LAB MANUAL

DATA MINING (DMG)

B.Tech V semester

EXPERIMENT NO: 1

Create a data set using arff file and edit it in WEKA.

Description:

We need to create an Employee Table with training data set which includes attributes like name, id, salary, experience, gender, phone number.

Procedure:

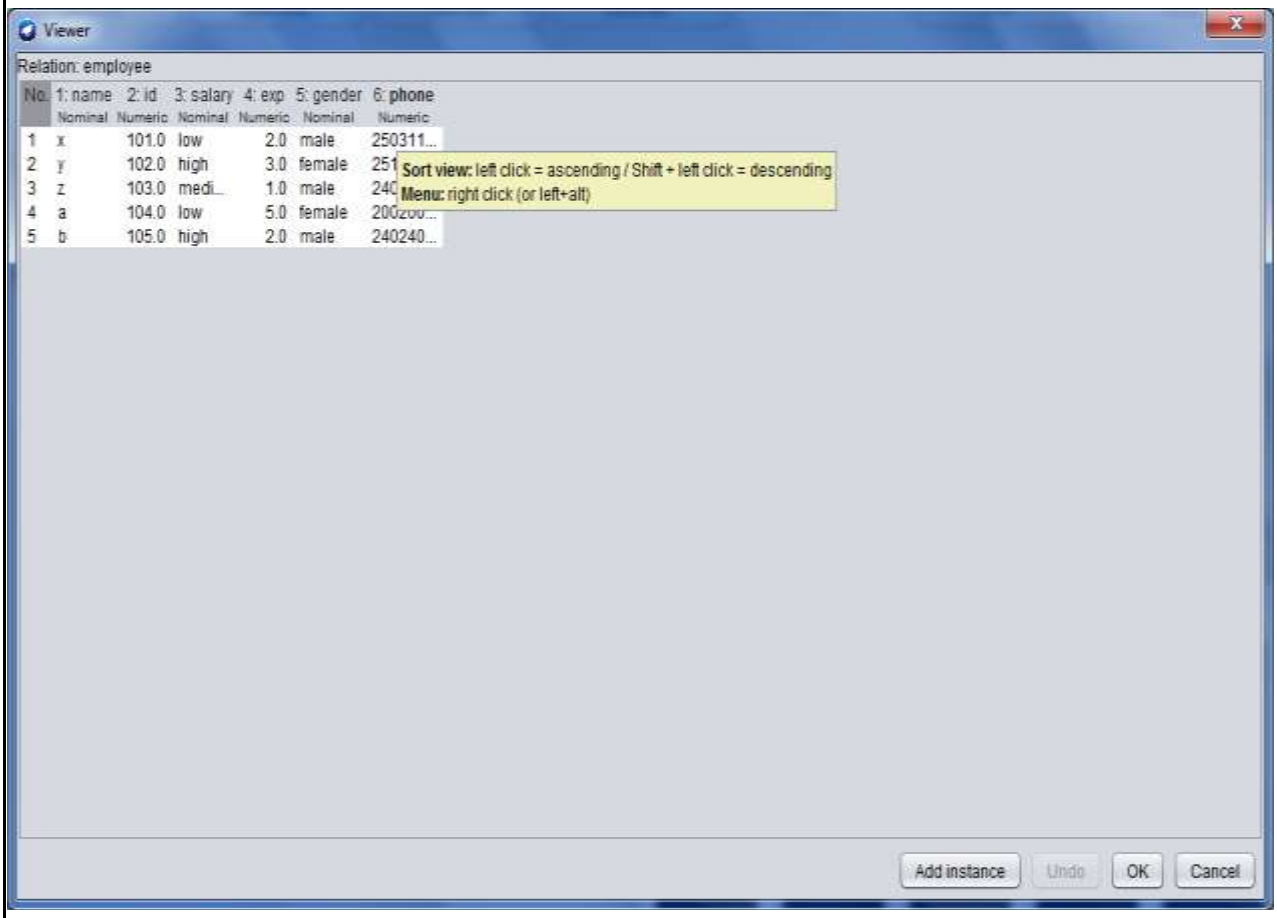
Steps:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Employee Table.

```
@relation employee
@attribute name {x,y,z,a,b}
@attribute id numeric
@attribute salary {low,medium,high}
@attribute exp numeric
@attribute gender {male,female}
@attribute phone numeric

@data
x,101,low,2,male,250311
y,102,high,3,female,251665
z,103,medium,1,male,240238
a,104,low,5,female,200200
b,105,high,2,male,240240
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows employee table on weka.

Expected Output:



EXPERIMENT NO: 2

Create a Weather Table with the help of Data Mining Tool WEKA.

Description:

We need to create a Weather table with training data set which includes attributes like outlook, temperature, humidity, windy, play.

Procedure:

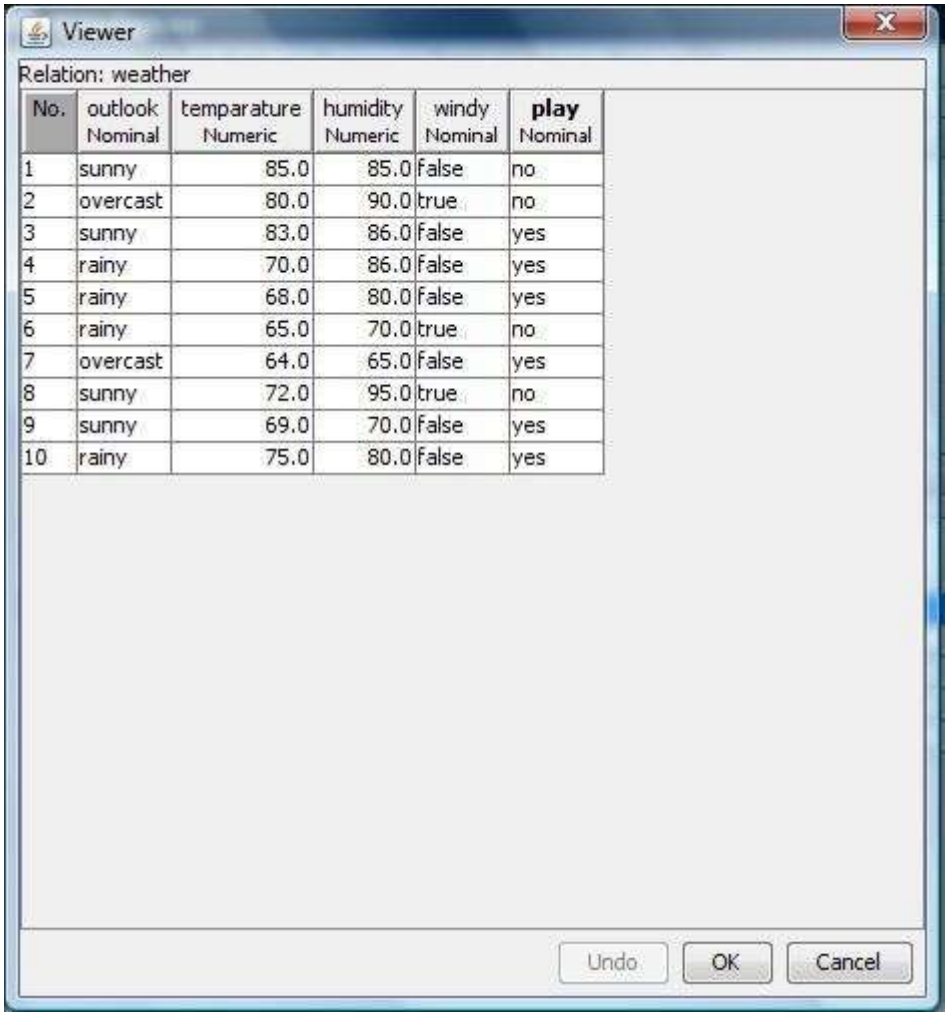
Steps:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Weather Table.

```
@relation weather
@attribute outlook {sunny,rainy,overcast}
@attribute temparature numeric
@attribute humidity numeric
@attribute windy {true,false}
@attribute play {yes,no}

@data
sunny,85.0,85.0,false,no
overcast,80.0,90.0,true,no
sunny,83.0,86.0,false,yes
rainy,70.0,86.0,false,yes
rainy,68.0,80.0,false,yes
rainy,65.0,70.0,true,no
overcast,64.0,65.0,false,yes
sunny,72.0,95.0,true,no
sunny,69.0,70.0,false,yes
rainy,75.0,80.0,false,yes
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows weather table on weka.

Expected Output:



EXPERIMENT NO: 3

Demonstration of preprocessing techniques to the training data set of Weather Table.

Description:

Real world databases are highly influenced to noise, missing and inconsistency .so the data can be pre-processed to improve the quality of data and missing results and it also improves the efficiency.

We demonstrate the following 3 pre-processing techniques :

1) Add
2) Remove
3) Normalization

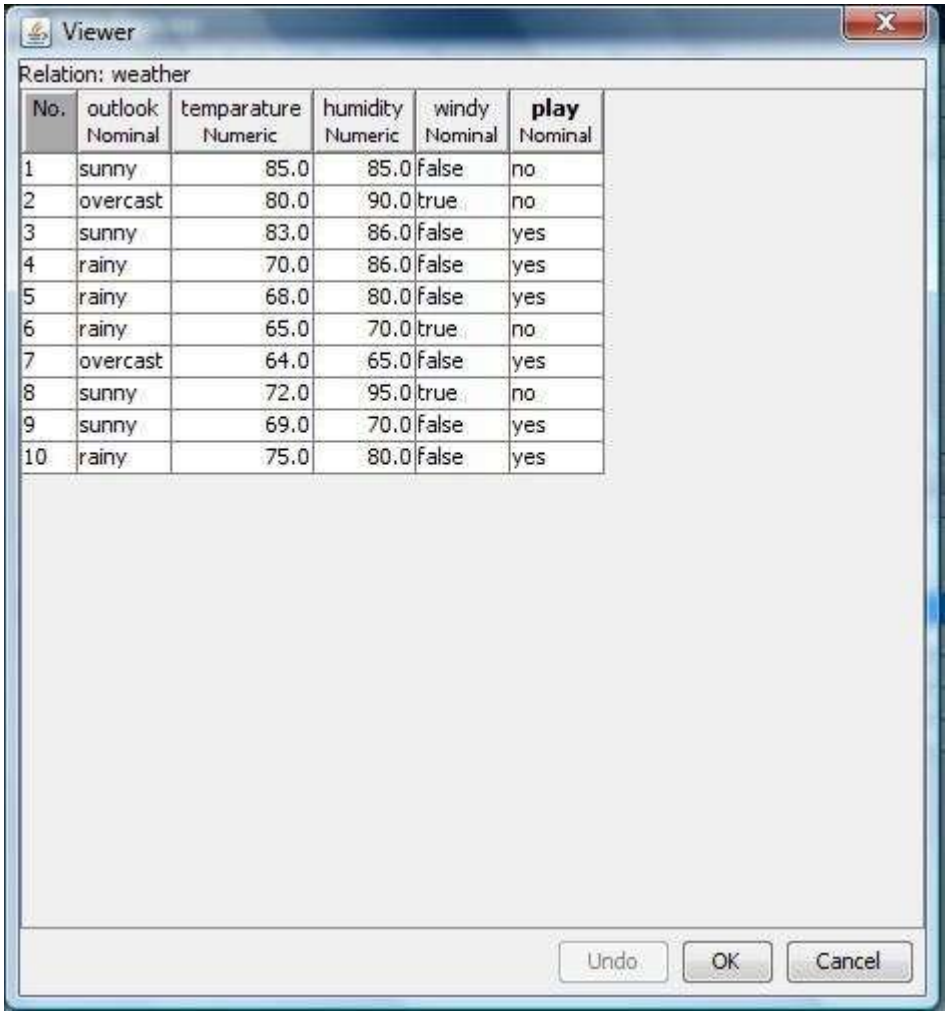
Creation of Weather Dataset:

