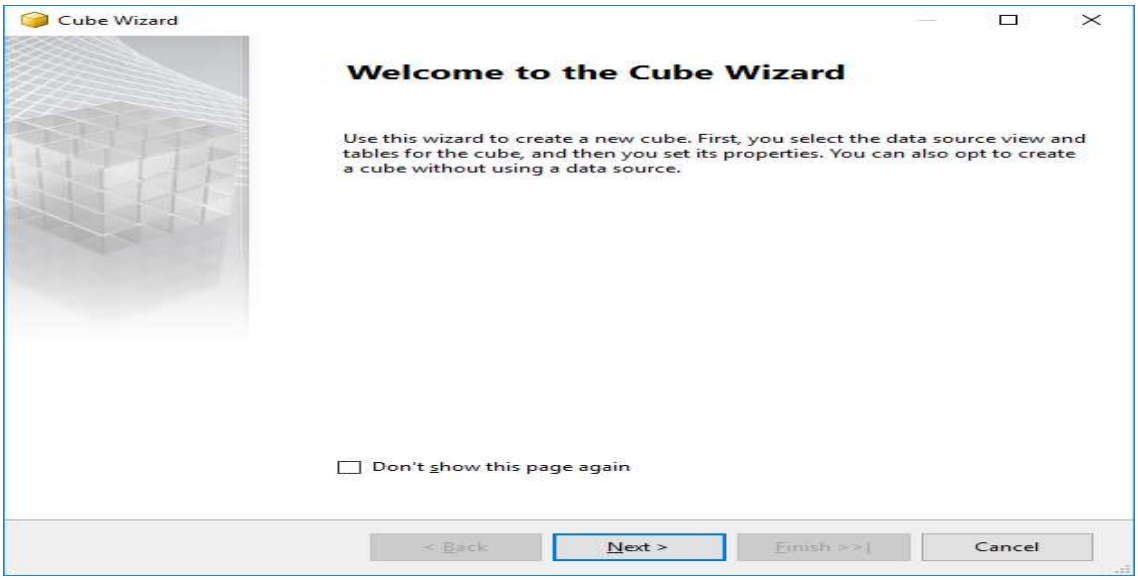

SalesInfo_BIPrj - Microsoft Visual Studio
File Edit View Project Build Debug Format Database Data Source View Tools VMware Window Help
Development
Sales Information.dsv [Design]
Start Page
Diagram Organizer
<All Tables>
Tables
BranchDim
ItemDim
LocationDim
SalesFact
sysdiagrams
TimeDim
ItemDim
Item_key
Item_name
Brand
Type
Supplier_Type
BranchDim
Branch_Key
Branch_name
Branch_Type
SalesFact
time_key
item_key
branch_key
location_key
dollars_sold
units_sold
LocationDim
Location_key
street
city
state
country
TimeDim
time_key
day
Day_Of_The_Week
month
Solution Explorer
SalesInfo_BIPrj
Data Sources
Sales Information.ds
Data Source Views
Sales Information.dsv
Cubes
Dimensions
Mining Structures
Roles
Assemblies
Miscellaneous
Properties
Sales Information DataSourceView
Advanced
RetrieveRelationshi True
SchemaRestriction
Data
Data Source Sales Information
Description
Name Sales Information
NameMatchingCrit (none)
Name
Specifies the name of the object.
Error List
Ready

Practical No 4

Aim : Create cube using SSAS(SQL Server Analysis Services.) and process the cube.

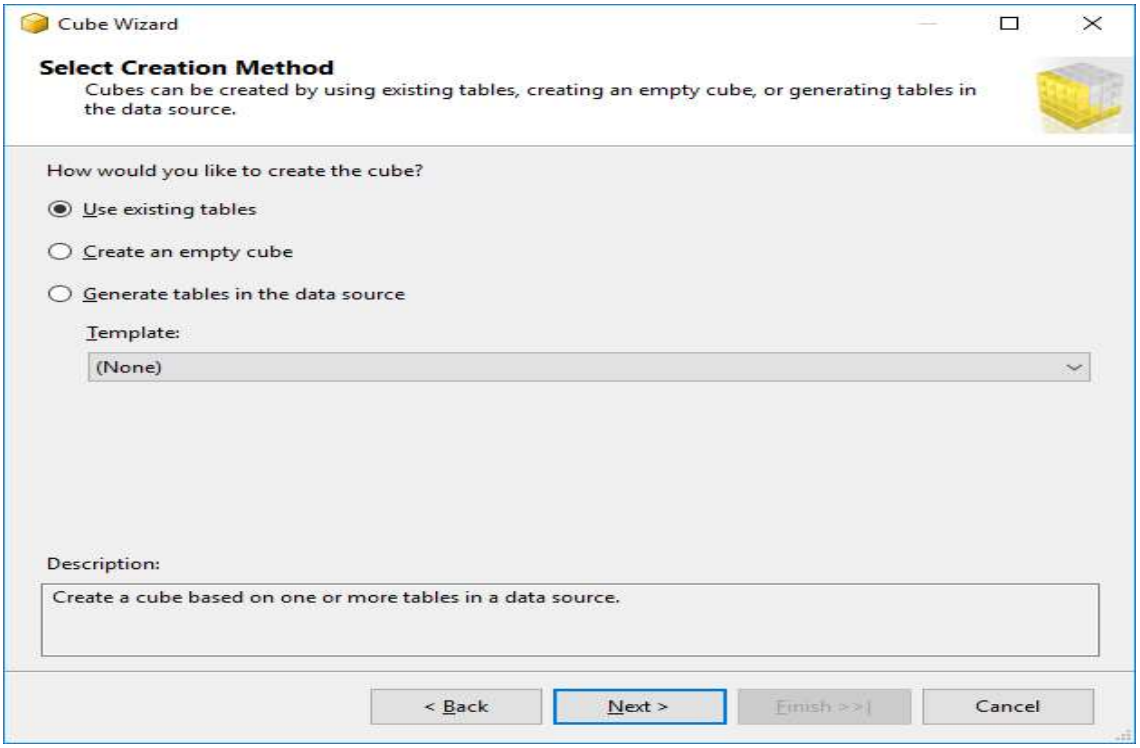
Solution :

1. **Right click on Cubes -> New Cube.**

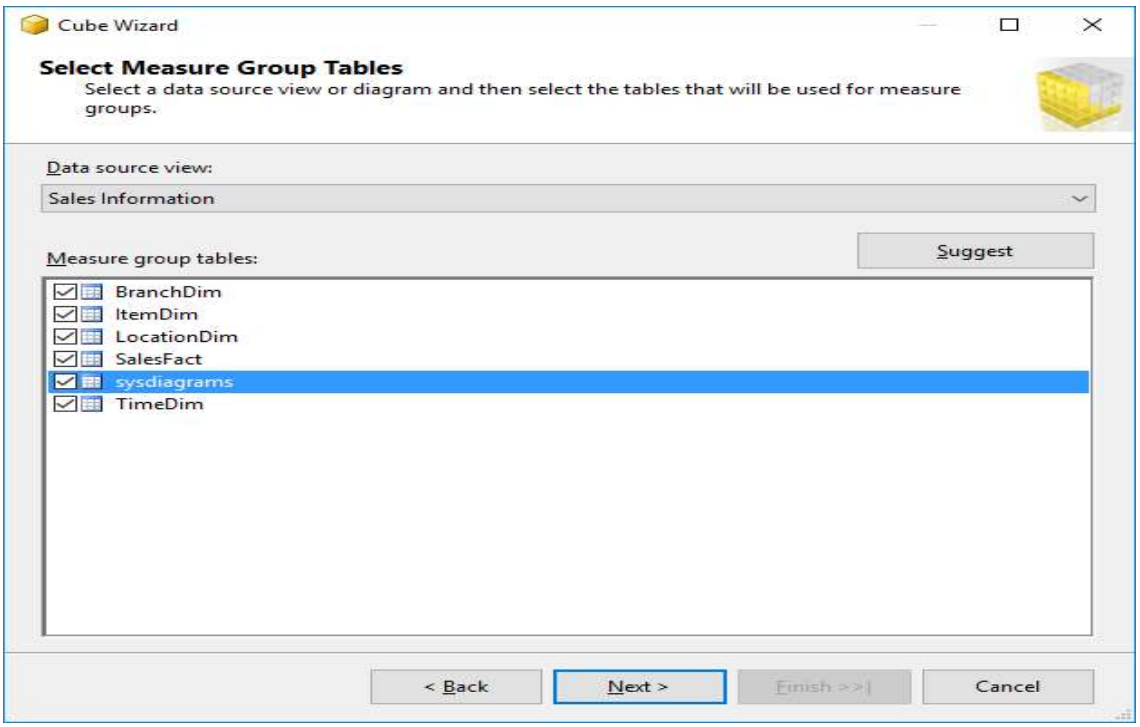


Click on Next.

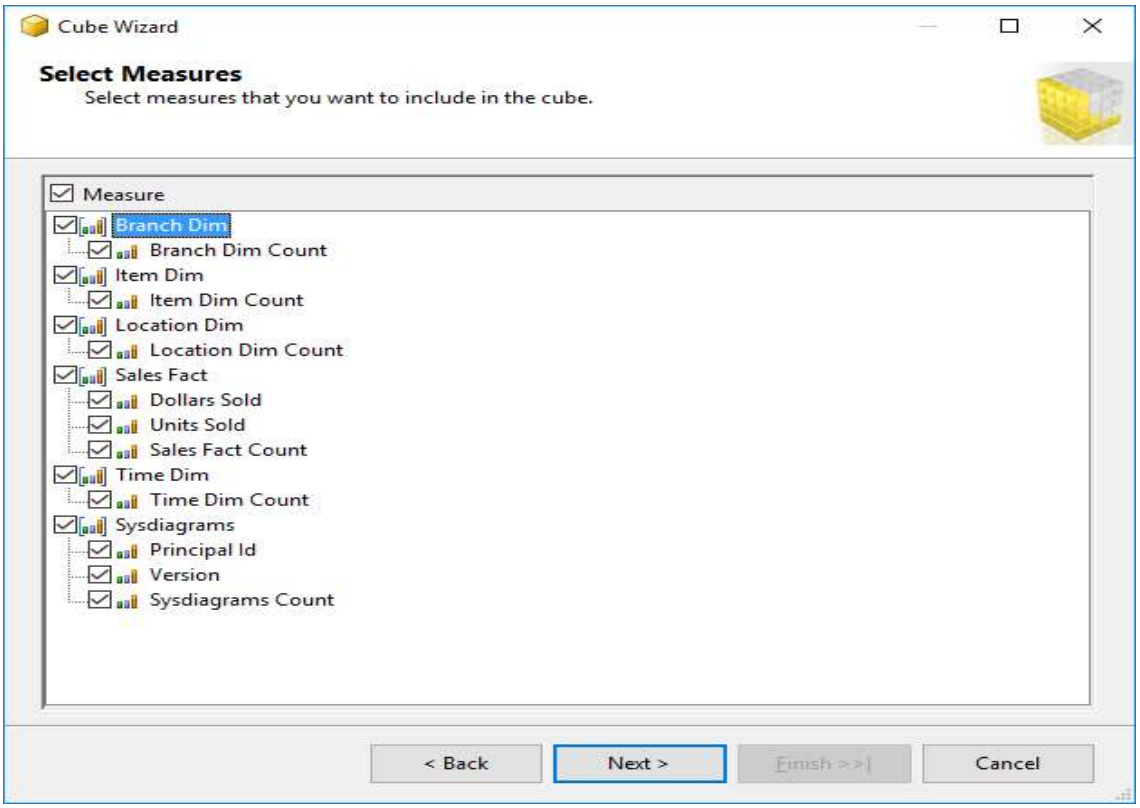
2. **Select First option "Use existing tables". Click on Next.**



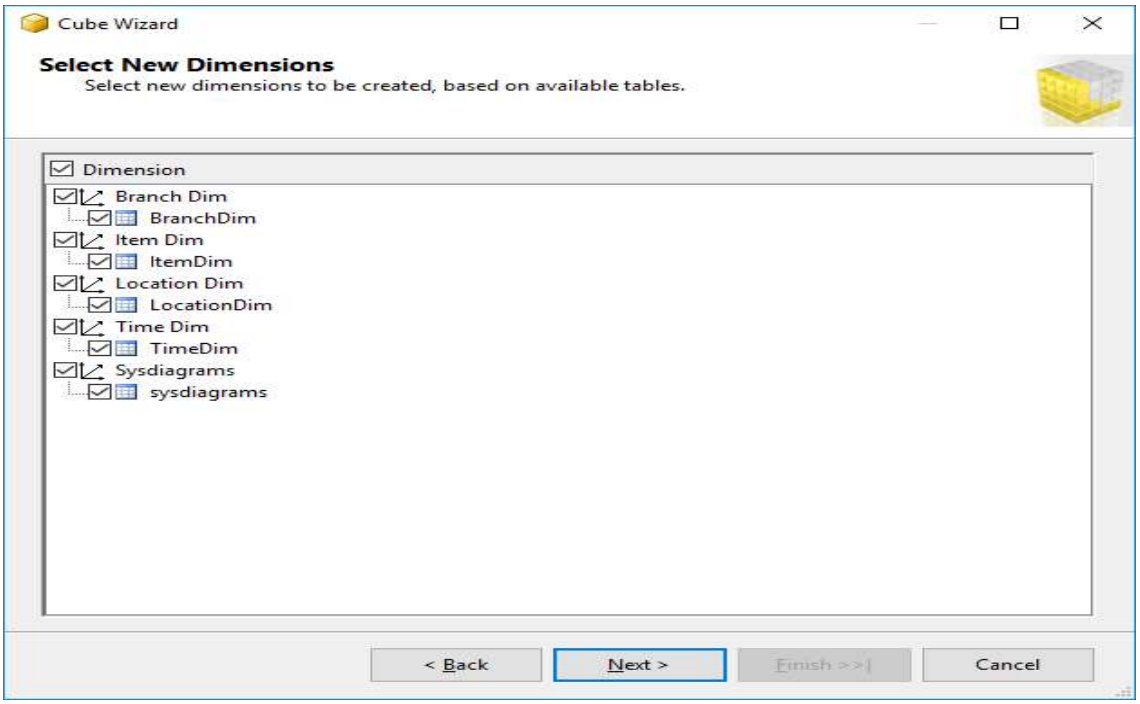
3. **Select Data Source View as "Sales Information" and Select all the tables.**



Click on Next.

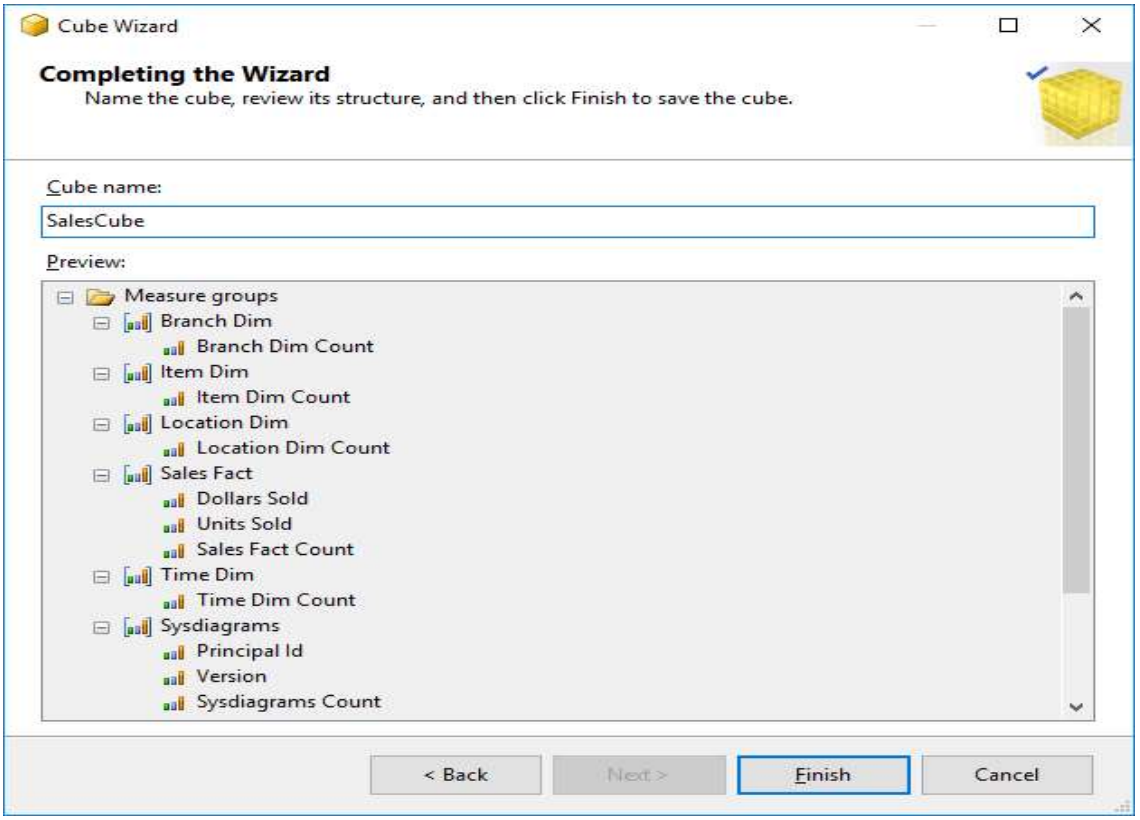


Click on Next.



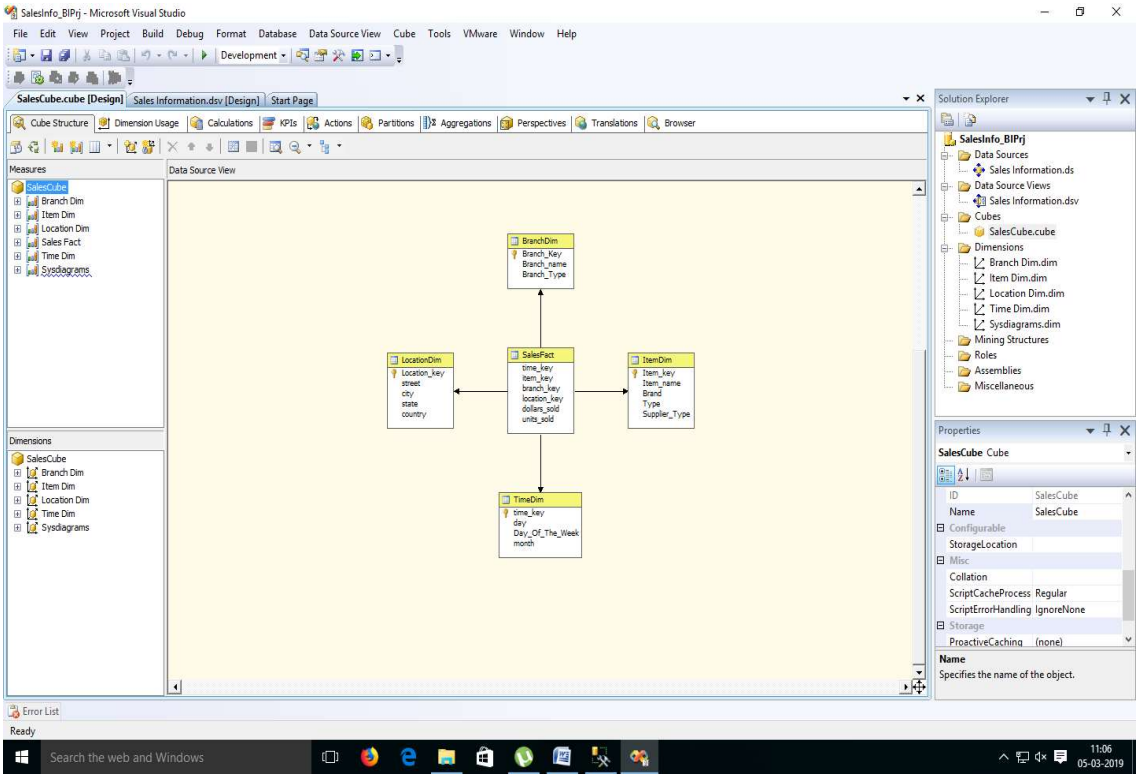
Click on Next.

4. **Name Cube as "SalesCube".**

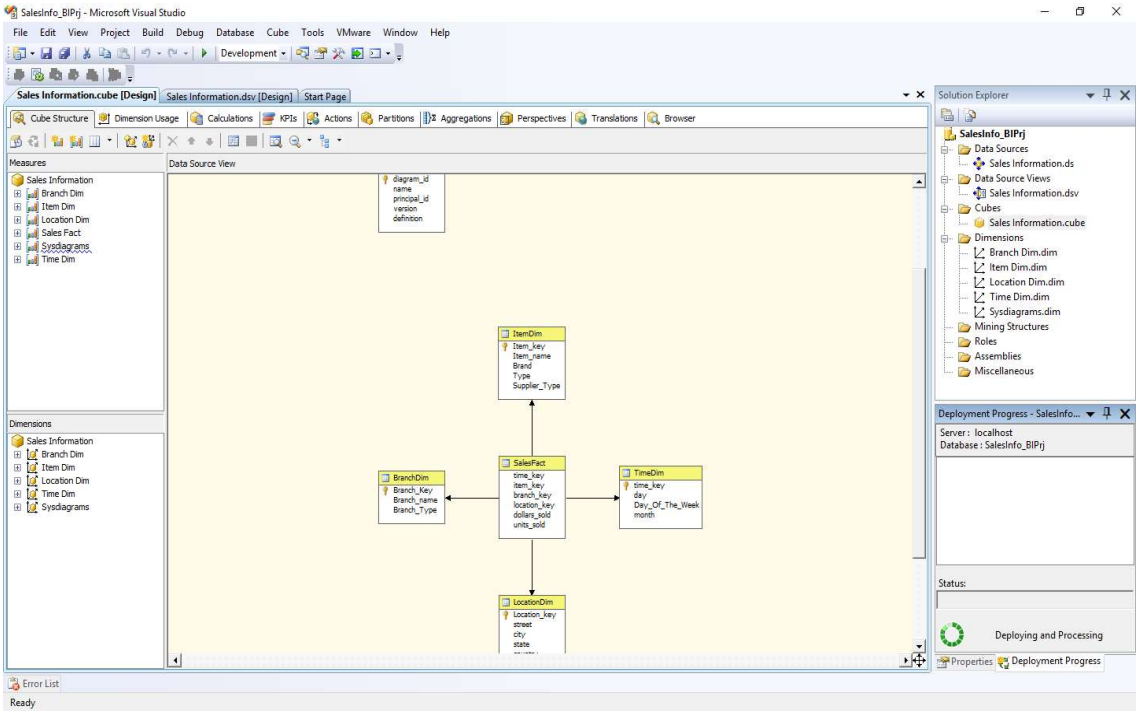


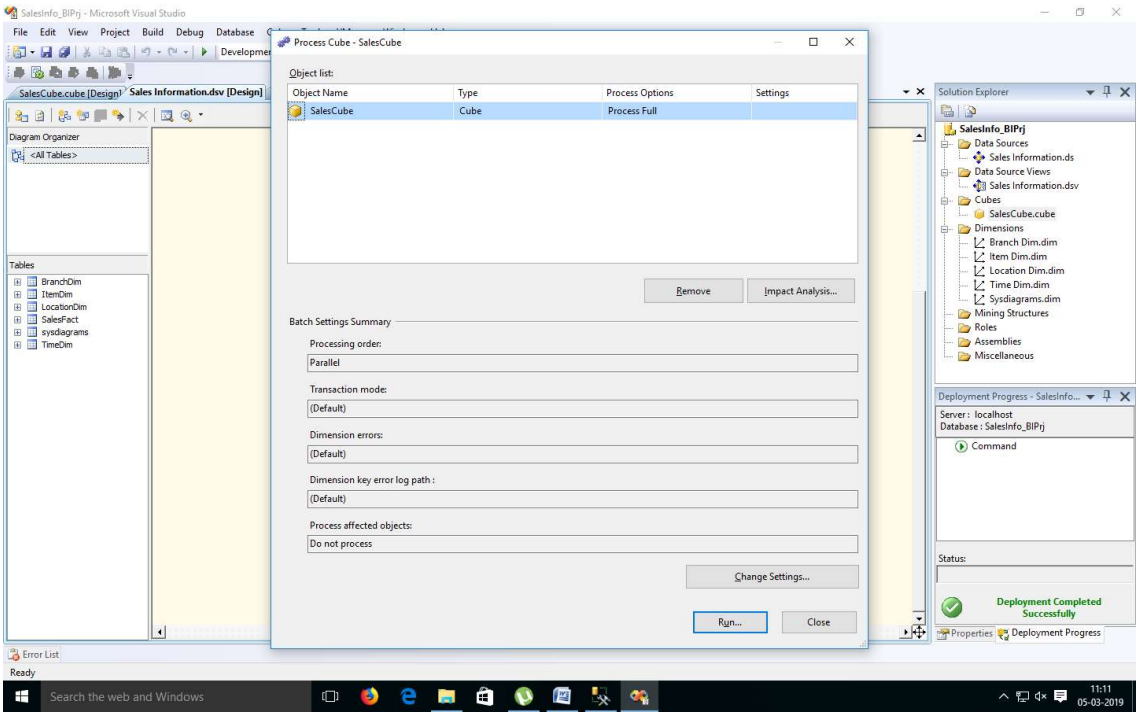
Click on Finish.

