

[yes,no]

$$H(6,8) = -\left[\frac{6}{14}\log_2\left(\frac{6}{14}\right) + \frac{8}{14}\log_2\left(\frac{8}{14}\right)\right] = 0,9852$$

**Split at Temperature:**

$$\text{Temperature} = \text{high: } H(2,5) = -\left[\frac{2}{7}\log_2\left(\frac{2}{7}\right) + \frac{5}{7}\log_2\left(\frac{5}{7}\right)\right] = 0,8631$$

$$\text{Temperature} = \text{low: } H(4,3) = -\left[\frac{4}{7}\log_2\left(\frac{4}{7}\right) + \frac{3}{7}\log_2\left(\frac{3}{7}\right)\right] = 0,9852$$

$$\text{Gain: } H(6,8) - H\left[\frac{7}{14}H(2,5) + \frac{7}{14}H(4,3)\right] = 0,01615$$

**Split at Rain:**

$$\text{Rain} = \text{yes: } H(0,7) = -\left[\frac{0}{7}\log_2\left(\frac{0}{7}\right) + \frac{7}{7}\log_2\left(\frac{7}{7}\right)\right] = 0$$

$$\text{Rain} = \text{no: } H(6,1) = -\left[\frac{6}{7}\log_2\left(\frac{6}{7}\right) + \frac{1}{7}\log_2\left(\frac{1}{7}\right)\right] = 0,5916$$

$$\text{Gain: } H(6,8) - H\left[\frac{7}{14}H(0,7) + \frac{7}{14}H(5,2)\right] = 0,6894$$

**Split at Windy:**

$$\text{Windy} = \text{True: } H(2,5) = -\left[\frac{2}{7}\log_2\left(\frac{2}{7}\right) + \frac{5}{7}\log_2\left(\frac{5}{7}\right)\right] = 0,8631$$

$$\text{Windy} = \text{False: } H(4,3) = -\left[\frac{4}{7}\log_2\left(\frac{4}{7}\right) + \frac{3}{7}\log_2\left(\frac{3}{7}\right)\right] = 1,3781$$

$$\text{Gain: } H(6,8) - H\left[\frac{7}{14}H(2,5) + \frac{7}{14}H(4,3)\right] = 0,1354$$

**Split at Humidity:**

$$\text{Humidity} = \text{High: } H(3, 4) = - \left[ \frac{3}{7} \log_2 \left( \frac{3}{7} \right) + \frac{4}{7} \log_2 \left( \frac{4}{7} \right) \right] = 0,9852$$

$$\text{Humidity} = \text{Low: } H(3, 4) = - \left[ \frac{3}{7} \log_2 \left( \frac{3}{7} \right) + \frac{4}{7} \log_2 \left( \frac{4}{7} \right) \right] = 0,9852$$

$$\text{Gain: } H(6, 8) - H \left[ \frac{7}{14} H(3, 4) + \frac{7}{14} H(3, 4) \right] = \mathbf{0}$$

RAIN: No

$$H(6, 1) = - \left[ \frac{6}{7} \log_2 \left( \frac{6}{7} \right) + \frac{1}{7} \log_2 \left( \frac{1}{7} \right) \right] = 0,5917$$

**Split at Temperature:**

$$\text{Temperature} = \text{High: } H(2, 0) = - \left[ \frac{2}{2} \log_2 \left( \frac{2}{2} \right) + \frac{0}{2} \log_2 \left( \frac{0}{2} \right) \right] = 0$$

$$\text{Temperature} = \text{Low: } H(4, 1) = - \left[ \frac{4}{5} \log_2 \left( \frac{4}{5} \right) + \frac{1}{5} \log_2 \left( \frac{1}{5} \right) \right] = 0,7220$$

$$\text{Gain: } H(6, 1) - H \left[ \frac{2}{7} H(2, 0) + \frac{5}{7} H(4, 1) \right] = \mathbf{0,0760}$$

**Split at Windy:**

$$\text{Windy} = \text{True: } H(2, 1) = - \left[ \frac{2}{3} \log_2 \left( \frac{2}{3} \right) + \frac{1}{3} \log_2 \left( \frac{1}{3} \right) \right] = 0,9183$$

$$\text{Windy} = \text{False: } H(4, 0) = - \left[ \frac{4}{4} \log_2 \left( \frac{4}{4} \right) + \frac{0}{4} \log_2 \left( \frac{0}{4} \right) \right] = 0$$

$$\text{Gain: } H(6, 1) - H \left[ \frac{3}{7} H(2, 1) + \frac{4}{7} H(4, 0) \right] = \mathbf{0,4695}$$

**Split at Humidity:**

$$\text{Humidity} = \text{High: } H(3, 0) = - \left[ \frac{3}{3} \log_2 \left( \frac{3}{3} \right) + \frac{0}{3} \log_2 \left( \frac{0}{3} \right) \right] = 0$$

$$\text{humidity} = \text{Low: } H(3, 1) = - \left[ \frac{3}{4} \log_2 \left( \frac{3}{4} \right) + \frac{1}{4} \log_2 \left( \frac{1}{4} \right) \right] = 0,8113$$

$$\text{Gain: } H(6, 1) - H \left[ \frac{3}{7} H(2, 1) + \frac{4}{7} H(3, 1) \right] = \mathbf{0,1281}$$

Rain: no, Windy: True

$$H(2,1) = -\left[\frac{2}{3}\log_2\left(\frac{2}{3}\right) + \frac{1}{3}\log_2\left(\frac{1}{3}\right)\right] = 0,9183$$

**Split at Temperature:**

$$\text{Temperature} = \text{High: } H(0,0) = -\left[\frac{0}{0}\log_2\left(\frac{0}{0}\right) + \frac{0}{0}\log_2\left(\frac{0}{0}\right)\right] = 0$$

$$\text{Temperature} = \text{Low: } H(2,1) = -\left[\frac{2}{3}\log_2\left(\frac{2}{3}\right) + \frac{1}{3}\log_2\left(\frac{1}{3}\right)\right] = 0,9183$$

$$\text{Gain: } H(2,1) - H\left[0 + \frac{3}{3}H(2,1)\right] = \mathbf{0}$$

**Split at Humidity:**

$$\text{Humidity} = \text{High: } H(2,0) = -\left[\frac{2}{2}\log_2\left(\frac{2}{2}\right) + \frac{0}{2}\log_2\left(\frac{0}{2}\right)\right] = 0$$

$$\text{Humidity} = \text{Low: } H(0,1) = -\left[0 + \frac{1}{1}\log_2\left(\frac{1}{1}\right)\right] = 0$$

$$\text{Gain: } H(2,1) - H\left[\frac{2}{3}H(2,0) + \frac{1}{3}H(0,1)\right] = \mathbf{0,9183}$$

Rain: no, windy: False

$$H(1,2) = -\left[\frac{1}{3}\log_2\left(\frac{1}{3}\right) + \frac{2}{3}\log_2\left(\frac{2}{3}\right)\right] = 0,9183$$

$$DS = \frac{2TP}{2TP + FP + FN}$$