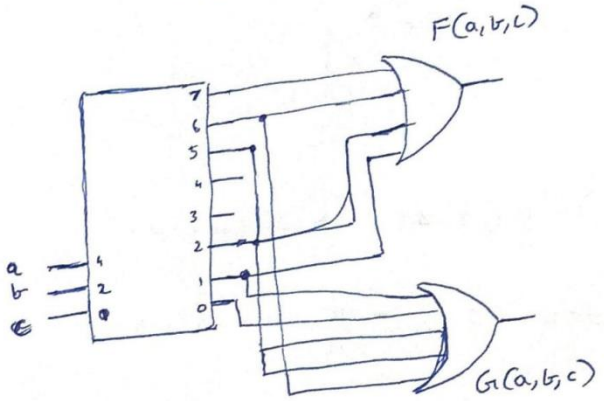
Ece home assignment
CB.EN.U4CSE20465

1) $F(a,b,c) = \Sigma m(1,2,6,7)$ $G(a,b,c) = \Sigma m(0,1,2,5,6)$

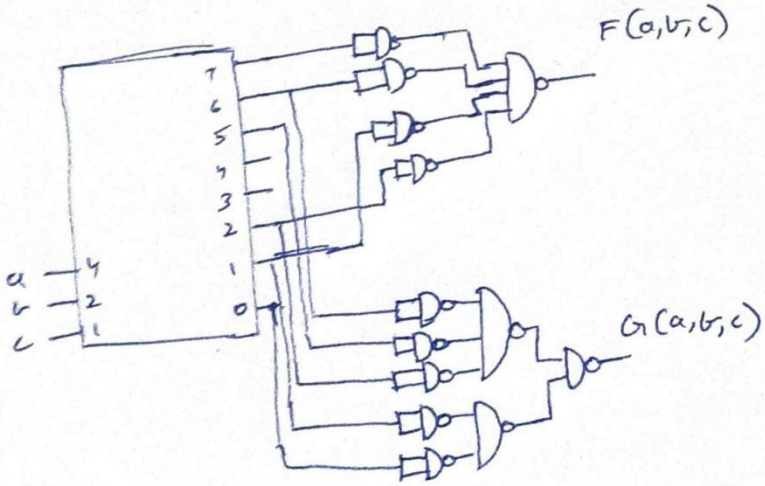
functions F and G with single decoder

→ minterms of F : 1, 2, 6, 7 G : 0, 1, 2, 5, 6