5. **Finally, we will get the Cube View as well Dimensions View like :**

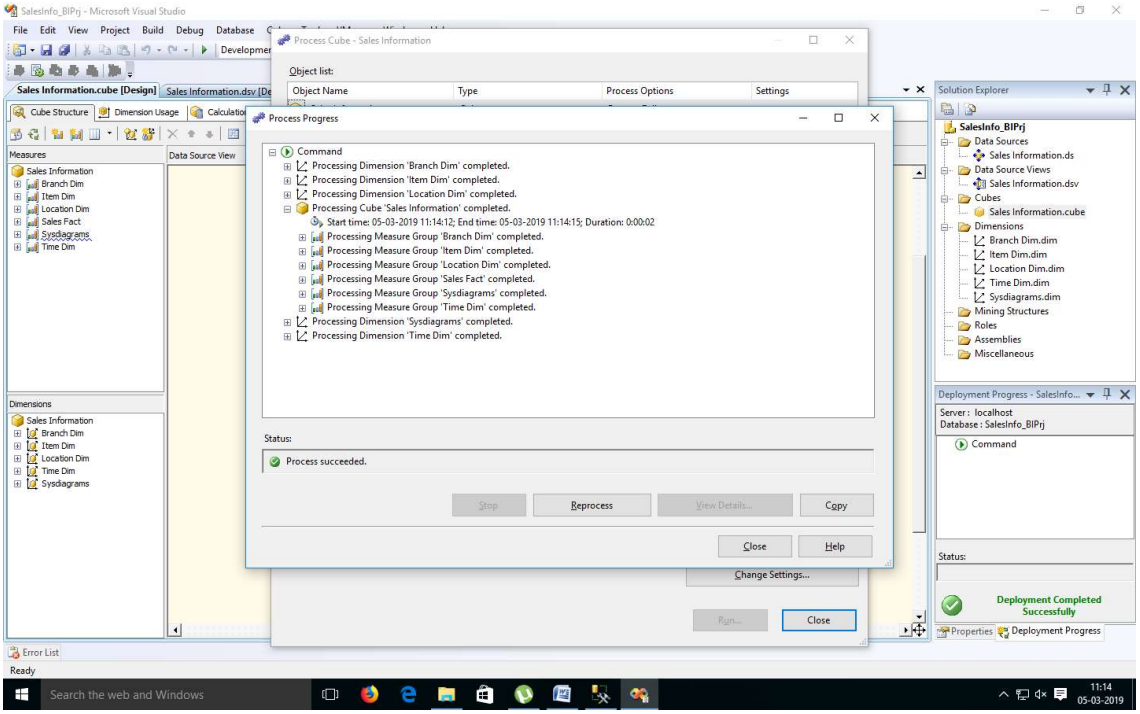


6. **Finally, Process cube by Right click on SalesCube -> Process .**





7. Click on Run.

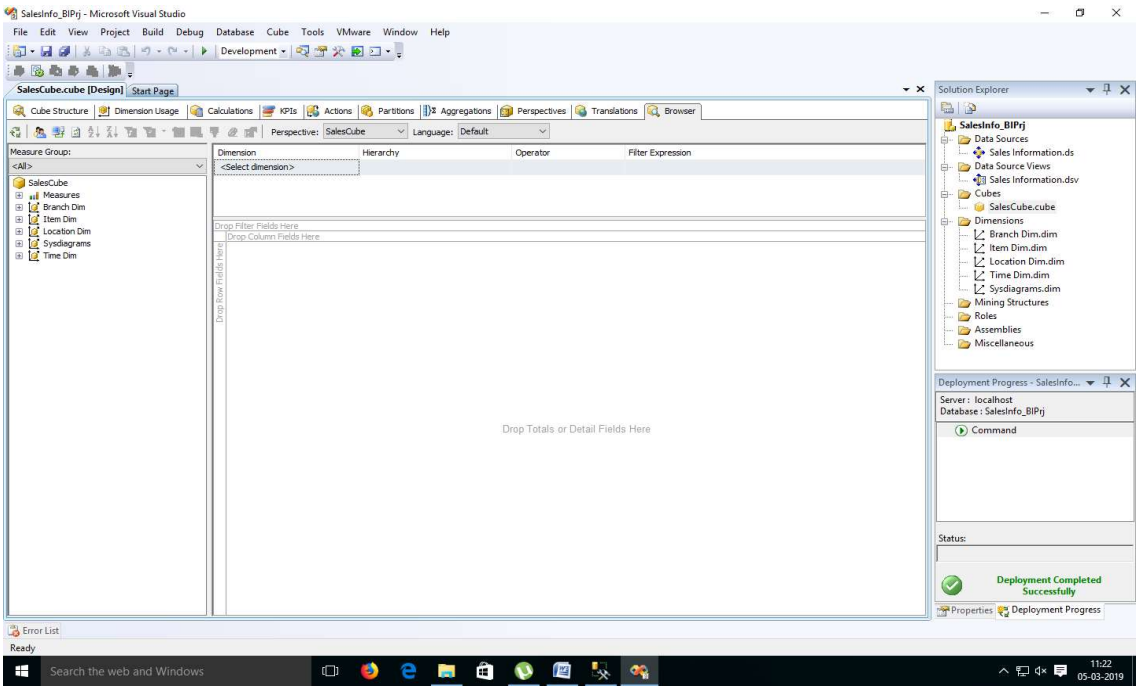


Practical No 5

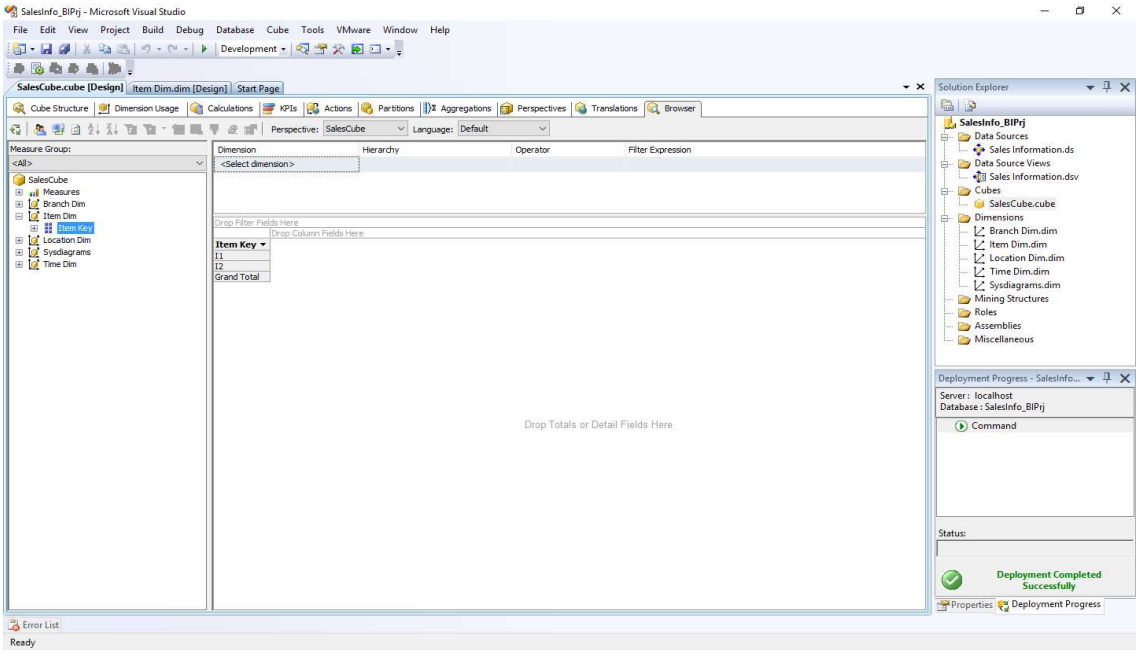
Aim : View cube data in multidimensional Format.

Solution :

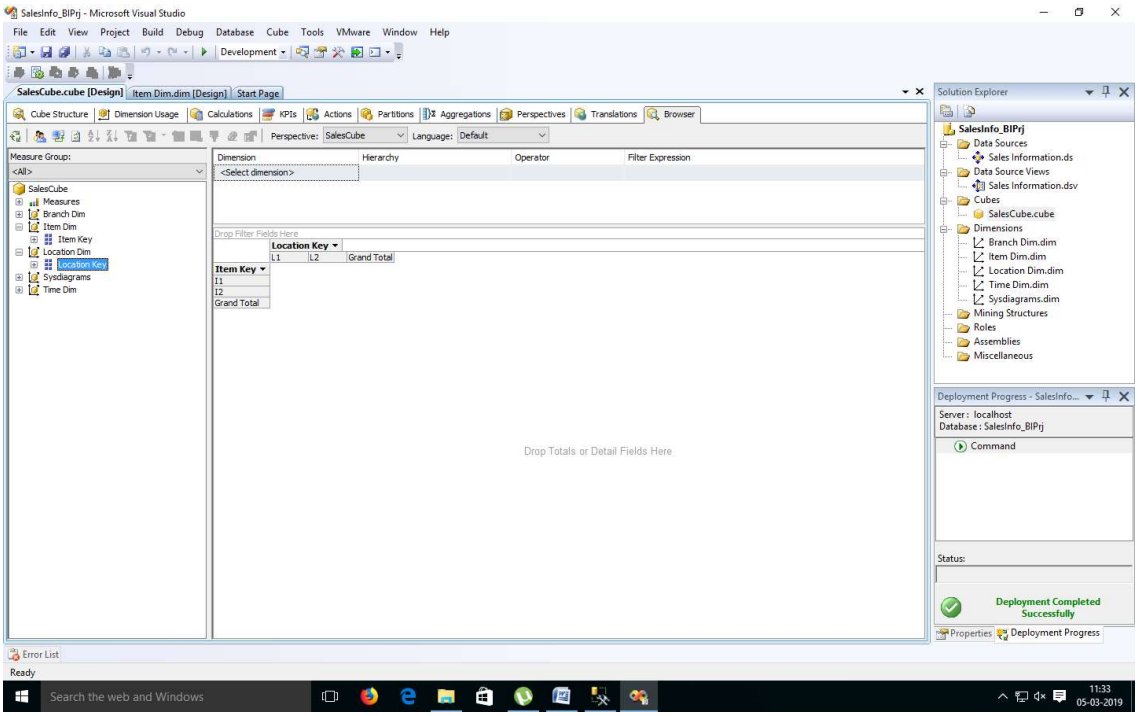
1. **Double Click on “SalesCube”. Go to the “Browser” Tab.**



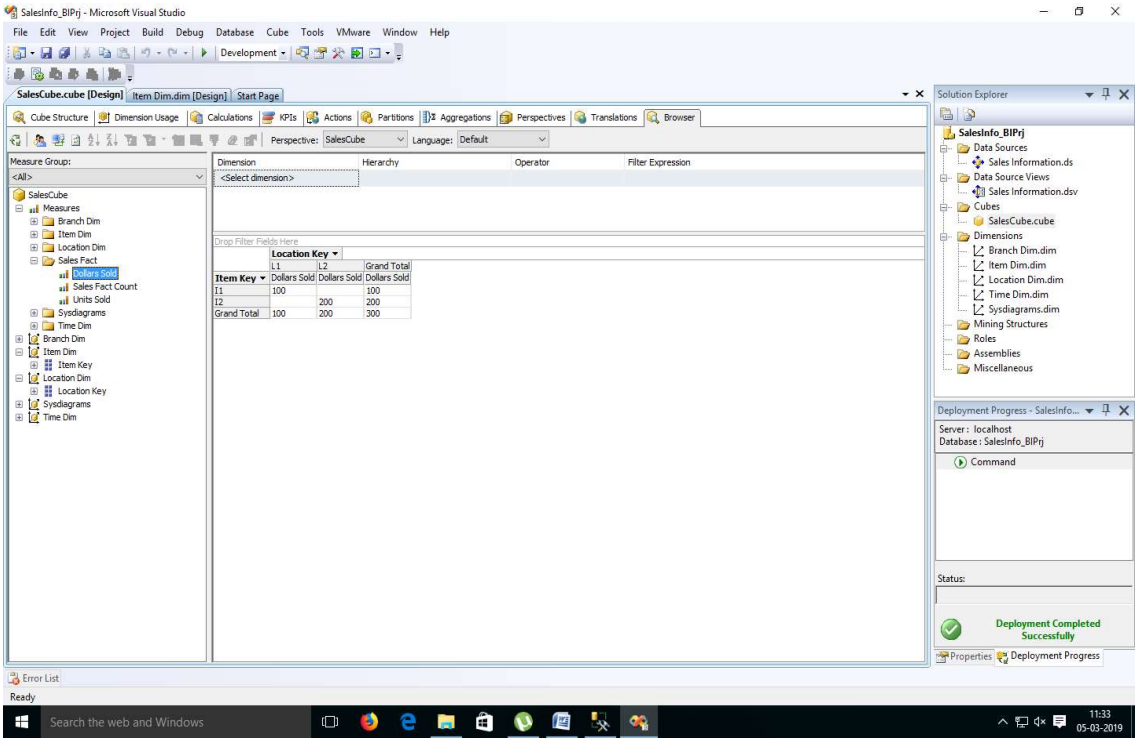
2. **Go to the “Item Dimension”. Right Click on ‘Item Key’ -> Add to Row Area.**



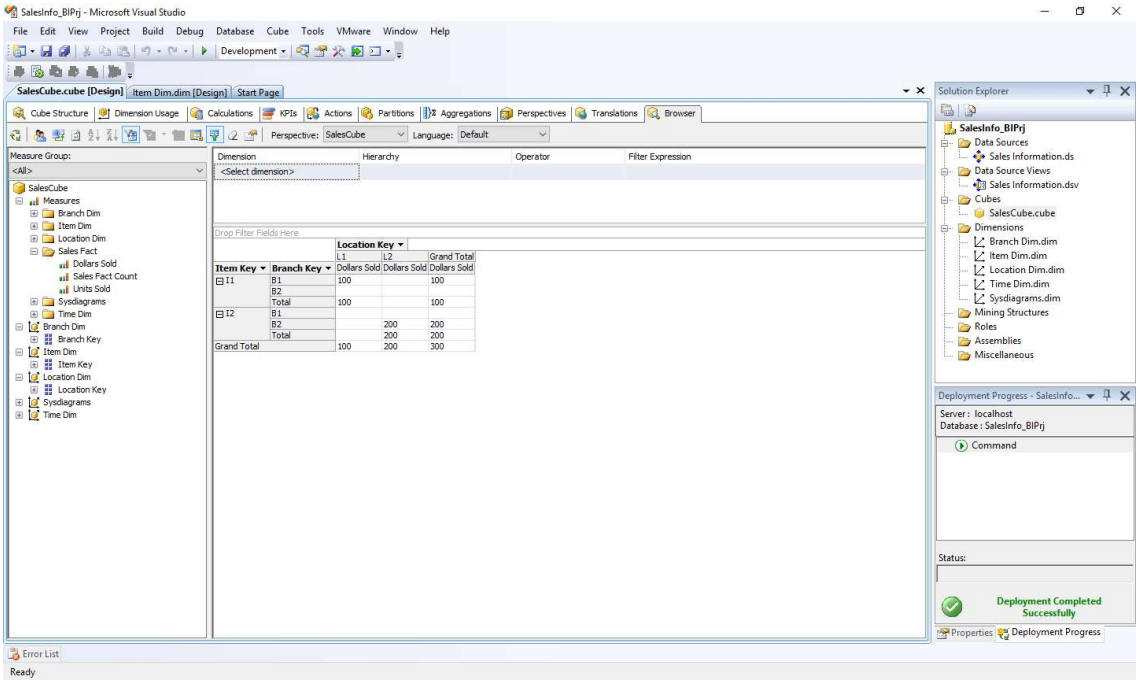
3. **Go to the "Location Dimension". Right Click on 'Location Key' -> Add to Column Area.**



4. **Go to 'Measures'. Select 'SalesFact' -> Right Click on "Dollars Sold" -> Add to Data area.**



5. **Go to the "Branch Dimension". Right Click on 'Branch Key' -> Add to Row Area.**

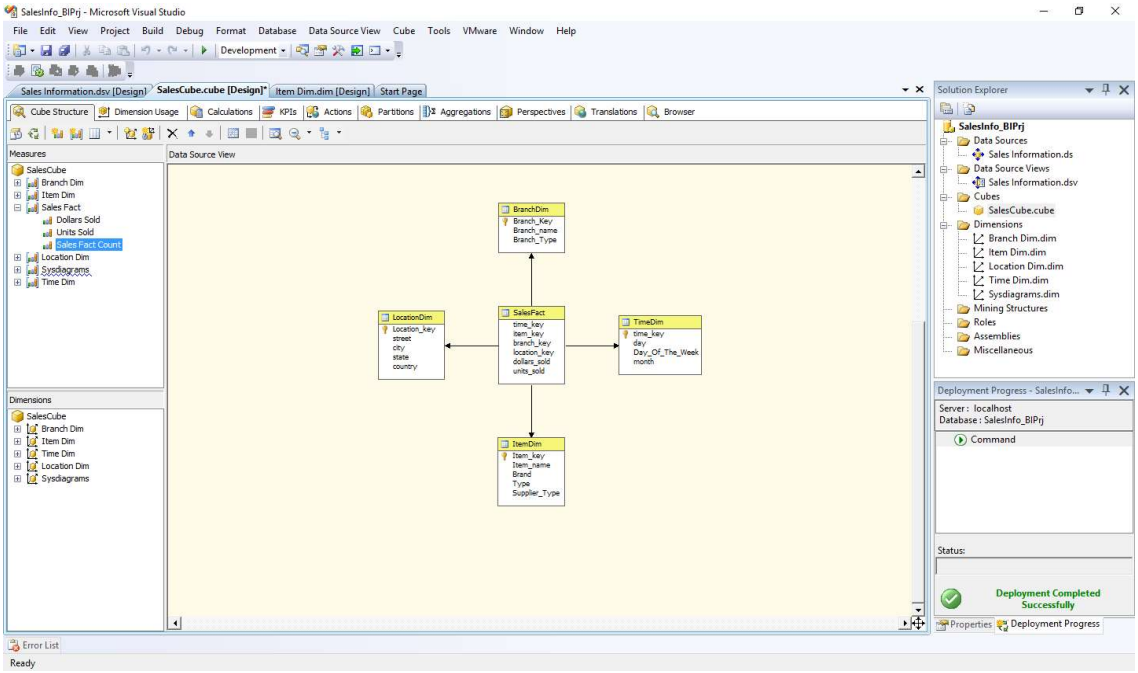


Practical No 6

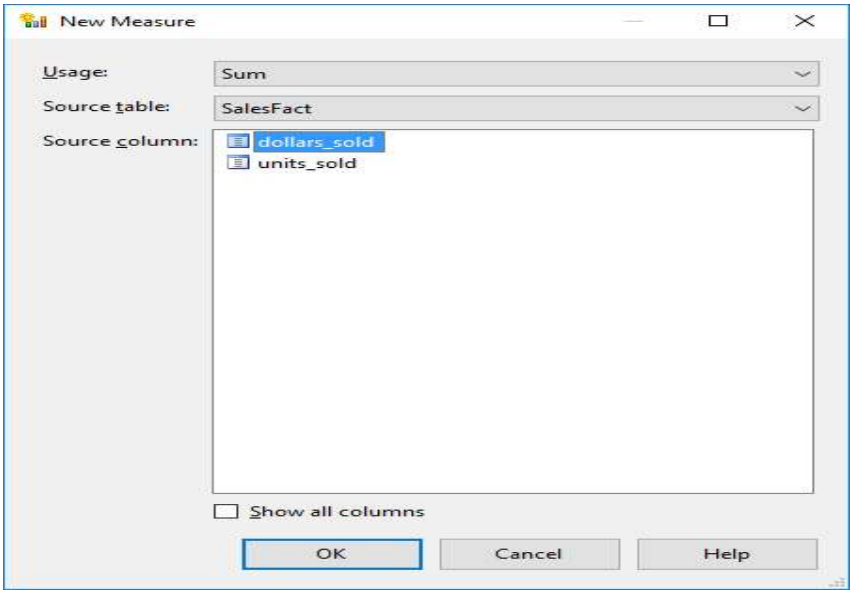
Aim : Working with measures in the cube.

Solution :

1. **Double click on 'SalesCube'. Go to cube structure.**

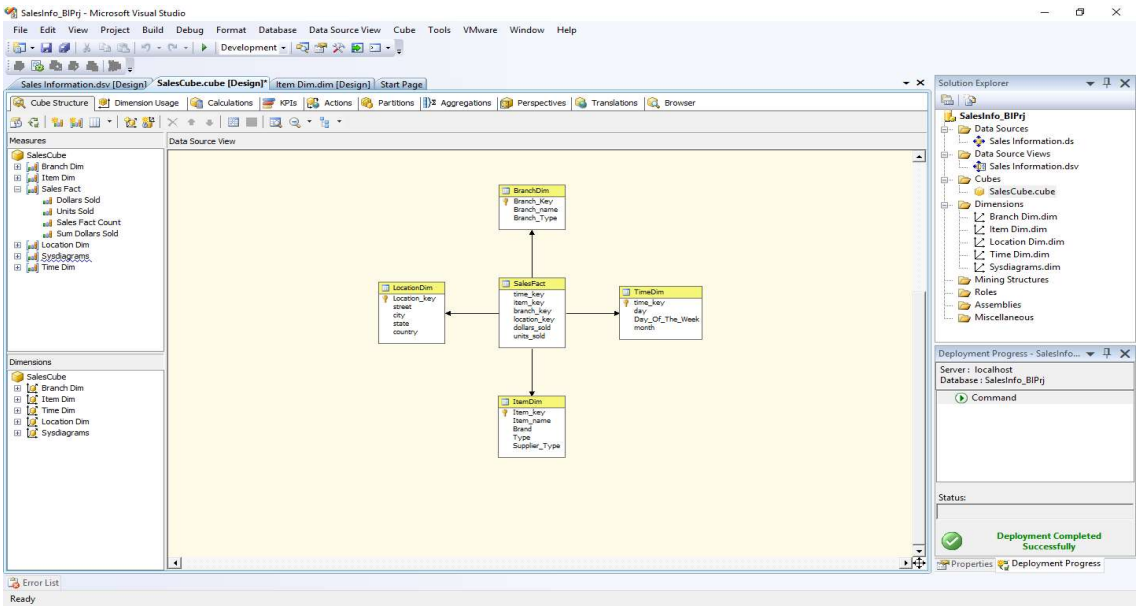


2. **Right click on SalesCube -> New Measure.**
   Select Usage = "Sum" , Source table = "SalesFact" and Source Column = "dollars_sold".

