

Q3

20 bulbs $\left\{ \begin{array}{l} 6 - 22 \text{ watt} \\ 9 - 18 \text{ watt} \\ 5 - 23 \text{ watt} \end{array} \right.$

(a) $P(\text{select exactly 2 23 watt})$

$= P(\text{exactly 2 23 watt and 1 other})$

$$= \frac{\binom{5}{2} \binom{15}{1}}{\binom{20}{3}}$$

(b) $P(\text{all 3 are the same rating}) = \frac{\binom{6}{3} + \binom{9}{3} + \binom{5}{3}}{\binom{20}{3}}$

$= P(\text{all 3 are 23 watt or 18 watt or 22 watt})$

(c) $P(\text{one of each type is selected}) = \frac{\binom{6}{1} \binom{9}{1} \binom{5}{1}}{\binom{20}{3}}$

(d). It's necessary to examine at least 6 bulbs if and only if the first 5 bulbs were all 18 watt and 22 watt, the chance of event will be

$$\frac{\binom{15}{5}}{\binom{20}{5}}$$

$$\binom{20}{5}$$

$$Q4. a) P(A_2|A_1) = \frac{P(A_1 \cap A_2)}{P(A_1)}$$

$$b) P(A_2 \cap A_3 | A_1) = \frac{P(A_1 \cap A_2 \cap A_3)}{P(A_1)}$$

$$c) P(A_2 \cup A_3 | A_1) = \frac{P[A_1 \cap (A_2 \cup A_3)]}{P(A_1)}$$

$$= \frac{P[(A_1 \cap A_2) \cup (A_1 \cap A_3)]}{P(A_1)}$$

$$= \frac{P(A_1 \cap A_2) + P(A_1 \cap A_3) - P(A_1 \cap A_2 \cap A_3)}{P(A_1)}$$

$$d) P(A_1 \cap A_2 \cap A_3 | A_1 \cup A_2 \cup A_3)$$

$$= \frac{P(A_1 \cap A_2 \cap A_3)}{P(A_1 \cup A_2 \cup A_3)}$$



Q6

$$P(\text{short}) = 0.6$$

$$P(\text{median}) = 0.3$$

$$P(\text{long}) = 0.1$$

$$P(\text{word} | \text{short}) = 0.8$$

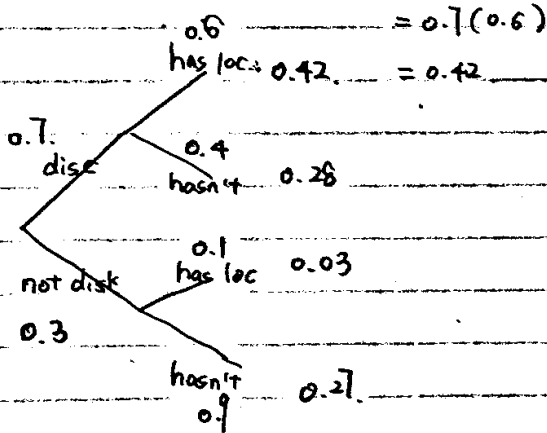
$$P(\text{word} | \text{median}) = 0.5$$

$$P(\text{word} | \text{long}) = 0.3$$

$$\Rightarrow a) P(\text{word}) = 0.8(0.6) + 0.5(0.3) + 0.3(0.1) = 0.66$$

$$b) P(\text{short} | \text{word}) = \frac{P(\text{short} \cap \text{word})}{P(\text{word})} = \frac{0.6(0.8)}{0.66}$$

Q5. $P(\text{discovered and has a locator}) = P(\text{discovered}) P(\text{locator} | \text{discovered})$



$$\Rightarrow P(\text{not discovered} | \text{has locator}) = \frac{P(\text{not discovered} \cap \text{has locator})}{P(\text{has locator})}$$

$$= \frac{0.03}{0.03 + 0.42} = 0.067$$

$$\Rightarrow P(\text{discovered} | \text{no locator}) = \frac{P(\text{discovered} \cap \text{no locator})}{P(\text{no locator})} = \frac{0.28}{0.55} = 0.509$$

