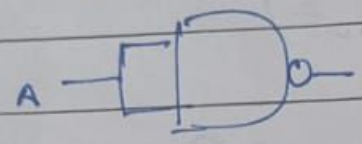
Date __/__/__
Intimate

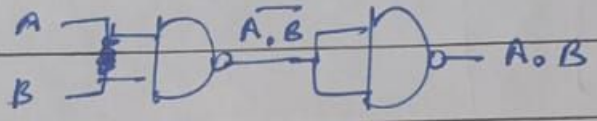
Mission ① →

(a) NOT gate

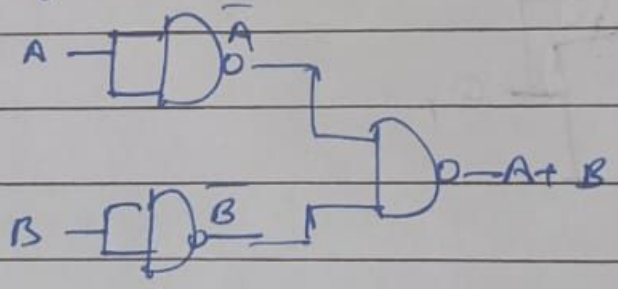


$\Rightarrow (\bar{A}A) = \bar{A}$

(b) And gate



(c) OR gate



Mission ② →

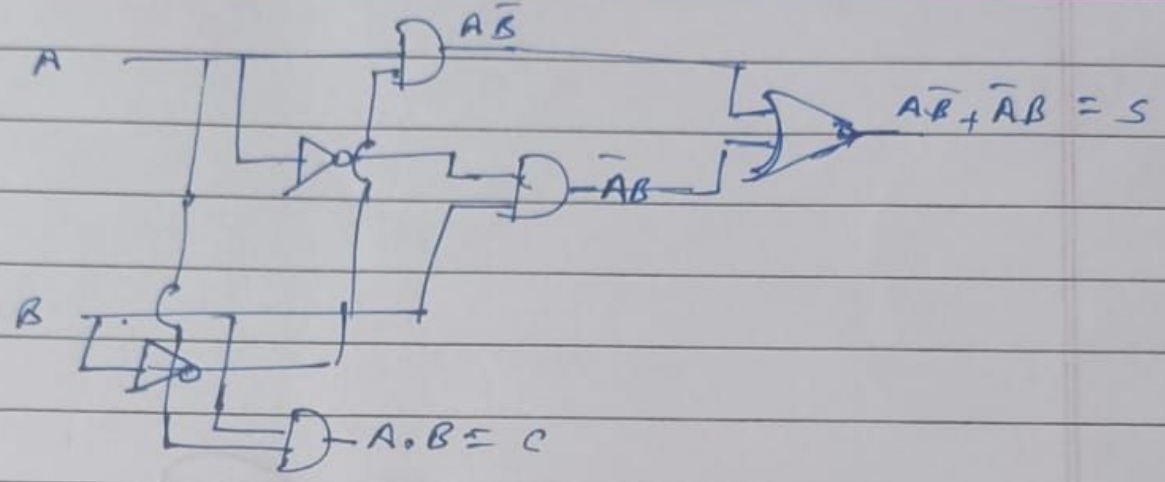
(a)

A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

(b) $S = A \oplus B = A\bar{B} + \bar{A}B$

$C = A . B$

(c)



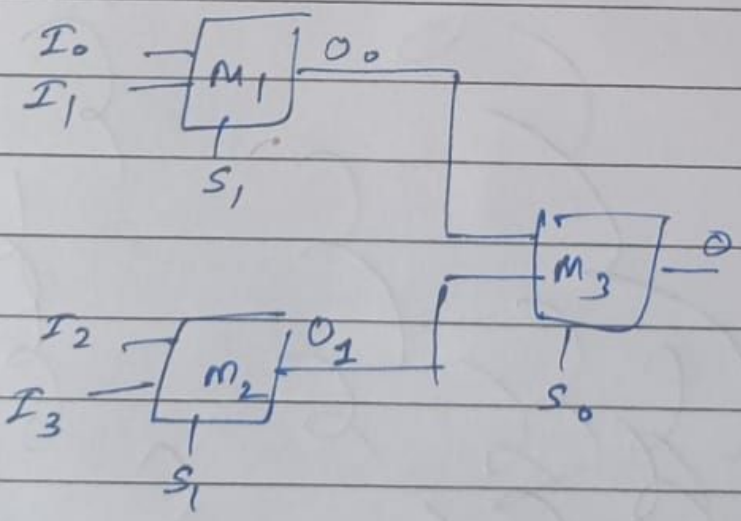
Mission (2) →

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

$O_0 = I_0 \bar{S}_1 + I_1 S_1$

$O_1 = I_2 \bar{S}_1 + I_3 S_1$

$O = O_0 \bar{S}_0 + O_1 S_0$



Date __/__/__
Intimate

Mission ④ :-

S_0 = reset

S_1 = 1

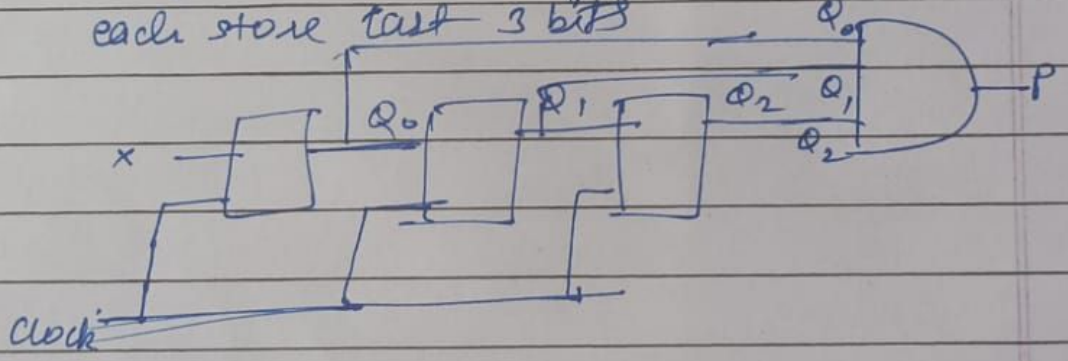
S_2 = 11

S_3 = 111

(a) 3 D-flip flops are needed

each store last 3 bits

(b)



Mission ⑤ :-

(a)

Current $Q_1 Q_0$	Next $Q_1^+ Q_0^+$
00	01
01	10
10	11
11	00

for D-flip flops, $D = Q(n+1)$ → for next state always

Date __/__/____
Intimate

(b) for Q_0 (0 → 1 → 0 → 1)

do, $Q_0^+ = \bar{Q}_0 \Rightarrow D_0 = \bar{Q}_0$

for Q_1, 0 → 1 when $Q_0 = 1$
or 1 → 0

i.e. sum bit → $D_1 = Q_1 \oplus Q_0$