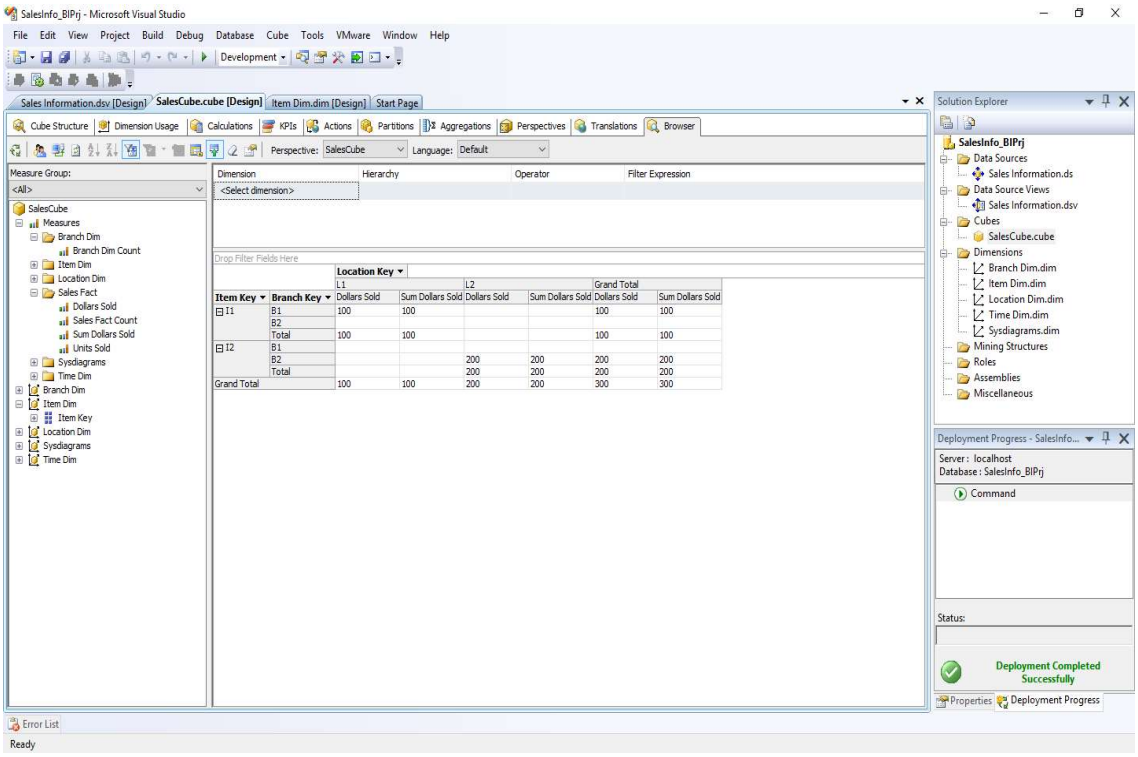


   Click on OK.

3. **Rename Measure as “Sum Dollars sold”.**



4. **Process Cube and Go to Browser and Reconnect it. Right Click on “Sum Dollars Sold” -> Add to Data Area.**

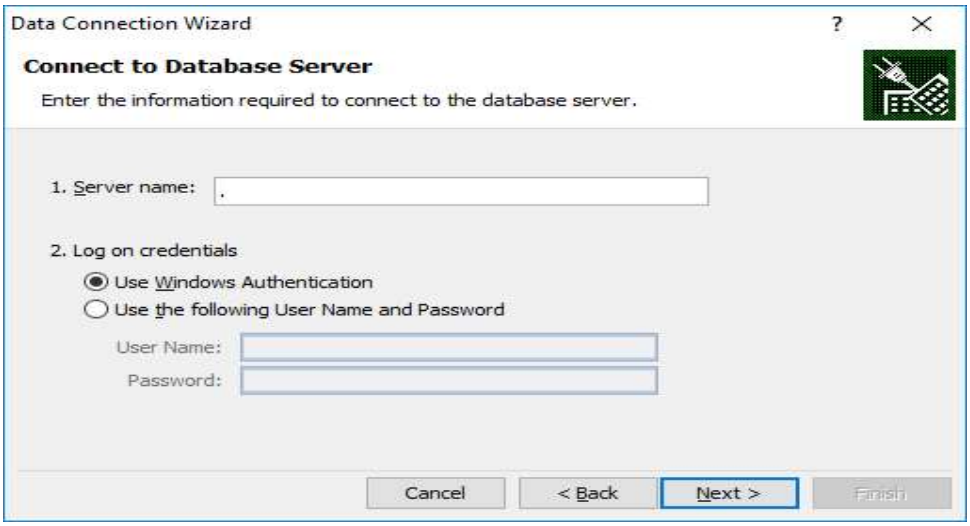


Practical No 7

Aim : Creating an Excel Pivot Table and Pivot Chart by using the OLAP cube data.

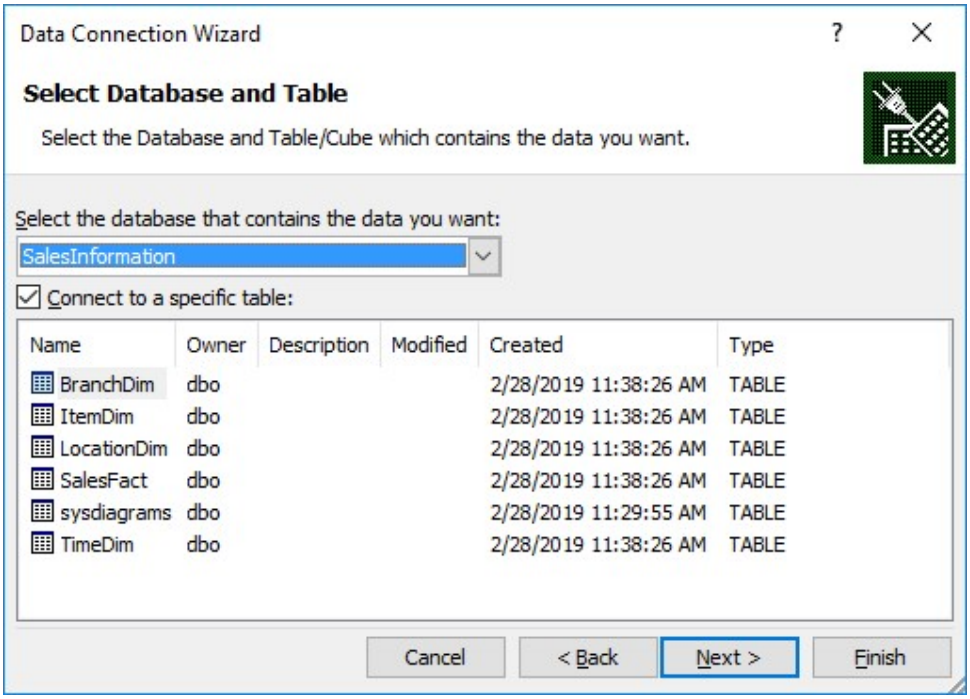
Solution :

1. **Open MS-Excel. Click on Data Menu.**
2. **Go to From Other Sources.**
   - **2.1. From SQL Server -> Type Server name as “.”**

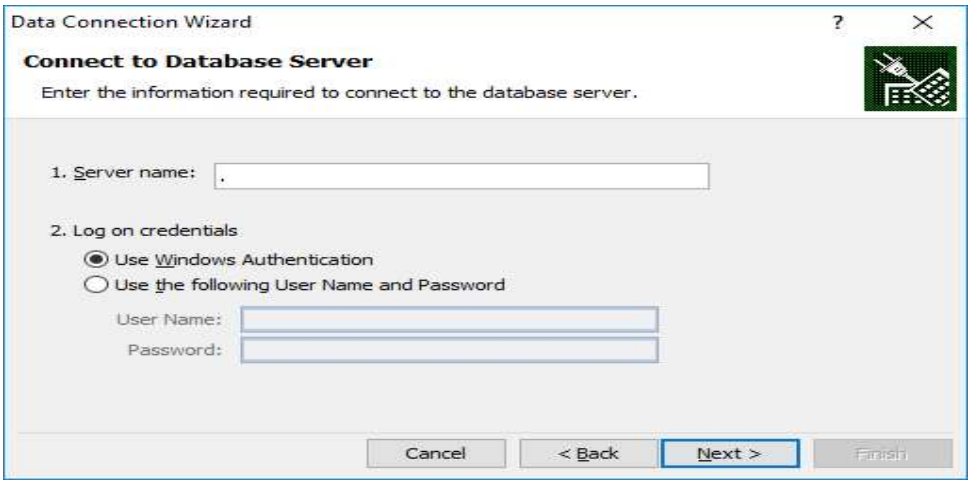


Click on Next.

Choose SQL Database -> “SalesInformation”

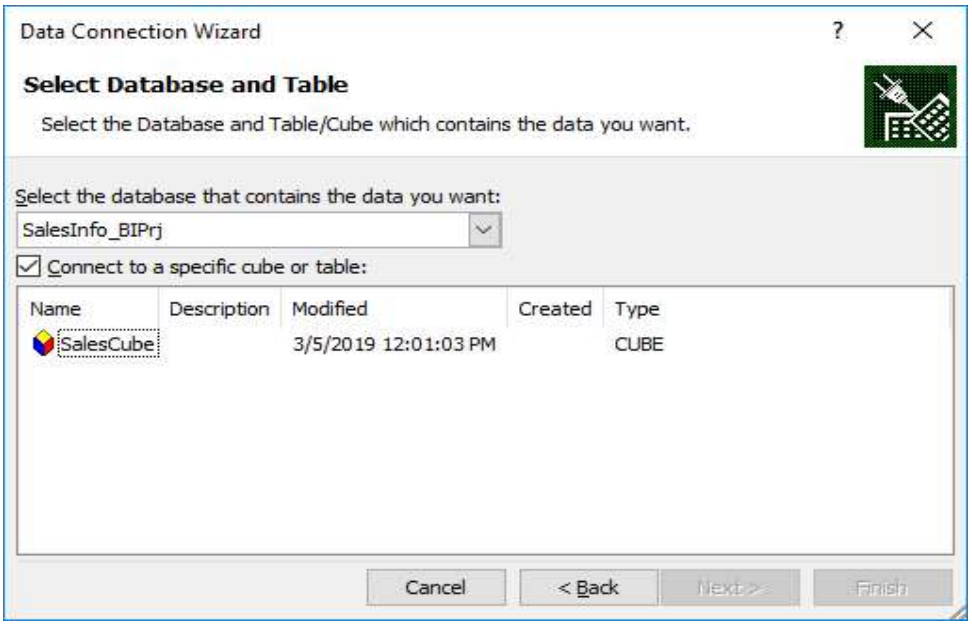


   - **2.2. From Analysis Services -> Type Server name as “.”**

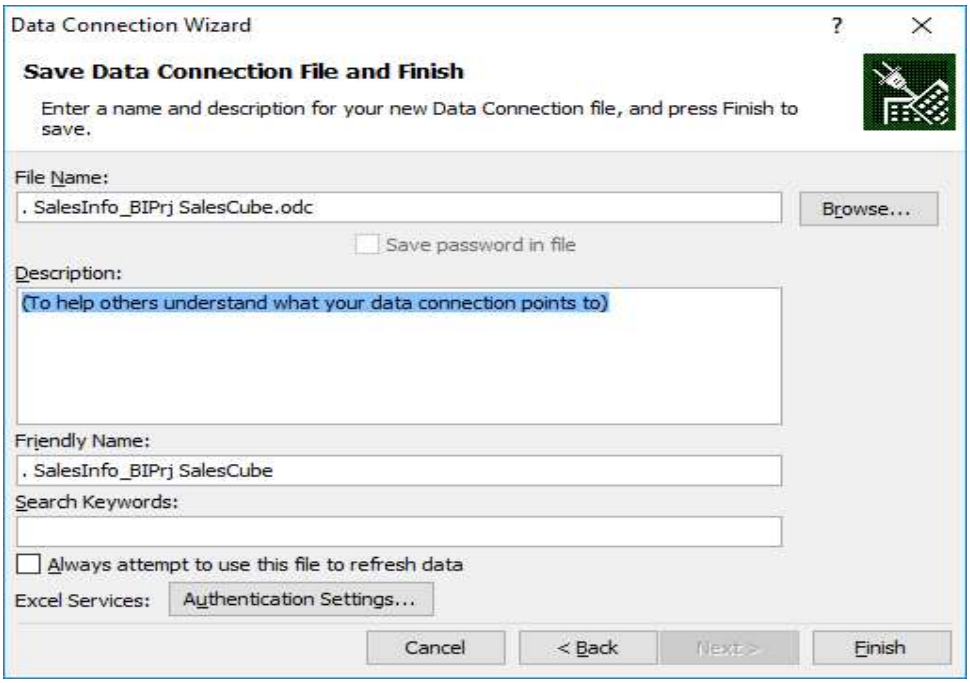


Click on Next.

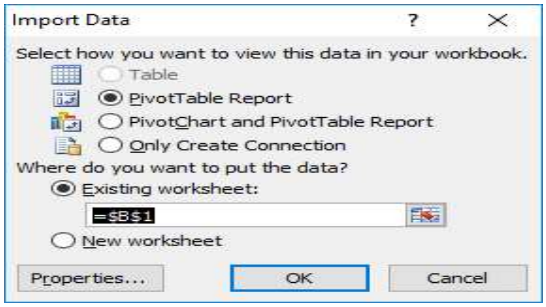
Choose Analysis Database as "SalesInfo_BIPrj". Click on Next.



Click on OK

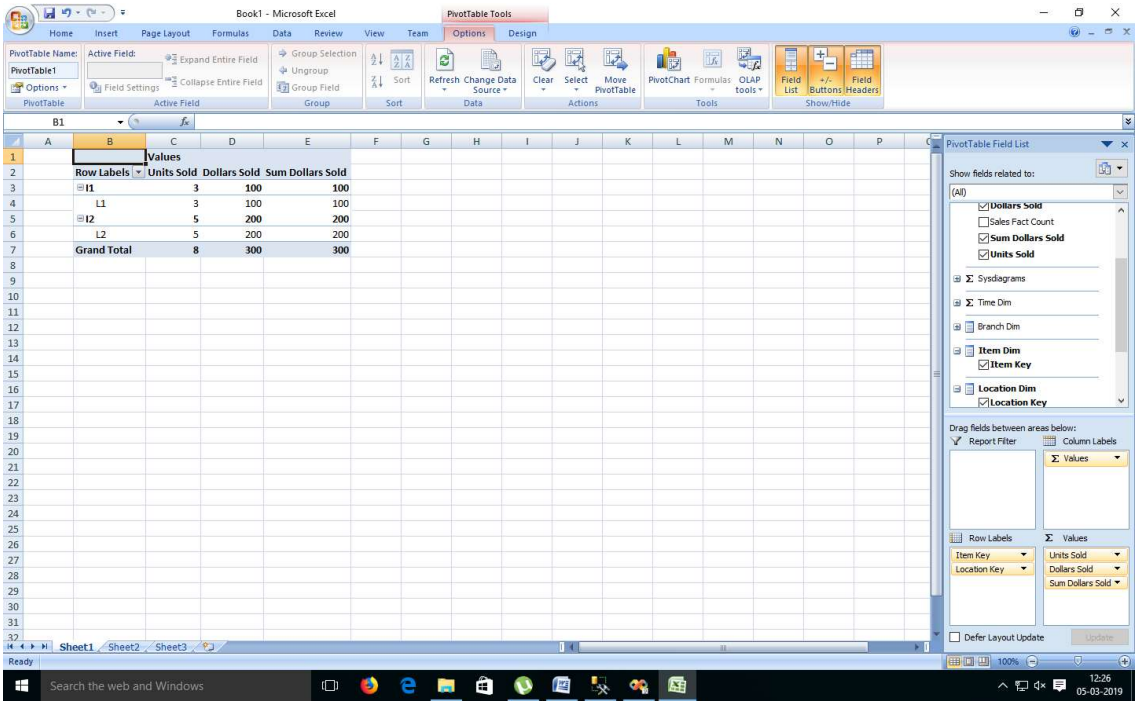


Click on Finish.

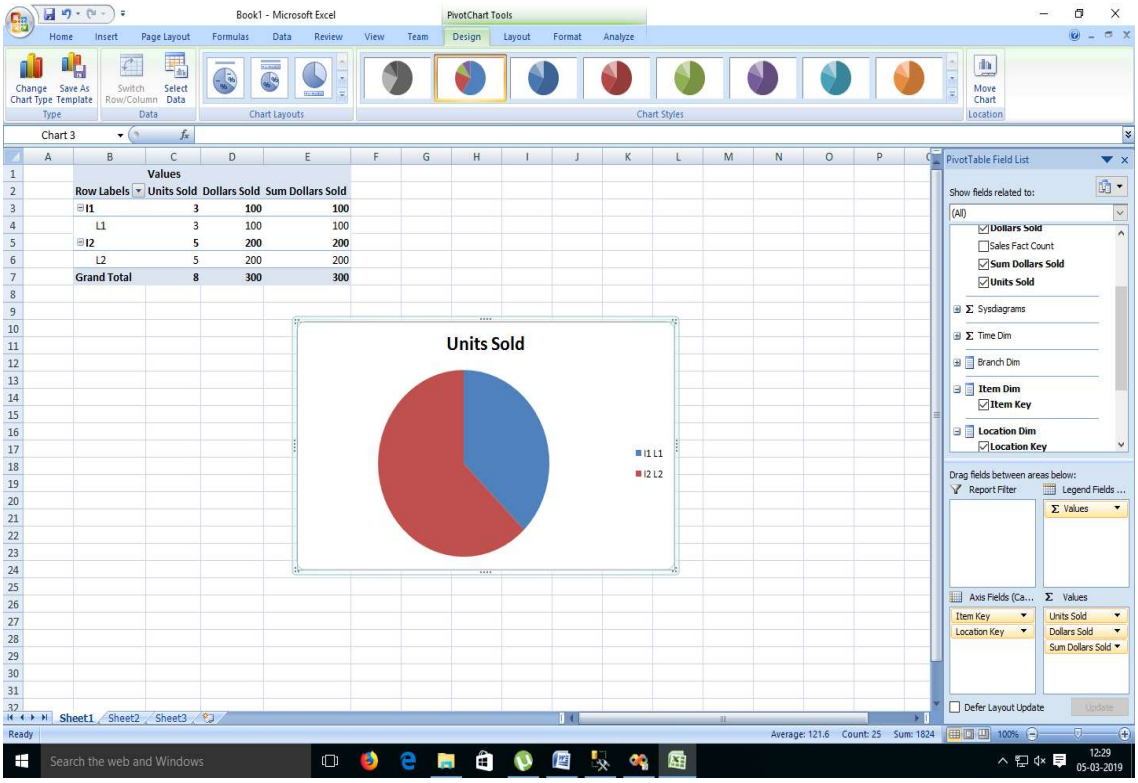


Click on OK.

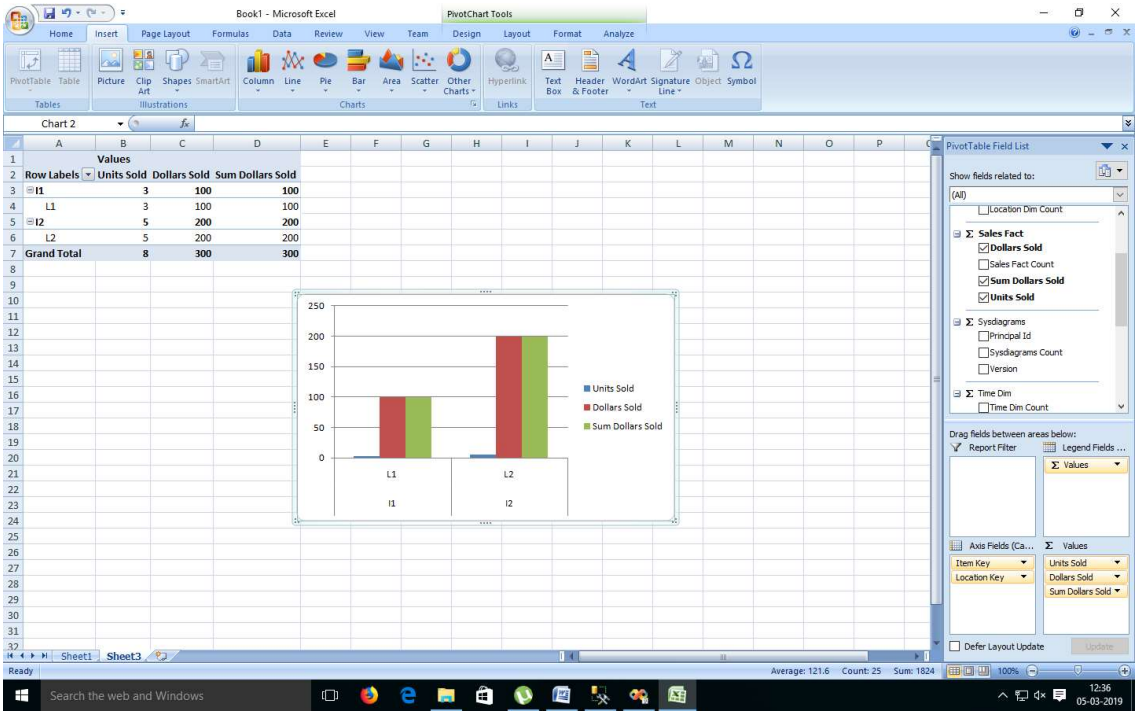
3. **Select Item Key, Location Key and Measures as Dollars Sold, Units Sold and Sum Dollars Sold**



4. **Select Result Area. Go to Insert Menu. Select Pie Chart option.**



5. **Select Result Area. Go to Insert Menu. Select Column option.**


Book1 - Microsoft Excel
PivotChart Tools
Values
Row Labels | Units Sold | Dollars Sold | Sum Dollars Sold
I1 | 3 | 100 | 100
L1 | 3 | 100 | 100
I2 | 5 | 200 | 200
L2 | 5 | 200 | 200
Grand Total | 8 | 300 | 300
250
200
150
100
50
0
L1
L2
I1
I2
Units Sold
Dollars Sold
Sum Dollars Sold
PivotTable Field List
Show fields related to:
(All)
Sales Fact
Dollars Sold
Sum Dollars Sold
Units Sold
Sysdiagrams
Time Dim
Drag fields between areas below:
Report Filter
Legend Fields ...
Values
Axis Fields (Ca...
Item Key
Location Key
Defer Layout Update
Update
Sheet1
Sheet3
Ready
Average: 121.6
Count: 25
Sum: 1824
Search the web and Windows
12:36
05-03-2019

Practical No 8

Aim : Firing Queries on Tables.

