Charles C. Stevenson

Artificial Intelligence.

1) 0.7 Cho, 0.2 Vanilla, 0.1 Strawberry.

$$S = \sum_{i=1}^{n} -P(v_i) \log_2 (P(v_i))$$

$$-\frac{0.7n}{n} \log_2 \left(\frac{0.7n}{n}\right) - \frac{0.2n}{n} \log\left(\frac{0.2n}{n}\right) - \frac{0.1n}{n} \log_2\left(\frac{0.1n}{n}\right)$$

$$= \cancel{1.15678} \ 1.05$$

II) Max Entropy $= \log_2(3) = 1.05$

M Gender F		StudentType G	
0.80 C	0.67 C	0.64 C	0.76 C
0.12 V	0.22 V	0.24 V	0.16 V
0.08 S	0.11 S	0.12 S	0.08 S

0.25 total males.

C)

$-0.80/0.25 \log_2\left(\frac{0.80}{0.25}\right) - \frac{0.12}{0.25} \log_2\left(\frac{0.12}{0.25}\right) - \frac{0.08}{0.25} \log_2\left(\frac{0.08}{0.25}\right)$

$S = 0.826$ $G = 0.25 \cdot 0.826$ $= 0.8435$

$-0.67 \log_2(0.67) - 0.22 \log(0.22) - 0.11 \log_2(0.11)$

$S = 1.11$ $G = 0.75 \cdot 0.826 = 0.215$ $= 0.529$

$-0.64 \log_2(0.64) - 0.24 \log(0.24) - 0.12 \log(0.12)$
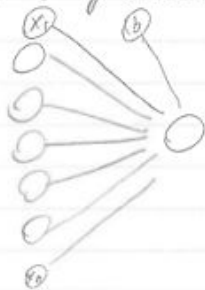
$\therefore S = 1.16063.$ $G = 1 - .5 \cdot 1.16 = 0.47$

$-0.76 \log_2(0.76) - 0.16 \log_2(0.16) - 0.08 \log_2(0.08) =$

$S = 0.925$ $G = 1 - .5 \cdot 0.925 = 0.5875.$

D) • Gender because one node contains the highest amount of gain.

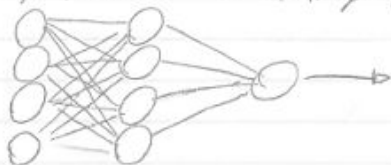Artificial Intelligence #3.

③ a) Majority function: Perceptron.

$$W_0 = -1$$
$$W_1 .. W_N = 1/(N/2)$$
$$X \geq 0 = 1$$
$$X < 0 = -1$$

b. Parity Function. : Multilayer NN.

c. X = 1 when $3X_p$: Perceptron.
   $Y_p = 3X_p$

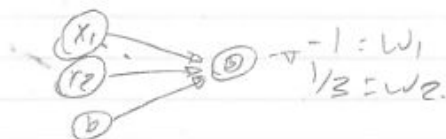

$$-1 = W_1$$
$$1/3 = W_2.$$

d. Multilayered NN.

4. Leave One Out Cross Validation.

the reason you would get 0 is because one would mess up the training set and train on the opposite majority of the test set. Another say is that there are no attributes to compare.