(procedure)

Designing steps:-

→ observe the problem delivation

→ Determine the required i/p & o/p

→ assign letter symbols to the i/p variables

- Make T.T.

- Determine Boolean Expression

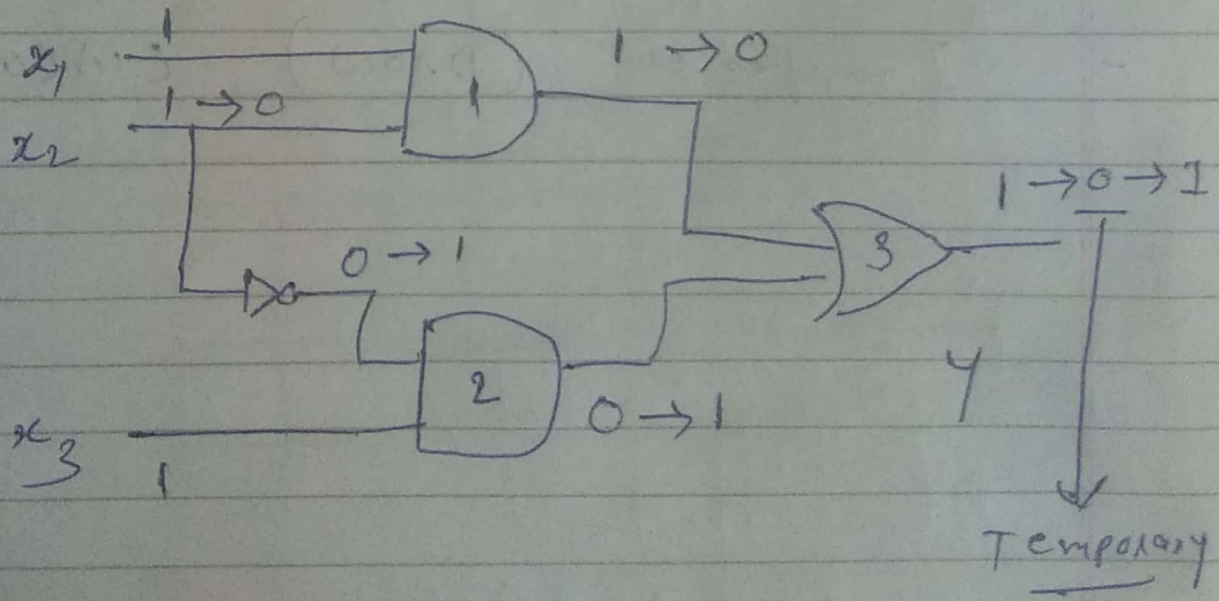
- Implement (draw) circuit.

(problem)

Hazards :-

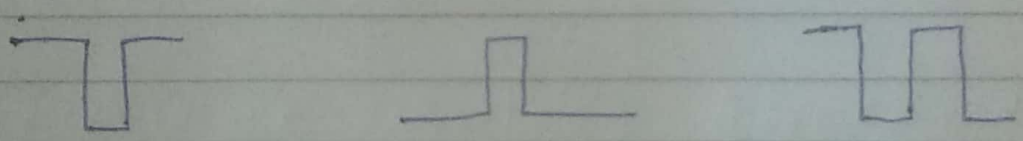
- Hazards are unwanted switching transients that may appear at the output of circuit because of different paths exhibit different propagation delay
- Hazards occur in combinational circuits where they may cause a temporary false output values.

$$Y = x_1 x_2 + \overline{x_2} x_3$$



→ when x_2 changes from 1 to 0, both input at gate 3 may be equal to 0 momentarily, causing the output to go to 0 for the short interval of time