Solution :

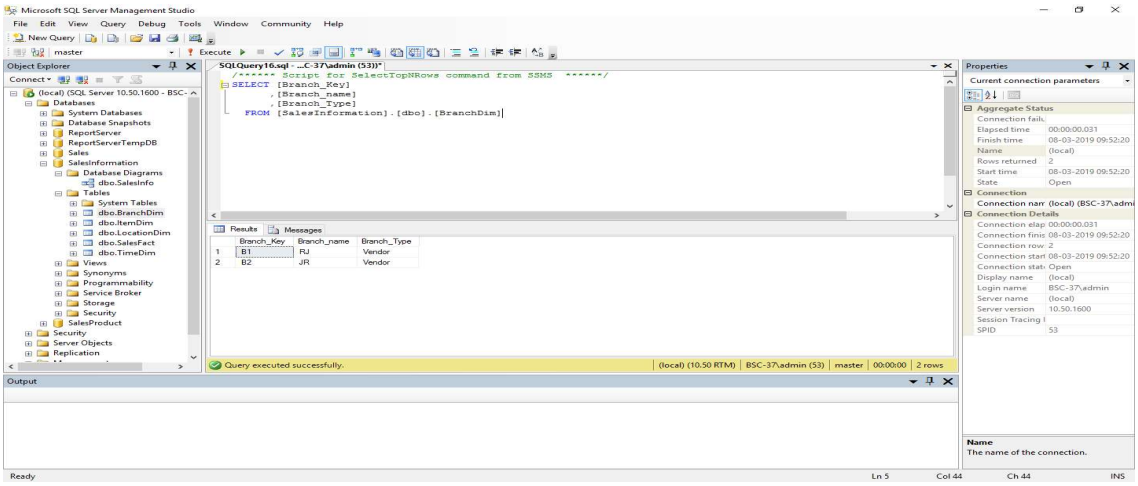
Open Application -> Microsoft SQL Server 2008 R2 -> SQL Server Management Studio

1. **Select Connect Tab -> Database Engine -> Select Server Name(local)**

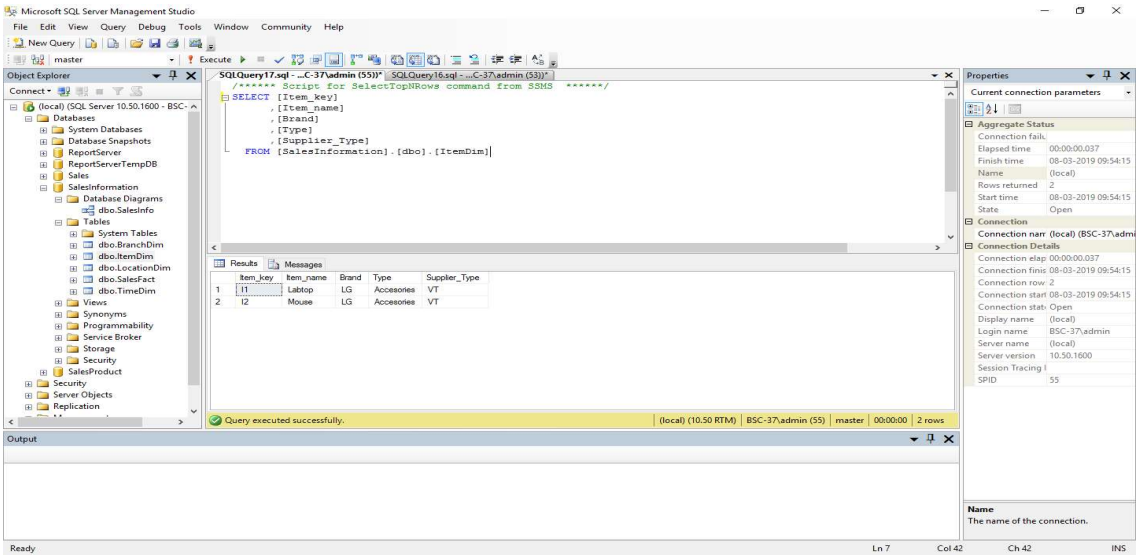
2. **Expand 'Database' -> Expand 'SalesInformation' -> Expand Tables.**

3. **Fire following queries :**

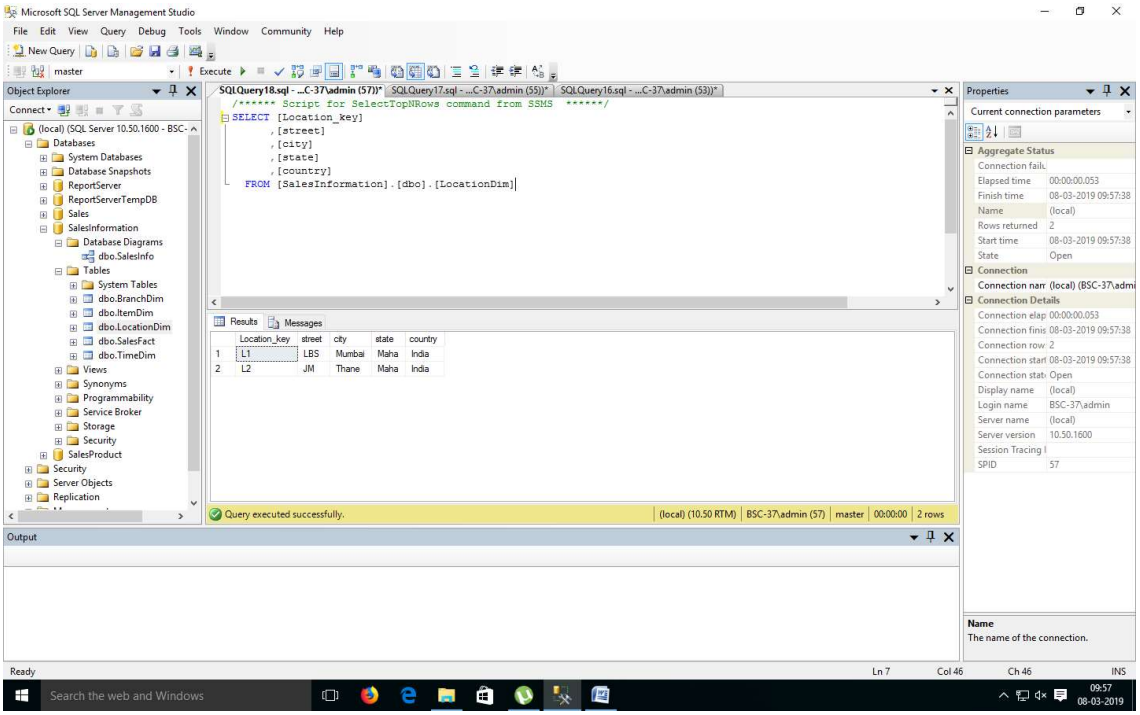
3.1.
```
SELECT [Branch_Key],[Branch_name],[Branch_Type]
FROM [SalesInformation].[dbo].[BranchDim]
```



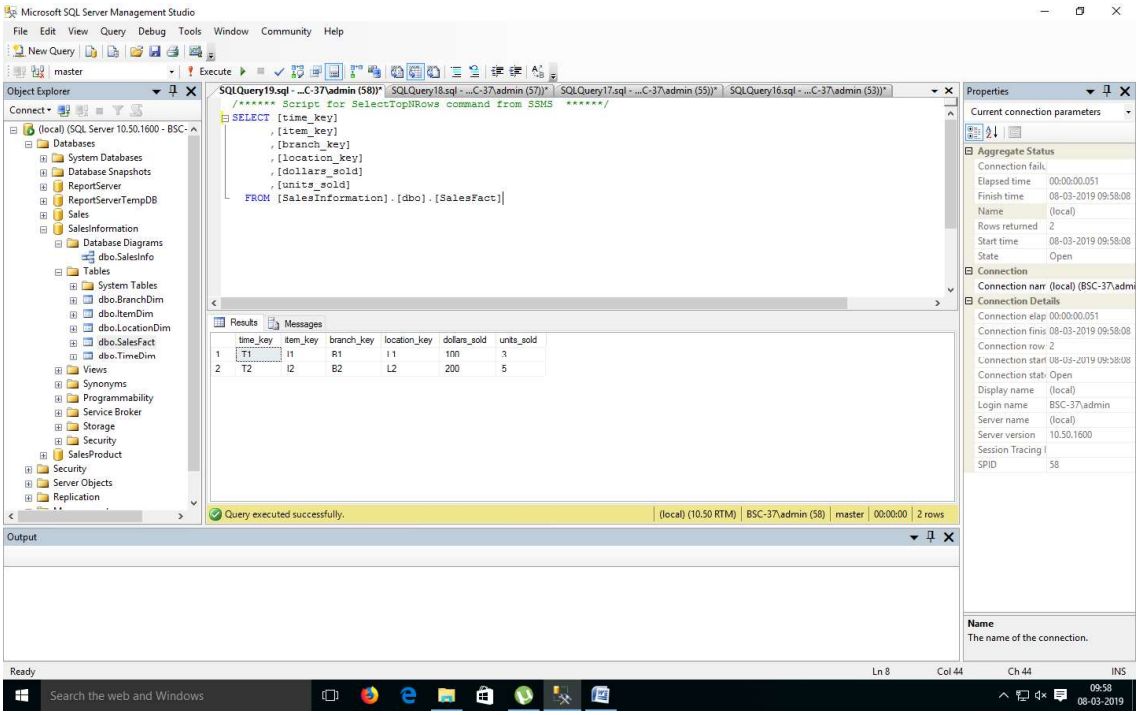
3.2.
```
SELECT [Item_key],[Item_name],[Brand],[Type],[Supplier_Type]
FROM[SalesInformation].[dbo].[ItemDim]
```



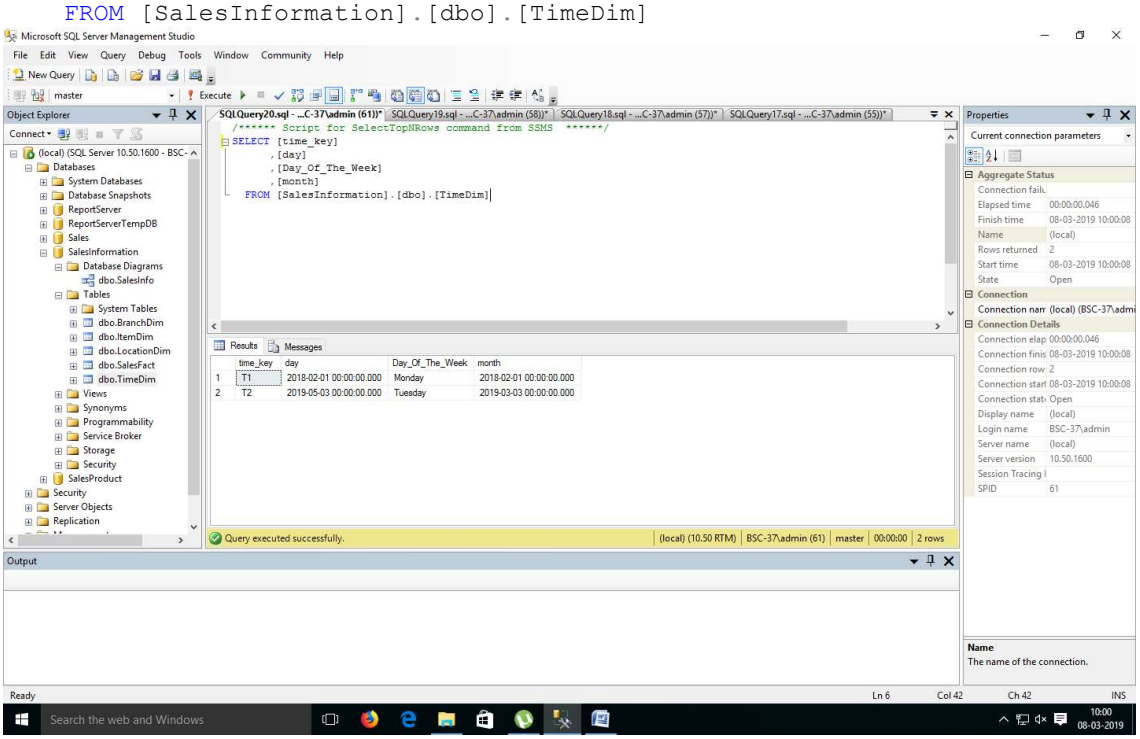
3.3.
```
SELECT [Location_key],[street],[city],[state],[country]
  FROM [SalesInformation].[dbo].[LocationDim]
```



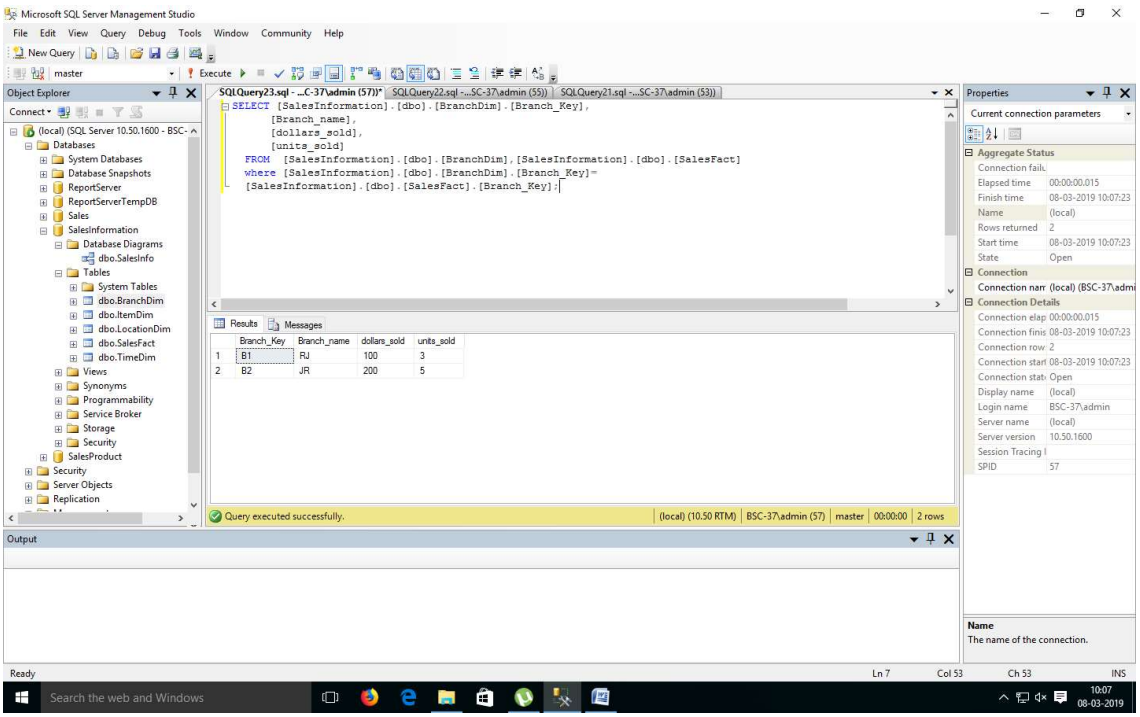
3.4.
```
SELECT [time_key],[item_key],[branch_key],[location_key]
  ,[dollars_sold],[units_sold]
   FROM [SalesInformation].[dbo].[SalesFact]
```



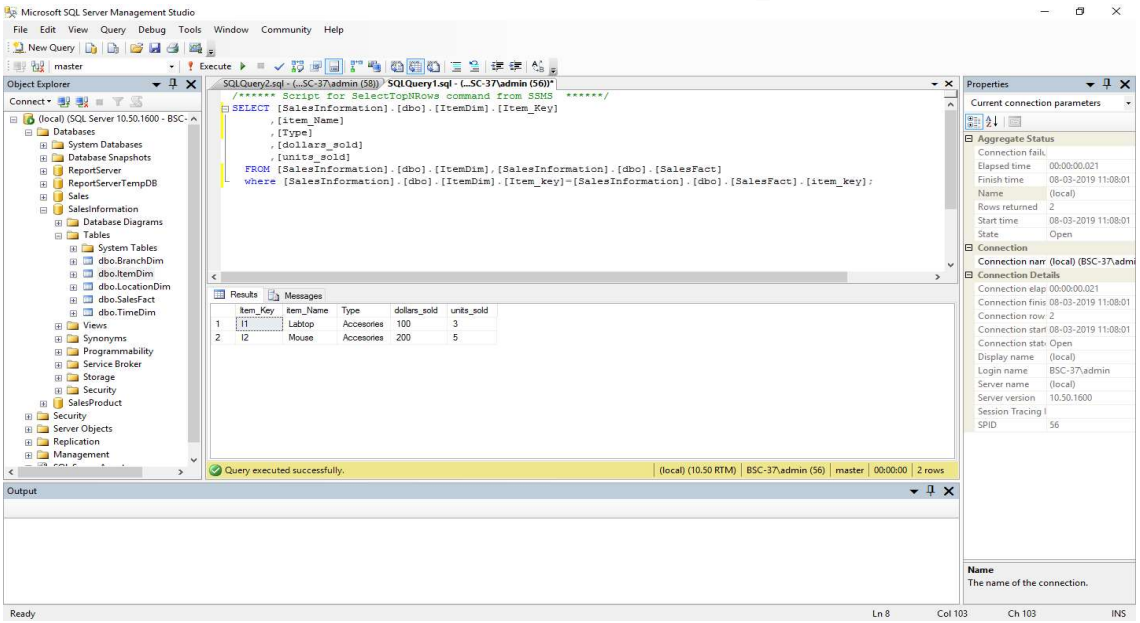
3.5.
```
SELECT [time_key],[day],[Day_Of_The_Week],[month]
  FROM [SalesInformation].[dbo].[TimeDim]
```



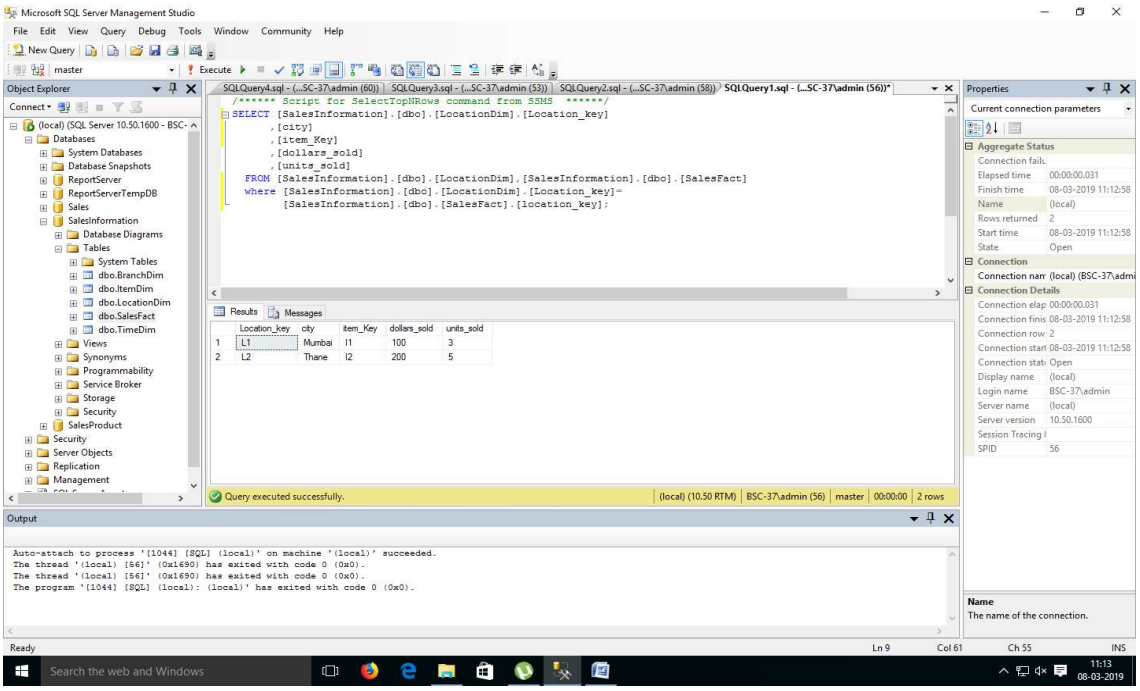
3.6.
```
SELECT [SalesInformation].[dbo].[BranchDim].[Branch_Key],
     [Branch_name],[dollars_sold],[units_sold]
  FROM  [SalesInformation].[dbo].[BranchDim],
        [SalesInformation].[dbo].[SalesFact]
  where [SalesInformation].[dbo].[BranchDim].[Branch_Key]=
  [SalesInformation].[dbo].[SalesFact].[Branch_Key];
```



3.7.
```
SELECT [SalesInformation].[dbo].[ItemDim].[Item_Key],[item_Name]
      ,[Type],[dollars_sold],[units_sold]
  FROM [SalesInformation].[dbo].[ItemDim],
       [SalesInformation].[dbo].[SalesFact]
  Where [SalesInformation].[dbo].[ItemDim].[Item_key]=
        [SalesInformation].[dbo].[SalesFact].[item_key];
```



3.8.
```
SELECT [SalesInformation].[dbo].[LocationDim].[Location_key]
      ,[city],[item_Key],[dollars_sold],[units_sold]
  FROM [SalesInformation].[dbo].[LocationDim],
       [SalesInformation].[dbo].[SalesFact]
  where [SalesInformation].[dbo].[LocationDim].[Location_key]=
        [SalesInformation].[dbo].[SalesFact].[location_key];
```

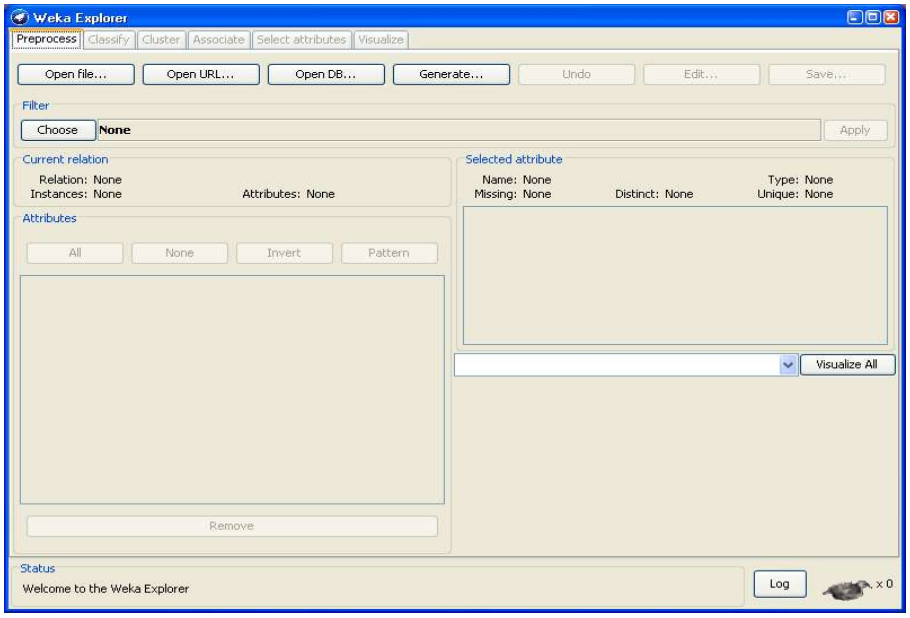


Practical No - 10

Aim : Data PreProcessing

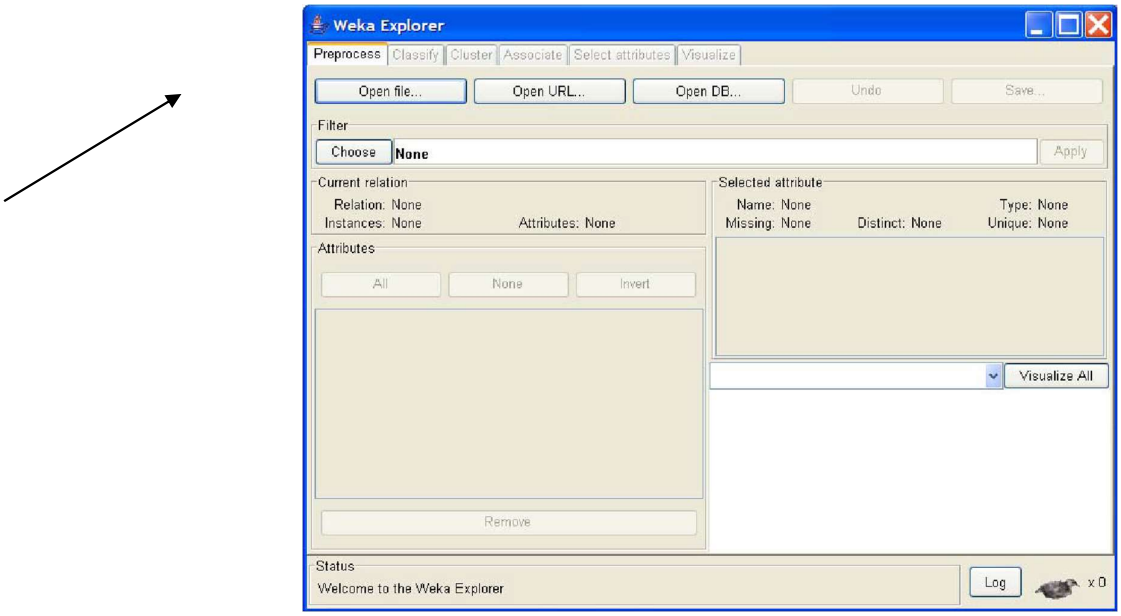
Solution :

Only the first tab, 'Preprocess', is active at the moment because there is no dataset open.



