Experiment-3A: Bayesian

Source Code:

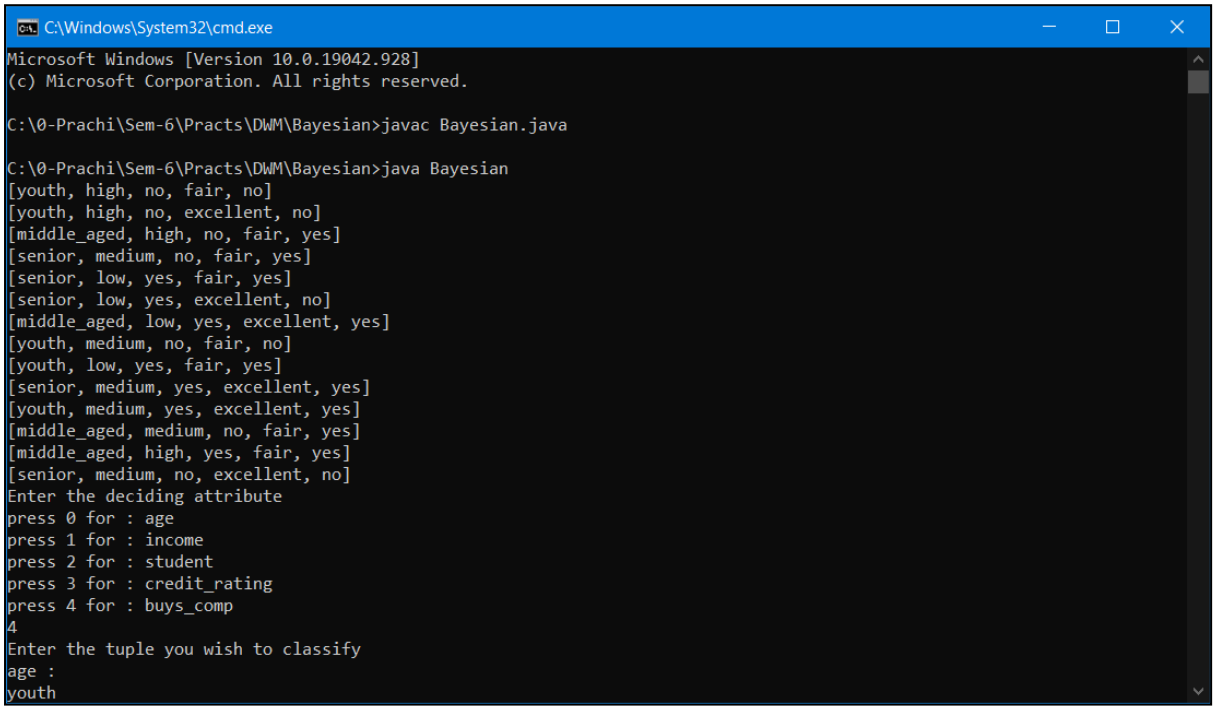
```
import java.util.*;
class table
{ String data[][]={
{"youth","high","no","fair","no"},
{"youth","high","no","excellent","no"},
{"middle_aged","high","no","fair","yes"},
{"senior","medium","no","fair","yes"},
{"senior","low","yes","fair","yes"},
{"senior","low","yes","excellent","no"},
{"middle_aged","low","yes","excellent","yes"},
{"youth","medium","no","fair","no"},
{"youth","low","yes","fair","yes"},
{"senior","medium","yes","excellent","yes"},
{"youth","medium","yes","excellent","yes"},
{"middle_aged","medium","no","fair","yes"},
{"middle_aged","high","yes","fair","yes"},
{"senior","medium","no","excellent","no"}
};
String attrib[][]={
{"age","youth","middle_aged","senior"},
{"income","high","medium","low"},
{"student","no","yes"},
{"credit_rating","fair","excellent"},
{"buys_comp","yes","no"}
};
```

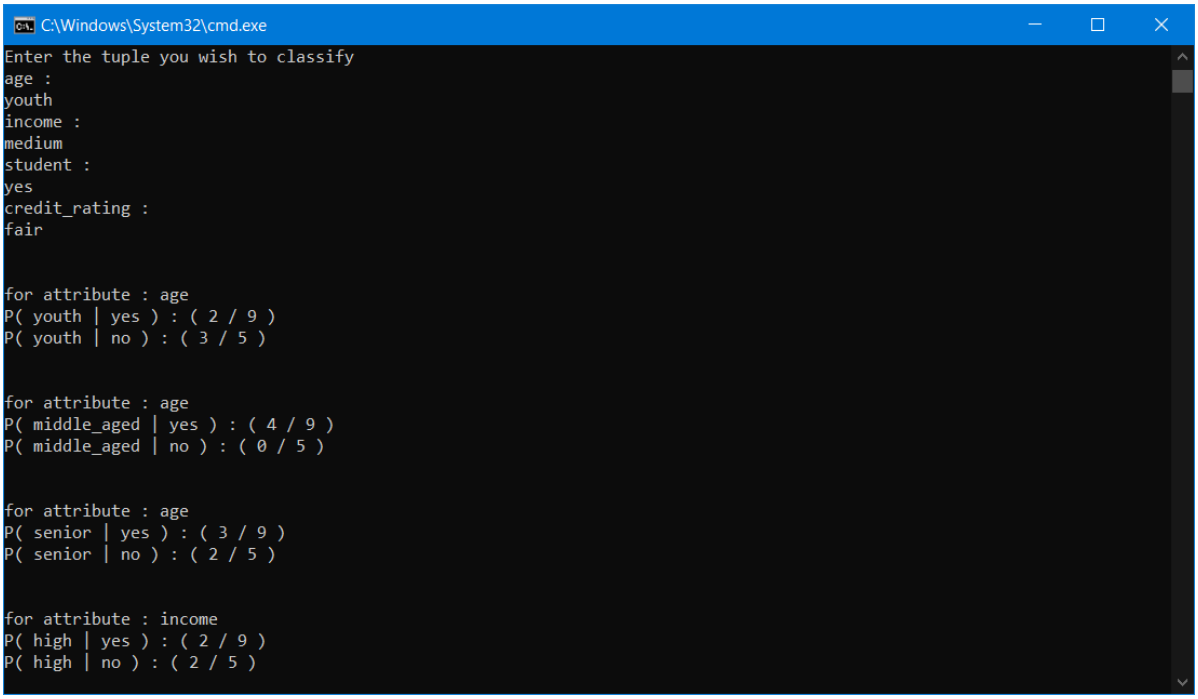
```
String temp[];
int yes,no;
int m,n,decide;
table()
{ n=5;
m=14;
Scanner in=new Scanner(System.in);
for(int i=0;i<m;i++)
System.out.println(Arrays.toString(data[i]));
System.out.println("Enter the deciding attribute");
for(int i=0;i<n;i++)
System.out.println("press "+i+" for : "+attrib[i][0]);
decide=in.nextInt();
System.out.println("Enter the tuple you wish to classify");
temp=new String[n-1];
for(int i=0;i<n-1;i++)
{ System.out.println(attrib[i][0] +" :");