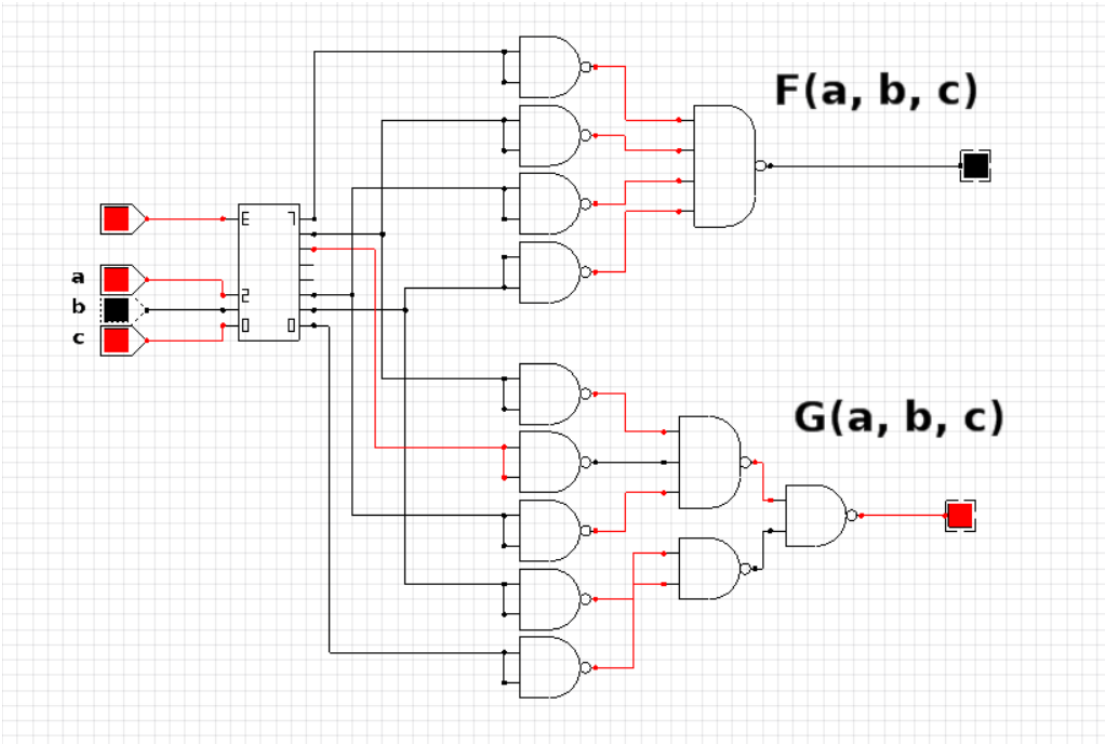
we need 3 × 8 Decoder



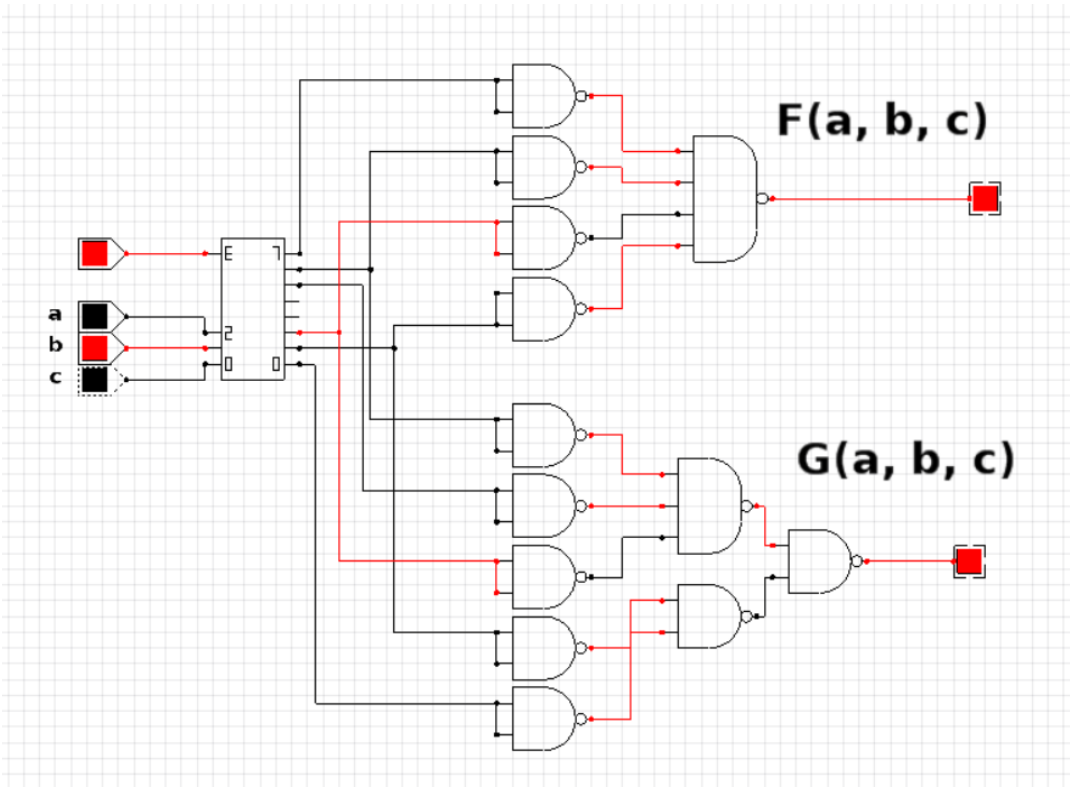
with nand gate

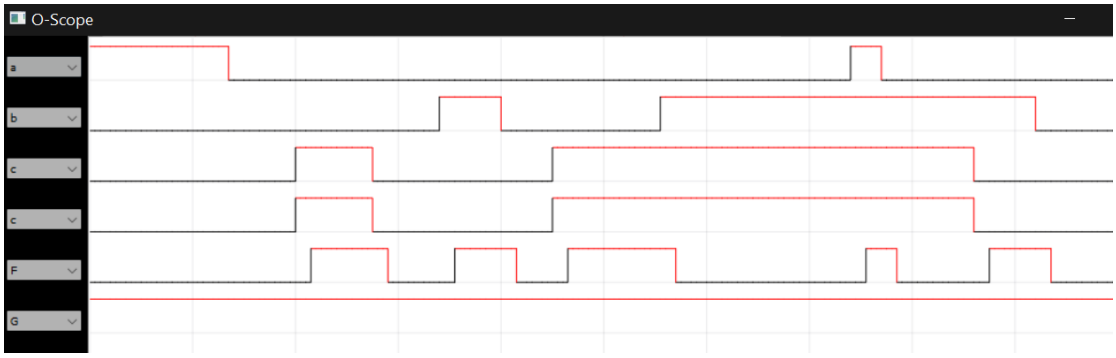


A-1 b-0 c-1 : 5
=> f(a, b, c) should give 0
And g(a, b, c) should give 1

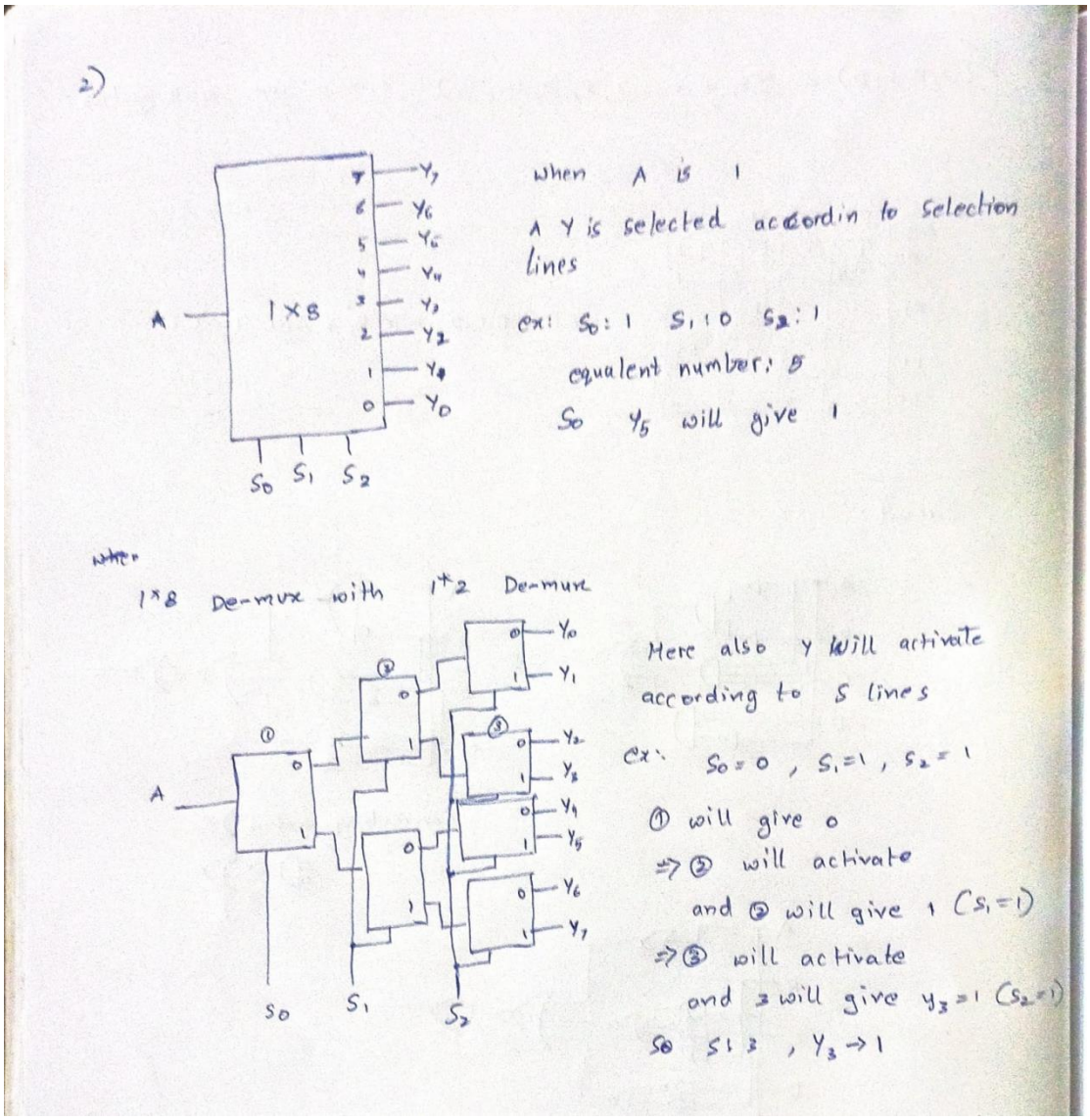


A-0 b-1 c-0 : 2