Opening file from a local file system

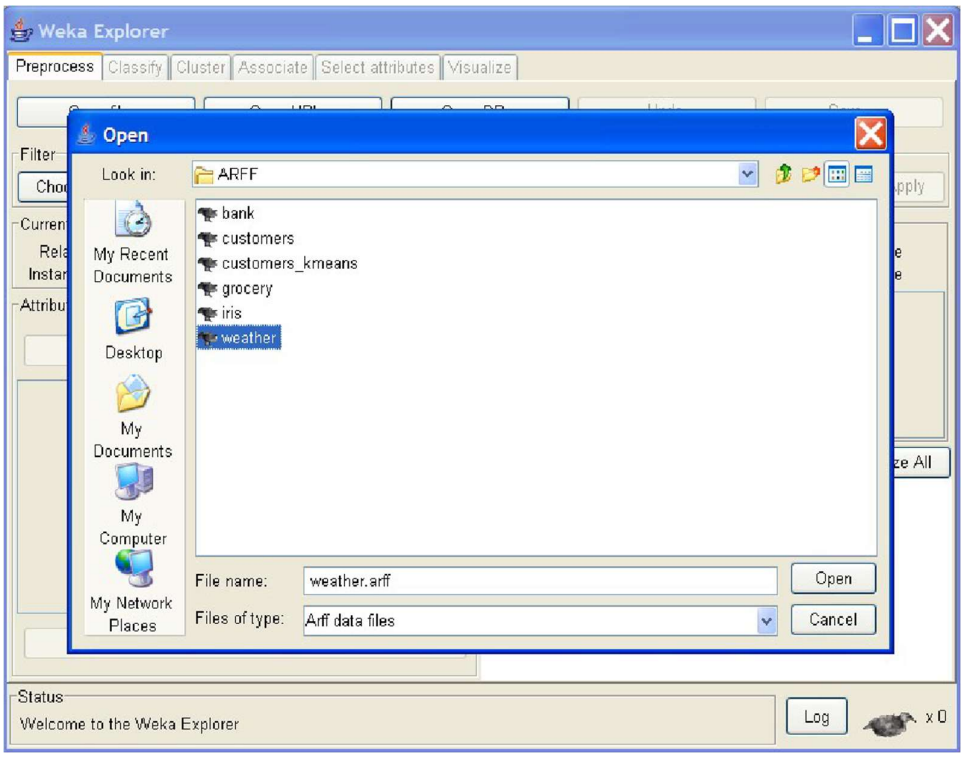
Click on 'Open file…' button



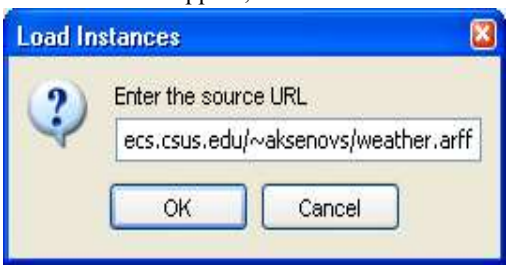
It brings up a dialog box allowing you to browse for the data file on the local file system, choose

"weather.arff" file.

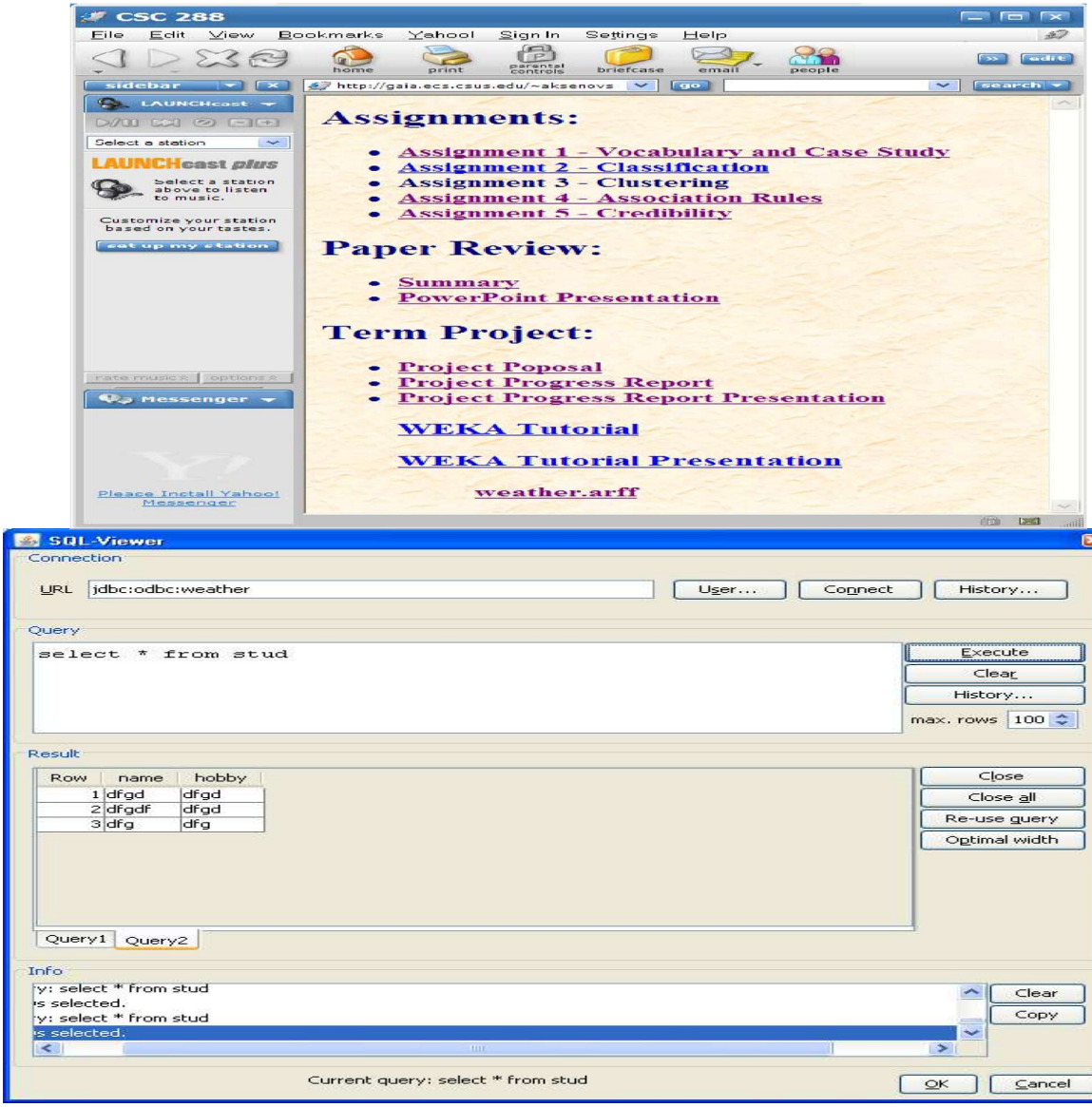
Opening file from a web site



A file can be opened from a website. Suppose, that "weather.arff" is on the followingwebsite:

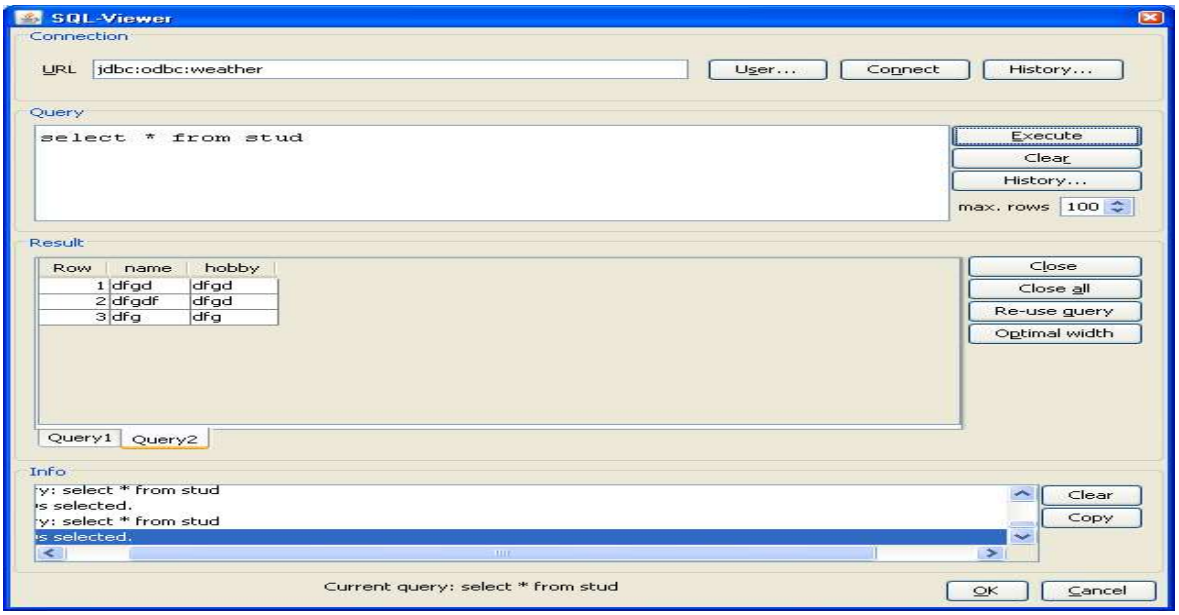


Reading data from a database:



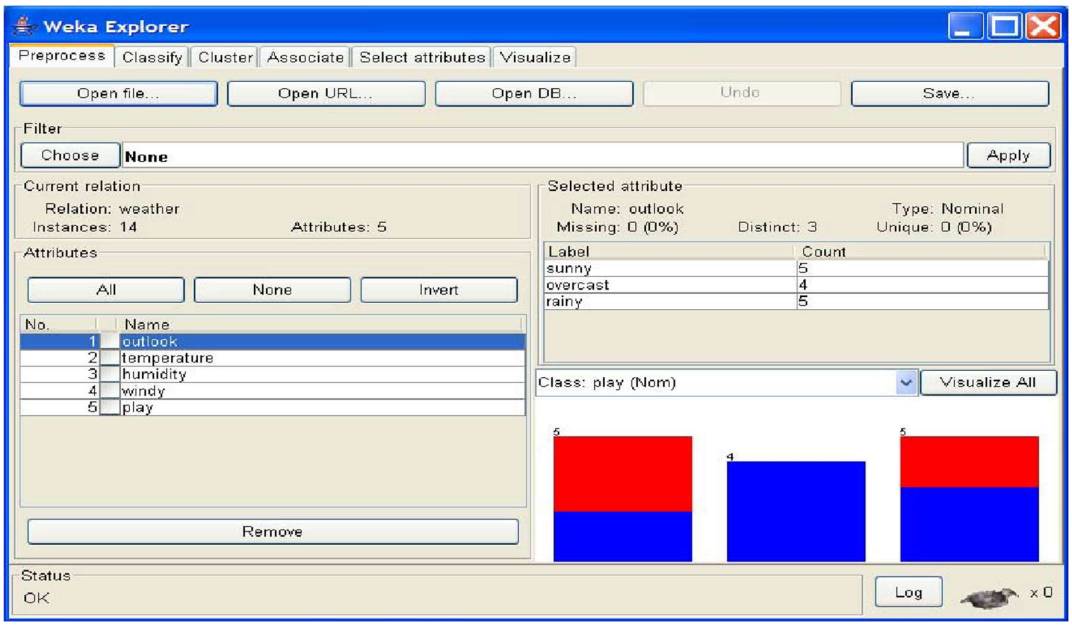
Loading data

The most common and easiest way of loading data into WEKA is from ARFF file, using Open File button.

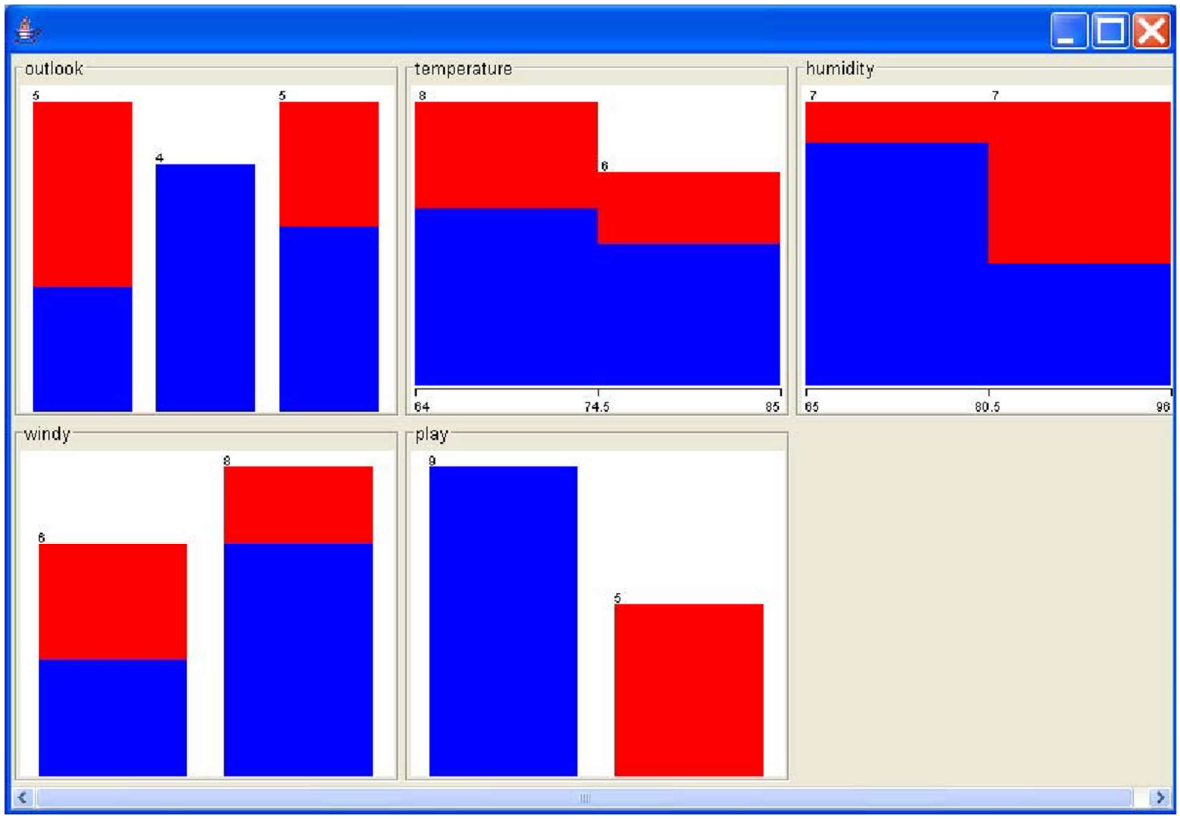


Loading data

The most common and easiest way of loading data into WEKA is from ARFF file, using Open File button.



Visualize Attributes:



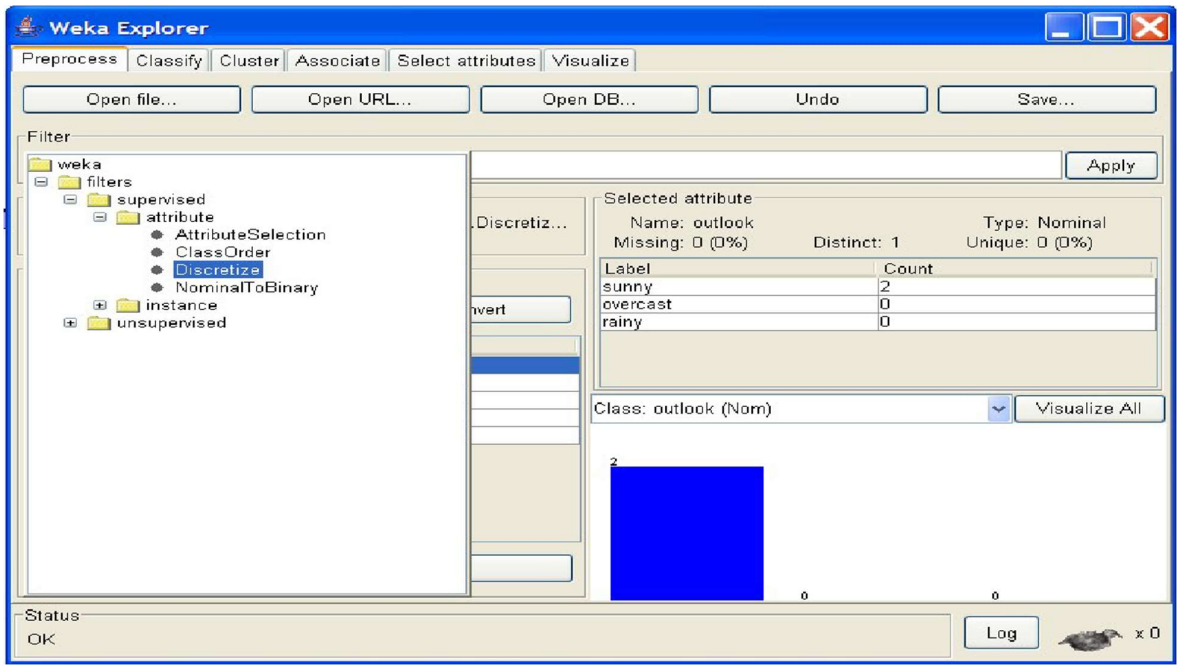
visualize all attributes by clicking on 'Visualize All' button.,

Practical No – 11

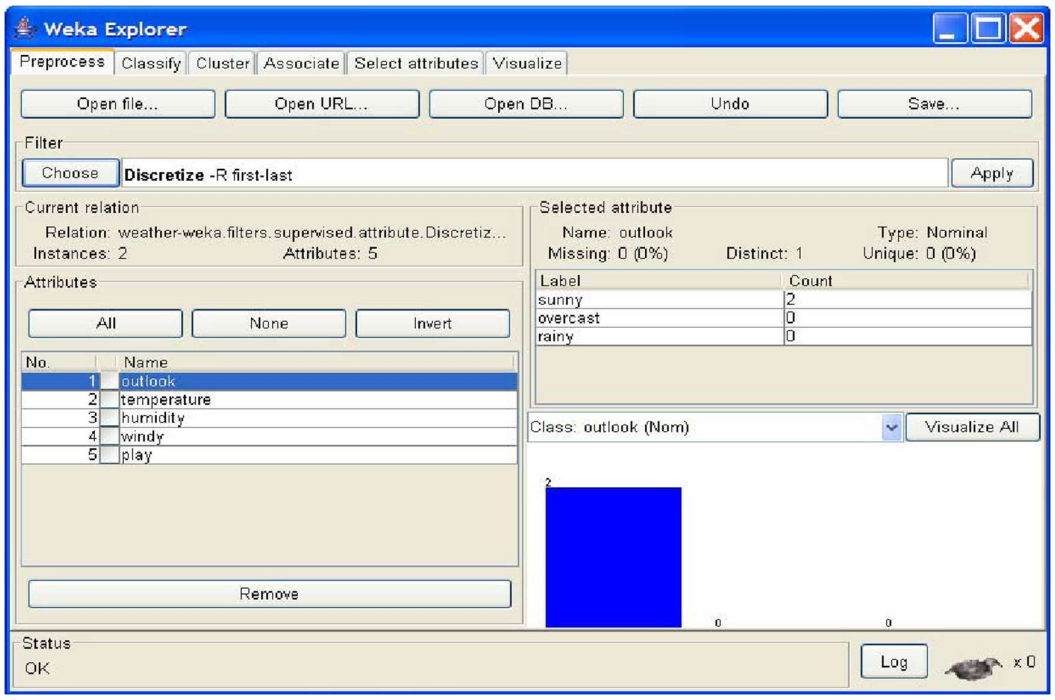
Aim : Data discretization.

Solution :

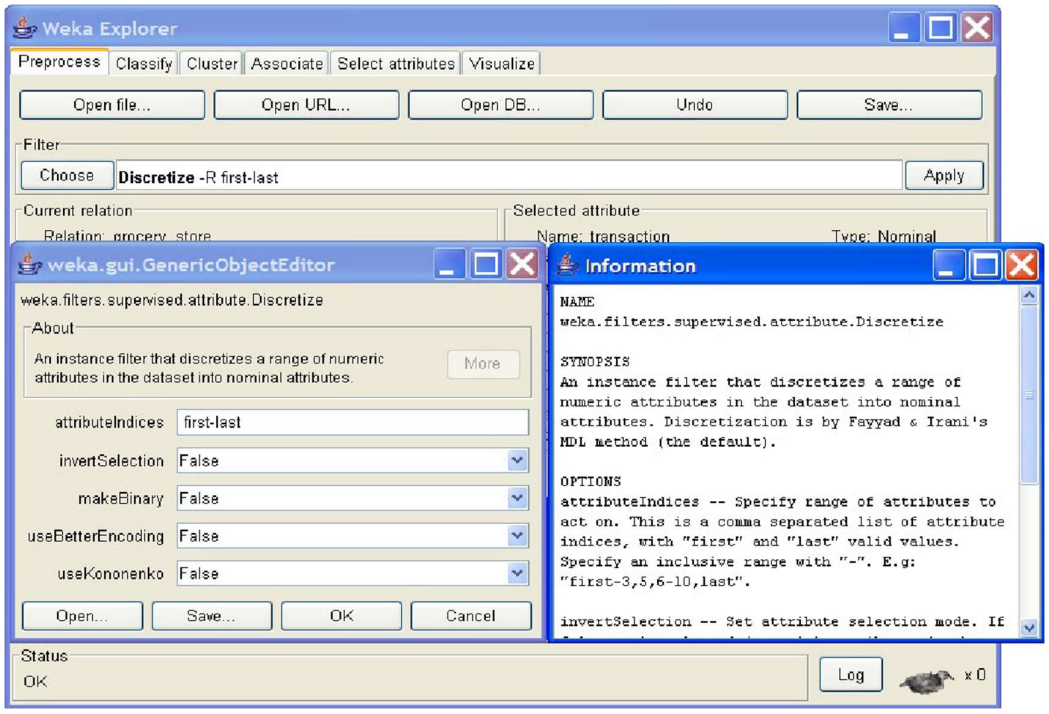
In ‘Filters’ window, click on the ‘Choose’ button.
This will show pull-down menu with a list of available filters. Select Supervised Attribute
Discretize and click on ‘Apply’ button.