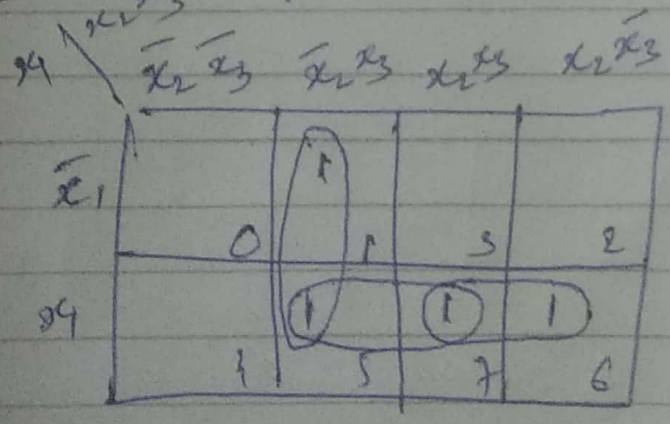
→ when the output momentarily go to 0 when it should remain 1 the hazard is known as static - 1 hazard



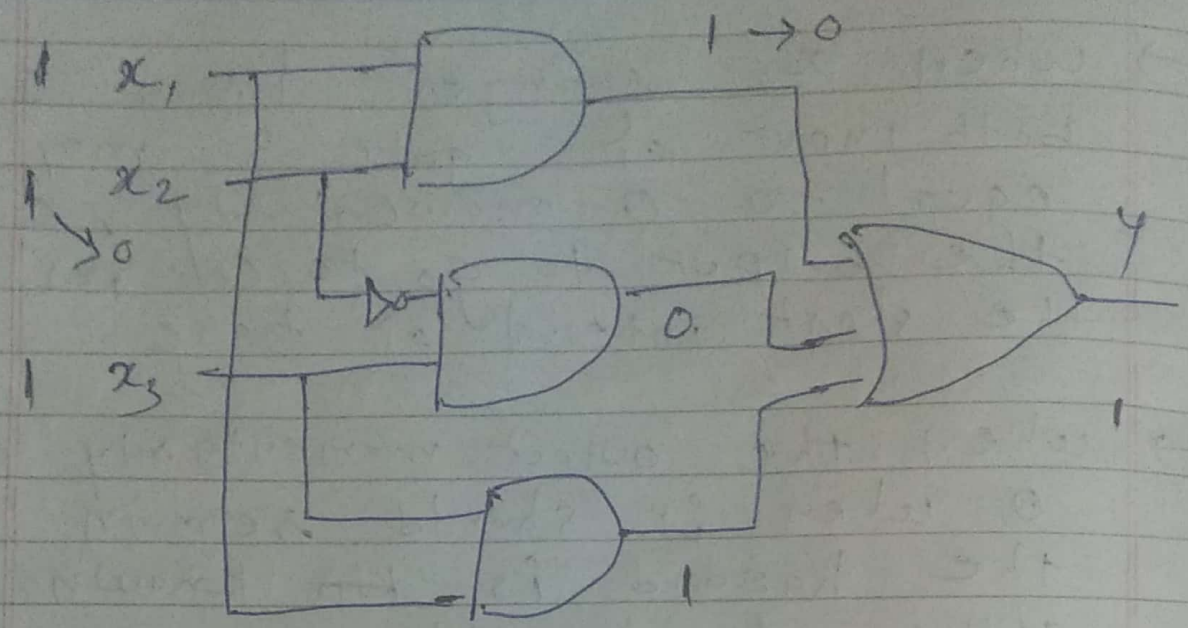
a) static - 1 b) static - 0 c) Dynamic hazard

