1.1

Q1. A Q2. A Q3. C Q4. A Q5. A

1.

let S denote play? information, A for weather. B for temp.
C for Humidity D for wind

$$Info(S) = -\frac{5}{10}\log_2\frac{5}{10} - \frac{5}{10}\log_2\frac{5}{10} = 1$$

$$Info(S|A) = \frac{3}{10}\left(-\frac{1}{3}\log_2\frac{1}{3} - \frac{2}{3}\log_2\frac{2}{3}\right) + \frac{3}{10}\left(-\frac{3}{3}\log_2\frac{3}{3} - 0\right) + \frac{4}{10}\left(-\frac{1}{4}\log_2\frac{1}{4} - \frac{3}{4}\log_2\frac{3}{4}\right) = \frac{3}{5}$$

$$Info(S|B) = \frac{4}{10}\left(-\frac{2}{4}\log_2\frac{2}{4} - \frac{2}{4}\log_2\frac{2}{4}\right) + \frac{5}{10}\left(-\frac{3}{5}\log_2\frac{3}{5} - \frac{2}{5}\log_2\frac{2}{5}\right) + \frac{1}{10}\left(-\frac{1}{1}\log_2\frac{1}{1}\right) = 0.885$$

$$Info(S|C) = \frac{7}{10}\left(-\frac{4}{7}\log_2\frac{4}{7} - \frac{3}{7}\log_2\frac{3}{7}\right) + \frac{3}{10}\left(-\frac{2}{3}\log_2\frac{2}{3} - \frac{1}{3}\log_2\frac{1}{3}\right) = 0.965$$

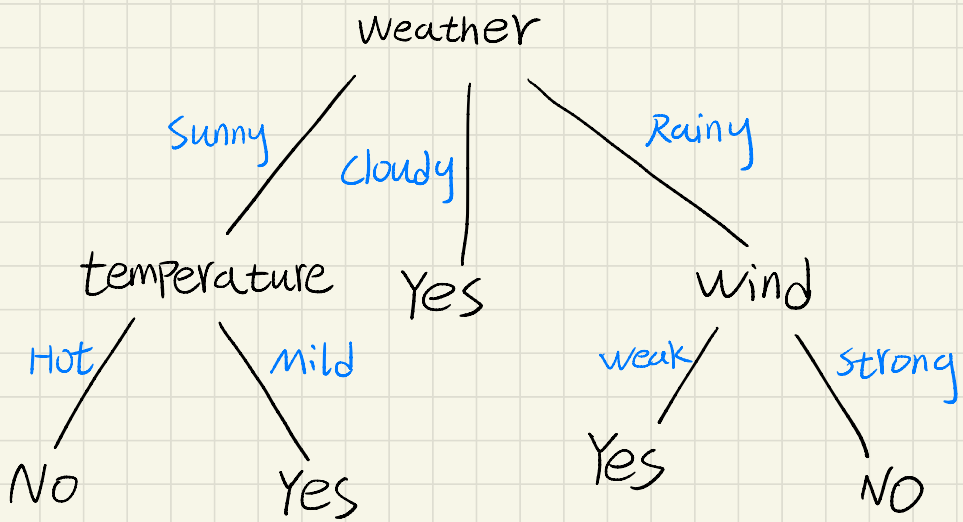
$$Info(S|D) = \frac{4}{10}\left(-\frac{3}{4}\log_2\frac{3}{4} - \frac{1}{4}\log_2\frac{1}{4}\right) + \frac{6}{10}\left(-\frac{2}{6}\log_2\frac{2}{6} - \frac{4}{6}\log_2\frac{4}{6}\right) = 0.875$$

$Gain(A) = 1 - \frac{3}{5} = 0.4$ $Gain(B) = 1 - 0.885 = 0.115$

$Gain(C) = 1 - 0.965 = 0.035$ $Gain(D) = 1 - 0.875 = 0.125$

So choosing A weather.

2.



1.2

1.

$\frac{28+2\times1-4}{1}+1=27$

① $Conv4(15) = 27\times27\times15$

$\left\lfloor\frac{27+2\times0-2}{2}\right\rfloor+1=13$

② $MaxPool_2 = 13\times13\times15$

$\frac{13+2\times0-2}{1}+1=12$

③ $Conv2(25) = 12\times12\times25$

$\frac{12+2\times0-2}{2}+1=6$

④ $MaxPool_2 = 6\times6\times25$

⑤ $FC5 = 5$

2. ① $Conv4(15) = (4\times4+1)\times15 = 255$

② $Conv2(25) = (2\times2\times15+1)\times25 = 1525$

③ $FC5 = (6\times6\times25+1)\times5 = 4505$

$Total = 255+1525+4505 = 6285$