The filter will convert Numeric values into Nominal.
the fields in the window changes to reflect available options.



a 'GenericObjectEditor' dialog box comes up on your screen.
The box lets you to choose the filter configuration options.

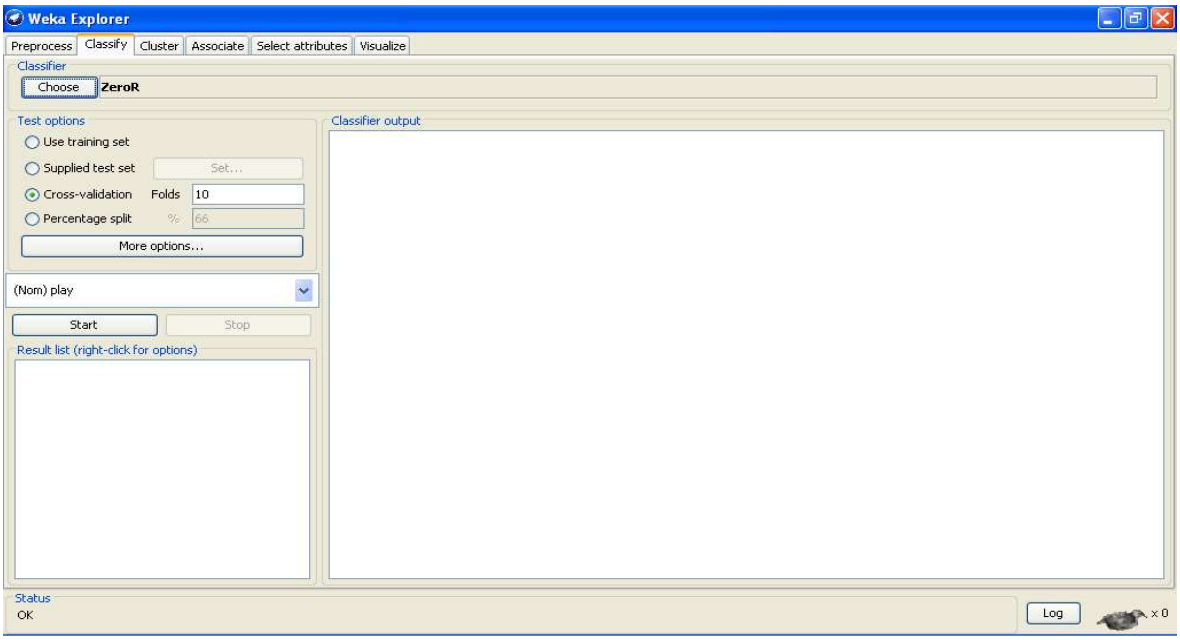


Practical No - 12

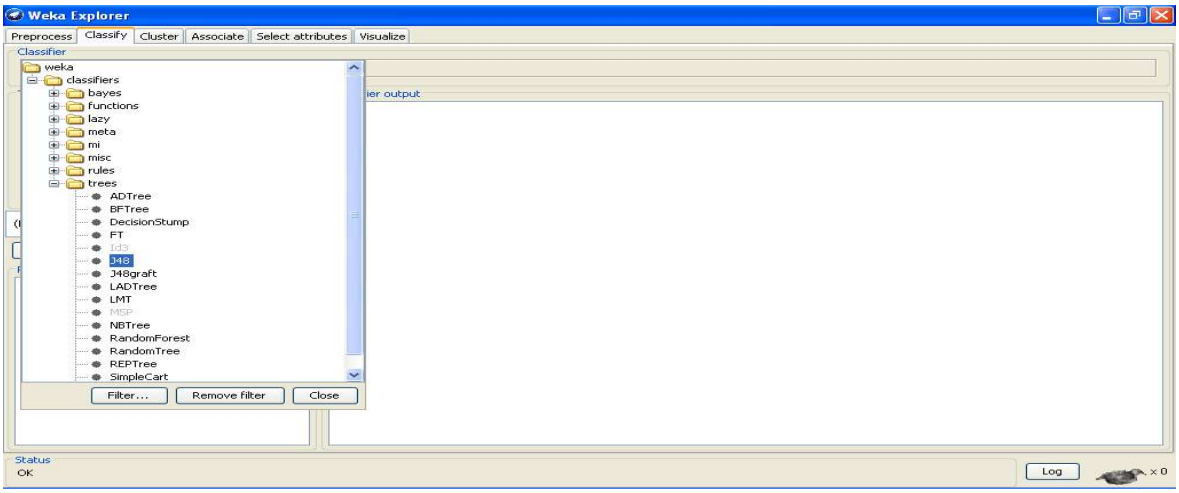
Aim : Classification problems.

Solution :

Once you have your data set loaded, all the tabs are available to you. Click on the ‘Classify’ tab.



Click on ‘Choose’ button in the ‘Classifier’ box just below the tabs and select C4.5 classifier WEKA Classifiers Trees J48.



Check ‘Percentage split’ radio-button and keep it as default 66%. Click on ‘More options…’ button.

<u>make sure that the Following options are checked :</u>

1. Output model.

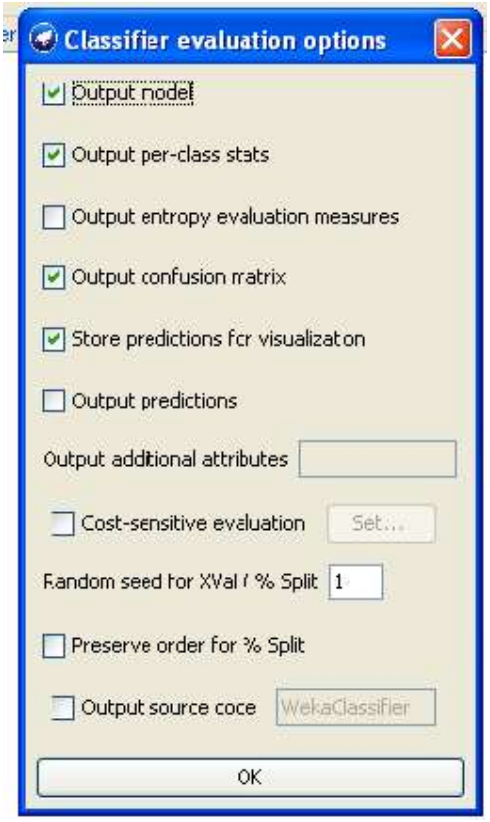
2. Output per-class stats.

3. Output confusion matrix

4. Store predictions for visualization.

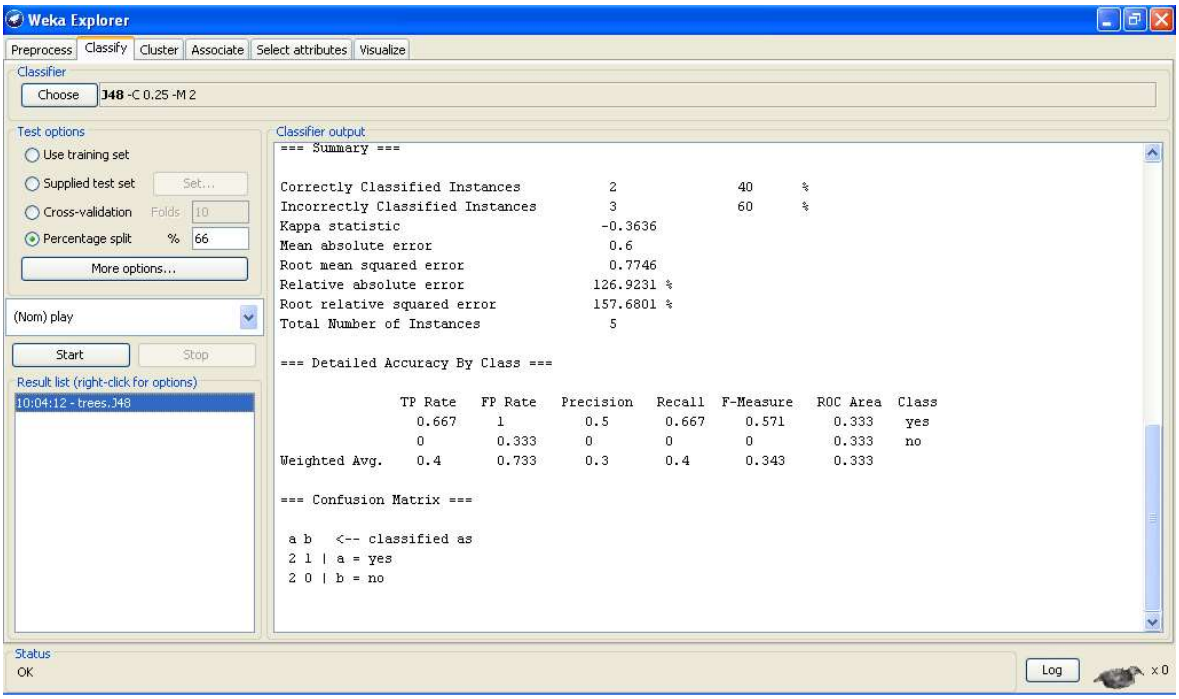
5. Set ‘Random seed for Xval / % Split’ to 1.

.



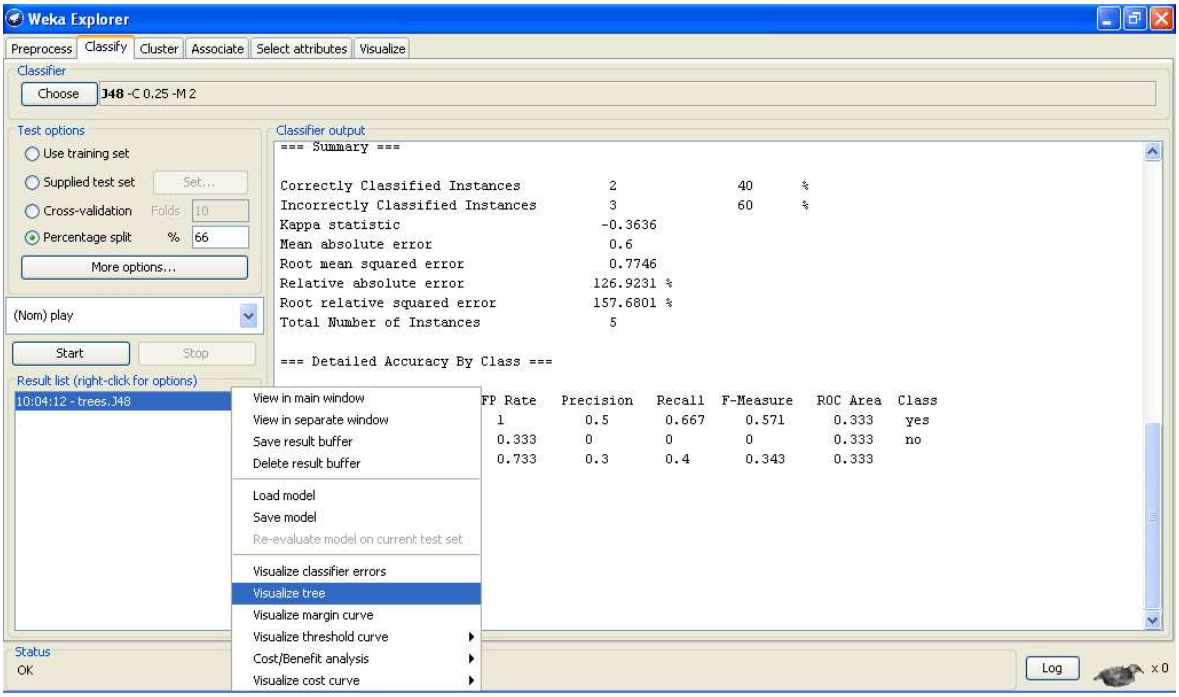
Once the options have been specified, you can run the classification algorithm. Click on

‘Start’ button

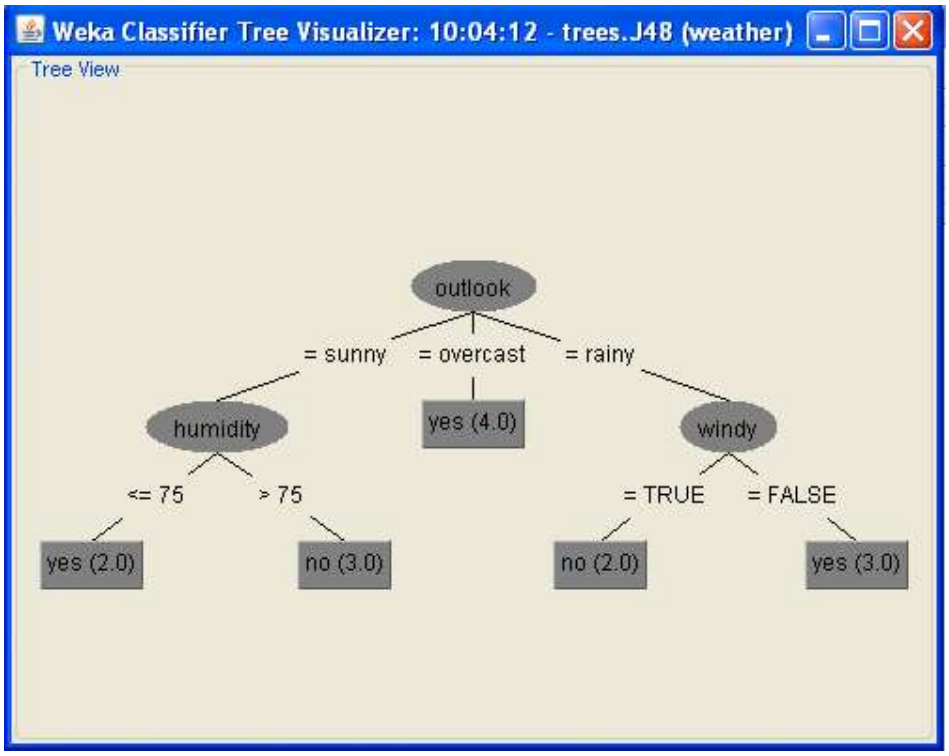


To see a graphical representation of the classification tree. Right-click on the

entry in ‘Result list’ for which you would like to visualize a tree.

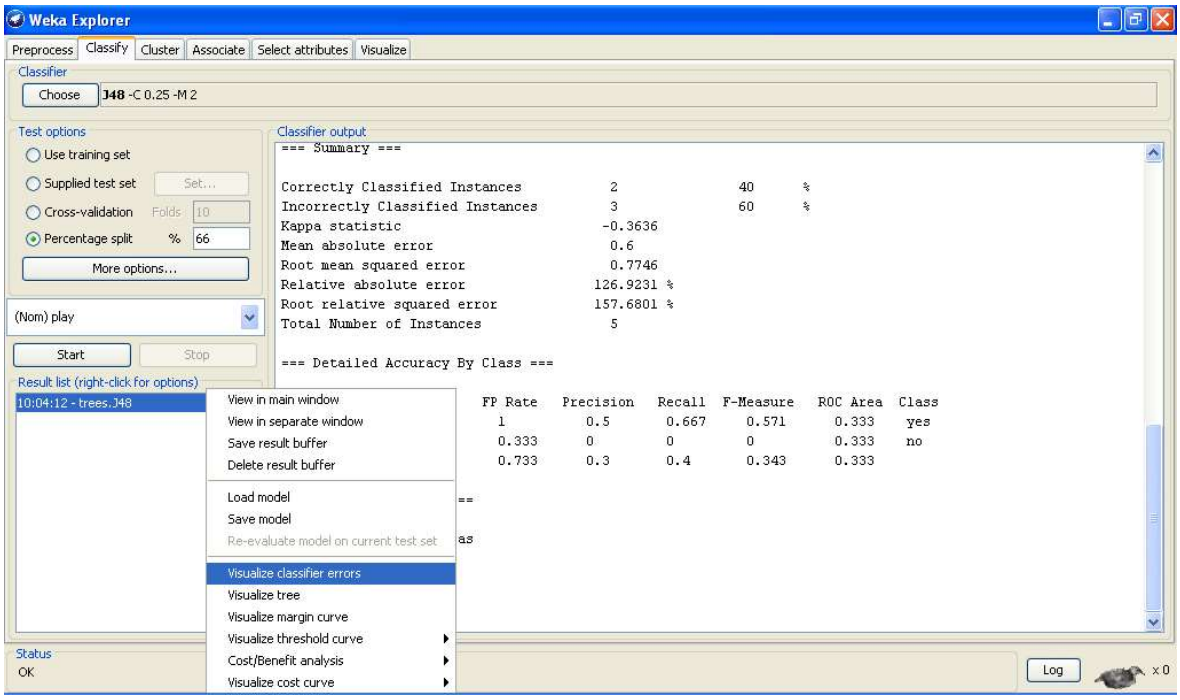


Select the item ‘Visualize tree’; a new window comes up to the screen displaying the tree.

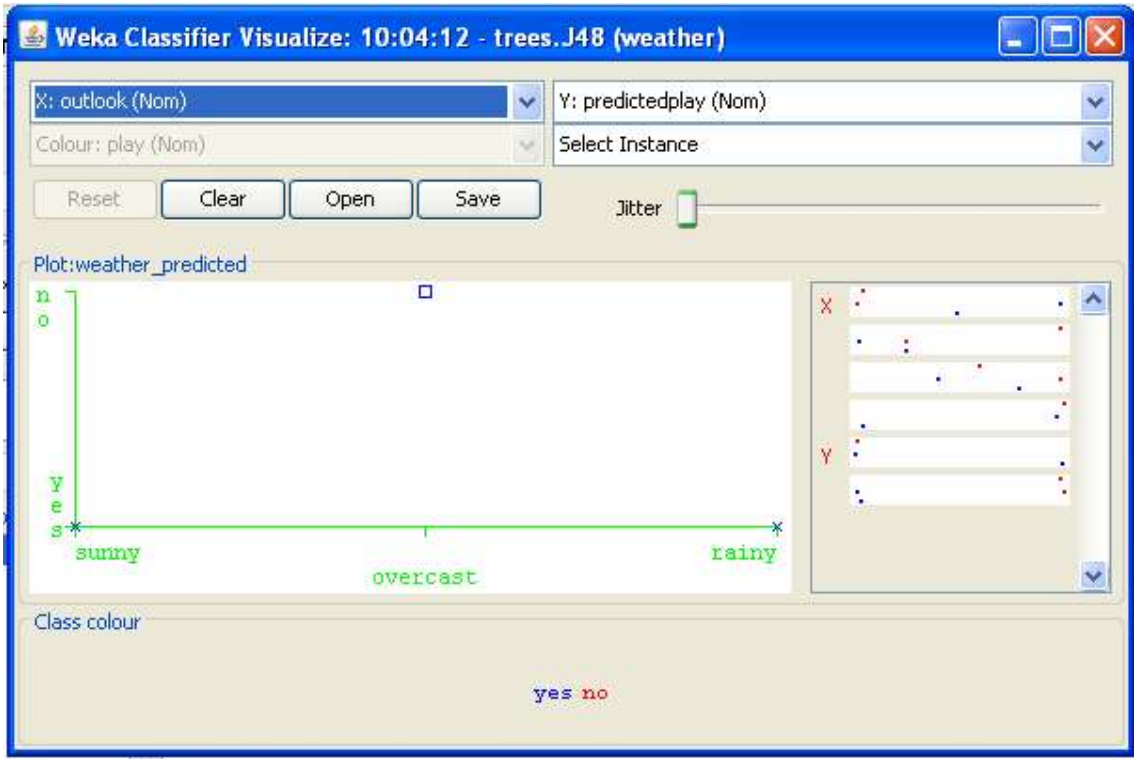


To visualize classification errors. Right-click on the entry in 'Result list' again

and select 'Visualize classifier errors' from the menu:



Visualize' window displaying graph appears on the screen.

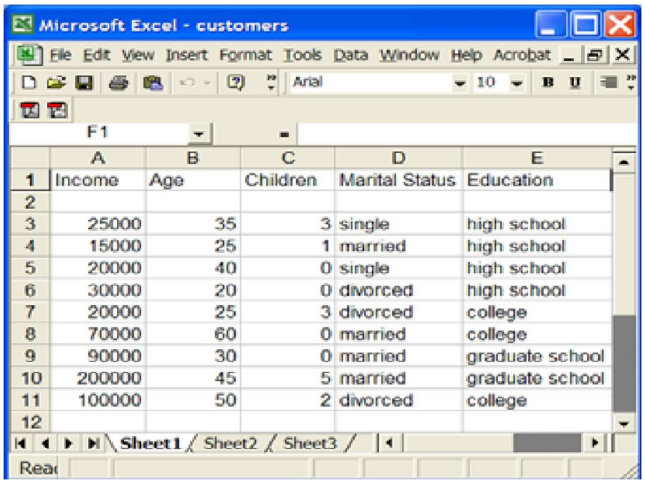

Weka Classifier Visualize: 10:04:12 - trees.J48 (weather)
X: outlook (Nom)
Y: predictedplay (Nom)
Colour: play (Nom)
Select Instance
Reset
Clear
Open
Save
Jitter
Plot:weather_predicted
n
o
y
e
s
sunny
overcast
rainy
X
Y
Class colour
yes no

Practical N0 - 13

Aim : Clustering Analysis.

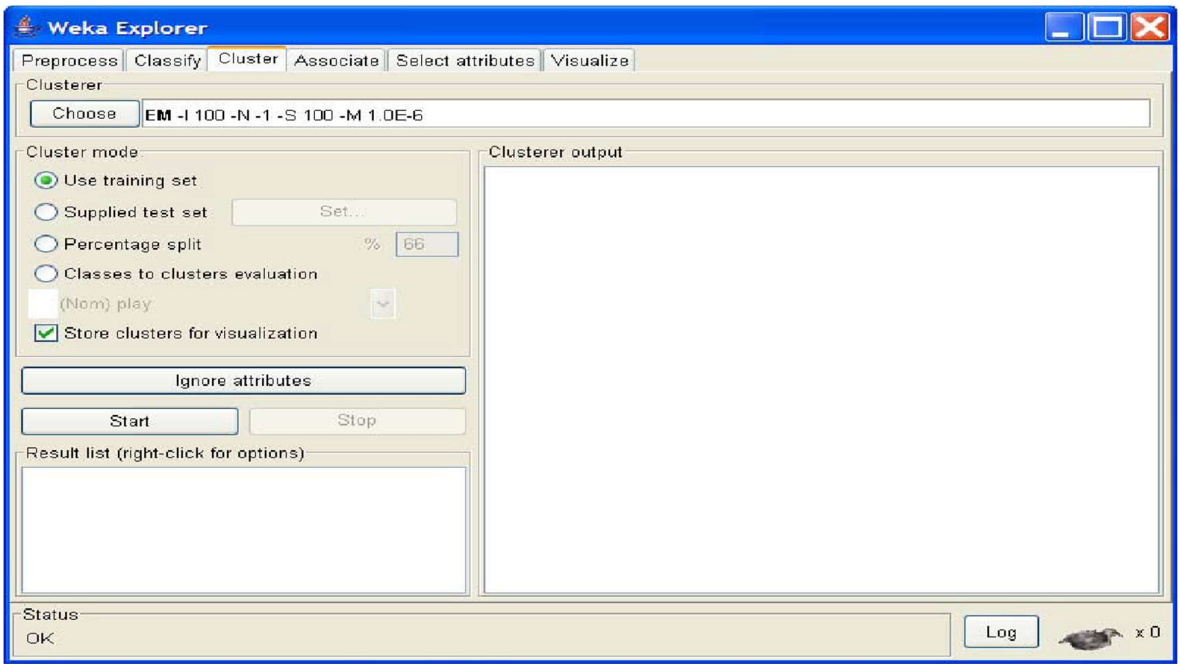
Solution :

we will use customer data [6] that is contained in "customers.arff" file and analyze it with k-means clustering scheme.