Procedure:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Weather Table.

```
@relation weather
@attribute outlook {sunny,rainy,overcast}
@attribute temparature numeric
@attribute humidity numeric
@attribute windy {true,false}
@attribute play {yes,no}

@data
sunny,85.0,85.0,false,no
overcast,80.0,90.0,true,no
sunny,83.0,86.0,false,yes
rainy,70.0,86.0,false,yes
rainy,68.0,80.0,false,yes
rainy,65.0,70.0,true,no
overcast,64.0,65.0,false,yes
sunny,72.0,95.0,true,no
sunny,69.0,70.0,false,yes
rainy,75.0,80.0,false,yes
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows weather table on weka.



Add → Pre-Processing Technique:

Procedure:

1) Start → Programs → Weka-3.8

2) Click on **explorer.**

3) Click on **open file.**

4) Select **Weather.arff** file and click on open.

5) Click on **Choose button** and select the **Filters option**.

6) In Filters, we have **Supervised** and **Unsupervised data**.

7) Click on **Unsupervised data**.

8) Select the attribute **Add**.

9) A new window is opened.

10) In that we enter attribute index, type, data format, nominal label values for **Climate**.

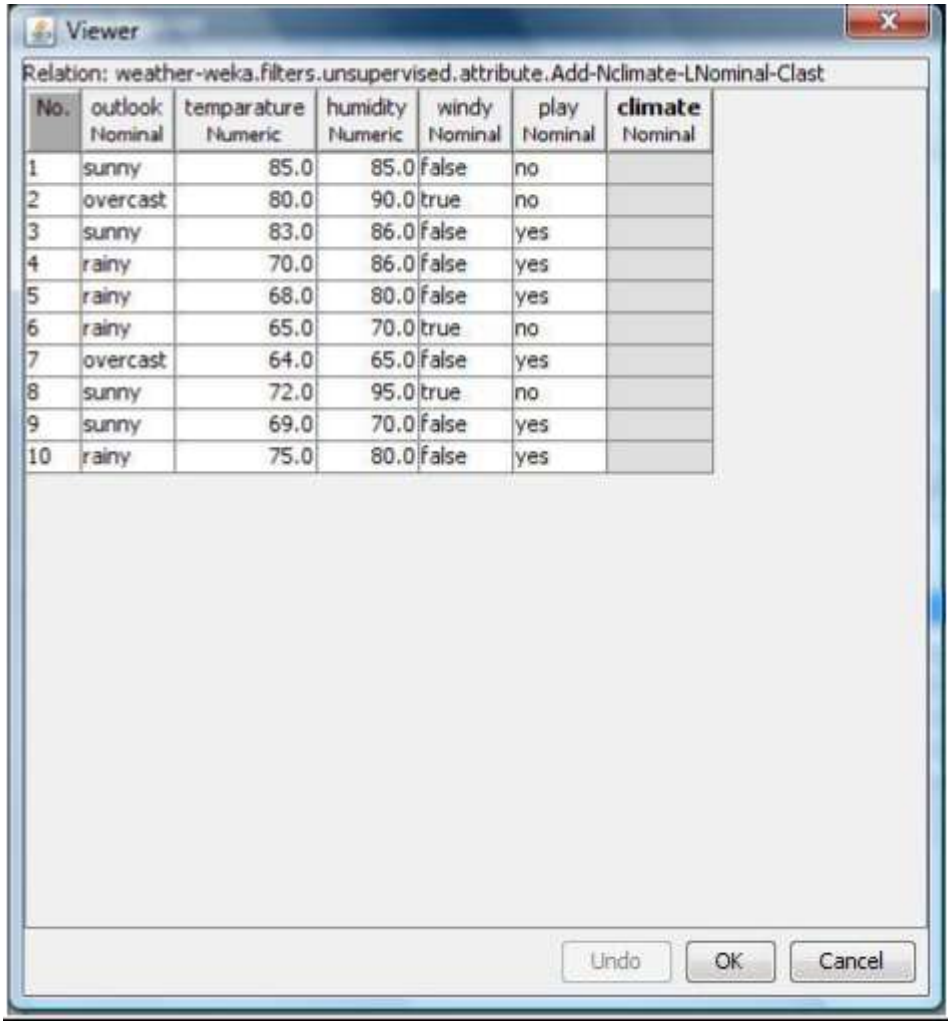
11) Click on **OK**.

12) Press the **Apply button**, then a new attribute is added to the Weather Table.

13) **Save** the file.

14) Click on the **Edit button**, it shows a new Weather Table on Weka.

Weather Table after adding new attribute CLIMATE:



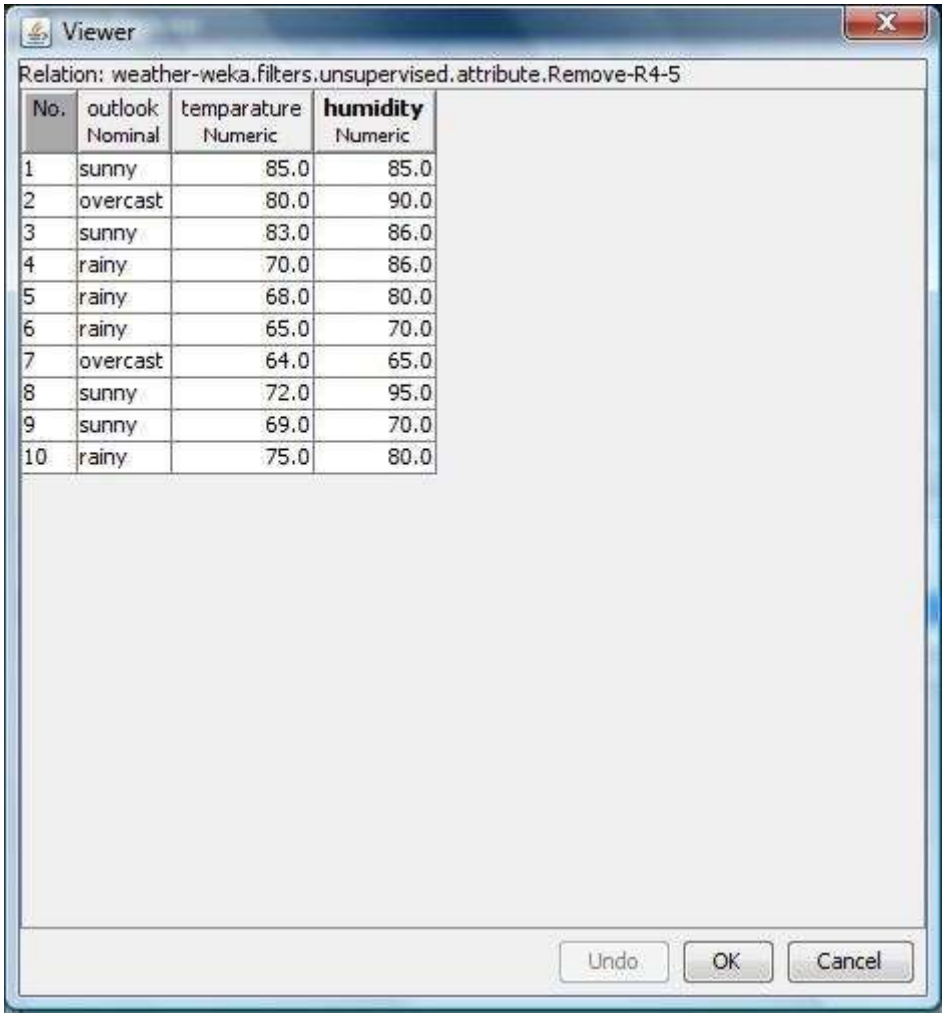
No.	outlook Nominal	temparature Numeric	humidity Numeric	windy Nominal	play Nominal	climate Nominal
1	sunny	85.0	85.0	false	no	
2	overcast	80.0	90.0	true	no	
3	sunny	83.0	86.0	false	yes	
4	rainy	70.0	86.0	false	yes	
5	rainy	68.0	80.0	false	yes	
6	rainy	65.0	70.0	true	no	
7	overcast	64.0	65.0	false	yes	
8	sunny	72.0	95.0	true	no	
9	sunny	69.0	70.0	false	yes	
10	rainy	75.0	80.0	false	yes	

Remove → Pre-Processing Technique:

Procedure:

1) Start → Programs → Weka-3.8
2) Click on **explorer.**
3) Click on **open file.**
4) Select **Weather.arff** file and click on open.
5) Click on **Choose button** and select the **Filters option**.
6) In Filters, we have **Supervised** and **Unsupervised data**.
7) Click on **Unsupervised data**.
8) Select the attribute **Remove**.
9) Select the attribute **Climate** to Remove.
10) Click **Remove button** and then **Save**.
11) Click on the **Edit button**, it shows a new Weather Table on Weka.

Weather Table after removing attributes WINDY, PLAY:



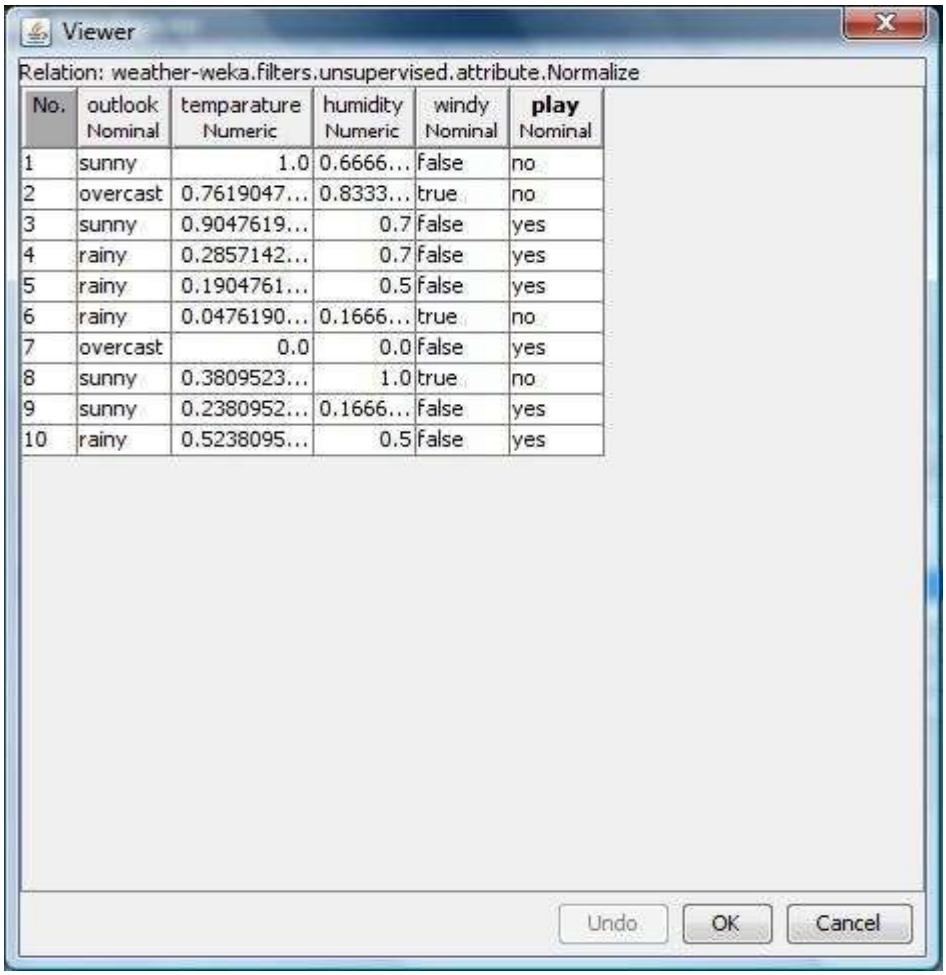
No.	outlook Nominal	temparature Numeric	**humidity** Numeric
1	sunny	85.0	85.0
2	overcast	80.0	90.0
3	sunny	83.0	86.0
4	rainy	70.0	86.0
5	rainy	68.0	80.0
6	rainy	65.0	70.0
7	overcast	64.0	65.0
8	sunny	72.0	95.0
9	sunny	69.0	70.0
10	rainy	75.0	80.0

Normalize → Pre-Processing Technique:

Procedure:

1) Start → Programs → Weka-3.8
2) Click on **explorer.**
3) Click on **open file.**
4) Select **Weather.arff** file and click on open.
5) Click on **Choose button** and select the **Filters option**.
6) In Filters, we have **Supervised** and **Unsupervised data**.
7) Click on **Unsupervised data**.
8) Select the attribute **Normalize**.
9) Select the attributes **temparature, humidity** to Normalize.
10) Click on **Apply button** and then **Save**.
11) Click on the **Edit button**, it shows a new Weather Table with normalized values on Weka.

Weather Table after Normalizing TEMPARATURE, HUMIDITY:



No.	outlook Nominal	temparature Numeric	humidity Numeric	windy Nominal	play Nominal
1	sunny	1.0	0.6666...	false	no
2	overcast	0.7619047...	0.8333...	true	no
3	sunny	0.9047619...	0.7	false	yes
4	rainy	0.2857142...	0.7	false	yes
5	rainy	0.1904761...	0.5	false	yes
6	rainy	0.0476190...	0.1666...	true	no
7	overcast	0.0	0.0	false	yes
8	sunny	0.3809523...	1.0	true	no
9	sunny	0.2380952...	0.1666...	false	yes
10	rainy	0.5238095...	0.5	false	yes

EXPERIMENT NO: 4

Normalize Weather Table data using Knowledge Flow.

Description:

The knowledge flow provides an alternative way to the explorer as a graphical front end to WEKA's algorithm. There are things that can be done in knowledge flow, but not in explorer. Knowledge flow presents a dataflow interface to WEKA. The user can select WEKA components from a toolbar, place them on a layout campus and connect them together in order to form a knowledge flow for processing and analyzing the data.

Creation of Weather Dataset:

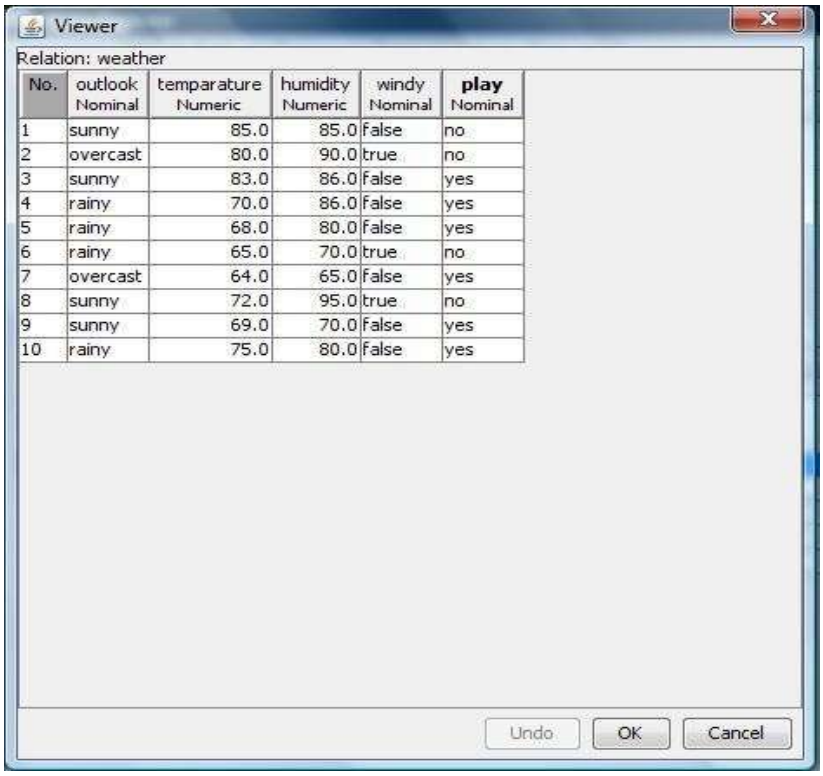
Procedure:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Weather Table.