temp[i]=in.next();
}
for(int i=0;i<m;i++)
if(data[i][4].equals("yes"))
yes++;
else
no++;
for(int i=0;i<4;i++)
for(int j=1;j<attrib[i].length;j++)
showall(attrib[i][j],i);
compute(decide);
}
void showall(String atr,int t)
{ int count=0,c1=0,c2=0;
for(int i=0;i<m;i++)
if(data[i][t].equals(atr))
count++;
```

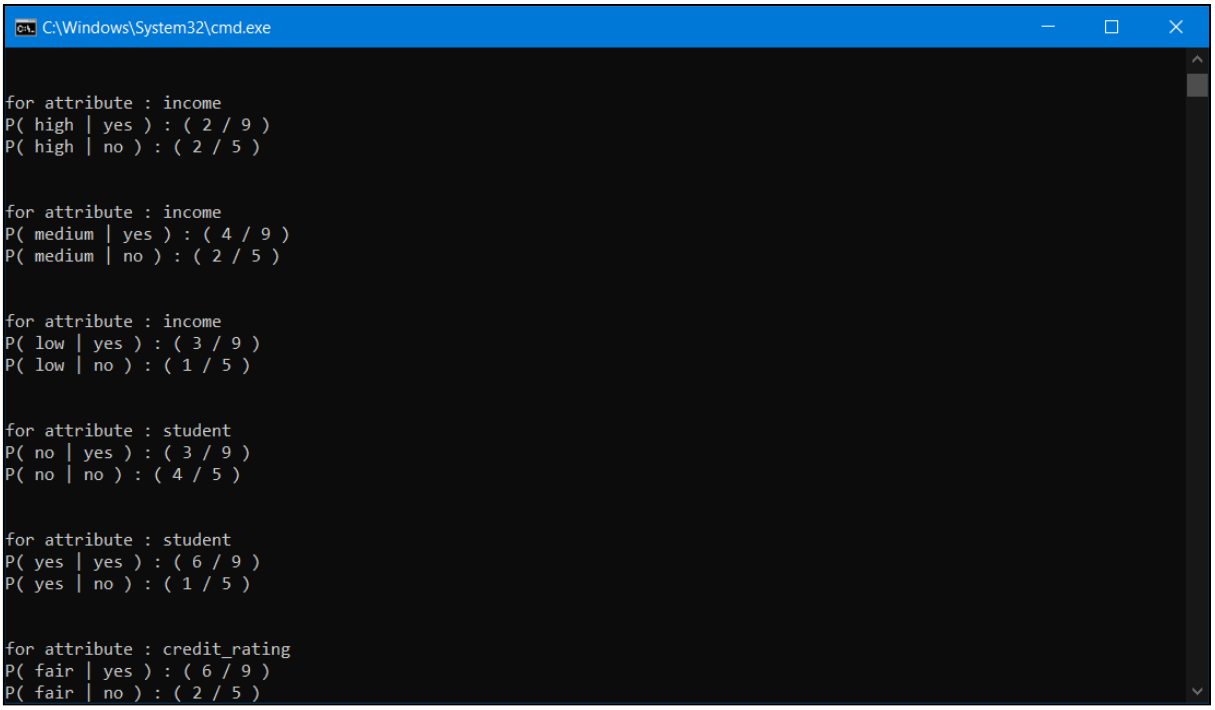
```
System.out.println("\n");
System.out.println("for attribute : "+attrib[t][0]);
for(int i=0;i<m;i++)
if(data[i][t].equals(atr) && data[i][4].equals("yes"))
c1++;
System.out.println("P( "+atr+" | yes ) : ( "+c1+" / "+yes +" ) ");
c1=0;
for(int i=0;i<m;i++)
if(data[i][t].equals(atr) && data[i][4].equals("no"))
c1++;
System.out.println("P( "+atr+" | no ) : ( "+c1+" / "+no +" ) ");
}
void compute(int t)
{ int count=0;
int yes[][]=new int[m][5];
int ansy[]=new int[n];
int ansn[]=new int[n];
for(int j=1;j<3;j++)
{ count=0;
for(int i=0;i<m;i++)
{ if(attrib[decide][j]==data[i][decide])
count++;
}
yes[decide][j]=count;
}
for(int i=0;i<temp.length;i++)
{ count=0;
for(int j=0;j<m;j++)
if(temp[i].equals(data[j][i]) && (data[j][n-1]).equals("yes"))
count++;
ansy[i]=count;
}
ansy[n-1]=yes[n-1][1];
ansn[n-1]=yes[n-1][2];
```

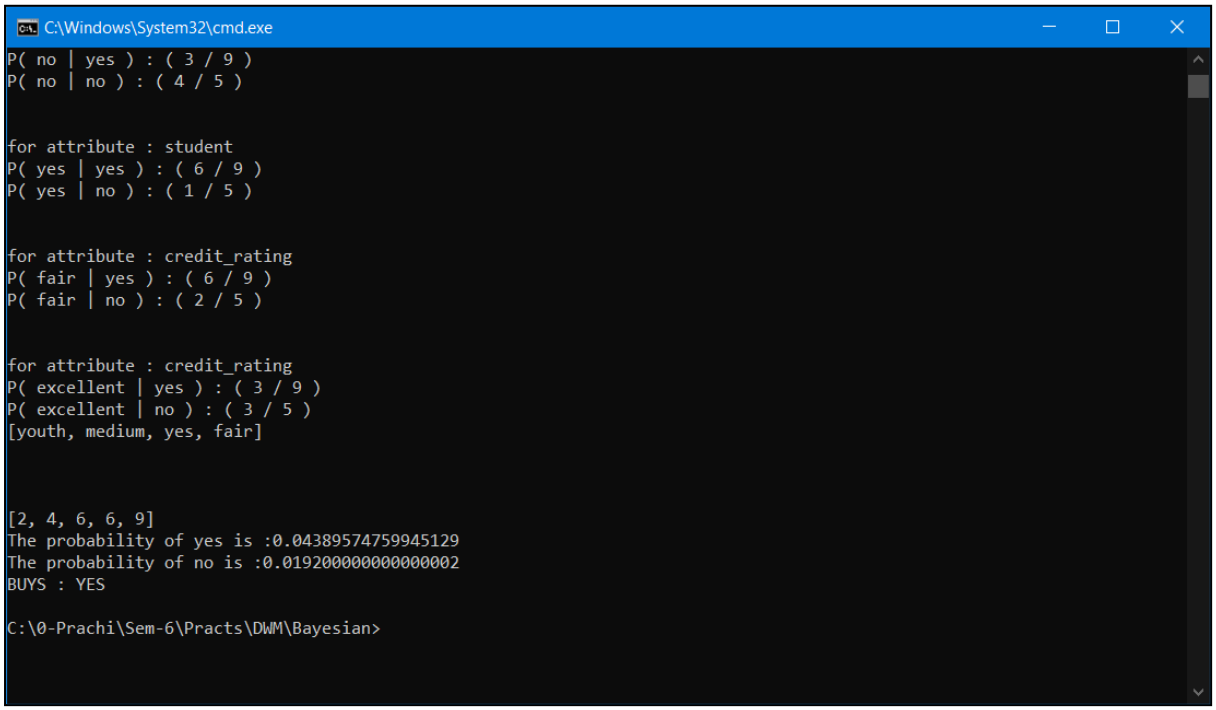
```
for(int i=0;i<temp.length;i++)
{ count=0;
for(int j=0;j<m;j++)
if(temp[i].equals(data[j][i]) && (data[j][n-1]).equals("no"))
count++;
ansn[i]=count;
}
