EXAMPLE 1

AGE	INCOME	STUDENT	CREDIT_RATING	BUYS_COMP
<=30	High	No	Fair	No
<=30	High	No	Excellent	No
31…40	High	No	Fair	Yes
>40	Medium	No	Fair	Yes
>40	Low	Yes	Fair	Yes
>40	Low	Yes	Excellent	No
31…40	Low	Yes	Excellent	Yes
<=30	Medium	No	Fair	No
<=30	Low	Yes	Fair	Yes
>40	Medium	Yes	Fair	Yes
<=30	Medium	Yes	Excellent	Yes
31…40	Medium	No	Excellent	Yes
31…40	High	Yes	Fair	Yes
>40	Medium	No	Excellent	No

C1 : buys_computer = “yes”

C2 : buys_computer = “no”

Data sample X = (age <=30, Income = medium, Student = yes Credit_rating = Fair)

A data sample is given to us here and we have to find whether the person buys a computer or no using Naive Bayesian classification. So first we calculate the probability of buys_computer. So the numbers of yes values divided upon total records that is 14 gives us the probability of buys_computer with yes and same with no.

P(Ci) : P(buys_computer = “yes”) = 9/14 = 0.643

P(buys_computer = “no”) = 5/14= 0.357

The total number of records in the table are 14.

Compute P(X|Ci) for each class

P(age = “<=30” | buys_computer = “yes”) = 2/9 = 0.222

P(age = “<= 30” | buys_computer = “no”) = 3/5 = 0.6

P(income = “medium” | buys_computer = “yes”) = 4/9 = 0.444 P(income = “medium” | buys_computer = “no”) = 2/5 = 0.4

P(student = “yes” | buys_computer = “yes) = 6/9 = 0.667

P(student = “no” | buys_computer = “no”) = 1/5 = 0.2

P(credit_rating = “fair” | buys_computer = “yes”) = 6/9 = 0.667 P(credit_rating = “fair” | buys_computer = “no”) = 2/5 = 0.4

Multiplying all the probabilities with yes values and no values from above separately.

P(X|Ci) :
P(X|buys_computer = “yes”)
= 0.222 x 0.444 x 0.667 x 0.667
= 0.044
P(X|buys_computer = “no”)
= 0.6 x 0.4 x 0.2 x 0.4
= 0.019
Now, multiply these probabilities with the above calculated P(Ci)

P(X|Ci)*P(Ci) :
P(X|buys_computer = “yes”) * P(buys_computer = “yes”) =
0.044 x 0.643=0.028
P(X|buys_computer = “no”) * P(buys_computer = “no”) =
0.019 x 0.357=0.007

The maximum value is 0.028.
Therefore, X belongs to class (“buys_computer = yes”)