

$$\text{Info}(D) = I(8,4) = -\frac{8}{12} \log_2 \left(\frac{8}{12} \right) - \frac{4}{12} \log_2 \left(\frac{4}{12} \right) = 0.9183$$

$$\text{Info}_{\text{Age}}(D) = \frac{4}{12} I(2,2) + \frac{3}{12} I(3,0) + \frac{5}{12} I(3,2)$$

$$I(2,2) = -\frac{2}{4} \log_2 \left(\frac{2}{4} \right) - \frac{2}{4} \log_2 \left(\frac{2}{4} \right) = 1$$

$$I(3,0) = -\frac{3}{3} \log_2 \left(\frac{3}{3} \right) = 0$$

$$I(3,2) = -\frac{3}{5} \log_2 \left(\frac{3}{5} \right) - \frac{2}{5} \log_2 \left(\frac{2}{5} \right) = 0.9710$$

$$\text{Info}_{\text{Age}}(D) = \frac{4}{12} (1) + \frac{3}{12} (0) + \frac{5}{12} (0.9710) = 0.5761$$

$$\text{Gain}(\text{Age}) = \text{Info}(D) - \text{Info}_{\text{Age}}(D) = 0.9183 - 0.5761 = 0.3422$$

$$\text{Info}_{\text{Income}}(D) = \frac{4}{12} I(2,2) + \frac{5}{12} I(4,1) +$$