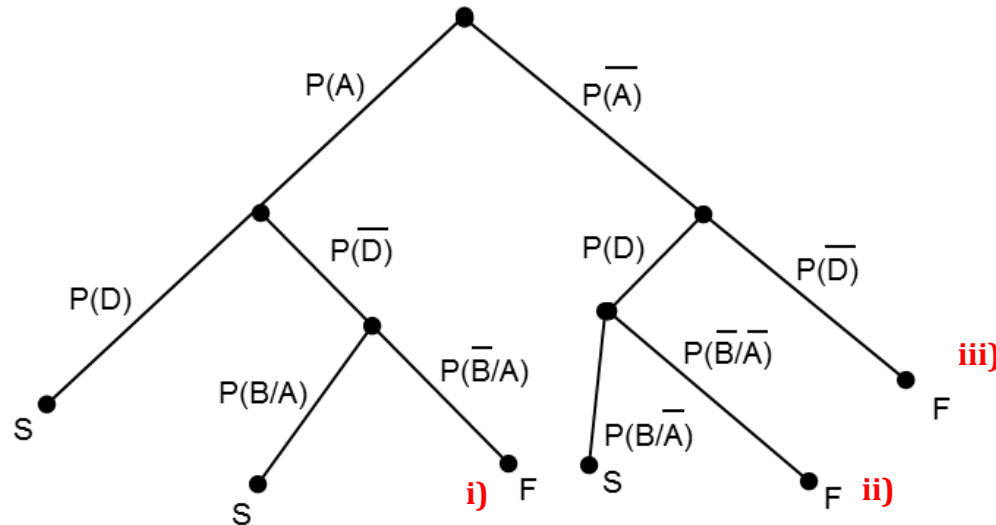


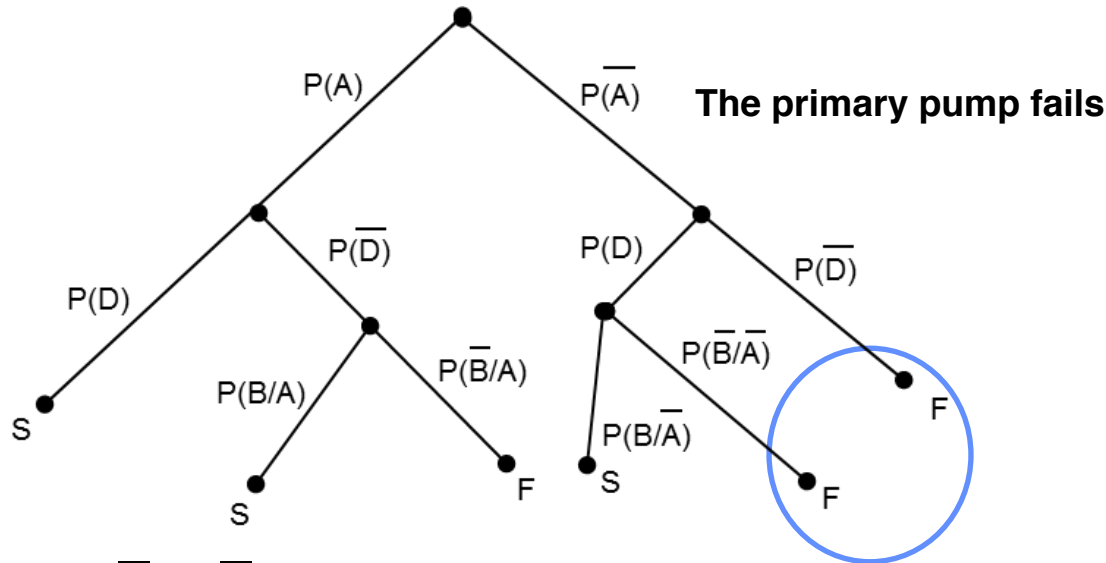
# Cabinet cooling system (Solution)



$$\begin{aligned}
 P(\text{failure}) &= P(\bar{B} | A) P(\bar{D}) P(A) + P(\bar{B} | \bar{A}) P(D) P(\bar{A}) + P(\bar{A}) P(\bar{D}) \\
 &= P(\bar{B} \cap A) P(\bar{D}) + P(\bar{B} \cap \bar{A}) P(D) + P(\bar{A}) P(\bar{D}) \\
 &= P((\bar{B} \cap A) \cup \bar{A}) P(\bar{D}) + P(\bar{B} \cap \bar{A}) P(D) \\
 &= P((\bar{B} \cup \bar{A}) \cap (A \cup \bar{A})) P(\bar{D}) + P(\bar{B} \cap \bar{A}) P(D) \\
 &= P(\bar{B} \cup \bar{A}) P(\bar{D}) + P(\bar{B} \cap \bar{A}) P(D)
 \end{aligned}$$

Distributive Law (E3)

# Cabinet cooling system (Solution)



$$P(\bar{A} | F) = \frac{P(F|\bar{A})P(\bar{A})}{P(F)}$$

Bayes theorem

As  $P(\bar{A})$  was given and  $P(F)$  has been calculated, we only need to calculate  $P(F|\bar{A})$

$$P(F|\bar{A}) = \frac{P(F \cap \bar{A})}{P(\bar{A})} = \frac{P(\bar{D})P(\bar{A}) + P(\bar{B}|\bar{A})P(D)P(\bar{A})}{P(\bar{A})}$$

Two failure paths correspond to  $\bar{A}$

$$P(F|\bar{A}) = P(\bar{D}) + P(\bar{B}|\bar{A})P(D)$$