=> f(a, b, c) should give 1
And g(a, b, c) should give 1





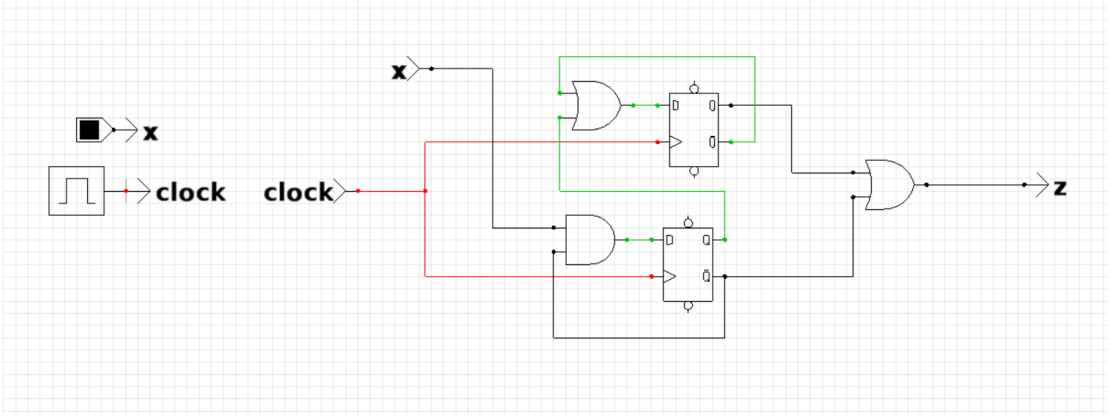
2. 1*8 de-mux and 1*8 de-mux from 1*2 de-mux



3.

A sequential circuit with two D flips- flops A and B, one input x, and one output z is specified by the following next