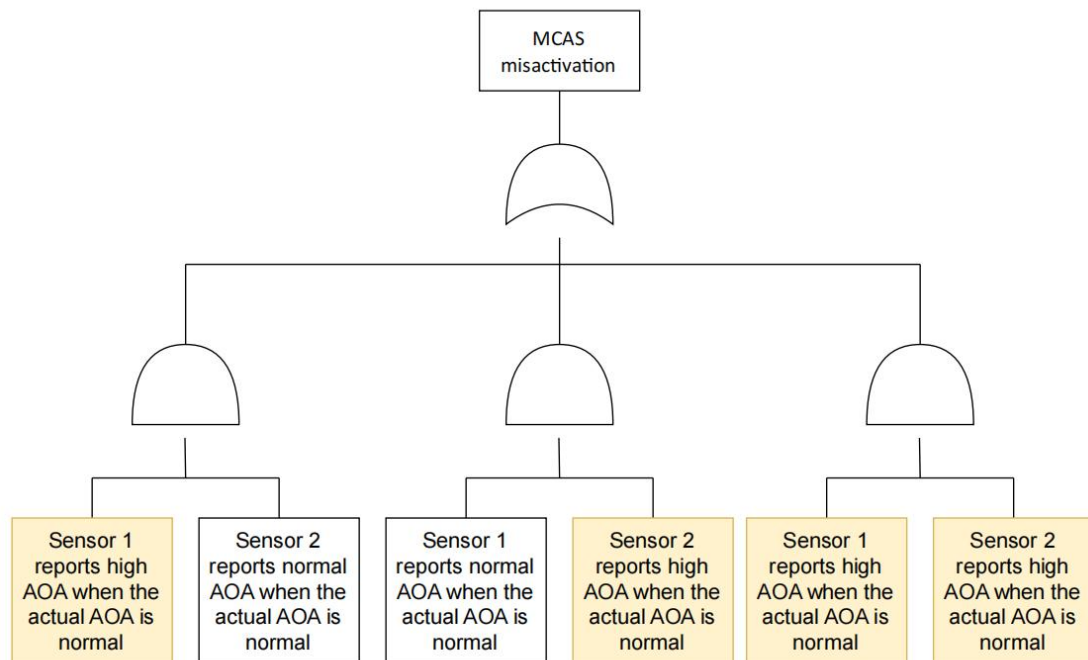


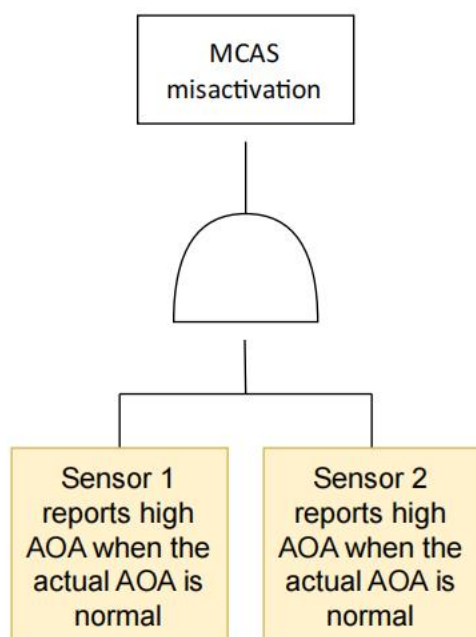
## Answer Sheet: Risk Management Part

### MCAS mis-activation on the faulty design



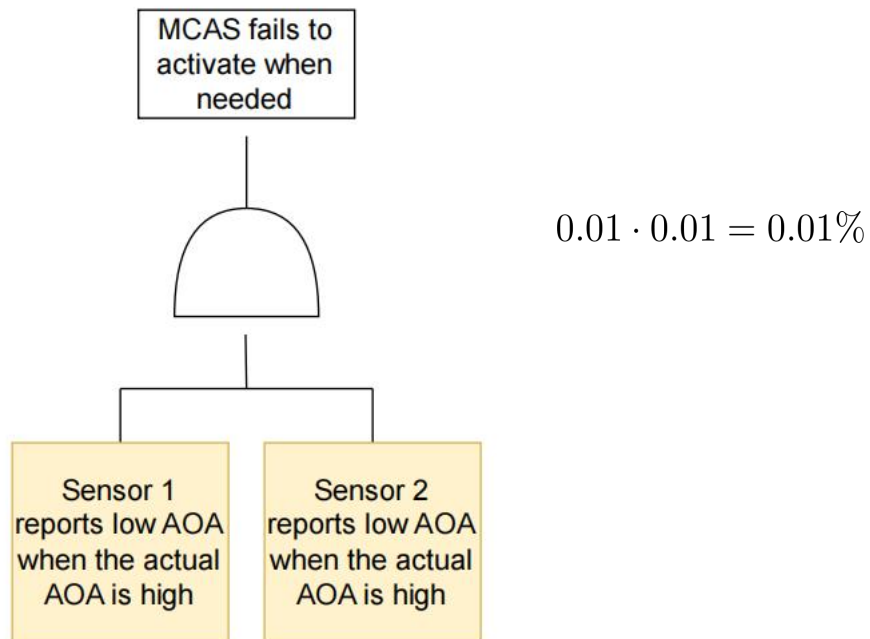
$$0.01 \cdot 0.98 + 0.01 \cdot 0.98 + 0.01 \cdot 0.01 = 1.97\%$$

