

# CSE435 Introduction to EDA & Testing - Spring 2022

## Homework Assignment #3

Shao-Hsuan Chu - B073040018

1. (20%) For a D F/F of the following truth table, try to derive a set of function pattern to test this F/F. What functional fault can be detected by your derived pattern.

D	Q	Q(t+1)
0	0	0
1	0	1
0	1	0
1	1	1

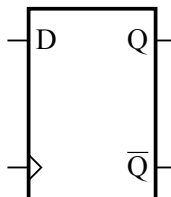


Figure 1: D F/F

**Solution:**

2. (20%) For a T F/F of the following truth table, try to derive a set of function pattern to test this F/F. What functional fault can be detected by your derived pattern.

T	Q	Q(t+1)
0	0	0
0	1	1
1	0	1
1	1	0

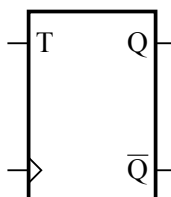


Figure 2: T F/F

**Solution:**

3. (20%) For a J-K F/F of the following truth table, try to derive a set of function pattern to test this F/F. What functional fault can be detected by your derived pattern.

J	K	Q(t+1)
0	0	Q
0	1	0
1	0	1
1	1	$\bar{Q}$

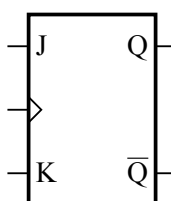


Figure 3: J-K F/F

**Solution:**

4. PLA Faults, Given  $f1=AB+BC+CA+\overline{A}\overline{B}+\overline{B}\overline{C}+\overline{C}\overline{A}$ ,  $f2=AB+BC+CA$ .  
(20%) Please draw AND-Array and OR-Array of Missing Crosspoint Faults in AND-OR Plane, and show the equivalent stuck fault representation.

(a) Missing Crosspoint Faults: Missing C in AND Plane.

**Solution:**

(b) Missing Crosspoint Faults: Missing P1, P3, P5 in f1 in OR Plane.

**Solution:**

5. PLA Faults, Given  $f1=AB+BC+CA$ ,  $f2=\overline{A}\overline{B}+\overline{B}\overline{C}+\overline{C}\overline{A}$ .  
(20%) Please draw AND-Array and OR-Array of Extra Crosspoint Faults in AND-OR Plane, and show the equivalent stuck fault representation.

(a) Extra Crosspoint Faults: Extra  $\overline{B}$  in P1, A in P2, C in P3 in AND Plane.

**Solution:**

(b) Extra Crosspoint Faults: Extra P4, P5, P6 in f2 in OR Plane.

**Solution:**