state and output equations: A (t+1) = A'+B, B(t+1)= B'x, z=A+B'. (i) Draw the logic diagram of the circuit. (ii) Derive the state table (iii) Draw the state diagram of the circuit and simulate its behavior using a simulation tool.

(i)



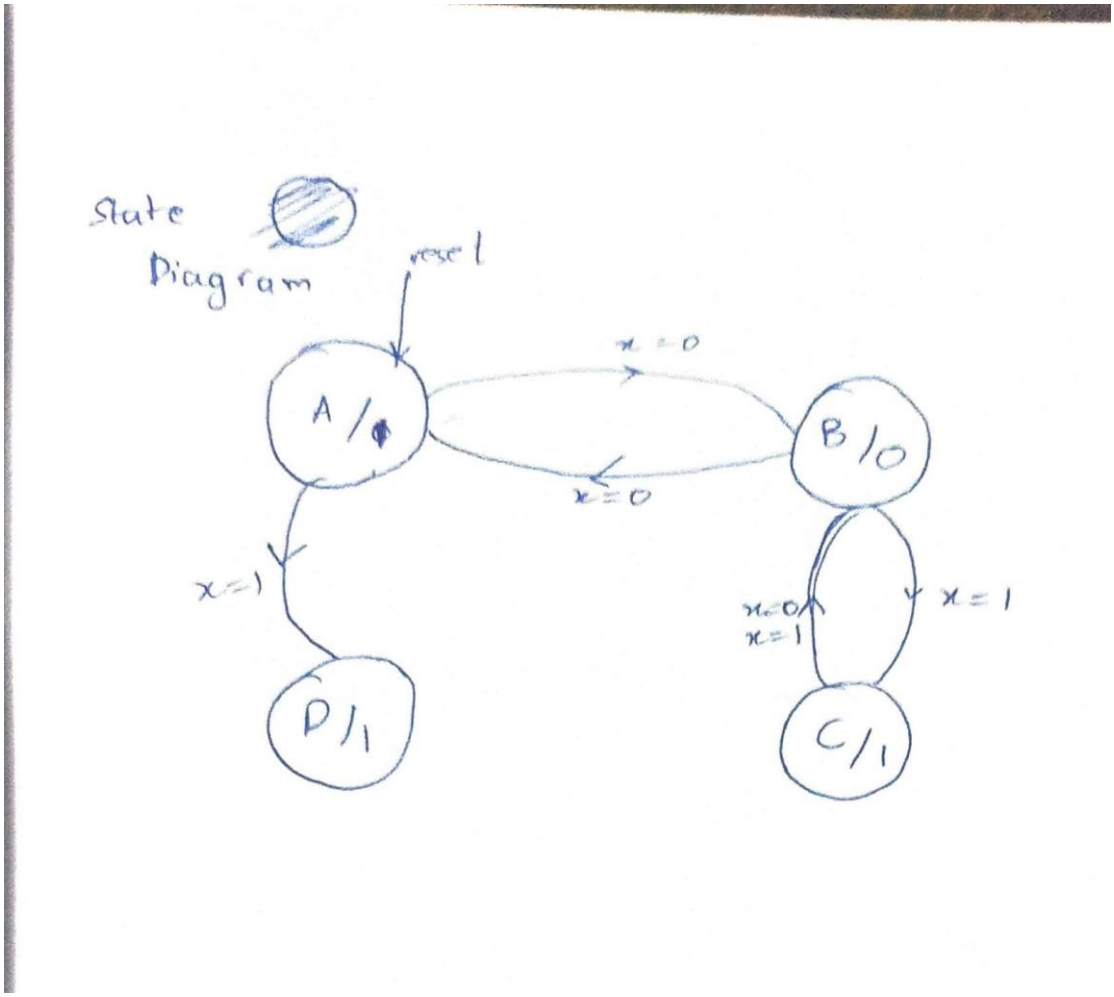
(ii)