→ removing

$$y = x_1x_2 + \bar{x}_2x_3$$



$$y = \bar{x}_2x_3 + x_1x_2 + x_1\bar{x}_3$$

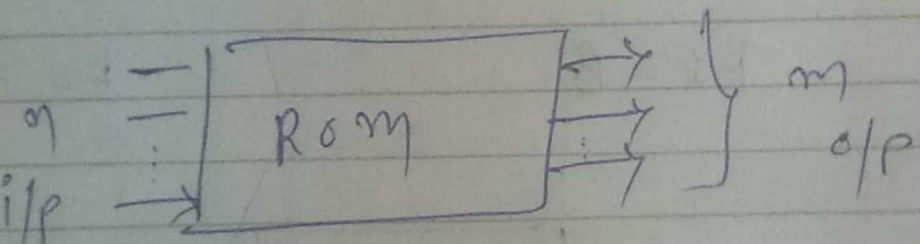


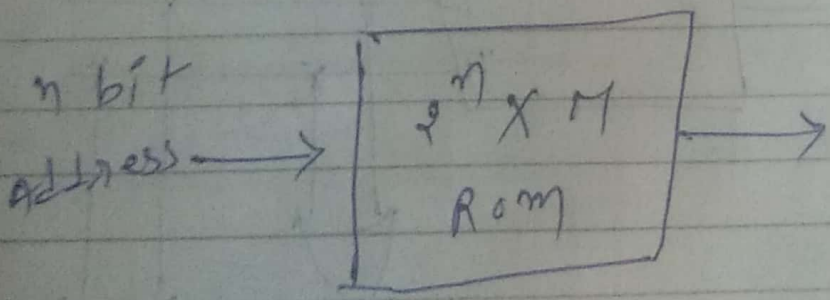
(Prog. Logic Device)

PLD

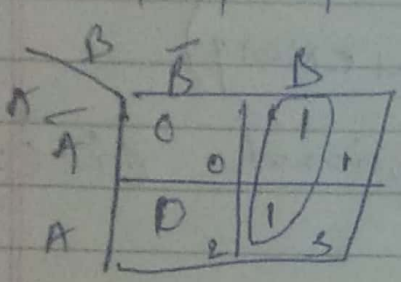
	AND	OR
1) ROM	fixed	prog
2) PLA	prog	prog
3) PAL	prog	fixed

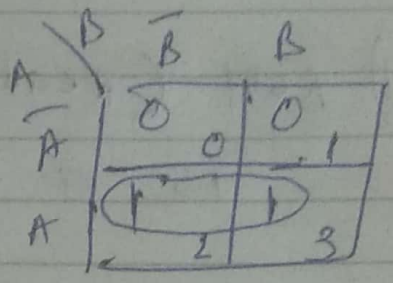
1) ROM (Read only memory)
is a Combinational circuit





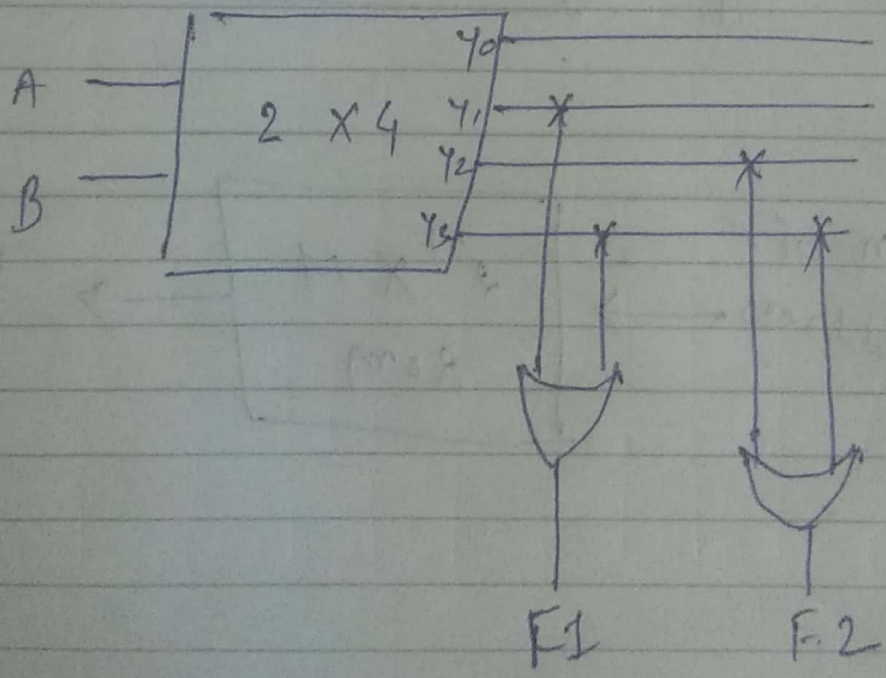
A	B	F1	F2
0	0	0	0
0	1	1	0
1	0	0	1
1	1	1	1





$F1 = B$

$F2 = A$



No. of OR = No. of output (2)