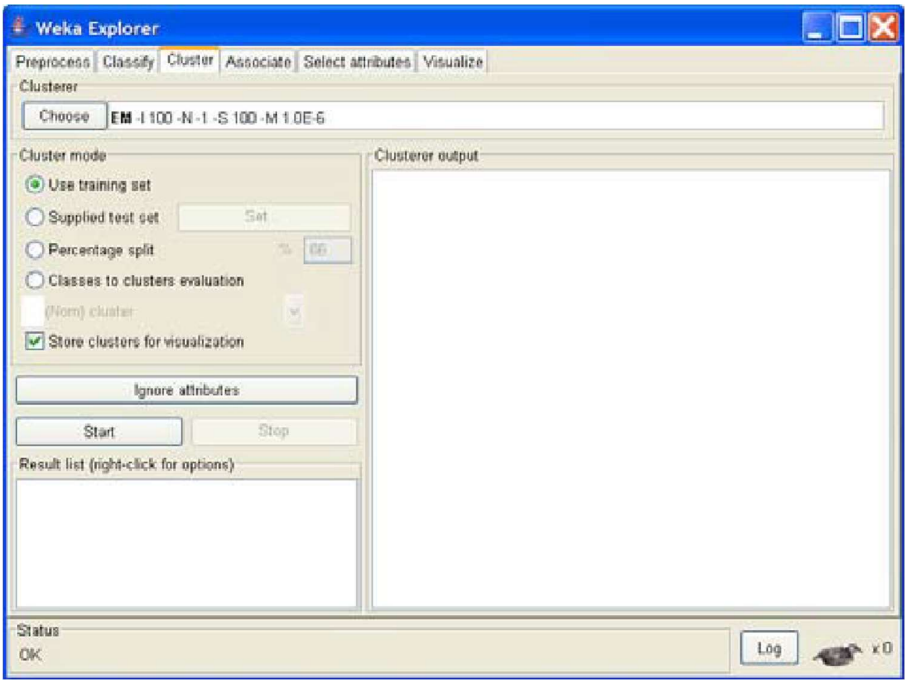


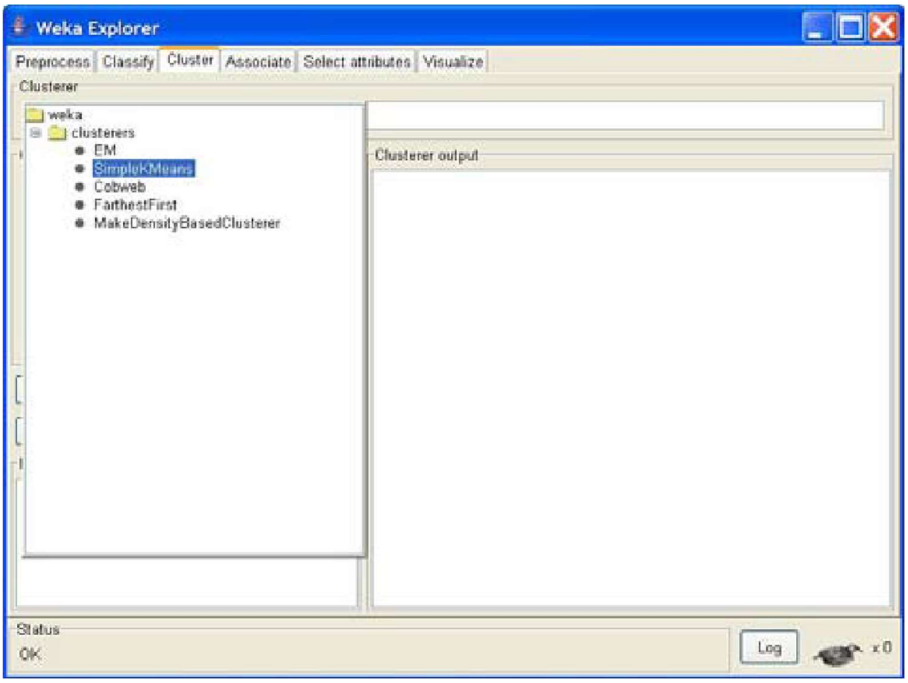
	A	B	C	D	E
1	Income	Age	Children	Marital Status	Education
2					
3	25000	35	3	single	high school
4	15000	25	1	married	high school
5	20000	40	0	single	high school
6	30000	20	0	divorced	high school
7	20000	25	3	divorced	college
8	70000	60	0	married	college
9	90000	30	0	married	graduate school
10	200000	45	5	married	graduate school
11	100000	50	2	divorced	college
12					

In 'Preprocess' window click on 'Open file…' button and select "customers.arff" file. Click 'Cluster' tab at the top of WEKA Explorer window.

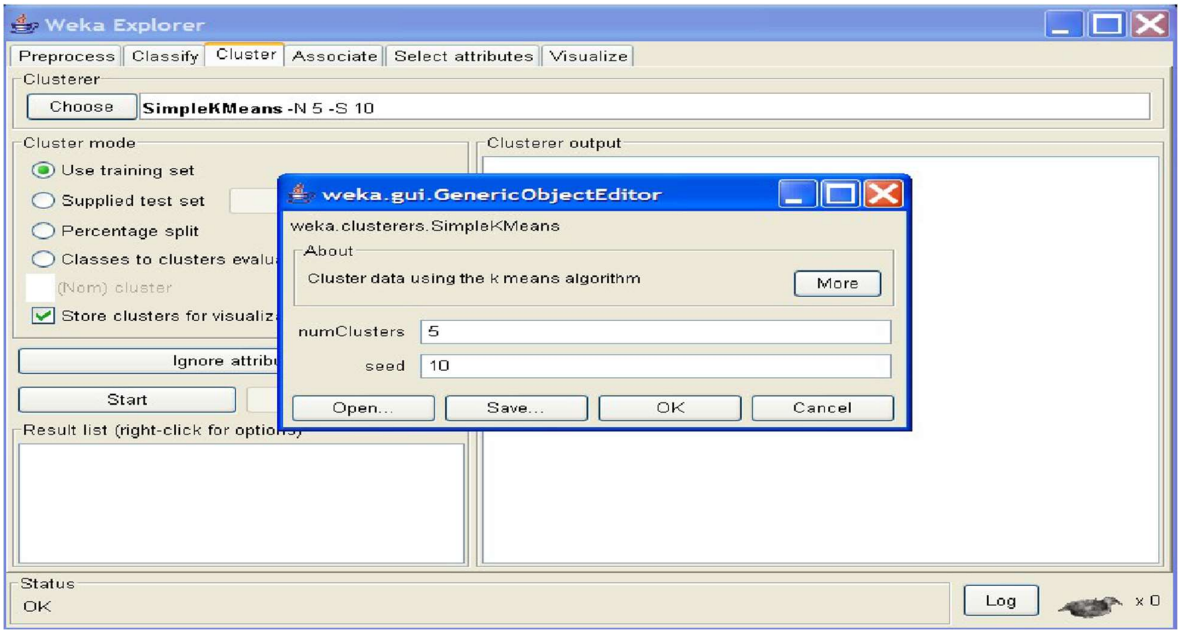


In the 'Clusterer' box click on 'Choose' button. In pull-down menu select WEKA □ Clusterers, and select the cluster scheme 'SimpleKMeans'. Some implementations of K-means only allow numerical values for attributes.

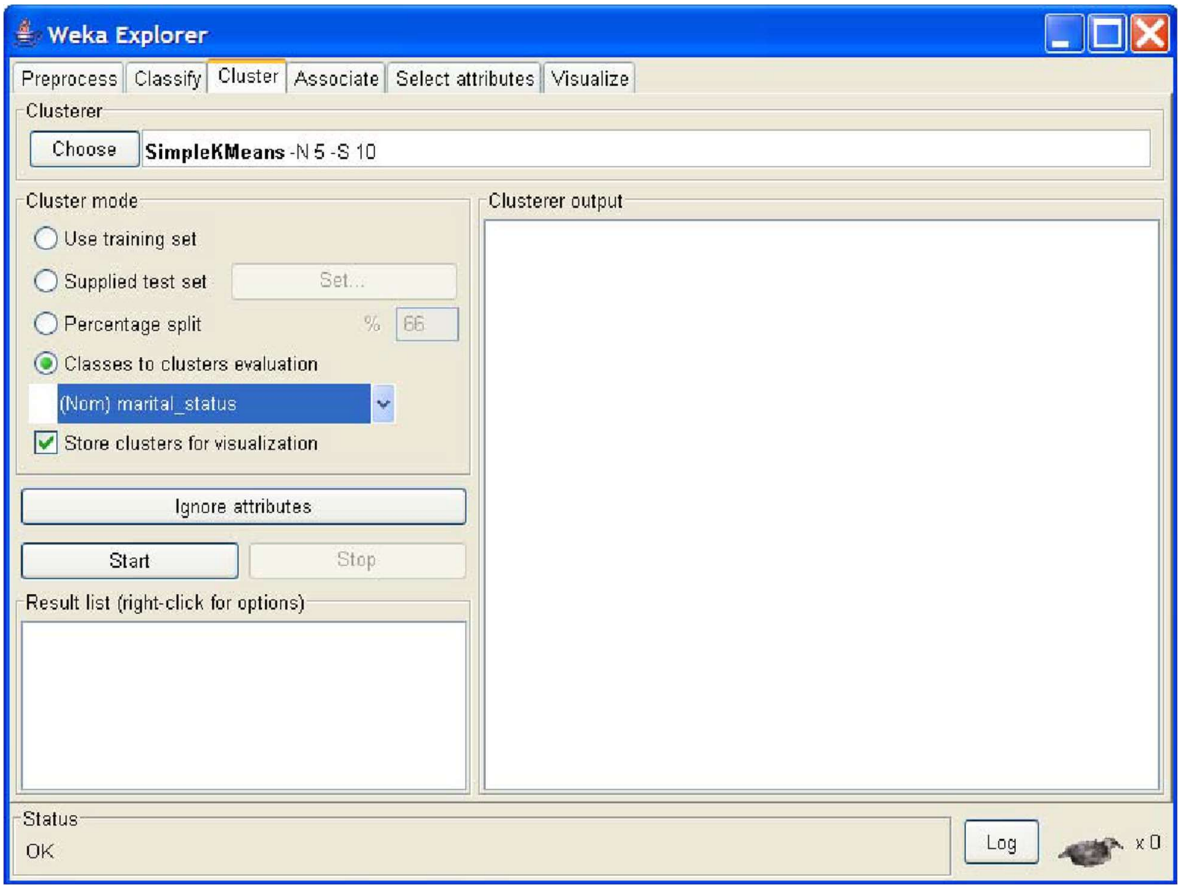




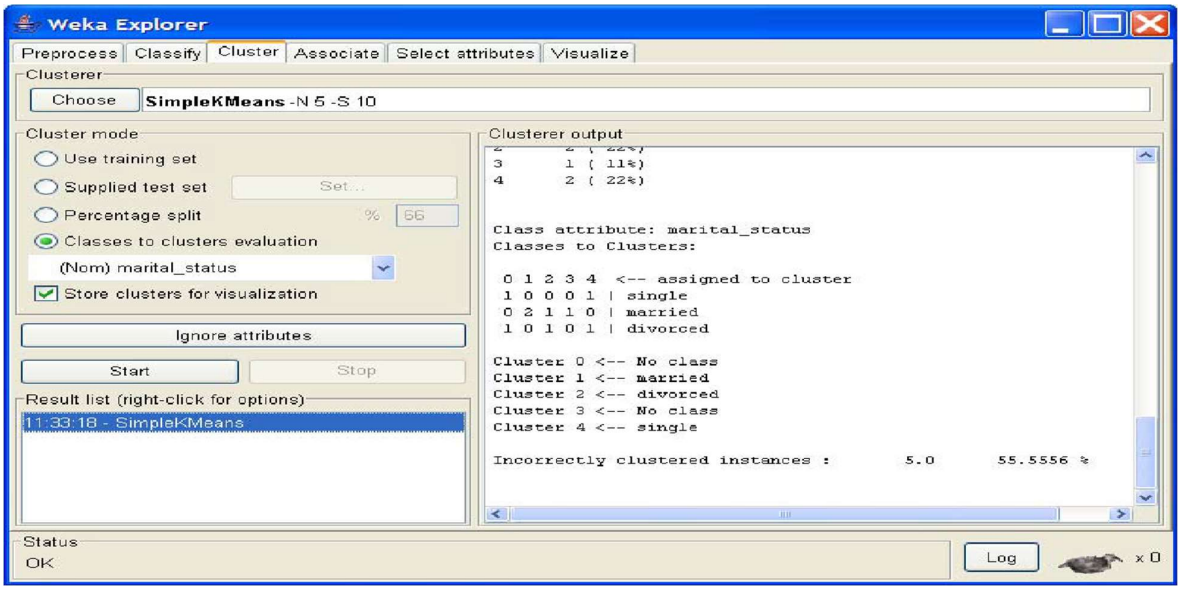
right-click on the algorithm "weak.gui.GenericObjectEditor" comes up to the screen. Set the value in "numClusters" box to 5(instead of default 2) because you have five clusters in your .arff file.



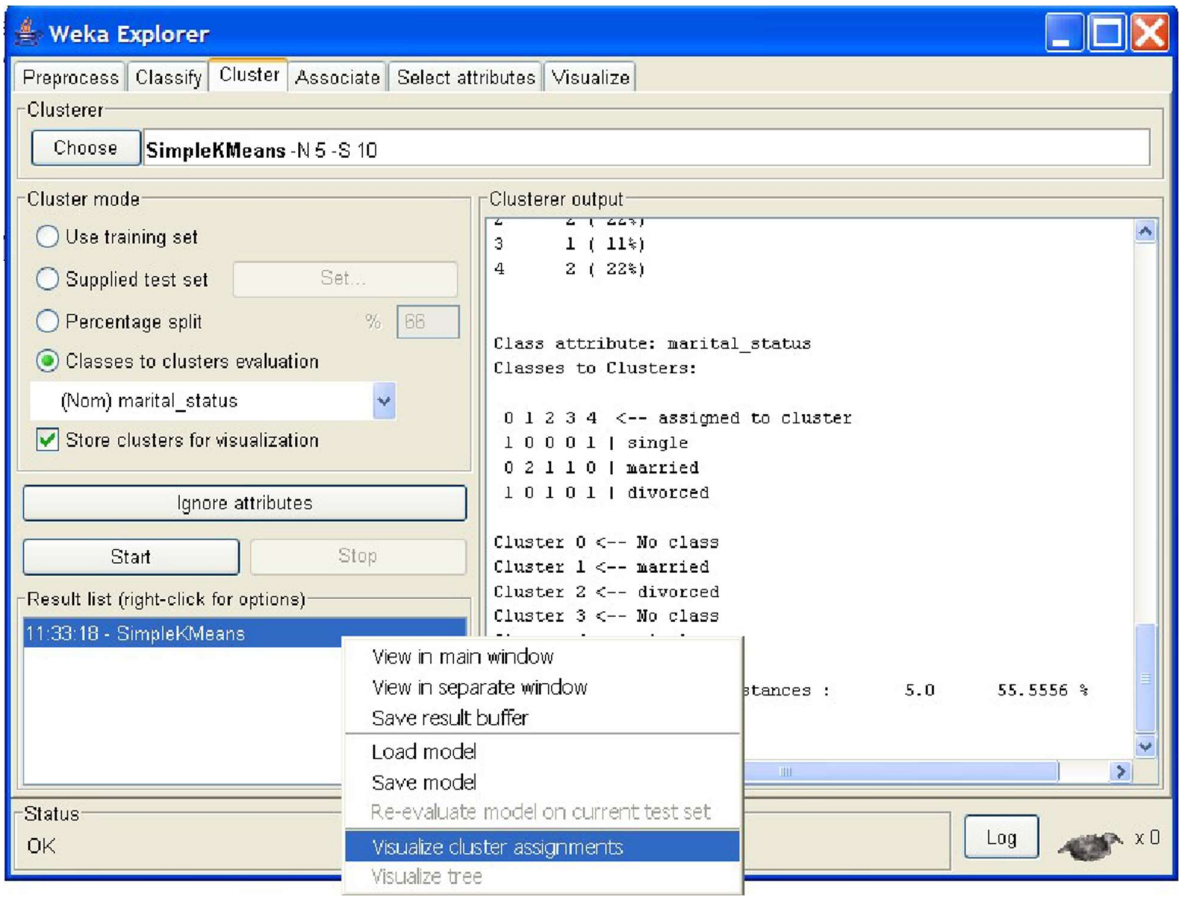
Click on 'Classes to cluster evaluation' radio-button in 'Cluster mode' box and select 'marital_status' in the pull-down box below.



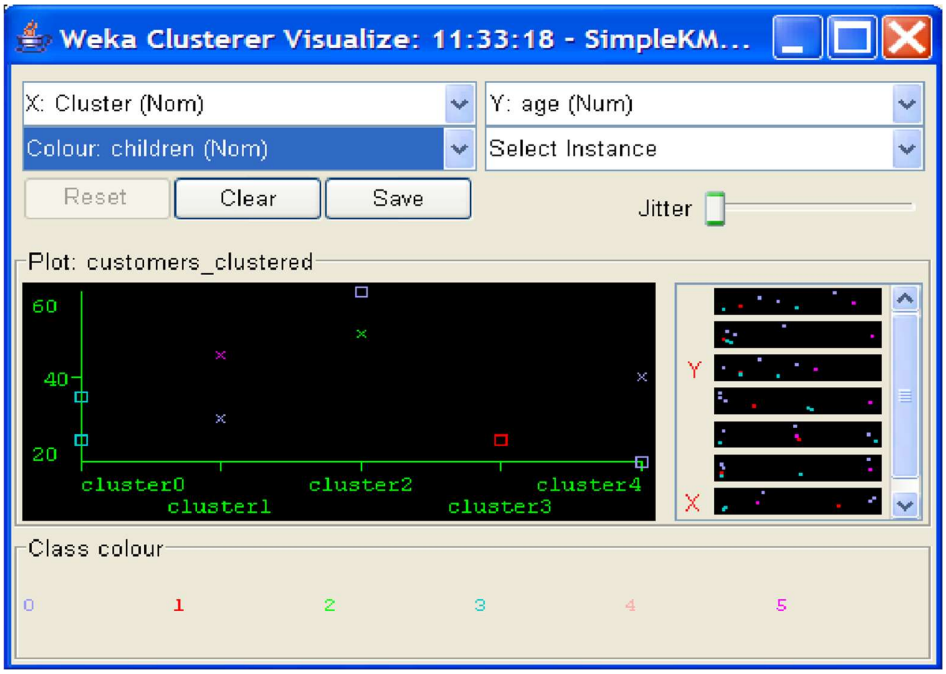
Click on the 'Start' button to execute the algorithm.



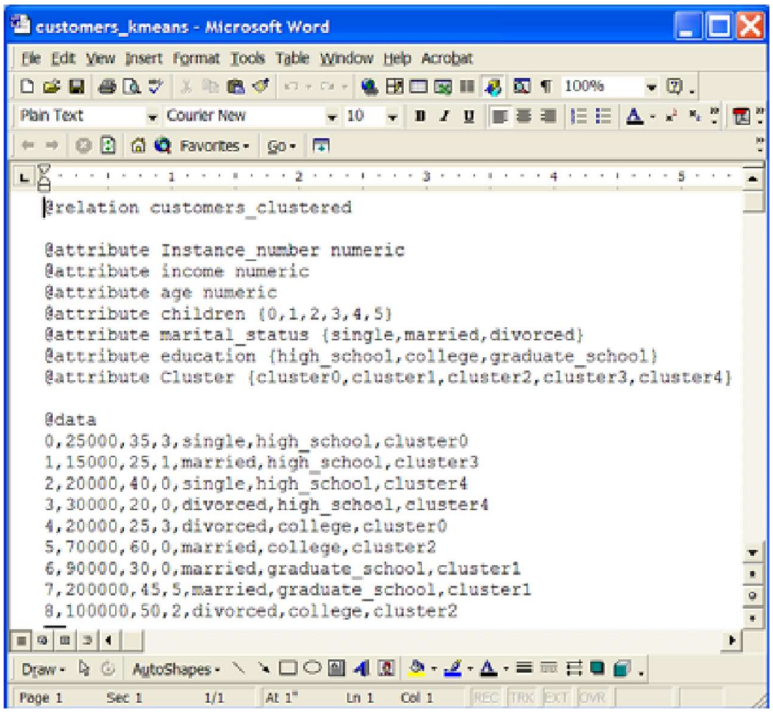
Right-click on the entry in the 'Result list' and select 'Visualize cluster assignments' in the pull-down window.



'Weka Clusterer Visualize' window.



there is a new attribute appeared in the file – 'cluster' that was added by WEKA. This attribute represents the custering done by WEKA.

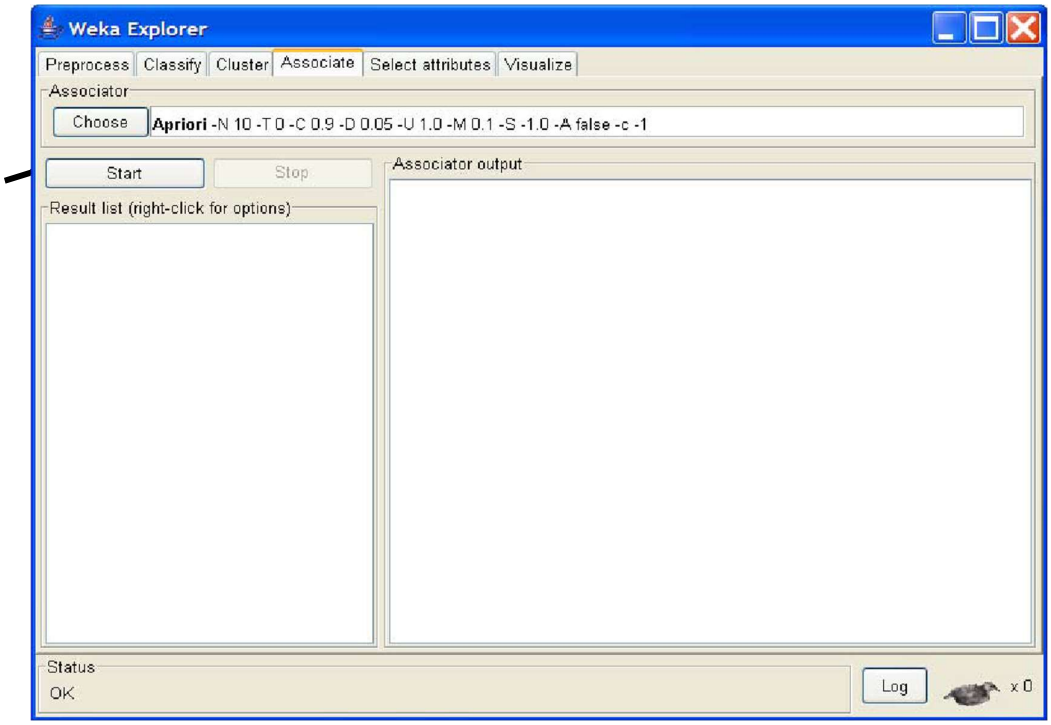


Practical No-14

Aim : Association Rule Mining.

