Compute entropy

**Entropy (Source)**

= -5/16 \* log (5/16) - 5/16 \* log (5/16) - 6/16 \* log (6/16))

= 0.5244+0.5244+0.53064 = 1.57943

**Entropy (Demand)**

= 7/16 \* (-3/7 \* log (3/7) - 2/7 \* log (2/7) - 2/7 \* log (2/7)) +

4/16 \* (-2/4 \* log (2/4) - 1/4 \* log (1/4) - 1/4 \* log (1/4)) +

5/16 \* (-2/5 \* log (2/5) - 2/5 \* log (2/5))

= 0.68104+0.375+0.30342 = 1.35946

**Entropy (Strategy)**

= 9/16 \* (-3/9 \* log (3/9) - 3/9 \* log (3/9) - 3/9 \* log (3/9)) +

7/16 \* (-2/7 \* log (2/7) - 2/7 \* log (2/7) - 3/7 \* log (3/7))

= 0.89154+0.68104 = 1.57258

**Entropy (Campaign)**

= 9/16 \* (-4/9 \* log (4/9) - 4/9 \* log (4/9) - 1/9 \* log (1/9)) +

7/16 \* (-1/7 \* log (1/7) - 1/7 \* log (1/7) - 5/7 \* log (5/7))

= 0.78308 + 0.50262 = 1.2857

**Gain (S, Demand)** = 1.57942 – 1.35946 = 0.21997

**Gain (S, Strategy)** = 1.57942 – 1.57258= 0.00584

**Gain (S, Campaign)** = 1.57942 – 1.2857= 0.29372

**Choose “Campaign” as a node to split the tree.**

**Entropy (Aggressive)** =0.78308

**Entropy (Demand)**

= 6/16 \* (-3/6 \* log (3/6) - 2/6 \* log (2/6) - 1/6 \* log (1/6)) +

2/16 \* (-1/2 \* log (1/2) – 1/2 \* log (1/2)) +

1/16 \* (-1/1 \* log (1/1))

= 0.54718 + 0.125 + 0 = 0.67218

**Entropy (Strategy)**

= 7/16 \* (-3/7 \* log (3/7) - 3/7 \* log (3/7) - 3/7 \* log (3/7)) +

2/16 \* (-1/2 \* log (1/2) - 1/2 \* log (1/2))

= 0.63386 + 0.125 = 0.75886

**Gain (aggressive, Demand)** = 0.78308 – 0.67218 = 0.1109

**Gain (aggressive, Strategy)** = 0.78308 – 0.75886 = 0.02422

**Choose “Demand” as a node to split the tree under “aggressive”.**

**Entropy (lowkey) =** 0.50262

**Entropy (Demand)**

= 1/16 \* (-1/1 \* log (1/1)) +

2/16 \* (-1/2 \* log (1/2) - 1/2 \* log (1/2)) +

4/16 \* (-1/4 \* log (1/4) – 3/4 \* log (3/4))

= 0 + 0.125 + 0.20282= 0.32782

Entropy (Strategy)

= 2/16 \* (-2/2 \* log (2/2)) +

5/16 \* (-1/5 \* log (1/5) - 1/5 \* log (1/5) - 3/5 \* log (3/5))

= 0 + 0.42842 = 0.42842

Gain (lowkey, Demand) = 0.50262 – 0.32782 = 0.1748

Gain (lowkey, Strategy) = 0.50262 – 0.42842 = 0.0742

**Choose “Demand” as a node to split the tree under “lowkey”.**

**Result:**

**First, choose “Campaign” as root node.**

**Second, choose “Demand” as a child under the two values of “Campaign”.**

**Finally, choose “Strategy” to split the tree at the bottom.**