### MCAS mis-activation on Aggressive Design

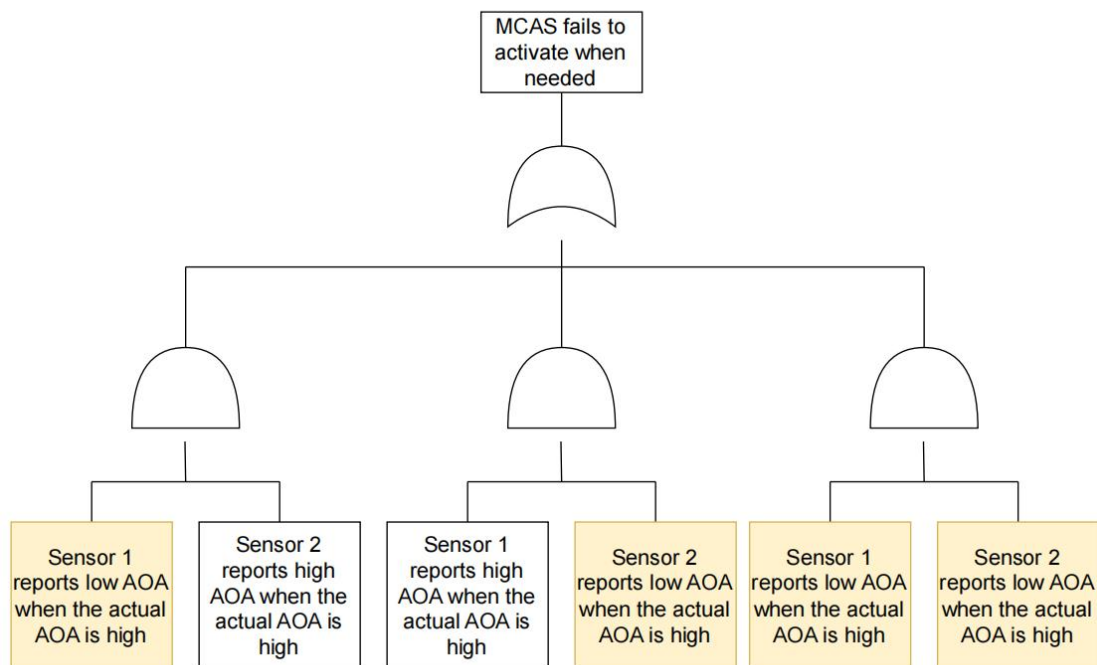


$$0.01 \cdot 0.01 = 0.01\%$$

MCAS fails to activate when needed on the faulty design

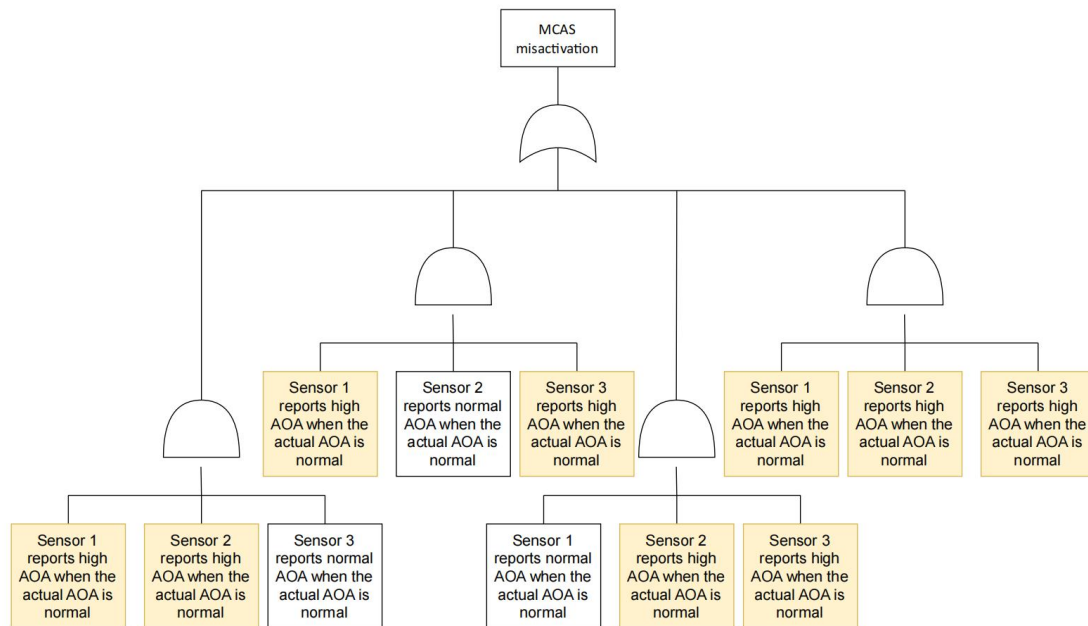


MCAS fails to activate when needed on Aggressive Design



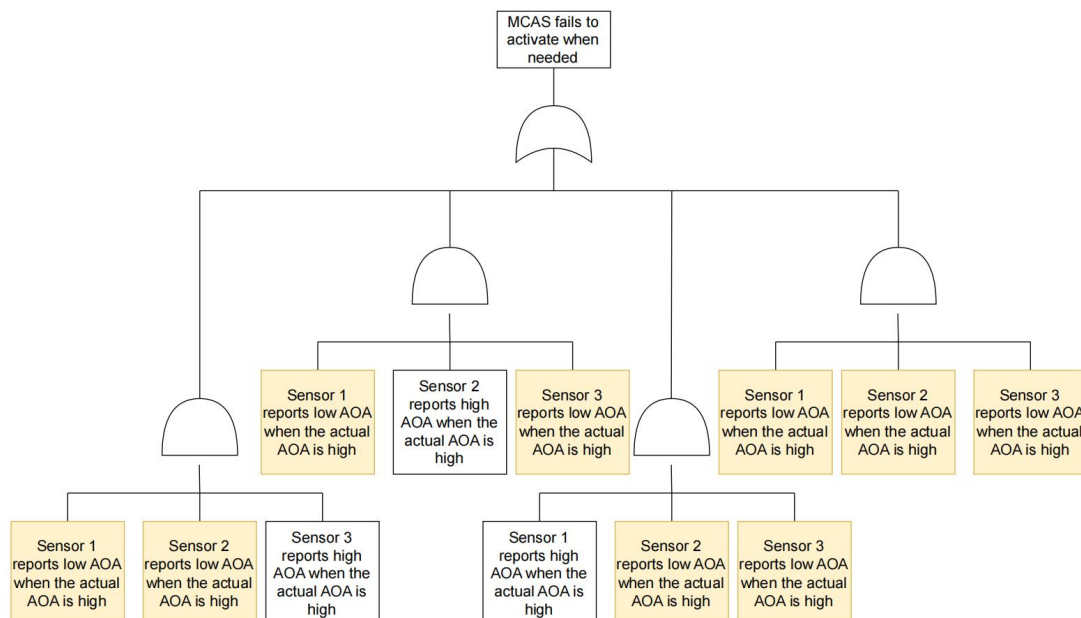
$$0.01 \cdot 0.98 + 0.01 \cdot 0.98 + 0.01 \cdot 0.01 = 1.97\%$$

## MCAS mis-activation on the 2/3 design



$$(0.01 \cdot 0.01 \cdot 0.98) \cdot 3 + 0.01 \cdot 0.01 \cdot 0.01 = 0.0295\%$$

## MCAS fails to activate when needed on 2/3 Design



$$(0.01 \cdot 0.01 \cdot 0.98) \cdot 3 + 0.01 \cdot 0.01 \cdot 0.01 = 0.0295\%$$

2/3 design is an overall better design because it both reduces the probability of mis-activation and activation failure below 1.00%.

Compared to faulty design, 2/3 design does not increase the probability of activation failure very much but sharply decrease the probability of mis-activation.