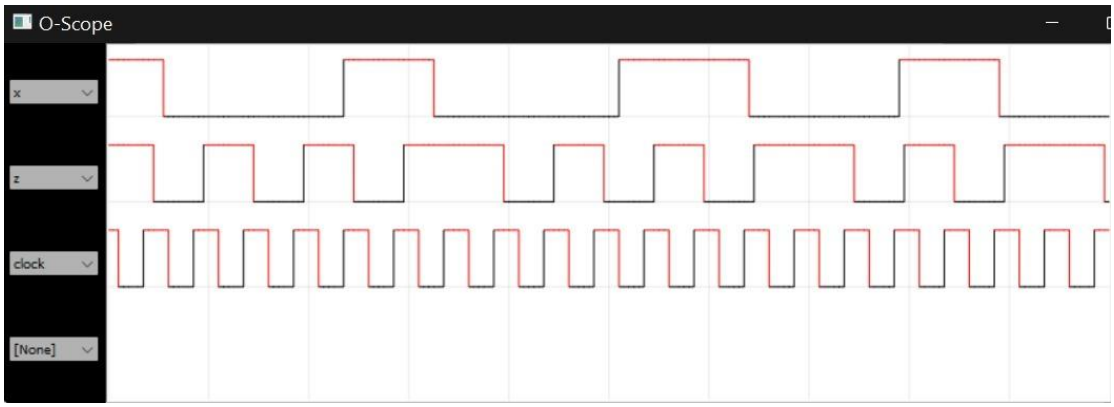
State table

Present State	Next State x=0	Next State x=1	output
BA	BA	BA	Z
00	01	11	1
01	00	10	0
10	01	01	1
11	01	01	1