```
@relation weather
@attribute outlook {sunny,rainy,overcast}
@attribute temparature numeric
@attribute humidity numeric
@attribute windy {true,false}
@attribute play {yes,no}

@data
sunny,85.0,85.0,false,no
overcast,80.0,90.0,true,no
sunny,83.0,86.0,false,yes
rainy,70.0,86.0,false,yes
rainy,68.0,80.0,false,yes
rainy,65.0,70.0,true,no
overcast,64.0,65.0,false,yes
sunny,72.0,95.0,true,no
sunny,69.0,70.0,false,yes
rainy,75.0,80.0,false,yes
```

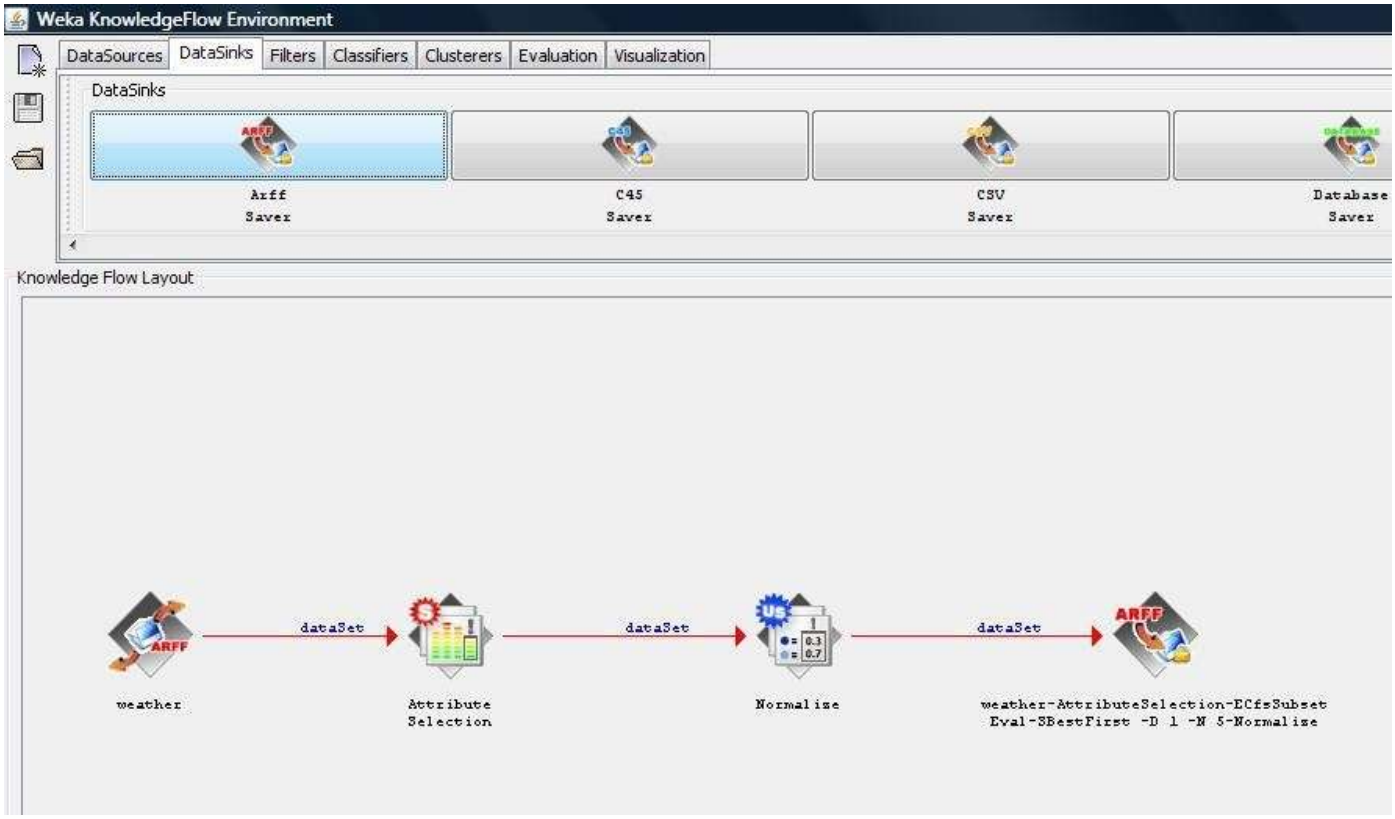
3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows Weather table on weka.

Weather Table in WEKA:



Procedure for Knowledge Flow:

1) Open Start → Programs → Weka-3.8
2) Open the **Knowledge Flow**.
3) Select the **Data Source component** and **add Arff Loader** into the **knowledge layout canvas**.
4) Select the **Filters component** and **add Attribute Selection** and N**ormalize** into the knowledge layout canvas.
5) Select the **Data Sinks** component and **add Arff Saver** into the knowledge layout canvas.
6) Right click on **Arff Loader** and select **Configure option** then the new window will be opened and select **Weather.arff**
7) Right click on **Arff Loader** and select **Dataset option** then establish a link between **Arff Loader** and A**ttribute Selection**.
8) Right click on **Attribute Selection** and select **Dataset option** then establish a link between **Attribute Selection** and **Normalize**.
9) Right click on **Attribute Selection** and select **Configure option** and choose the best attribute for Weather data.
10) Right click on **Normalize** and select **Dataset option** then establish a link between **Normalize** and **Arff Saver**.
11) Right click on **Arff Saver** and select **Configure option** then new window will be opened and set the path, enter **.arff** in look in dialog box to save normalize data.
12) click on **Start option** then everything will be executed one by one.
13) Check whether output is created or not by selecting the preferred path.


Weka KnowledgeFlow Environment
DataSources
DataSinks
Filters
Classifiers
Clusterers
Evaluation
Visualization
DataSinks
Arff Saver
C45 Saver
CSV Saver
Database Saver
Knowledge Flow Layout
dataSet
dataSet
dataSet
weather
Attribute Selection
Normalize
weather-AttributeSelection-ECfsSubsetEval-SBestFirst -D 1 -N 5-Normalize

EXPERIMENT NO: 5

Demonstrate Construction of Decision Tree for Weather data and classify it.

Description:

Classification & Prediction:

Classification is the process for finding a model that describes the data values and concepts for the purpose of Prediction.

Decision Tree:

A decision Tree is a classification scheme to generate a tree consisting of root node, internal nodes and external nodes.

Root nodes representing the attributes. Internal nodes are also the attributes. External nodes are the classes and each branch represents the values of the attributes

Decision Tree also contains set of rules for a given data set; there are two subsets in Decision Tree. One is a Training data set and second one is a Testing data set. Training data set is previously classified data. Testing data set is newly generated data.

Creation of Weather Table:

Procedure:

1) Open Start → Programs → Accessories → Notepad

2) Type the following training data set with the help of Notepad for Weather Table.

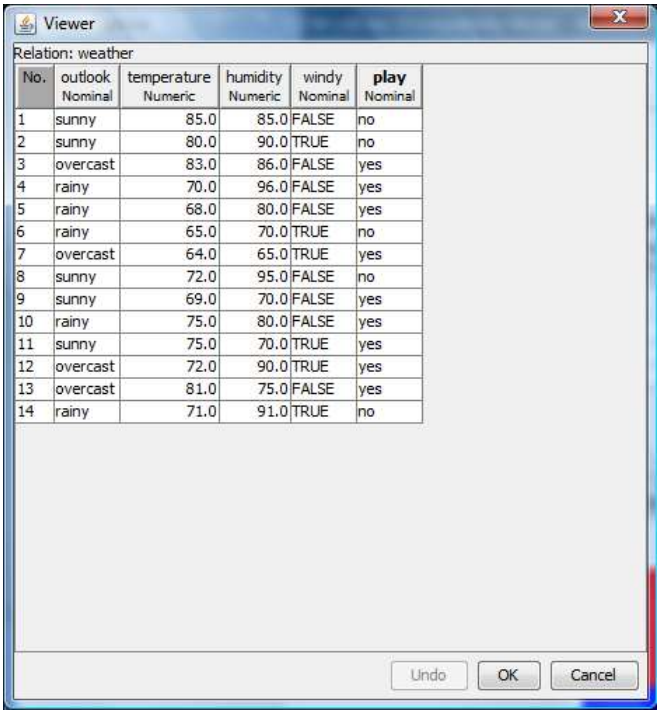
```
@relation weather
@attribute outlook {sunny, rainy, overcast}
@attribute temperature numeric
@attribute humidity numeric
@attribute windy {TRUE, FALSE}
@attribute play {yes, no}

@data
sunny,85,85,FALSE,no
sunny,80,90,TRUE,no
overcast,83,86,FALSE,yes
rainy,70,96,FALSE,yes
rainy,68,80,FALSE,yes
rainy,65,70,TRUE,no
overcast,64,65,TRUE,yes
sunny,72,95,FALSE,no
sunny,69,70,FALSE,yes
rainy,75,80,FALSE,yes
sunny,75,70,TRUE,yes
overcast,72,90,TRUE,yes
overcast,81,75,FALSE,yes
rainy,71,91,TRUE,no
```

3) After that the file is saved with **.arff** file format.

4) Minimize the arff file and then open Start → Programs → weka-3.8.

5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows weather table on weka.

Training Data Set → Weather Table

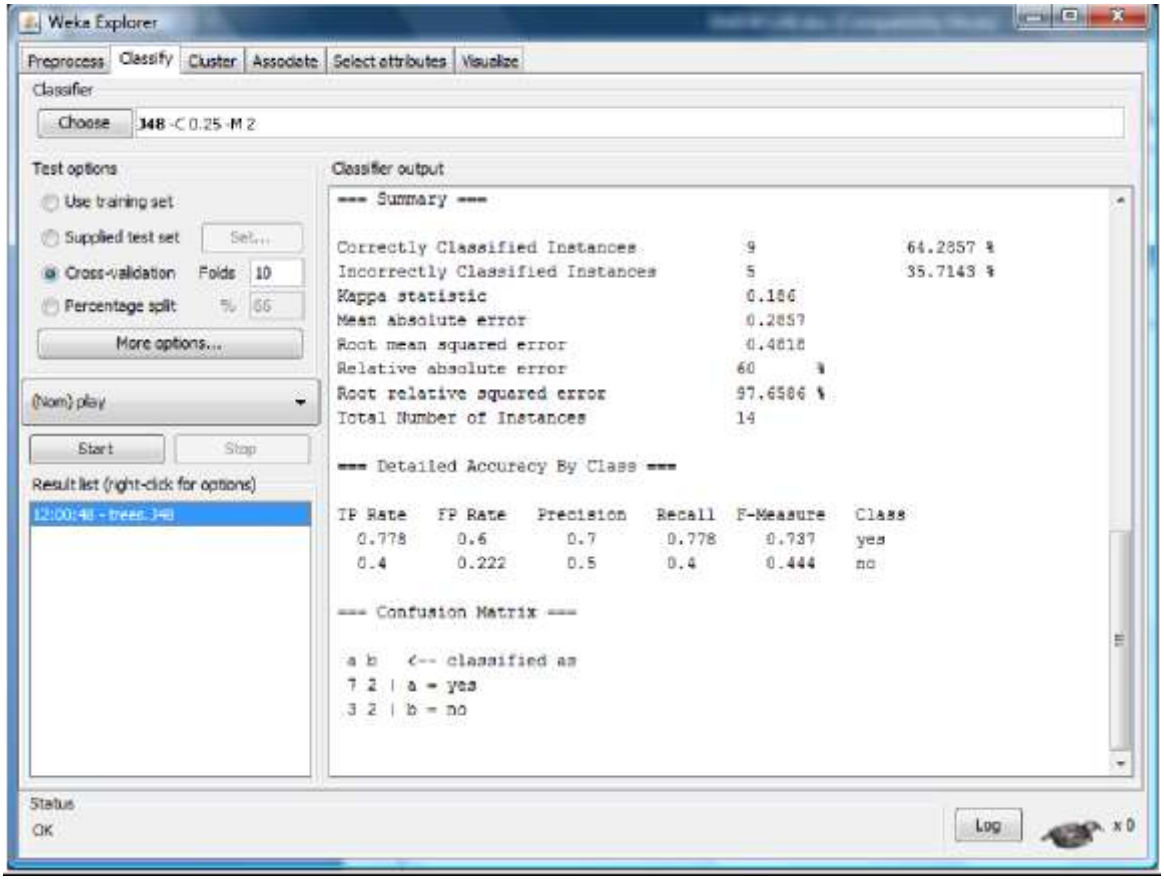


No.	outlook Nominal	temperature Numeric	humidity Numeric	windy Nominal	play Nominal
1	sunny	85.0	85.0	FALSE	no
2	sunny	80.0	90.0	TRUE	no
3	overcast	83.0	86.0	FALSE	yes
4	rainy	70.0	96.0	FALSE	yes
5	rainy	68.0	80.0	FALSE	yes
6	rainy	65.0	70.0	TRUE	no
7	overcast	64.0	65.0	TRUE	yes
8	sunny	72.0	95.0	FALSE	no
9	sunny	69.0	70.0	FALSE	yes
10	rainy	75.0	80.0	FALSE	yes
11	sunny	75.0	70.0	TRUE	yes
12	overcast	72.0	90.0	TRUE	yes
13	overcast	81.0	75.0	FALSE	yes
14	rainy	71.0	91.0	TRUE	no

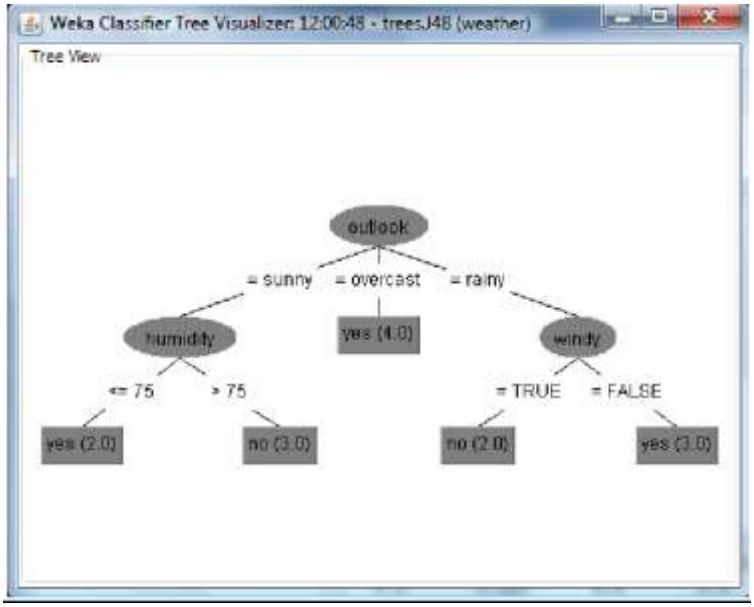
Procedure for Decision Trees:

1) Open Start → Programs → Weka-3.8
2) Open **explorer**.
3) Click on **open file** and select **weather.arff**
4) Select **Classifier option** on the top of the Menu bar.
5) Select **Choose button** and click on **Tree option**.
6) Click on **J48.**
7) Click on **Start button** and output will be displayed on the **right side** of the window.
8) Select the **result list** and **right click** on result list and select **Visualize Tree option**.
9) Then **Decision Tree** will be displayed on **new window**.

Output:



Decision Tree:



EXPERIMENT NO: 6

Write a procedure for Visualization for Weather Table.

Description:

Data visualization is the process of displaying data/information in graphical charts, figures and bars. It is used as means to deliver visual reporting to users for the performance, operations or general statistics of an application, network, hardware or virtually any IT asset. The Visualization can be shown in a 2-D representation.

Creation of Weather Table:

Procedure:

1) Open Start → Programs → Accessories → Notepad

2) Type the following training data set with the help of Notepad for Weather Table.