System.out.println(Arrays.toString(temp));
System.out.println("\n\n");
System.out.println(Arrays.toString(ansy));
double proby=1;
for(int i=0;i<n;i++)
proby=proby * ((double)ansy[i]/ansy[n-1]);
System.out.println("The probability of yes is :"+proby);
double probn=1;
for(int i=0;i<n;i++)
probn=probn * ((double)ansn[i]/ansn[n-1]);
System.out.println("The probability of no is :"+probn);
if(probn<proby)
System.out.println("BUYS : YES");
else
System.out.println("BUYS : NO");
}
}
class Bayesian
{ public static void main (String args[])
{ table t=new table();
}
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19042.928]
(c) Microsoft Corporation. All rights reserved.
C:\0-Prachi\Sem-6\Practs\DWM\Bayesian>javac Bayesian.java
C:\0-Prachi\Sem-6\Practs\DWM\Bayesian>java Bayesian
[youth, high, no, fair, no]
[youth, high, no, excellent, no]
[middle_aged, high, no, fair, yes]
[senior, medium, no, fair, yes]
[senior, low, yes, fair, yes]
[senior, low, yes, excellent, no]
[middle_aged, low, yes, excellent, yes]
[youth, medium, no, fair, no]
[youth, low, yes, fair, yes]
[senior, medium, yes, excellent, yes]
[youth, medium, yes, excellent, yes]
[middle_aged, medium, no, fair, yes]
[middle_aged, high, yes, fair, yes]
[senior, medium, no, excellent, no]
Enter the deciding attribute
press 0 for : age
press 1 for : income
press 2 for : student
press 3 for : credit_rating
press 4 for : buys_comp
4