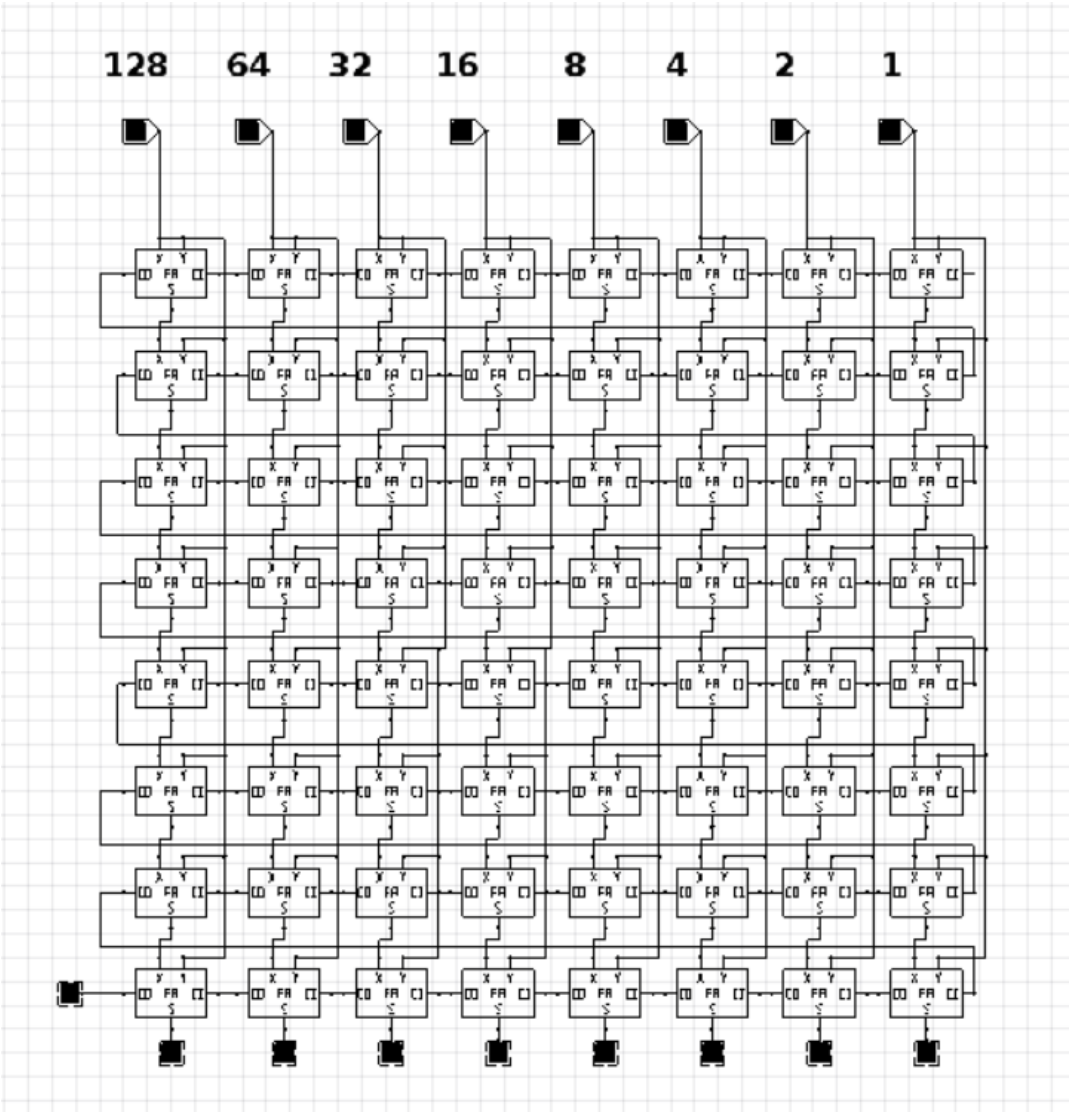
BA	x=0 BA	x=1 BA	Z
A	B	D	1
B	A	C	0
C	B	B	1
D	B	B	1

(iii)

