

- $S_1 : x > a \text{ \& \& } y < b$
- $S_2 : x > a \text{ \& \& } a > y \geq b$
- $S_3 : y > 25 \text{ \& \& } x < a$
- $S_4 : y > 25 \text{ \& \& } x > a$
- $S_5 : \text{Rest}$

$P(S_i)$
 $i = 1, 2, \dots, 5$

region S_i with probability $P(S_i)$.

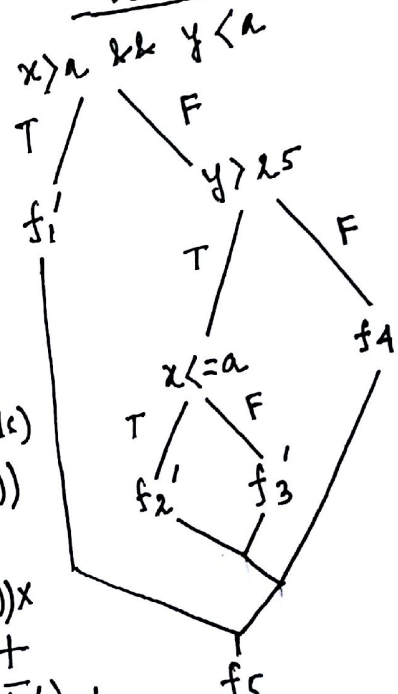
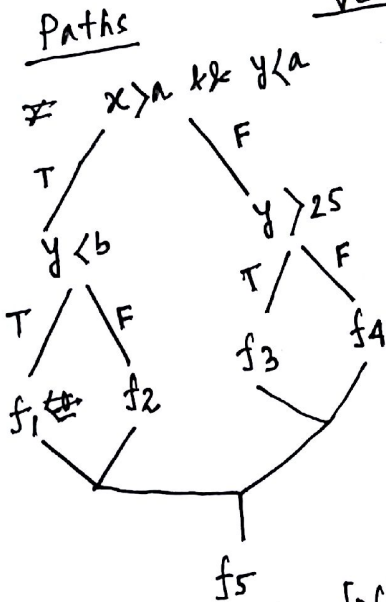
$P(\bar{f}_i)$
 $i = 1, 2, \dots, 5$

indicates the failure probability of function f_i .

$$\begin{aligned}
 P(S_1) &: 0.25 \times 0.3 = 0.075 \\
 P(S_2) &: 0.6 \times 0.3 = 0.18 \\
 P(S_3) &: 0.7 \times 0.075 = 0.0525 \\
 P(S_4) &: 0.075 - 0.0525 = 0.0225 \\
 P(S_5) &: 1 - (0.075 + 0.18 + 0.0525 + 0.0225) \\
 &= 0.67
 \end{aligned}$$

Ver 1

$P(\bar{f}_1) = 0.01$	$P(\bar{f}_1') = 0.005$
$P(\bar{f}_2) = 0.02$	$P(\bar{f}_2') = 0.001$
$P(\bar{f}_3) = 0.001$	$P(\bar{f}_3') = 0.003$
$P(\bar{f}_4) = 0.003$	$P(\bar{f}_4') = 0.003$
$P(\bar{f}_5) = 0.01$	$P(\bar{f}_5') = 0.01$
<u>Ver 1</u>	<u>Ver 2</u>



$$\begin{aligned}
 P(\text{Ver 1 fails}) &= P(S_1) \times [P(\bar{f}_1) + (1 - P(\bar{f}_1)) \times P(\bar{f}_5)] + \\
 &P(S_2) \times [P(\bar{f}_2) + (1 - P(\bar{f}_2)) \times P(\bar{f}_5)] + \\
 &(P(S_3) + P(S_4)) \times [P(\bar{f}_3) + (1 - P(\bar{f}_3)) \times P(\bar{f}_5)] + \\
 &P(S_5) \times [P(\bar{f}_4) + (1 - P(\bar{f}_4)) \times P(\bar{f}_5)] \\
 &= \text{CALCULATE !!}
 \end{aligned}$$

$$\begin{aligned}
 P(\text{Ver 2 fails}) &= (P(S_1) + P(S_2)) \\
 &\times [P(\bar{f}_1') + (1 - P(\bar{f}_1')) \times P(\bar{f}_5)] + \\
 &P(S_3) \times [P(\bar{f}_2') + (1 - P(\bar{f}_2')) \times P(\bar{f}_5)] + P(S_4) \times [P(\bar{f}_3')] \\
 &+ (1 - P(\bar{f}_3')) \times P(\bar{f}_5)] + P(S_5) \times \\
 &[P(\bar{f}_4) + (1 - P(\bar{f}_4)) \times P(\bar{f}_5)] \\
 &= \text{CALCULATE !!}
 \end{aligned}$$

Joint Failure Probability =

$$P(S_1) \times \left[\left(P(\bar{f}_1) + (1 - P(\bar{f}_1)) \times P(\bar{f}_5) \right) \times \left(P(\bar{f}_1') + (1 - P(\bar{f}_1')) \times P(\bar{f}_5) \right) \right]$$
$$+ P(S_2) \times \left[\left(P(\bar{f}_2) + (1 - P(\bar{f}_2)) \times P(\bar{f}_5) \right) \times \left(P(\bar{f}_1') + (1 - P(\bar{f}_1')) \times P(\bar{f}_5) \right) \right] +$$

.....

$$+ P(S_5) \times \left[\left(P(\bar{f}_4) + (1 - P(\bar{f}_4)) \times P(\bar{f}_5) \right) \right]$$

= CALCULATE !!

[The last path is common for both the versions. If this path fails for ver 1, it will also fail for ver 2]