Enter the tuple you wish to classify
age :
youth


C:\Windows\System32\cmd.exe
Enter the tuple you wish to classify
age :
youth
income :
medium
student :
yes
credit_rating :
fair
for attribute : age
P(youth | yes) : (2 / 9)
P(youth | no) : (3 / 5)
for attribute : age
P(middle_aged | yes) : (4 / 9)
P(middle_aged | no) : (0 / 5)
for attribute : age
P(senior | yes) : (3 / 9)
P(senior | no) : (2 / 5)
for attribute : income
P(high | yes) : (2 / 9)
P(high | no) : (2 / 5)


C:\Windows\System32\cmd.exe
for attribute : income
P(high | yes) : (2 / 9)
P(high | no) : (2 / 5)
for attribute : income
P(medium | yes) : (4 / 9)
P(medium | no) : (2 / 5)
for attribute : income
P(low | yes) : (3 / 9)
P(low | no) : (1 / 5)
for attribute : student
P(no | yes) : (3 / 9)
P(no | no) : (4 / 5)
for attribute : student
P(yes | yes) : (6 / 9)
P(yes | no) : (1 / 5)
for attribute : credit_rating
P(fair | yes) : (6 / 9)
P(fair | no) : (2 / 5)


C:\Windows\System32\cmd.exe
P(no | yes) : (3 / 9)
P(no | no) : (4 / 5)
for attribute : student
P(yes | yes) : (6 / 9)
P(yes | no) : (1 / 5)
for attribute : credit_rating
P(fair | yes) : (6 / 9)
P(fair | no) : (2 / 5)
for attribute : credit_rating
P(excellent | yes) : (3 / 9)
P(excellent | no) : (3 / 5)
[youth, medium, yes, fair]
[2, 4, 6, 6, 9]
The probability of yes is :0.04389574759945129
The probability of no is :0.019200000000000002
BUYS : YES
C:\0-Prachi\Sem-6\Practs\DWM\Bayesian>