

$$\text{Info}(D) = I(q, D) = -\frac{9}{14} \log_2\left(\frac{9}{14}\right) - \frac{5}{14} \log_2\left(\frac{5}{14}\right) = 0.940$$

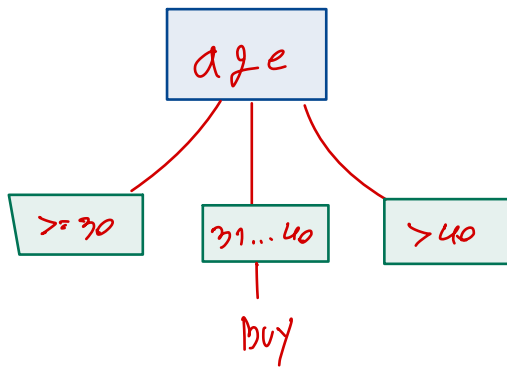
$$\begin{aligned} \text{Info}_{(\text{age})}(D) &= \frac{5}{14} I(2, D) + \frac{4}{14} I(4, D) + \frac{5}{14} I(7, D) \\ &= 0.694 = 0.940 - 0.694 = 0.246 \end{aligned}$$

$$\begin{aligned} \text{Info}_{(\text{income})}(D) &= \frac{4}{14} I(2, D) + \frac{6}{14} I(4, D) + \frac{4}{14} I(3, D) \\ &= 0.911 = 0.940 - 0.911 = 0.29 \end{aligned}$$

$$\begin{aligned} \text{Info}_{(\text{student})}(D) &= \frac{7}{14} I(3, D) + \frac{7}{14} I(6, D) \\ &= 0.799 = 0.940 - 0.799 = 0.192 \end{aligned}$$

$$\begin{aligned} \text{Info}_{(\text{credit ratings})}(D) &= \frac{8}{14} I(6, D) + \frac{6}{14} I(3, D) \\ &= 0.892 = 0.940 - 0.892 = 0.049 \end{aligned}$$

Root node = age



Age ≥ 30

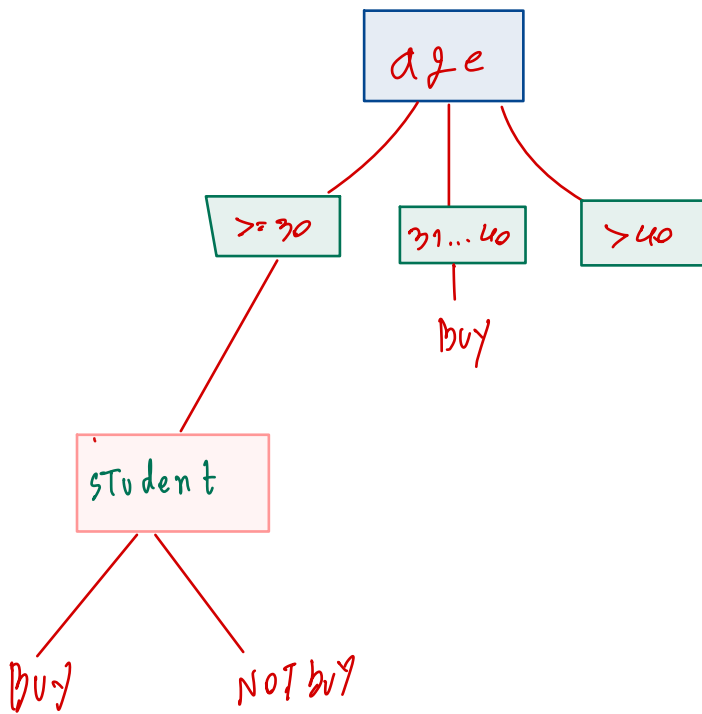
$$\text{Info D} = I(2,3) = \frac{2}{5} \log_2 2 - \left(\frac{2}{5}\right) - \frac{3}{5} \log_2 2 - \left(\frac{3}{5}\right) = 0.971$$

$$\begin{aligned} \text{Info}_{(\text{income})D} &= \frac{2}{5} I(0,2) + \frac{2}{5} I(1,1) + \frac{1}{5} I(1,0) \\ &= 0.971 - 0.4 = 0.571 \end{aligned}$$

$$\begin{aligned} \text{Info}_{(\text{student})D} &= \frac{2}{5} I(2,0) + \frac{3}{5} I(0,3) \\ &= 0.971 - 0 = 0.971 \end{aligned}$$

$$\begin{aligned} \text{Info}_{(\text{credit rating})D} &= \frac{3}{5} I(1,2) + \frac{2}{5} I(1,1) \\ &= 0.971 - 0.951 = 0.020 \end{aligned}$$

Decision node k 2 ab student income
(2) 11 mlt oahu on 12 in student or above 12



Age > 40

$$Info(D) = I(1,2) = -\frac{2}{15} \log_2\left(\frac{2}{15}\right) - \frac{2}{15} \log_2\left(\frac{2}{15}\right) = 0.971$$

$$Info_{income}(D) = \frac{2}{3} I(1,1) + \frac{2}{5} I(2,1)$$

$$= 0.971 - 0.951 = 0.02$$

$$Info_{student}(D) = \frac{2}{9} I(2,1) + \frac{2}{9} I(1,1)$$

$$= 0.971 - 0.951 = 0.02$$

$$Info_{credit-rating}(D) = \frac{2}{5} I(1,0) + \frac{2}{5} I(0,2)$$

$$= 0.971 - 0 = 0.971$$

∴ credit rating is a decision node

