Given Dataset

| rec | Age | Income | Student | Credit_rating | Buys_computer |
|---|---|---|---|---|---|
| r1 | <=30 | High | No | Fair | No |
| r2 | <=30 | High | No | Excellent | No |
| r3 | 31-40 | High | No | Fair | Yes |
| r4 | >40 | Medium | No | Fair | Yes |
| r5 | >40 | Low | Yes | Fair | Yes |
| r6 | >40 | Low | Yes | Excellent | No |
| r7 | 31-40 | Low | Yes | Excellent | Yes |
| r8 | <=30 | Medium | No | Fair | No |
| r9 | <=30 | Low | Yes | Fair | Yes |
| r10 | >40 | Medium | Yes | Fair | Yes |
| r11 | <=30 | Medium | Yes | Excellent | Yes |
| r12 | 31-40 | Medium | No | Excellent | Yes |
| r13 | 31-40 | High | Yes | Fair | Yes |
| r14 | >40 | Medium | No | Excellent | No |

Use Naïve Bayes to classify the instance

< age=Youth; Income = Medium; Student = Yes; Credit_Rating = Fair >

Will the customer buy a computer?

**Solution:**

P(buys_computer = yes) = 9/14 =0.643

P(buys_computer = no) = 5/14= 0.357

P(are=youth | buys_computer = yes) = 2/9 = 0.222

P(age=youth /buys_computer = no) = 3/5 =0.600

P(income=medium /buys_computer = yes) = 4/9 =0.444

P(income=medium /buys_computer = no) = 2/5 =0.400

P(student=yes /buys_computer = yes) = 6/9 =0.667

P(student=yes/buys_computer = no) = 1/5 =0.200

P(credit rating=fair /buys_computer = yes) = 6/9 =0.667

P(credit rating=fair /buys_computer = no) = 2/5 =0.400

P(Customer buy a computer = yes) = P(age=youth | buys_computer = yes) x P(income=medium | buys_computer = yes) x P(student=yes | buys_computer = yes) x P(credit rating=fair | buys_computer = yes) = 0.222 x 0.444 x 0.667 x 0.667 = 0.044

P(Customer buy a computer = No) = P(age=youth | buys_computer = no) x P(income=medium | buys_computer = no) x P(student=yes | buys_computer = no) x P(credit rating=fair | buys_computer = no) = 0.600 * 0.400 * 0.200 * 0.400 = 0.019

**Classification result = Customer Buy - yes**