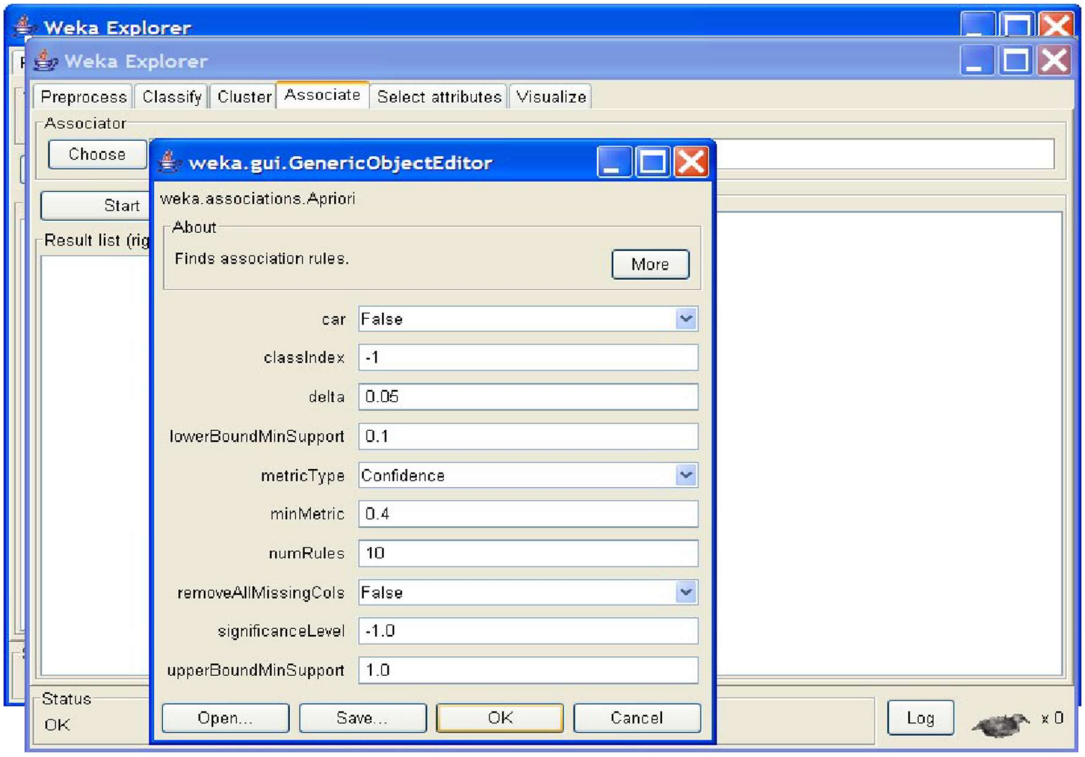
Solution :

Choosing Association Scheme
Click 'Associate' tab at the top of 'WEKA Explorer' window. It brings up interface for the Apriori algorithm.



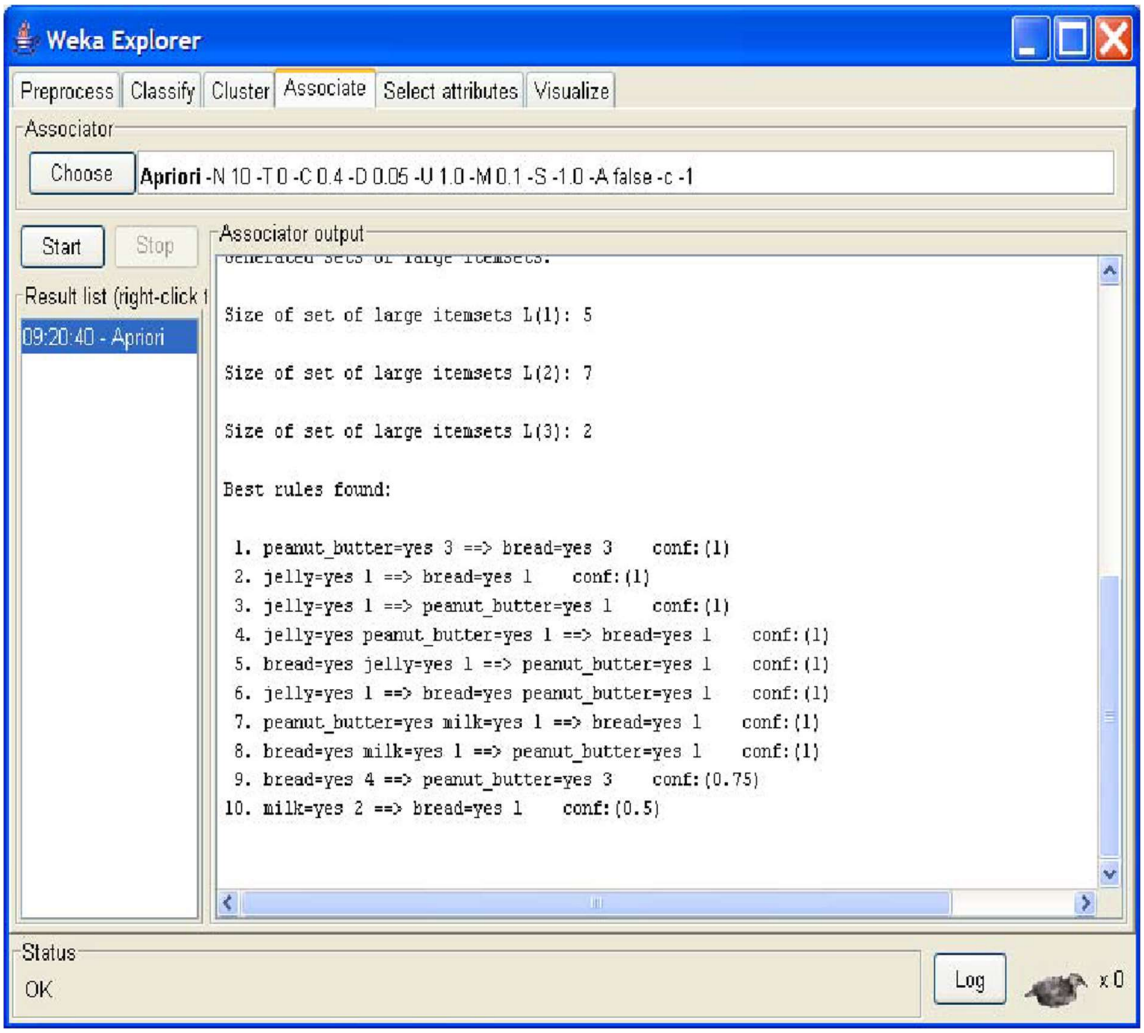
Setting Test Options

Check the text field in the ‘Associator’ box at the top of the window



Right-click on the ‘Associator’ box, ‘GenericObjectEditor’ appears on your screen

Click on the ‘Start’ button to execute the algorithm

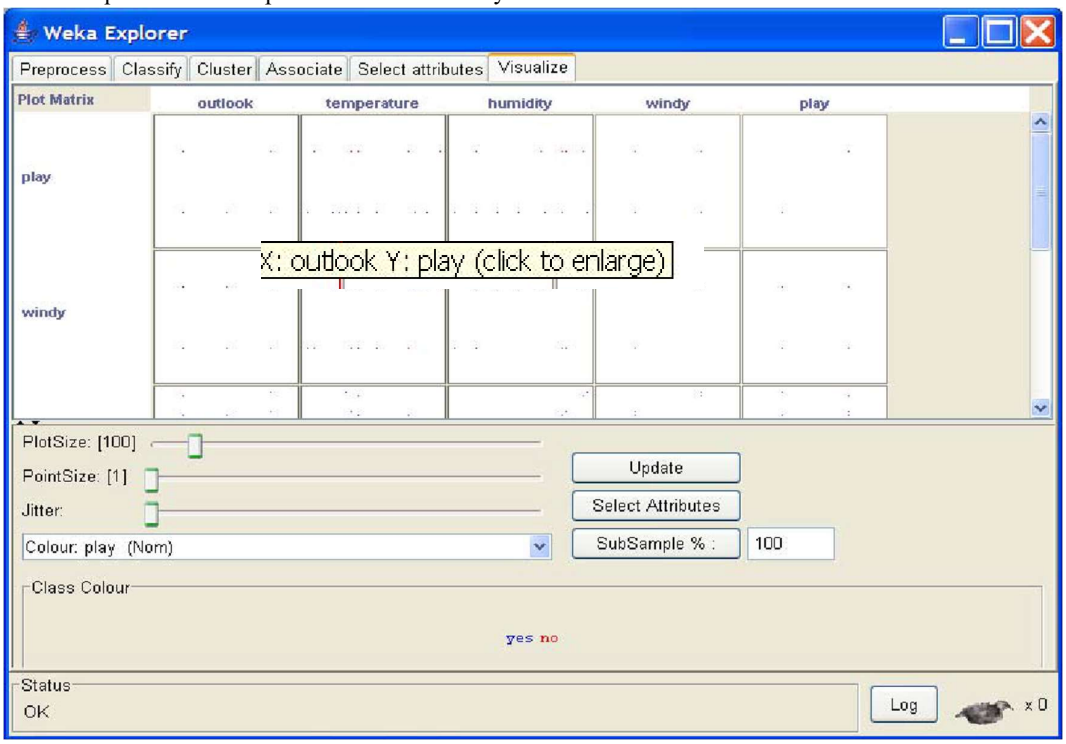

Weka Explorer
Preprocess
Classify
Cluster
Associate
Select attributes
Visualize
Associator
Choose
Apriori -N 10 -T 0 -C 0.4 -D 0.05 -U 1.0 -M 0.1 -S -1.0 -A false -c -1
Start
Stop
Result list (right-click t
09:20:40 - Apriori
Associator output
Size of set of large itemsets L(1): 5
Size of set of large itemsets L(2): 7
Size of set of large itemsets L(3): 2
Best rules found:
1. peanut_butter=yes 3 ==> bread=yes 3 conf:(1)
2. jelly=yes 1 ==> bread=yes 1 conf:(1)
3. jelly=yes 1 ==> peanut_butter=yes 1 conf:(1)
4. jelly=yes peanut_butter=yes 1 ==> bread=yes 1 conf:(1)
5. bread=yes jelly=yes 1 ==> peanut_butter=yes 1 conf:(1)
6. jelly=yes 1 ==> bread=yes peanut_butter=yes 1 conf:(1)
7. peanut_butter=yes milk=yes 1 ==> bread=yes 1 conf:(1)
8. bread=yes milk=yes 1 ==> peanut_butter=yes 1 conf:(1)
9. bread=yes 4 ==> peanut_butter=yes 3 conf:(0.75)
10. milk=yes 2 ==> bread=yes 1 conf:(0.5)
Status
OK
Log
x 0

Practical No-15

Aim : Data Visualization

Solution :

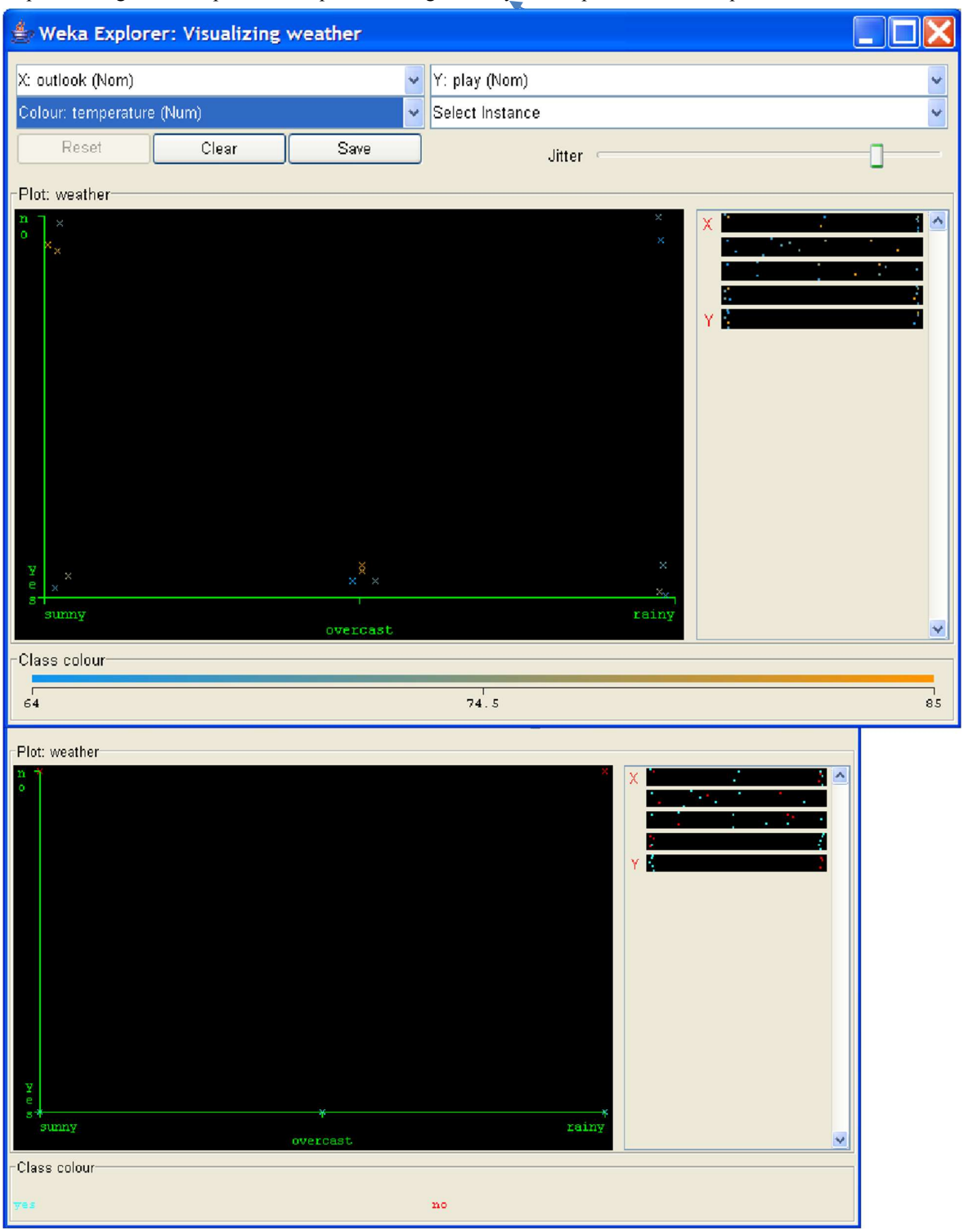
To open Visualization screen, click ‘Visualize’ tab.
Select a square that corresponds to the attributes you would like to visualize.



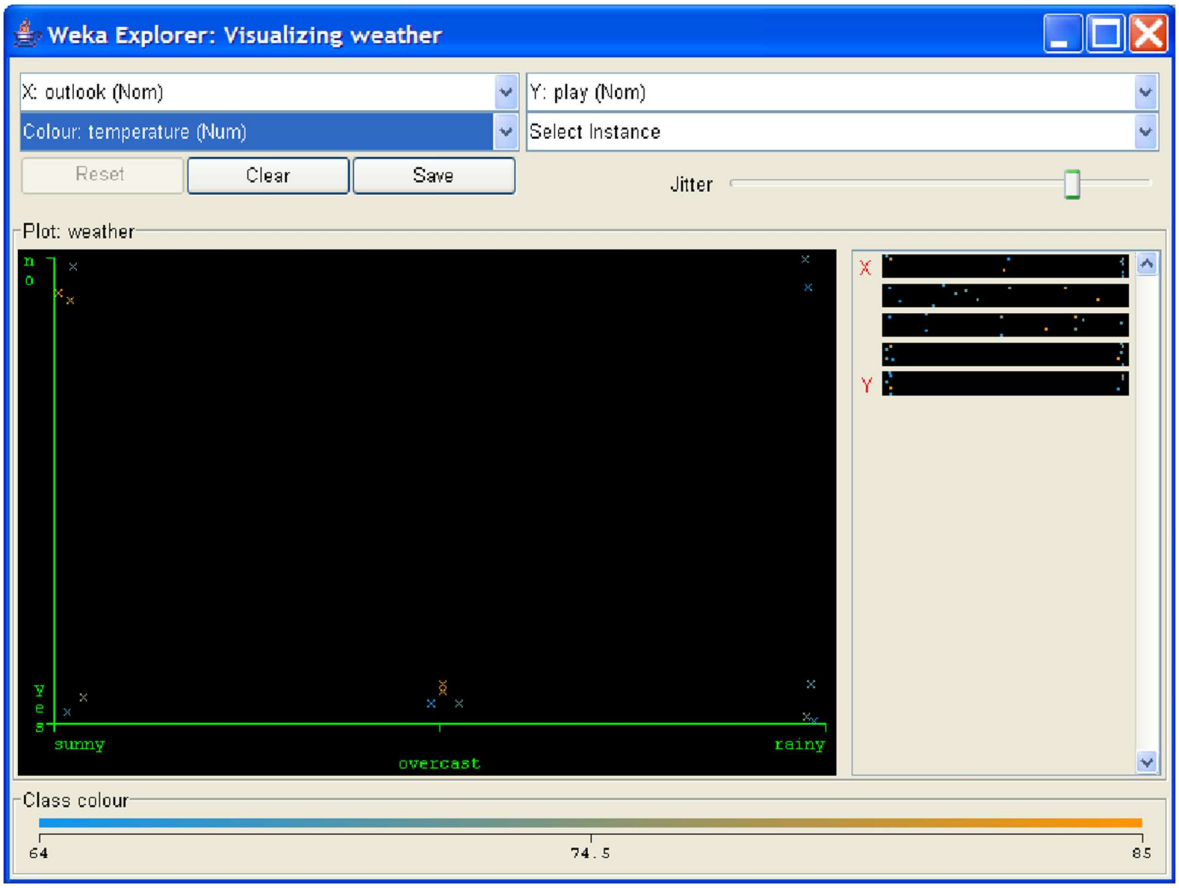
A ‘Visualizing weather’ window appears on the screen.

Changing the View

Keep sliding ‘Jitter’, a random
displacement given to all points in the plot, to the right, until you can spot concentration points

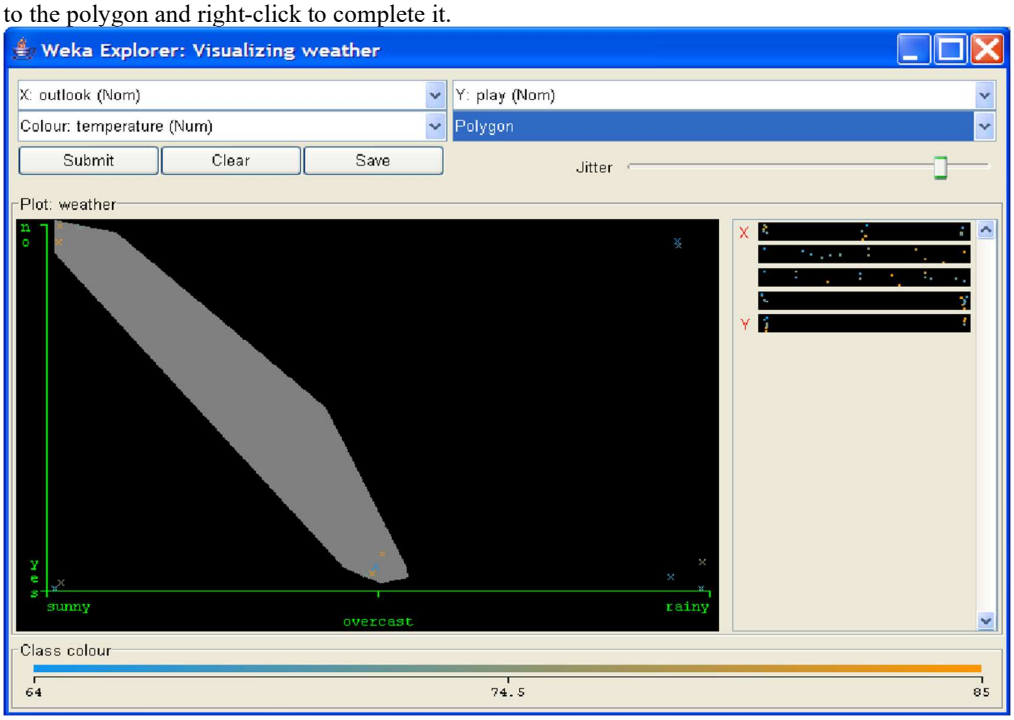


displacement given to all points in the plot, to the right, until you can spot concentration points

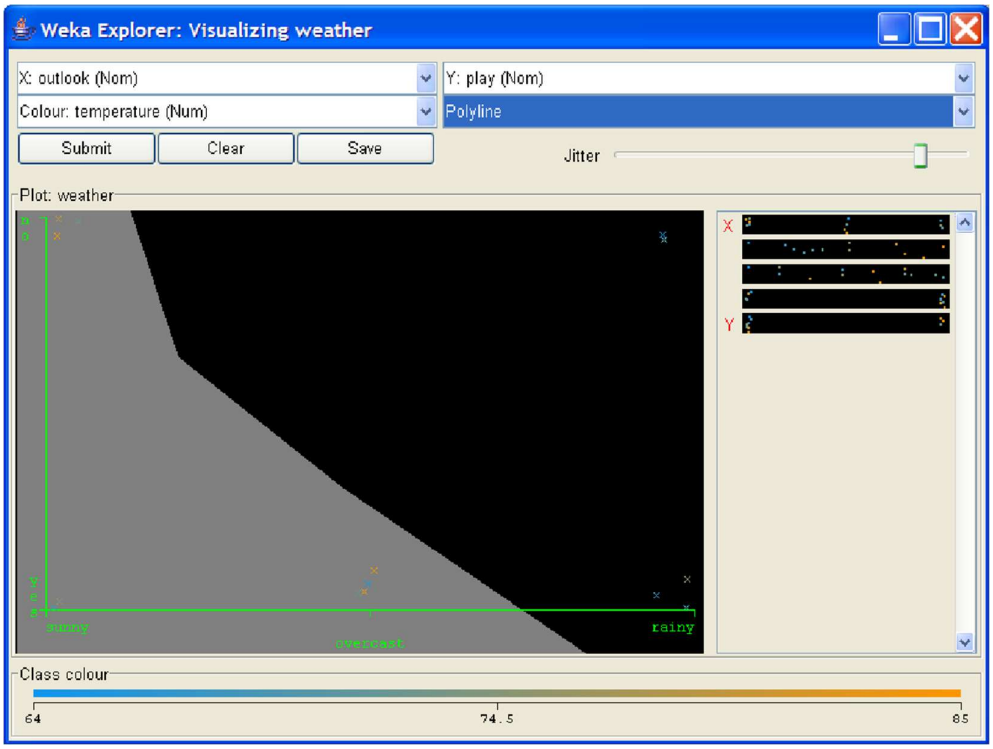


Selecting Instances: Click on an individual data point

3. **Polygon**. You can select several points by building a free-form polygon. Left-click othe graph to add vertices to the polygon and right-click to complete it.



4. **Polyline**. To distinguish the points on one side from the once on another, you can build a polyline. Left-click on the graph to add vertices to the polyline and right-click to finish.



Rectangle. You can create a rectangle by dragging it around the points