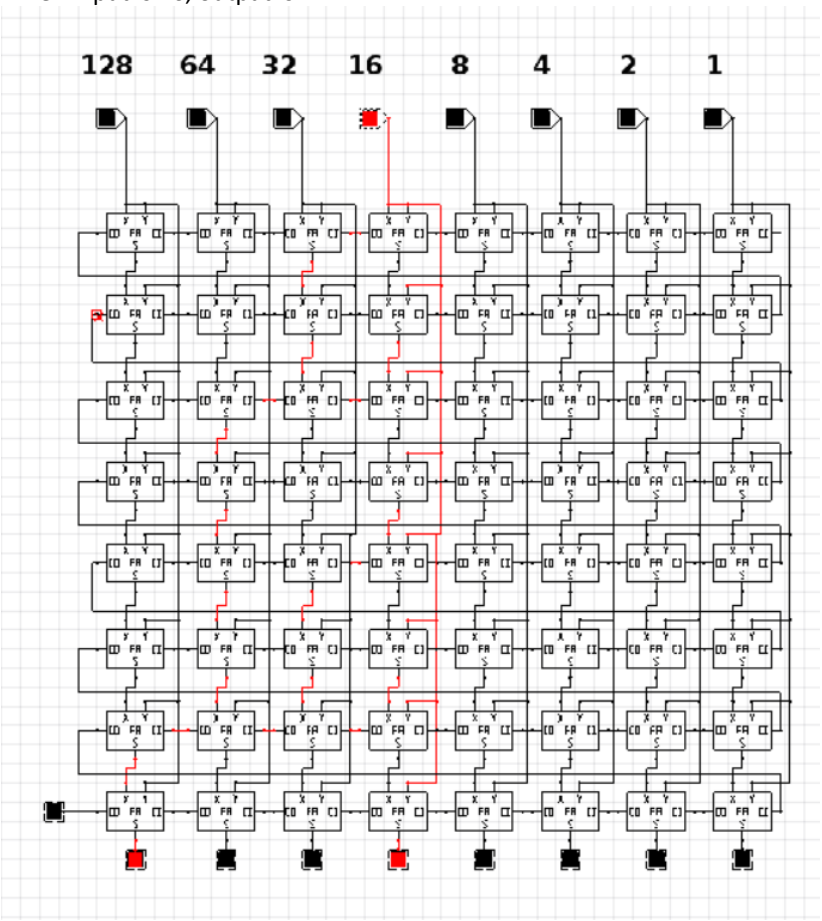

State
Diagram
reset
A/1
B/0
D/1
C/1
x=0
x=0
x=1
x=0
x=1
x=1


O-Scope
x
z
clock
[None]

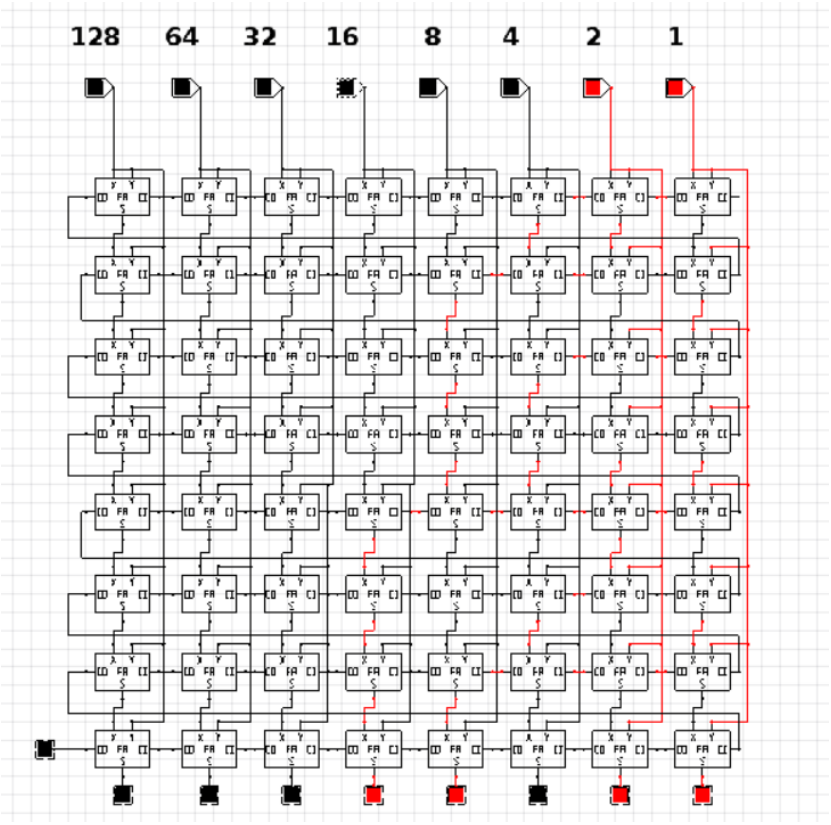
4. Design a circuit using a single ripple adder for computing the value of y given y = 9x, where x is an 8-bit number. Simulate for four different values of x.



