**Calculating the Entropy for Decision Tree**

Buy Computer

| Buy Computer | | |
|---|---|---|
| yes | no | sum |
| 12 | 8 | 20 |

Age

| | Buy computer | Buy computer | |
|---|---|---|---|
| | yes | no | sum |
| <30 | 2 | 6 | 8 |
| 31…40 | 6 | 0 | 6 |
| >40 | 4 | 2 | 6 |

Income

| | Buy computer | Buy computer | |
|---|---|---|---|
| | yes | no | sum |
| high | 3 | 2 | 5 |
| medium | 5 | 3 | 8 |
| low | 4 | 3 | 7 |

Student

| | Buy computer | Buy computer | |
|---|---|---|---|
| | yes | no | sum |
| yes | 8 | 1 | 9 |
| no | 4 | 7 | 11 |

Credit rating

| | Buy computer | Buy computer | |
|---|---|---|---|
| | yes | no | sum |
| Fair | 7 | 3 | 10 |
| Excellent | 5 | 5 | 10 |

Calculated with ID3 method from http://www.saedsayad.com/decision_tree.htm

Entropy Buy Computer

E(BuyComputer) = E(12,8)

= 0.971

**Entropy(BuyComputer, Age)**

E(BuyCompter, Age) = P(<30)*E(2,6) + P(31..40)*E(6,0) + P(>40)*E(4,2)

= (8/20)*0.811 + (6/20)*0 + (6/20)*0.918

= 0.6

**Entropy(BuyComputer, Income)**

E(BuyComputer, Income) = P(high)*E(3,2) + P(medium)* E(5,3) + P(low)*E(4,3)

= (5/20)*E(3,2) + (8/20)*E(5,3) + (7/20)*E(4,3)

= 0.25*0.971 + 0.4*0.954 + 0.35*0.9855

= 0.96

**Entropy(BuyComputer, Student)**

E(BuyComputer, Student) = P(IsStudent)*E(8,1)+P(noStudent)*E(4,7)

= (9/20)*(E8,1) + (11/20)*E(4,7)

= 0.45*0.5044 + 0.55*0.9457

= 0.747

**Entropy(BuyComputer, CreditRating)**

E(BuyComputer, CreditRating) = P(Fair)*E/7,3) + P(Excellent)*E(5,5)

= (10/20)*E(7,3) + 10/20*E(5,5)

= 0.5*0.881 + 0.5*1

= 0.941