Compared to aggressive design, 2/3 design does not increase the probability of mis-activation. very much but sharply decrease the probability of activation failure.

	Faulty	Aggressive	2/3
MCAS mis-activation	1.97%	0.01%	0.0295%
MCAS fails to activate when needed	0.01%	1.97%	0.0295%

## Answer Sheet: UPPAAL Part

Required files: greedy.xml, greedy.xtr, polite.xml, and polite.xtr (if necessary)

---

1-a:

knife1\_fork1: there is 1 knife and 1 fork on the table

knife0\_fork1: there is no knife and 1 fork on the table

knife1\_fork0 : there is 1 knife and no fork on the table

knife0\_fork0: there is no knife and no fork on the table

1-b:

---

knife0\_fork1

1-c:

---

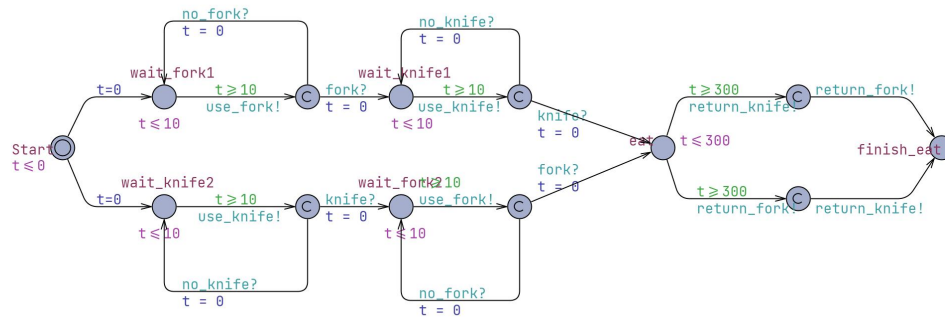
knife0\_fork0

---

2-a: Model File: greedy.xml

---

paste the picture of your template of greedy customer here



2-b:

Query:

A[] gclk > 700 imply GreedyCustomer1.finish\_eat or GreedyCustomer2.finish\_eat

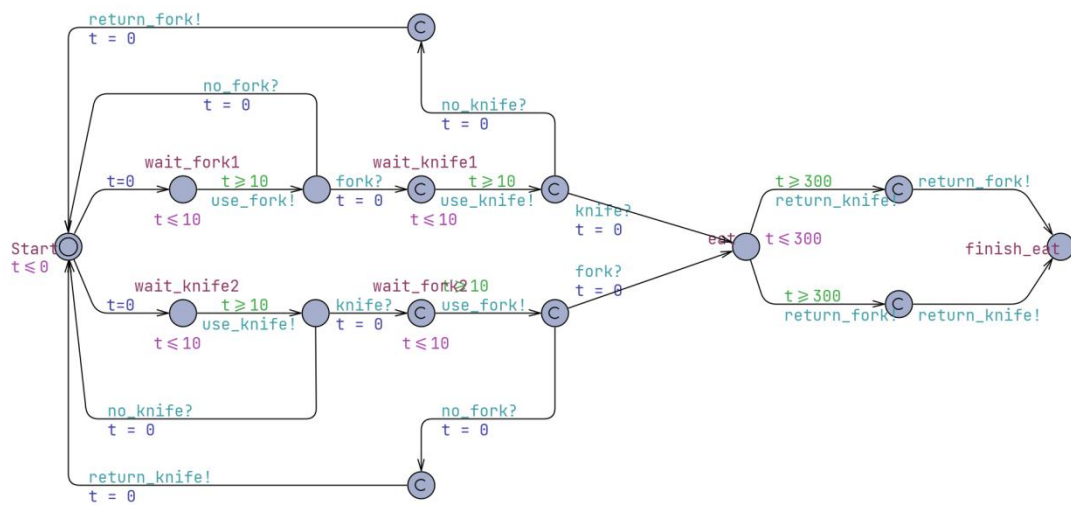
Validation Result:

**Property is not satisfied.**

Counter Example (Trace File): greedy.xtr

3-a: Model File: polite.xml

paste the picture of your template of polite customer here



3-b:

Query:

$A \parallel \text{gclk} == 700 \text{ imply } \text{PoliteCustomer1.finish\_eat} \text{ and } \text{PoliteCustomer2.finish\_eat}$

Validation Result:

Property is satisfied.

Counter example (Trace File): polite.xtr (if necessary)