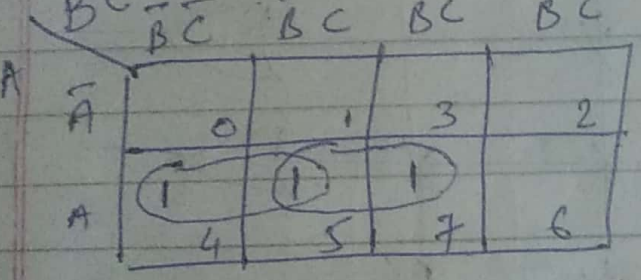
(PLA) → (Prog. Logic Array)

It is PLD with programmable AND gates followed by programmable OR gates

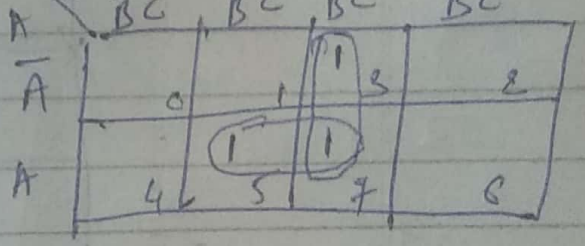
Step 1

A	B	C	Y_1	Y_2
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	0
1	0	1	1	1
1	1	0	0	0
1	1	1	1	1

Y_1



Y_2

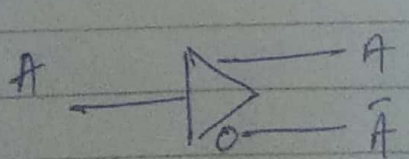


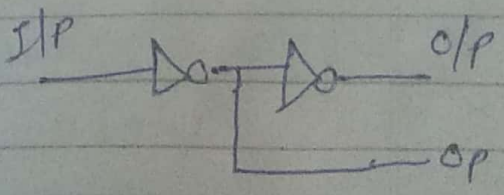
Step 2

$Y_1 = A\bar{B} + AC$

$Y_2 = AC + BC$

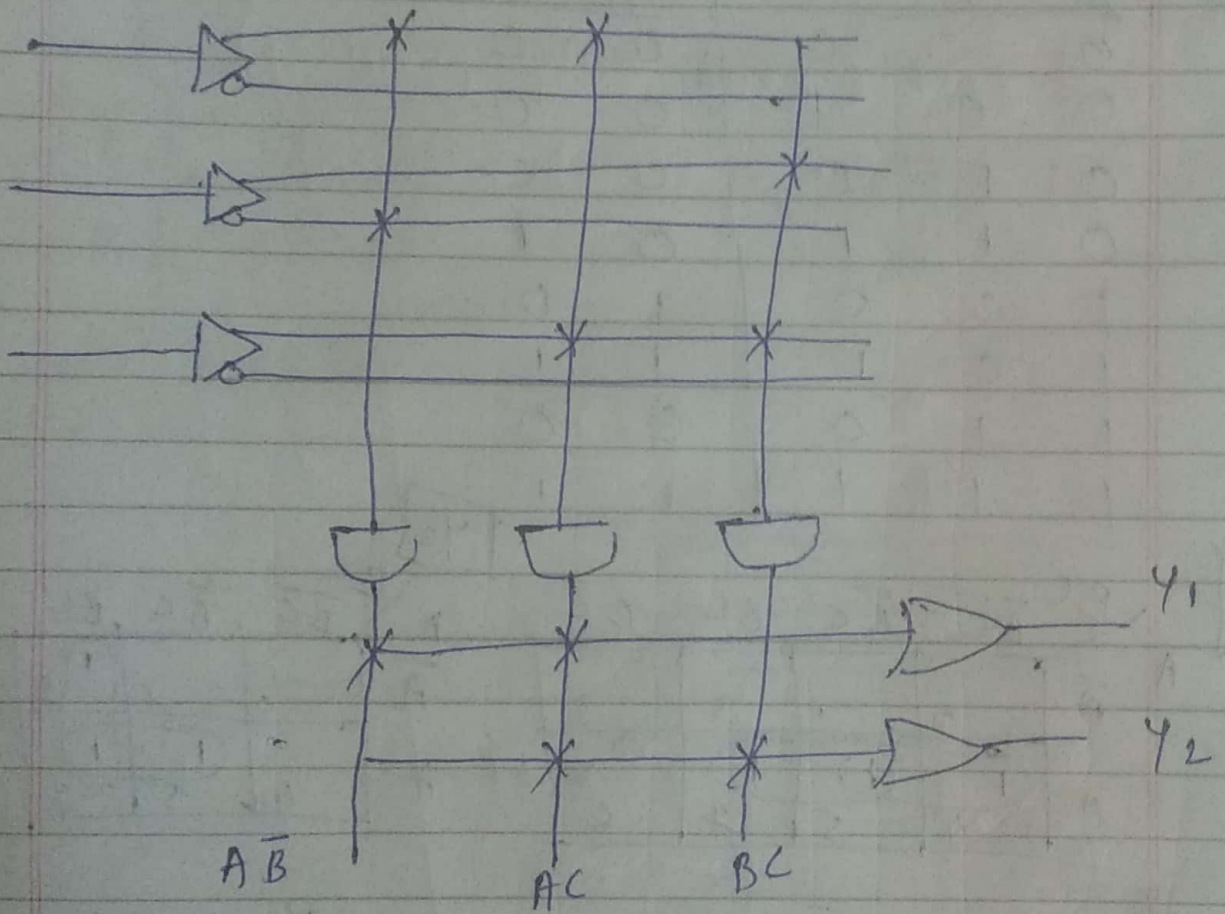
Step 3 No. of i/p Buffer (variable)