```
@relation weather
@attribute outlook {sunny, rainy, overcast}
@attribute temperature numeric
@attribute humidity numeric
@attribute windy {TRUE, FALSE}
@attribute play {yes, no}

@data
sunny,85,85,FALSE,no
sunny,80,90,TRUE,no
overcast,83,86,FALSE,yes
rainy,70,96,FALSE,yes
rainy,68,80,FALSE,yes
rainy,65,70,TRUE,no
overcast,64,65,TRUE,yes
sunny,72,95,FALSE,no
sunny,69,70,FALSE,yes
rainy,75,80,FALSE,yes
sunny,75,70,TRUE,yes
overcast,72,90,TRUE,yes
overcast,81,75,FALSE,yes
rainy,71,91,TRUE,no
```

3) After that the file is saved with **.arff** file format.

4) Minimize the arff file and then open Start → Programs → weka-3.8.

5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.

6) In that dialog box there are four modes, click on **explorer**.

7) Explorer shows many options. In that click on **'open file'** and select the arff file

8) Click on **edit button** which shows weather table on weka.

Training Data Set → Weather Table

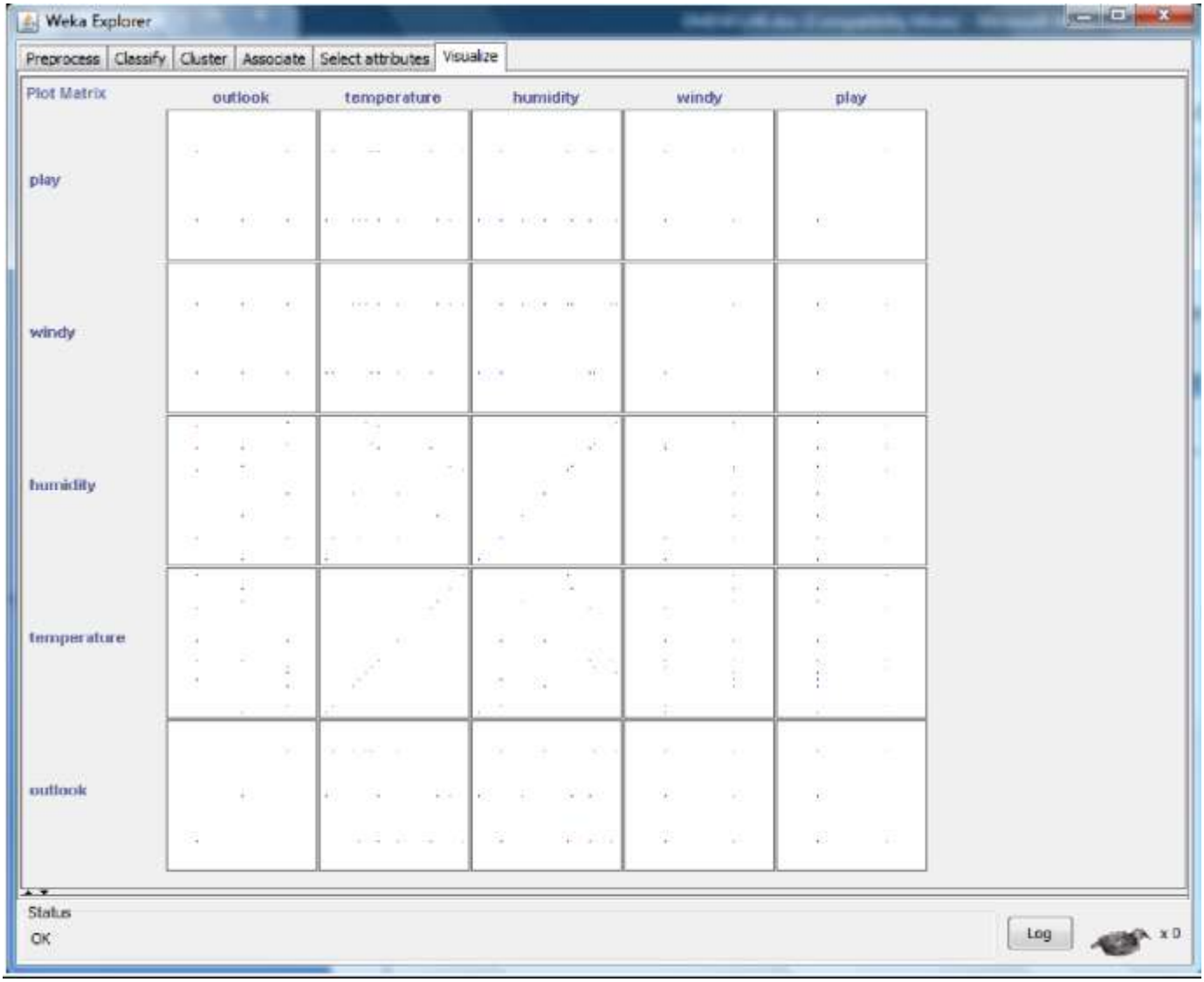
Viewer

Relation: weather

No.	outlook Nominal	temperature Numeric	humidity Numeric	windy Nominal	play Nominal
1	sunny	85.0	85.0	FALSE	no
2	sunny	80.0	90.0	TRUE	no
3	overcast	83.0	86.0	FALSE	yes
4	rainy	70.0	96.0	FALSE	yes
5	rainy	68.0	80.0	FALSE	yes
6	rainy	65.0	70.0	TRUE	no
7	overcast	64.0	65.0	TRUE	yes
8	sunny	72.0	95.0	FALSE	no
9	sunny	69.0	70.0	FALSE	yes
10	rainy	75.0	80.0	FALSE	yes
11	sunny	75.0	70.0	TRUE	yes
12	overcast	72.0	90.0	TRUE	yes
13	overcast	81.0	75.0	FALSE	yes
14	rainy	71.0	91.0	TRUE	no

Undo OK Cancel

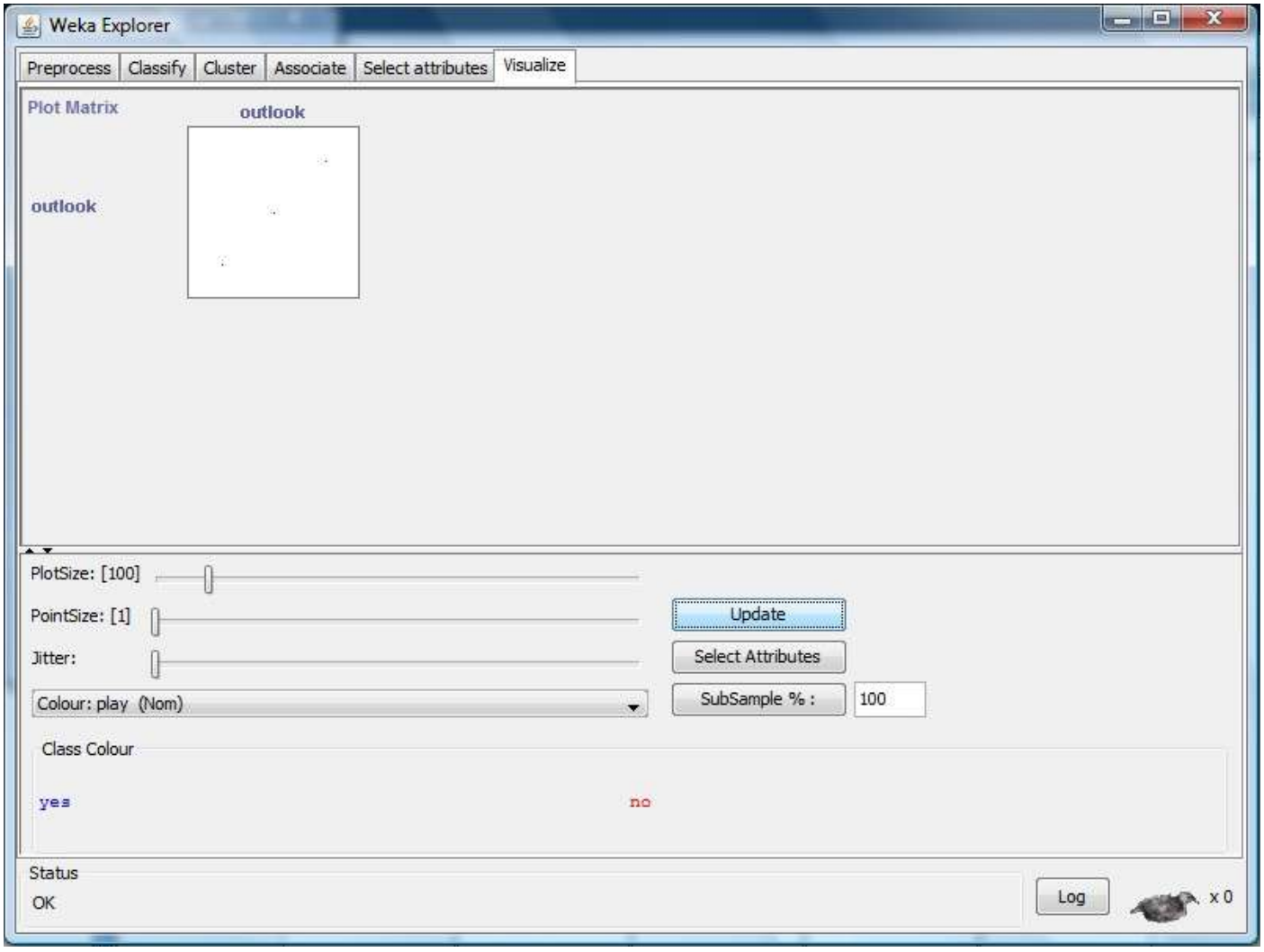
Plot Matrix:



Procedure:

1) Open Start → Programs → Weka-3.8 → Weka-3.8
2) Open the explorer and click on **Preprocess**, then a new window will appear. In that window select **weather.arff** file then the data will be displayed.
3) After that click on the **Visualize tab** on the top of the Menu bar.
