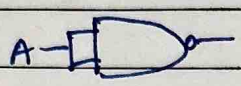
Date : / /
Page:

Assignment 1

Mission 1)

a) NAND (A, A) = NOT (A)



NOT gate

b) NOT (NAND (A, B)) = A AND B

c) $A + B = \overline{\overline{A} \cdot \overline{B}}$

NAND (NAND ($\overline{A}$, A), NAND (B, B)) = A OR B

Mission 2) Truth table

A	B	Sum (S)	Carry (C)
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Boolean expression -

$C = A \cdot B$

$S = A \oplus B$

circuit = XOR + AND

Date : / /
Page:

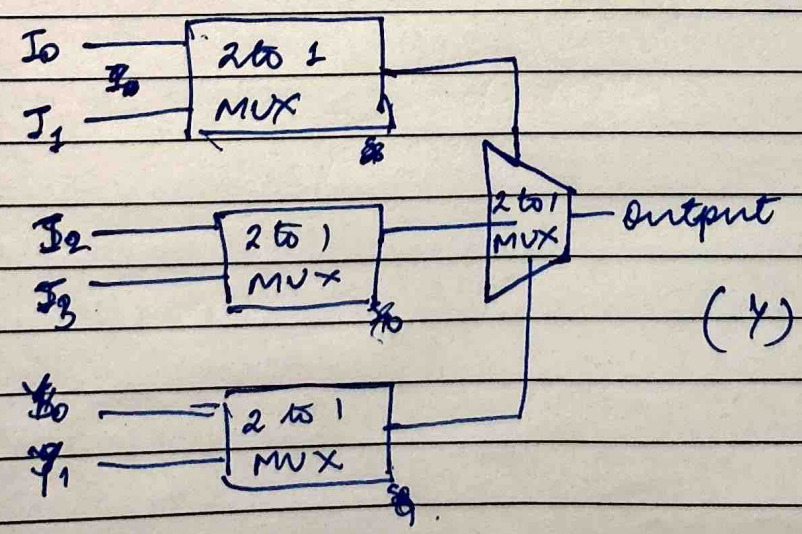
Mission 3) Truth Table

S_1	S_0	Output
0	0	I_0
0	1	I_1
1	0	I_2
1	1	I_3

MUX_0 Input = I_0, I_1
Select = S_0
Output = Y_0

MUX_1 Input = I_2, I_3
Select = S_0
Output = Y_1

MUX_2 Input = Y_0, Y_1
Select = S_1
Output = Y

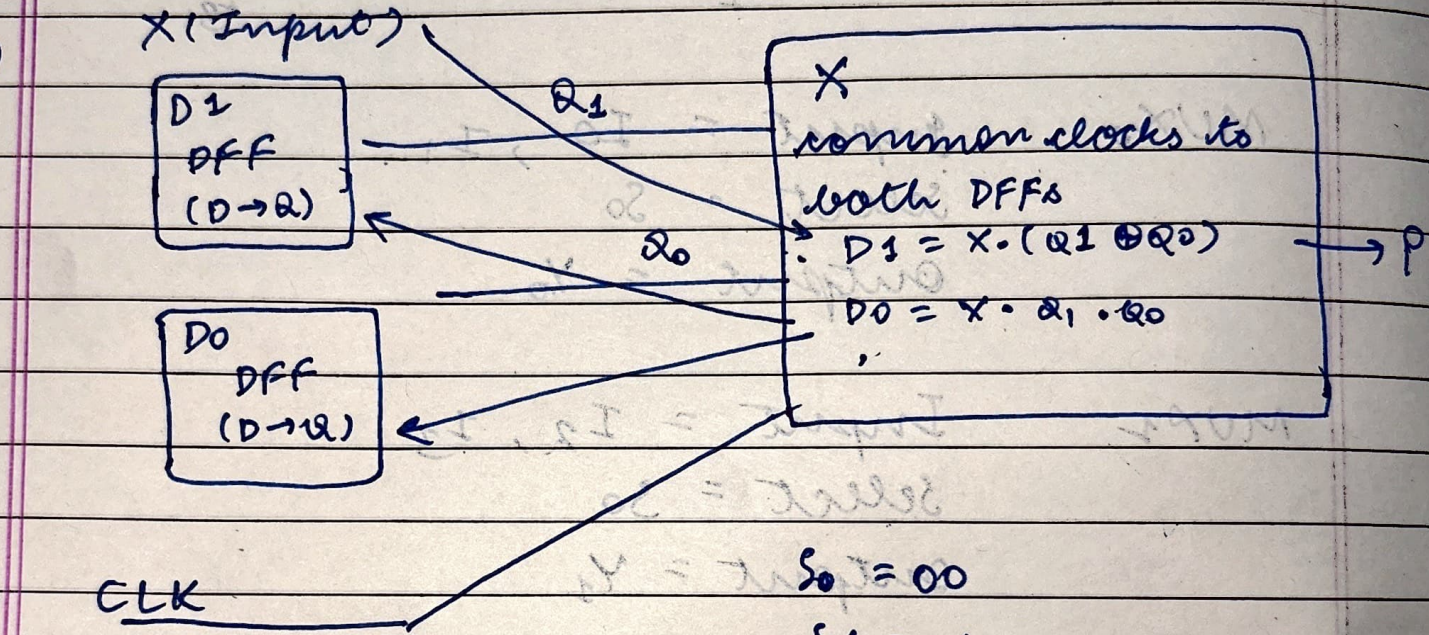


Mission 4. a) current input x(t) prev. x(t-1) and x(t-2)

circuit can keep x(t-1) and x(t-2)

⇒ ~~2~~ 2 D flip flops to decide last 3 inputs (1 1 1)

b)



S0 = 00

S1 = 01

S2 = 10

DFFs = Q1, Q0

Date : __/__/__
Page: _____

Mission 5

Q_1 toggles when $Q_0 = 1$

a)

Current Q_1Q_0	Next Q_1Q_0
00	01
01	10
10	11
11	00

b) $D_0 = \bar{Q}_0$

$D_1 = Q_1 \oplus Q_0$

c)