No of prog. AND gate = No. of minterm (non-repeatable) in output Expression

$(A\bar{B} + AC + BC) = (3)$

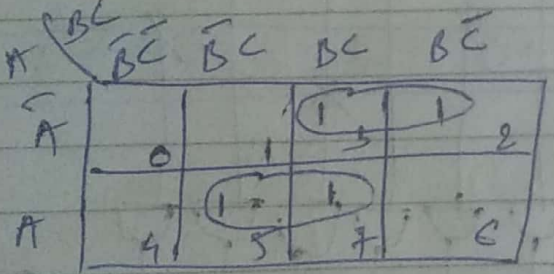


No. prog. OR = No. of function (output) = (2)

(PAL) prog. Array Logic

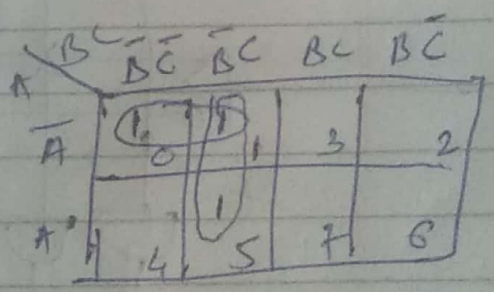
A	B	C	X	Y	Z
0	0	0	0	1	0
0	0	1	0	1	0
0	1	0	1	0	1
0	1	1	1	0	1
1	0	0	0	0	0
1	0	1	1	1	1
1	1	0	0	0	0
1	1	1	1	0	0

(X)



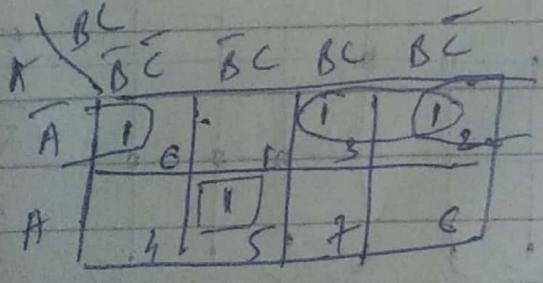
$X = \bar{A}B + AC$

(Y)



$Y = \bar{A}\bar{B} + \bar{B}C$

(Z)



$Z = \bar{A}\bar{C} + \bar{A}B + A\bar{B}C$

No. of i/p Buffer = No. of variable (3)

No. of AND gates = Max no. of minterm (For each function)

3(in z) * 3(fun) = 9

No. of OR gate = No. of output 3