4) When we select **Visualize tab** then **Plot Matrix** is displayed on the screen.

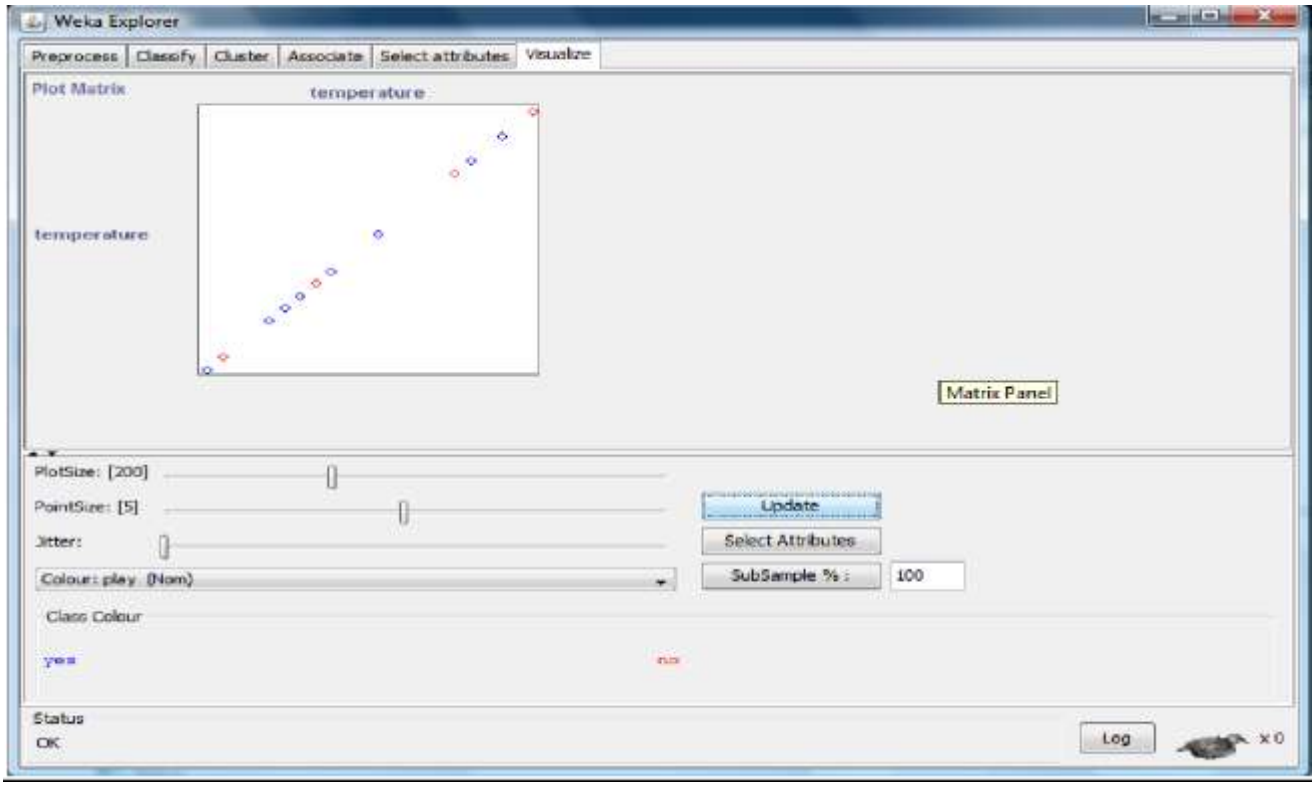
Output:



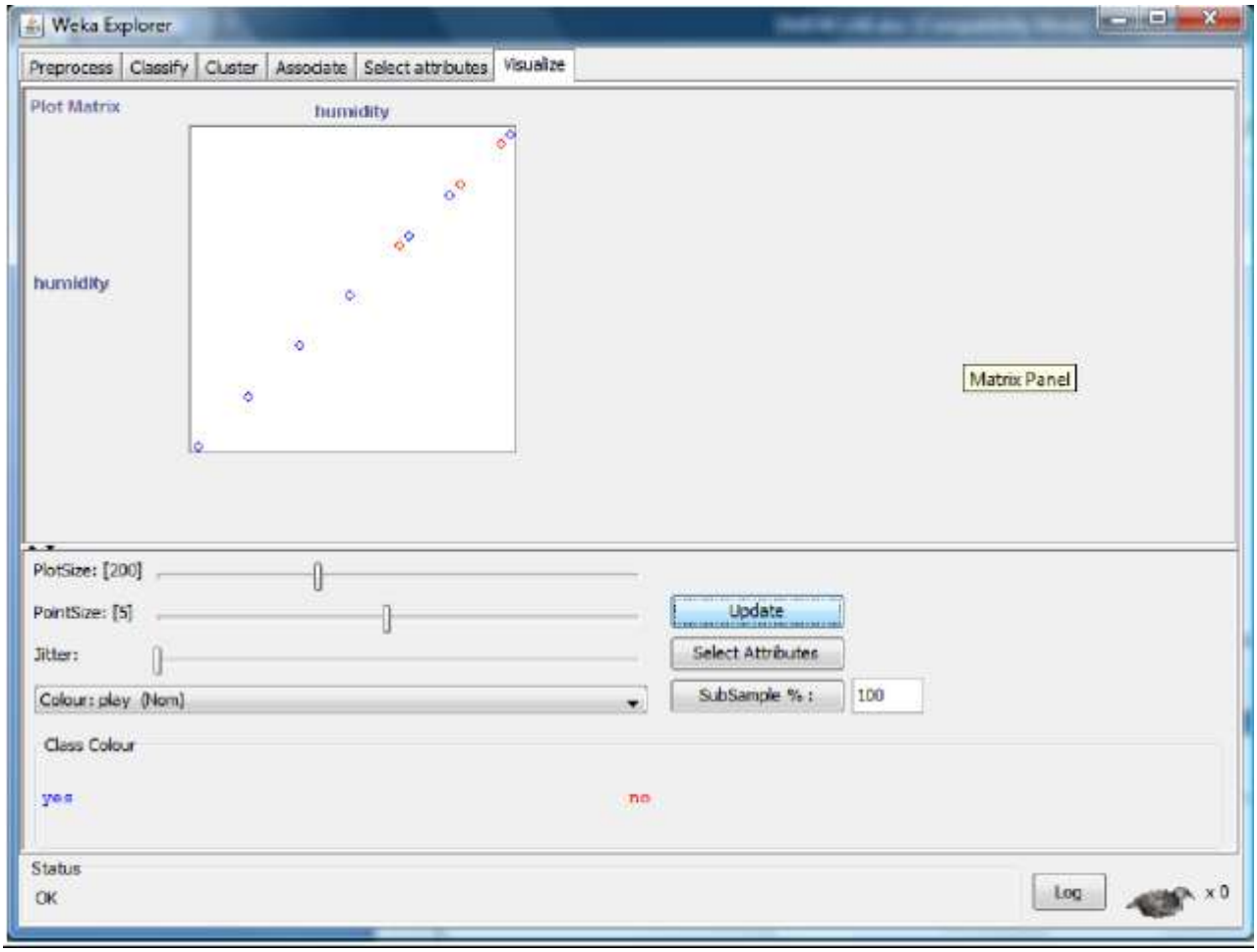
5) After that we select the **Select Attribute button**, then select **Outlook attribute** and click OK.
6) Click on the **Update button** to display the output.
7) After that select the **Select Attribute button** and select **Temperature attribute** and then click OK.
8) **Increase** the **Plot Size** and **Point Size**.
9) Click on the **Update button** to display the output.
10) After that we select the **Select Attribute button**, then select **Humidity attribute** and click OK.
11) Click on the **Update button** to display the output.
12) After that select the **Select Attribute button** and select **Windy attribute** and then click OK.
13) **Increase** the **Jitter Size**.
14) Click on the **Update button** to display the output.
15) After that we select the **Select Attribute button**, then select **Play attribute** and click OK.

16) Click on the **Update button** to display the output.

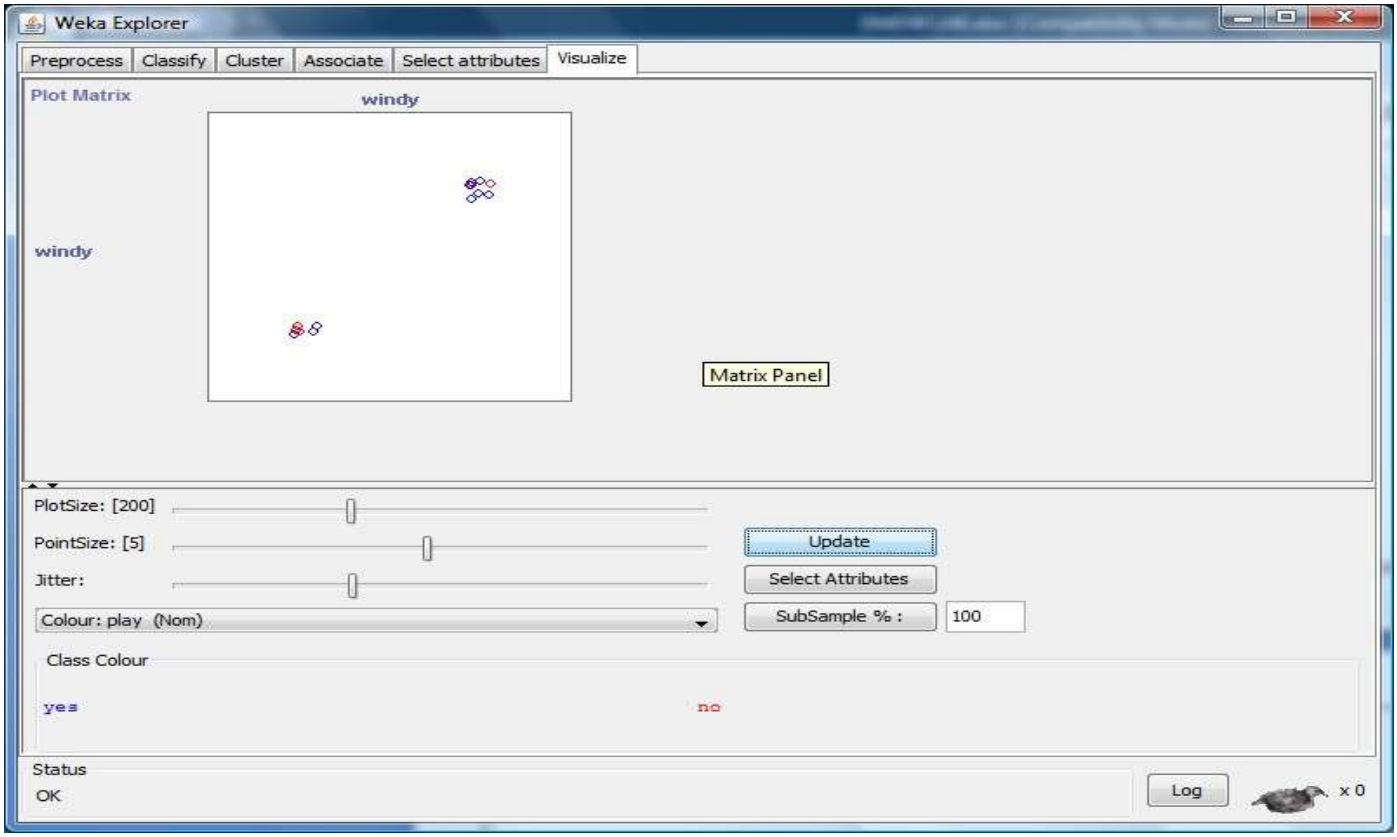
Output:



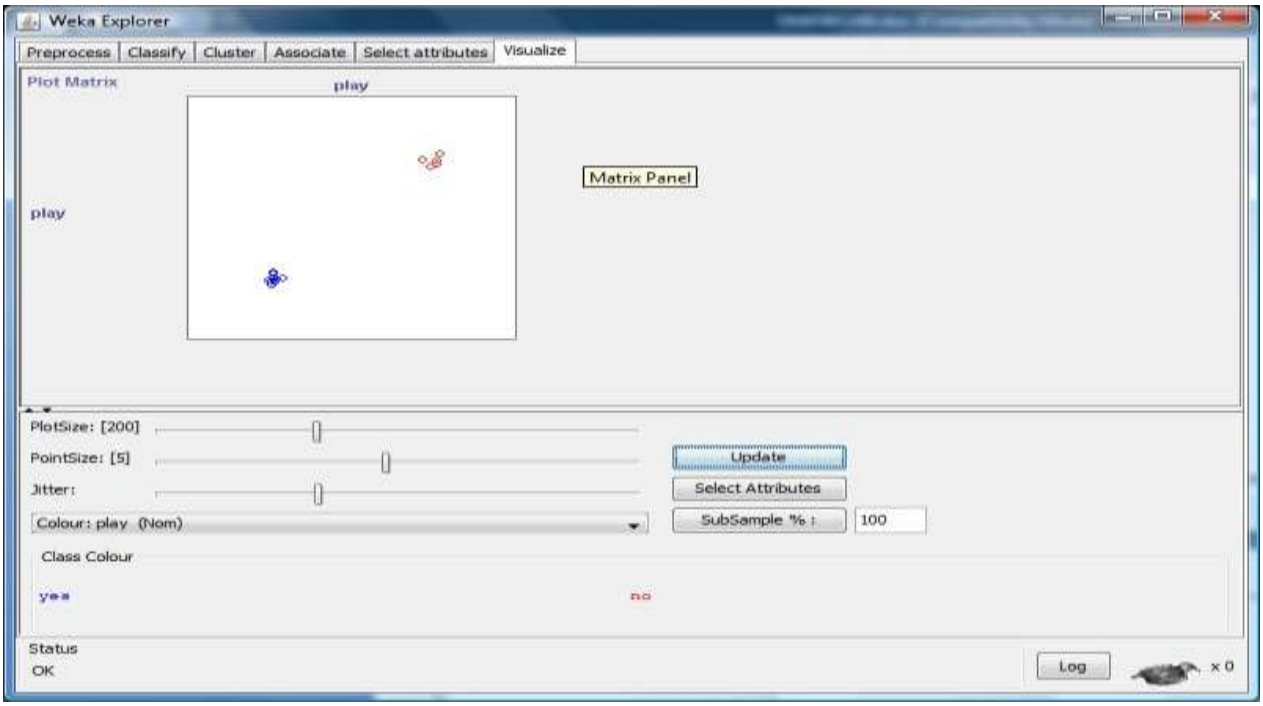
Output:



Output:



Output:



EXPERIMENT NO:7

Program to find Association Rules for Buying data.

Description:

In data mining, **association rule learning** is a popular and well researched method for discovering interesting relations between variables in large databases. It can be described as analyzing and presenting strong rules discovered in databases using different measures of interestingness. In market basket analysis association rules are used and they are also employed in many application areas including Web usage mining, intrusion detection and bioinformatics.

Creation of Buying Dataset:

Procedure:

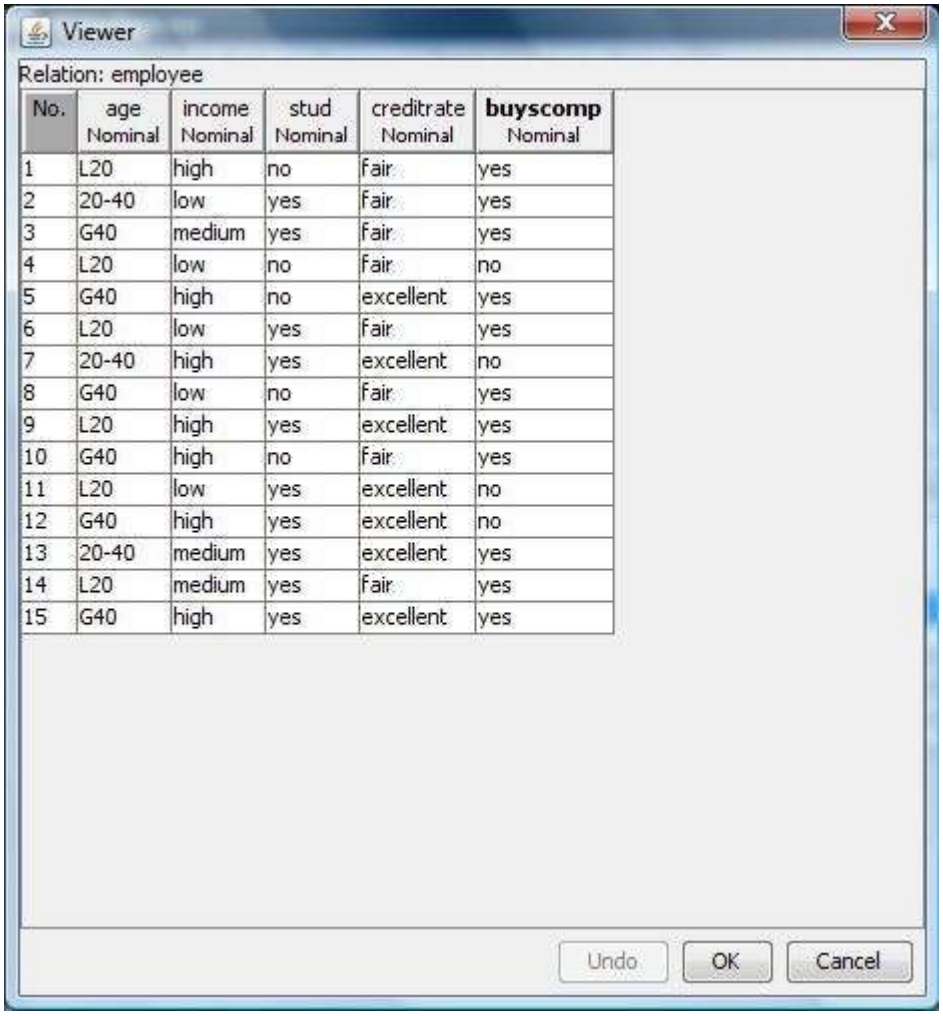
1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Buying Table.

