Naive Bayes in R

```
setwd ( " C:/users/home/desktop")
install.packages ("e1071")
> library("e1071")
> traindata <- read.table("C:/users/home/desktop/student.csv",header=TRUE,sep=",")
> traindata
  buys_computer   age income student credit_rating
1        No  <=30  High    No      Fair
2        No  <=30  High    No    Excellent
3       Yes 31..40  High    No      Fair
4       Yes  >40 Medium    No      Fair
5       Yes  >40  Low   Yes      Fair
6        No  >40  Low   Yes    Excellent
7       Yes 31..40  Low   Yes    Excellent
8        No  <=30 Medium    No      Fair
9       Yes  <=30  Low   Yes      Fair
10      Yes  >40 Medium   Yes      Fair
11      Yes  <=30 Medium   Yes    Excellent
12      Yes 31..40 Medium    No    Excellent
13      Yes 31..40  High   Yes      Fair
14       No  >40 Medium    No    Excellent

> testdata <-  read.table("C:/users/home/desktop/student1.csv",header=TRUE,sep=",")
> testdata
  age income student credit_rating
1 <=30 Medium   Yes      Fair

> tprior <- table(traindata$buys_computer)
> tprior

 No Yes
  5   9

> tprior <-tprior/sum(tprior)
> tprior

    No     Yes
0.3571429 0.6428571

> agecounts <- table(traindata[,c("buys_computer","age")])
> agecounts <- agecounts/rowSums(agecounts)
> agecounts
      age
buys_computer   <=30    >40   31..40
    No  0.6000000 0.4000000 0.0000000
    Yes 0.2222222 0.3333333 0.4444444
```

```
> incomecounts <-table(traindata[,c("buys_computer","income")])
> incomecounts <-incomecounts/rowSums(incomecounts)
> incomecounts
            income
buys_computer   High      Low    Medium
        No  0.4000000 0.2000000 0.4000000
        Yes 0.2222222 0.3333333 0.4444444


> studentcount <-table(traindata[,c("buys_computer","student")])
> studentcount <- studentcount/rowSums(studentcount)
> studentcount
            student
buys_computer   No       Yes
        No  0.8000000 0.2000000
        Yes 0.3333333 0.6666667


> credit_ratingcount <-table(traindata[,c("buys_computer","credit_rating")])
> credit_ratingcount <- credit_ratingcount/rowSums(credit_ratingcount)
> credit_ratingcount
            credit_rating
buys_computer Excellent    Fair
        No  0.6000000 0.4000000
        Yes 0.3333333 0.6666667


> prob_yes <-
+   agecounts["Yes",testdata[,c("age")]]*
+   incomecounts["Yes",testdata[,c("income")]]*
+   studentcount["Yes",testdata[,c("student")]]*
+   credit_ratingcount["Yes",testdata[,c("credit_rating")]]*
+   tprior["Yes"]

> prob_no <-
+   agecounts["No",testdata[,c("age")]]*
+   incomecounts["No",testdata[,c("income")]]*
+   studentcount["No",testdata[,c("student")]]*
+   credit_ratingcount["No",testdata[,c("credit_rating")]]*
+   tprior["No"]

> max(prob_yes,prob_no)
[1] 0.04114286

> prob_yes
    Yes
0.003527337

> prob_no
    No
0.04114286
```

```
> model <- naiveBayes(buys_computer ~ age+income+student+ credit_rating,traindata)
> model
```

Naive Bayes Classifier for Discrete Predictors

Call:
naiveBayes.default(x = X, y = Y, laplace = laplace)

A-priori probabilities:
Y
     No   Yes
0.3571429 0.6428571

Conditional probabilities:
    age
Y   <=30   >40   31..40
  No 0.6000000 0.4000000 0.0000000
  Yes 0.2222222 0.3333333 0.4444444

    income
Y   High   Low   Medium
  No 0.4000000 0.2000000 0.4000000
  Yes 0.2222222 0.3333333 0.4444444

    student
Y   No   Yes
  No 0.8000000 0.2000000
  Yes 0.3333333 0.6666667

    credit_rating
Y   Excellent   Fair
  No 0.6000000 0.4000000
  Yes 0.3333333 0.6666667

```
> results <- predict (model,testdata)
> results
```

[1] No
Levels: No Yes