```
@relation buying
@attribute age {L20,20-40,G40}
@attribute income {high,medium,low}
@attribute stud {yes,no}
@attribute creditrate {fair,excellent}
@attribute buyscomp {yes,no}
@data
L20,high,no,fair,yes
20-40,low,yes,fair,yes
G40,medium,yes,fair,yes
L20,low,no,fair,no
G40,high,no,excellent,yes
L20,low,yes,fair,yes
20-40,high,yes,excellent,no
G40,low,no,fair,yes
L20,high,yes,excellent,yes
G40,high,no,fair,yes
L20,low,yes,excellent,no
G40,high,yes,excellent,no
20-40,medium,yes,excellent,yes
L20,medium,yes,fair,yes
G40,high,yes,excellent,yes
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows buying table on weka.

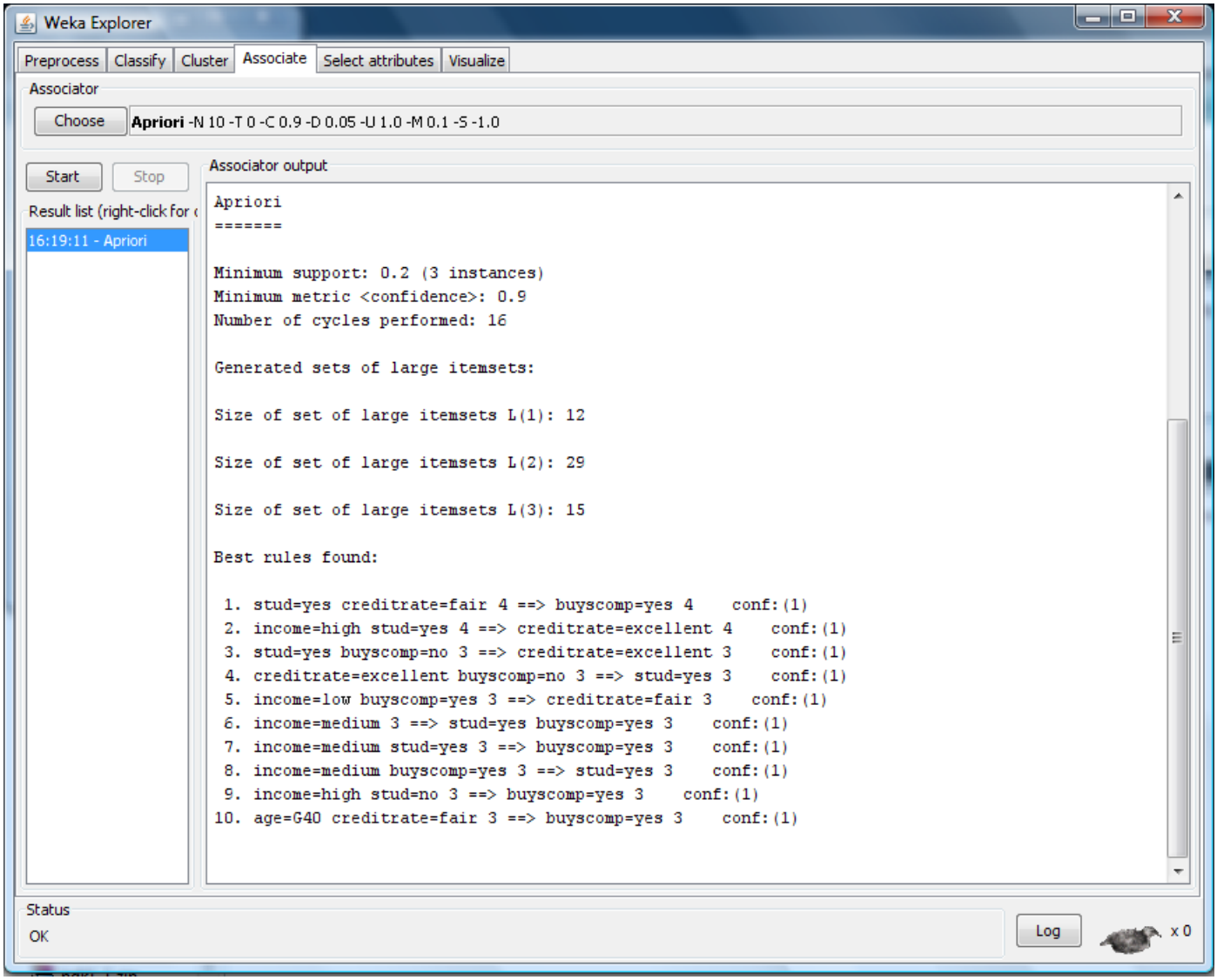
Output:

Data Set → Buying Table



Procedure for Association Rules:

1) Open Start → Programs → Weka-3.8 → Weka-3.8
2) Open **explorer**.
3) Click on **open file** and select **buying.arff**
4) Select **Associate option** on the top of the Menu bar.
5) Select **Choose button** and then click on **Apriori Algorithm**.
6) Click on **Start button** and output will be displayed on the **right side** of the window.


Weka Explorer
Preprocess
Classify
Cluster
Associate
Select attributes
Visualize
Associator
Choose
Apriori -N 10 -T 0 -C 0.9 -D 0.05 -U 1.0 -M 0.1 -S -1.0
Start
Stop
Result list (right-click for
16:19:11 - Apriori
Associator output
Apriori
=======
Minimum support: 0.2 (3 instances)
Minimum metric <confidence>: 0.9
Number of cycles performed: 16
Generated sets of large itemsets:
Size of set of large itemsets L(1): 12
Size of set of large itemsets L(2): 29
Size of set of large itemsets L(3): 15
Best rules found:
1. stud=yes creditrate=fair 4 ==> buyscomp=yes 4 conf:(1)
2. income=high stud=yes 4 ==> creditrate=excellent 4 conf:(1)
3. stud=yes buyscomp=no 3 ==> creditrate=excellent 3 conf:(1)
4. creditrate=excellent buyscomp=no 3 ==> stud=yes 3 conf:(1)
5. income=low buyscomp=yes 3 ==> creditrate=fair 3 conf:(1)
6. income=medium 3 ==> stud=yes buyscomp=yes 3 conf:(1)
7. income=medium stud=yes 3 ==> buyscomp=yes 3 conf:(1)
8. income=medium buyscomp=yes 3 ==> stud=yes 3 conf:(1)
9. income=high stud=no 3 ==> buyscomp=yes 3 conf:(1)
10. age=G40 creditrate=fair 3 ==> buyscomp=yes 3 conf:(1)
Status
OK
Log
x 0

EXPERIMENT NO:8

Program to find Association Rules for Banking data.

Description:

In data mining, **association rule learning** is a popular and well researched method for discovering interesting relations between variables in large databases. It can be described as analyzing and presenting strong rules discovered in databases using different measures of interestingness. In market basket analysis association rules are used and they are also employed in many application areas including Web usage mining, intrusion detection and bioinformatics.

Creation of Banking Table:

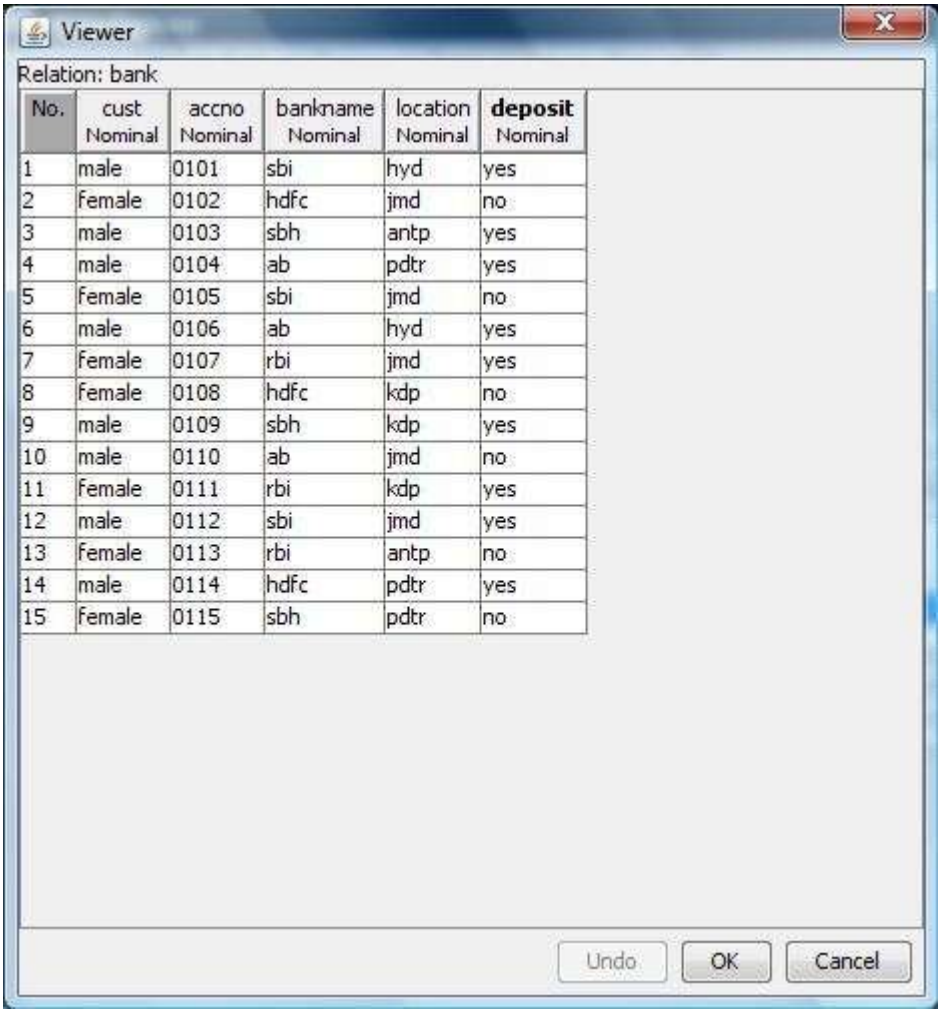
Procedure:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Banking Table.

```
@relation bank
@attribute cust {male,female}
@attribute accno
{0101,0102,0103,0104,0105,0106,0107,0108,0109,0110,0111,0112,0113,0114,0115}
@attribute bankname {sbi,hdfc,sbh,ab,rbi}
@attribute location {hyd,jmd,antp,pdtr,kdp}
@attribute deposit {yes,no}
@data
male,0101,sbi,hyd,yes
female,0102,hdfc,jmd,no
male,0103,sbh,antp,yes
male,0104,ab,pdtr,yes
female,0105,sbi,jmd,no
male,0106,ab,hyd,yes
female,0107,rbi,jmd,yes
female,0108,hdfc,kdp,no
male,0109,sbh,kdp,yes
male,0110,ab,jmd,no
female,0111,rbi,kdp,yes
male,0112,sbi,jmd,yes
female,0113,rbi,antp,no
male,0114,hdfc,pdtr,yes
female,0115,sbh,pdtr,no
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows banking table on weka.

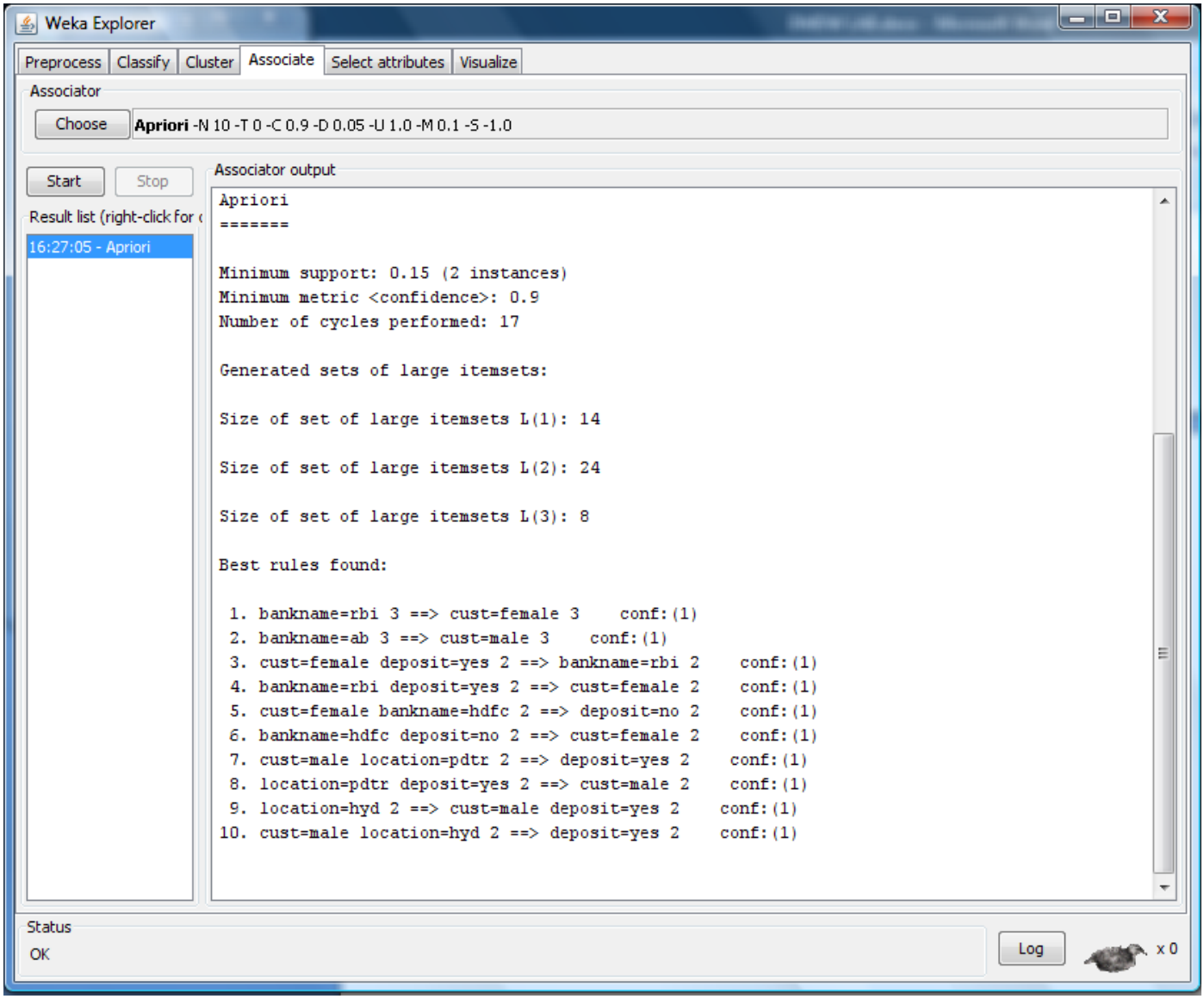
Training Data Set → Banking Table



Procedure for Association Rules:

1) Open Start → Programs → Weka-3.8 → Weka-3.8
2) Open **explorer**.
3) Click on **open file** and select **bank.arff**
4) Select **Associate option** on the top of the Menu bar.
5) Select **Choose button** and then click on **Apriori Algorithm**.
6) Click on **Start button** and output will be displayed on the **right side** of the window.

Output:


Weka Explorer
Preprocess
Classify
Cluster
Associate
Select attributes
Visualize
Associator
Choose
Apriori -N 10 -T 0 -C 0.9 -D 0.05 -U 1.0 -M 0.1 -S -1.0
Start
Stop
Result list (right-click for
16:27:05 - Apriori
Associator output
Apriori
=======
Minimum support: 0.15 (2 instances)
Minimum metric <confidence>: 0.9
Number of cycles performed: 17
Generated sets of large itemsets:
Size of set of large itemsets L(1): 14
Size of set of large itemsets L(2): 24
Size of set of large itemsets L(3): 8
Best rules found:
1. bankname=rbi 3 ==> cust=female 3 conf:(1)
2. bankname=ab 3 ==> cust=male 3 conf:(1)
3. cust=female deposit=yes 2 ==> bankname=rbi 2 conf:(1)
4. bankname=rbi deposit=yes 2 ==> cust=female 2 conf:(1)
5. cust=female bankname=hdfc 2 ==> deposit=no 2 conf:(1)
6. bankname=hdfc deposit=no 2 ==> cust=female 2 conf:(1)
7. cust=male location=pdtr 2 ==> deposit=yes 2 conf:(1)
8. location=pdtr deposit=yes 2 ==> cust=male 2 conf:(1)
9. location=hyd 2 ==> cust=male deposit=yes 2 conf:(1)
10. cust=male location=hyd 2 ==> deposit=yes 2 conf:(1)
Status
OK
Log
x 0

EXPERIMENT NO:9

Aim: Write a procedure for Clustering Customer data using Simple KMeans Algorithm.

Description:

Cluster analysis or **clustering** is the task of assigning a set of objects into groups (called **clusters**) so that the objects in the same cluster are more similar (in some sense or another) to each other than to those in other clusters. Clustering is a main task of explorative data mining, and a common technique for statistical data analysis used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, and bioinformatics.

Creation of Customer Table:

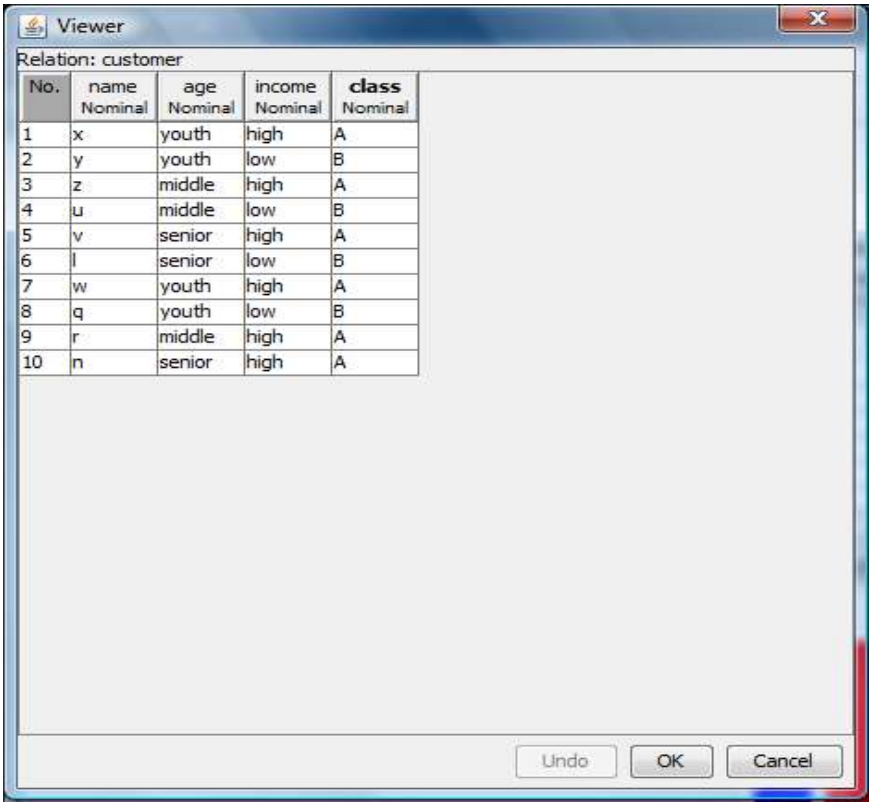
Procedure:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for customer.

```
@relation customer
@attribute name {x,y,z,u,v,l,w,q,r,n}
@attribute age {youth,middle,senior}
@attribute income {high,medium,low}
@attribute class {A,B}

@data
x,youth,high,A
y,youth,low,B
z,middle,high,A
u,middle,low,B
v,senior,high,A
l,senior,low,B
w,youth,high,A
q,youth,low,B
r,middle,high,A
n,senior,high,A
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows buying table on weka.

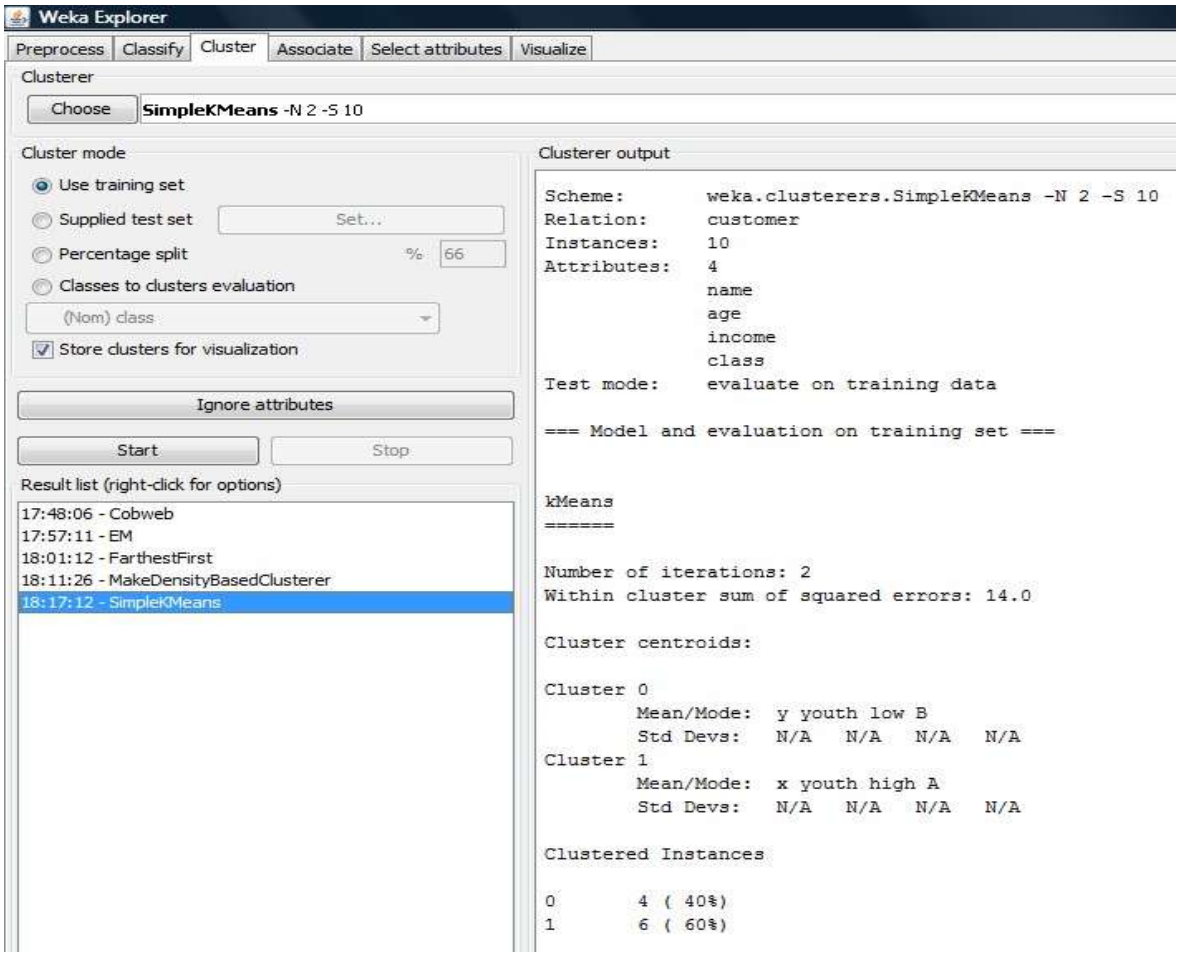
Training Data Set → Customer Table



Procedure:

1) Click **Start** -> **Programs** -> **Weka 3.4**
2) Click on **Explorer**.
3) Click on **open file** & then select **Customer.arff** file.
4) Click on **Cluster menu**. In this there are different algorithms are there.
5) Click on **Choose button** and then select **SimpleKMeans** algorithm.
6) Click on **Start button** and then **output** will be displayed on the screen.

Output:


Weka Explorer
Preprocess
Classify
Cluster
Associate
Select attributes
Visualize
Clusterer
Choose
SimpleKMeans -N 2 -S 10
Cluster mode
Use training set
Supplied test set
Set...
Percentage split
%
66
Classes to clusters evaluation
(Nom) class
Store clusters for visualization
Ignore attributes
Start
Stop
Result list (right-click for options)
17:48:06 - Cobweb
17:57:11 - EM
18:01:12 - FarthestFirst
18:11:26 - MakeDensityBasedClusterer
18:17:12 - SimpleKMeans
Clusterer output
Scheme: weka.clusterers.SimpleKMeans -N 2 -S 10
Relation: customer
Instances: 10
Attributes: 4
name
age
income
class
Test mode: evaluate on training data
=== Model and evaluation on training set ===
kMeans
======
Number of iterations: 2
Within cluster sum of squared errors: 14.0
Cluster centroids:
Cluster 0
Mean/Mode: y youth low B
Std Devs: N/A N/A N/A N/A
Cluster 1
Mean/Mode: x youth high A
Std Devs: N/A N/A N/A N/A
Clustered Instances
0 4 (40%)
1 6 (60%)

EXPERIMENT NO:10

Aim: Write a procedure for Employee data using Make Density Based Cluster Algorithm.

Description:

Cluster analysis or **clustering** is the task of assigning a set of objects into groups (called **clusters**) so that the objects in the same cluster are more similar (in some sense or another) to each other than to those in other clusters. Clustering is a main task of explorative data mining, and a common technique for statistical data analysis used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, and bioinformatics.

Creation of Employee Table:

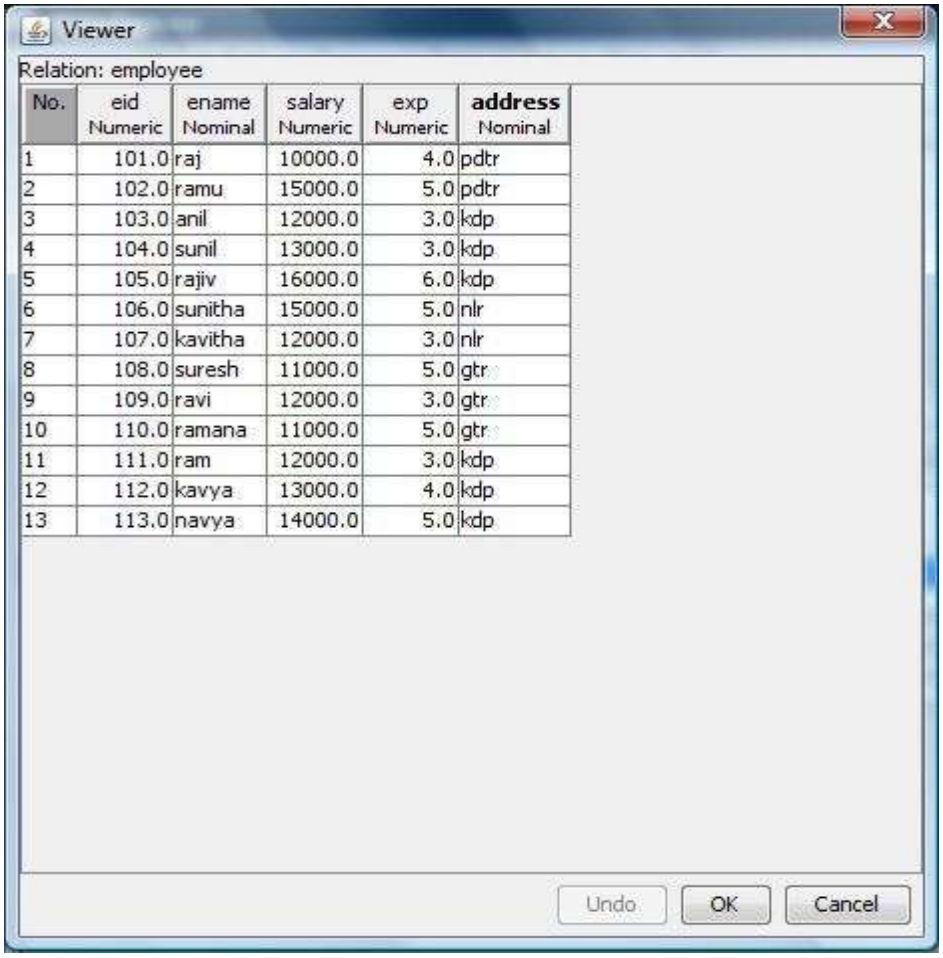
Procedure:

1) Open Start → Programs → Accessories → Notepad
2) Type the following training data set with the help of Notepad for Employee Table.

```
@relation employee
@attribute eid numeric
@attribute ename {raj,ramu,anil,sunil,rajiv,sunitha,kavitha,suresh,ravi,ramana,ram,kavya,navya}
@attribute salary numeric
@attribute exp numeric
@attribute address {pdtr,kdp,nlr,gtr}

@data
101,raj,10000,4,pdtr
102,ramu,15000,5,pdtr
103,anil,12000,3,kdp
104,sunil,13000,3,kdp
105,rajiv,16000,6,kdp
106,sunitha,15000,5,nlr
107,kavitha,12000,3,nlr
108,suresh,11000,5,gtr
109,ravi,12000,3,gtr
110,ramana,11000,5,gtr
111,ram,12000,3,kdp
112,kavya,13000,4,kdp
113,navya,14000,5,kdp
```

3) After that the file is saved with **.arff** file format.
4) Minimize the arff file and then open Start → Programs → weka-3.8.
5) Click on **weka-3.8**, then Weka dialog box is displayed on the screen.
6) In that dialog box there are four modes, click on **explorer**.
7) Explorer shows many options. In that click on **'open file'** and select the arff file
8) Click on **edit button** which shows employee table on weka.

Training Data Set → Employee Table



Procedure:

2) Click **Start** -> **Programs** -> **Weka 3.8**

3) Click on **Explorer**.

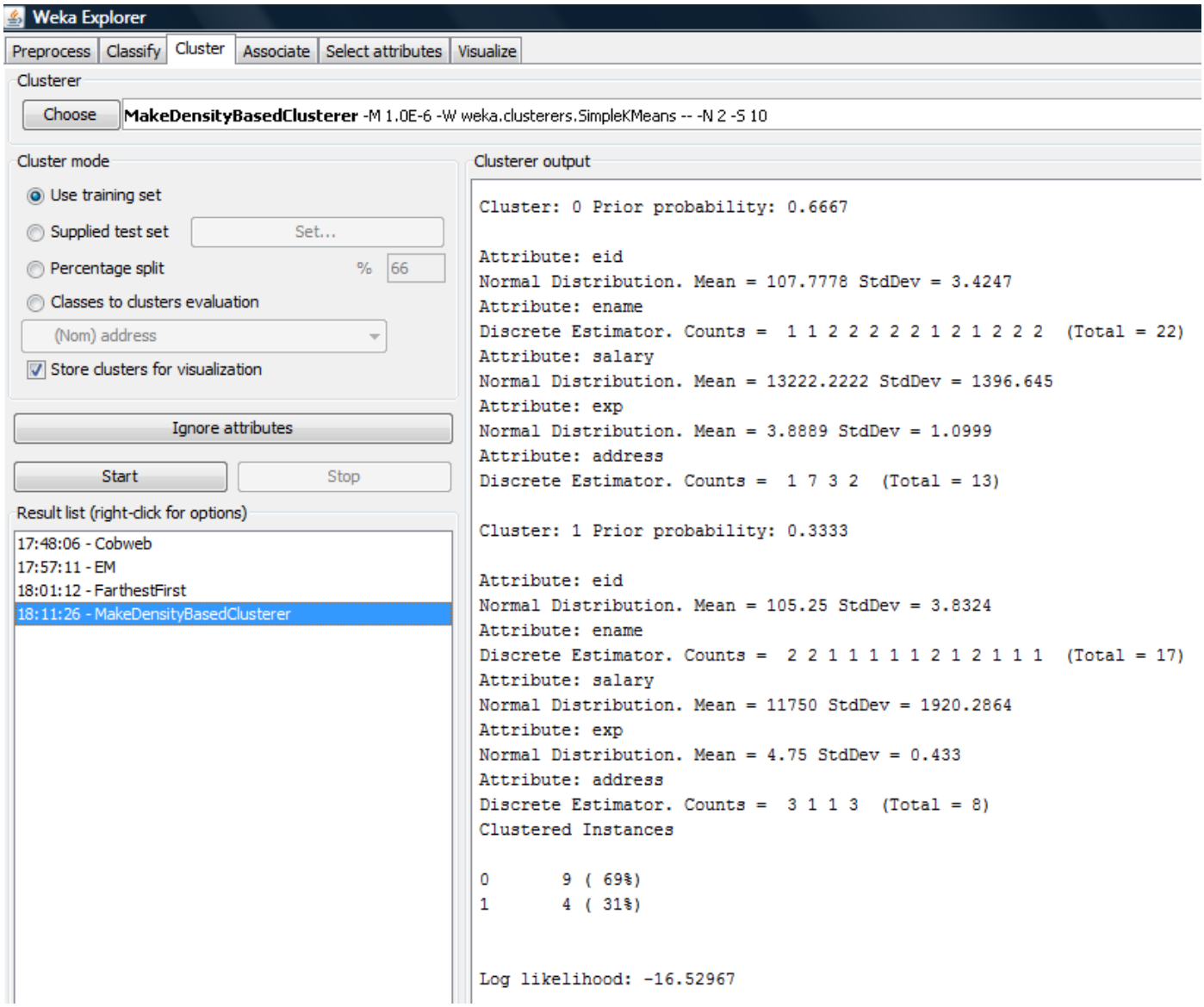
4) Click on **open file** & then select **Employee.arff** file.

5) Click on **Cluster menu**. In this there are different algorithms are there.

6) Click on **Choose button** and then select **MakeDensityBasedClusterer** algorithm.

7) Click on **Start button** and then **output** will be displayed on the screen.

Output:


Weka Explorer
Preprocess
Classify
Cluster
Associate
Select attributes
Visualize
Clusterer
Choose
MakeDensityBasedClusterer -M 1.0E-6 -W weka.clusterers.SimpleKMeans -- -N 2 -S 10
Cluster mode
Use training set
Supplied test set
Set...
Percentage split
% 66
Classes to clusters evaluation
(Nom) address
Store clusters for visualization
Ignore attributes
Start
Stop
Result list (right-click for options)
17:48:06 - Cobweb
17:57:11 - EM
18:01:12 - FarthestFirst
18:11:26 - MakeDensityBasedClusterer
Clusterer output
Cluster: 0 Prior probability: 0.6667
Attribute: eid
Normal Distribution. Mean = 107.7778 StdDev = 3.4247
Attribute: ename
Discrete Estimator. Counts = 1 1 2 2 2 2 2 1 2 1 2 2 2 (Total = 22)
Attribute: salary
Normal Distribution. Mean = 13222.2222 StdDev = 1396.645
Attribute: exp
Normal Distribution. Mean = 3.8889 StdDev = 1.0999
Attribute: address
Discrete Estimator. Counts = 1 7 3 2 (Total = 13)
Cluster: 1 Prior probability: 0.3333
Attribute: eid
Normal Distribution. Mean = 105.25 StdDev = 3.8324
Attribute: ename
Discrete Estimator. Counts = 2 2 1 1 1 1 1 2 1 2 1 1 1 (Total = 17)
Attribute: salary
Normal Distribution. Mean = 11750 StdDev = 1920.2864
Attribute: exp
Normal Distribution. Mean = 4.75 StdDev = 0.433
Attribute: address
Discrete Estimator. Counts = 3 1 1 3 (Total = 8)
Clustered Instances
0 9 (69%)
1 4 (31%)
Log likelihood: -16.52967