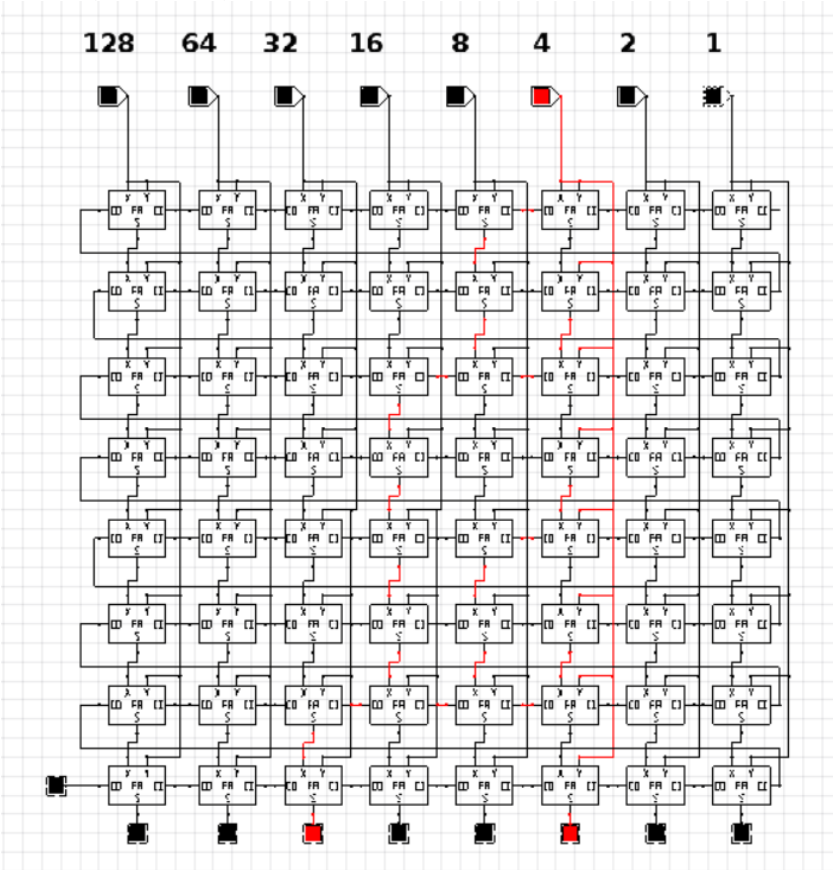
When input is 16, output is 144



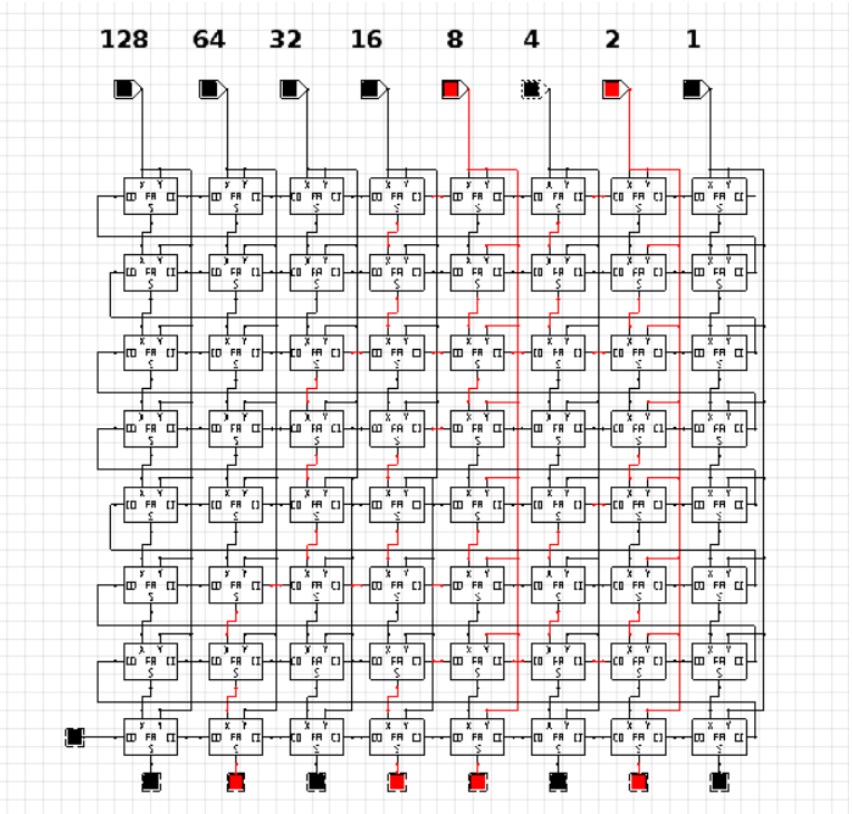
When input is 3, output is 27



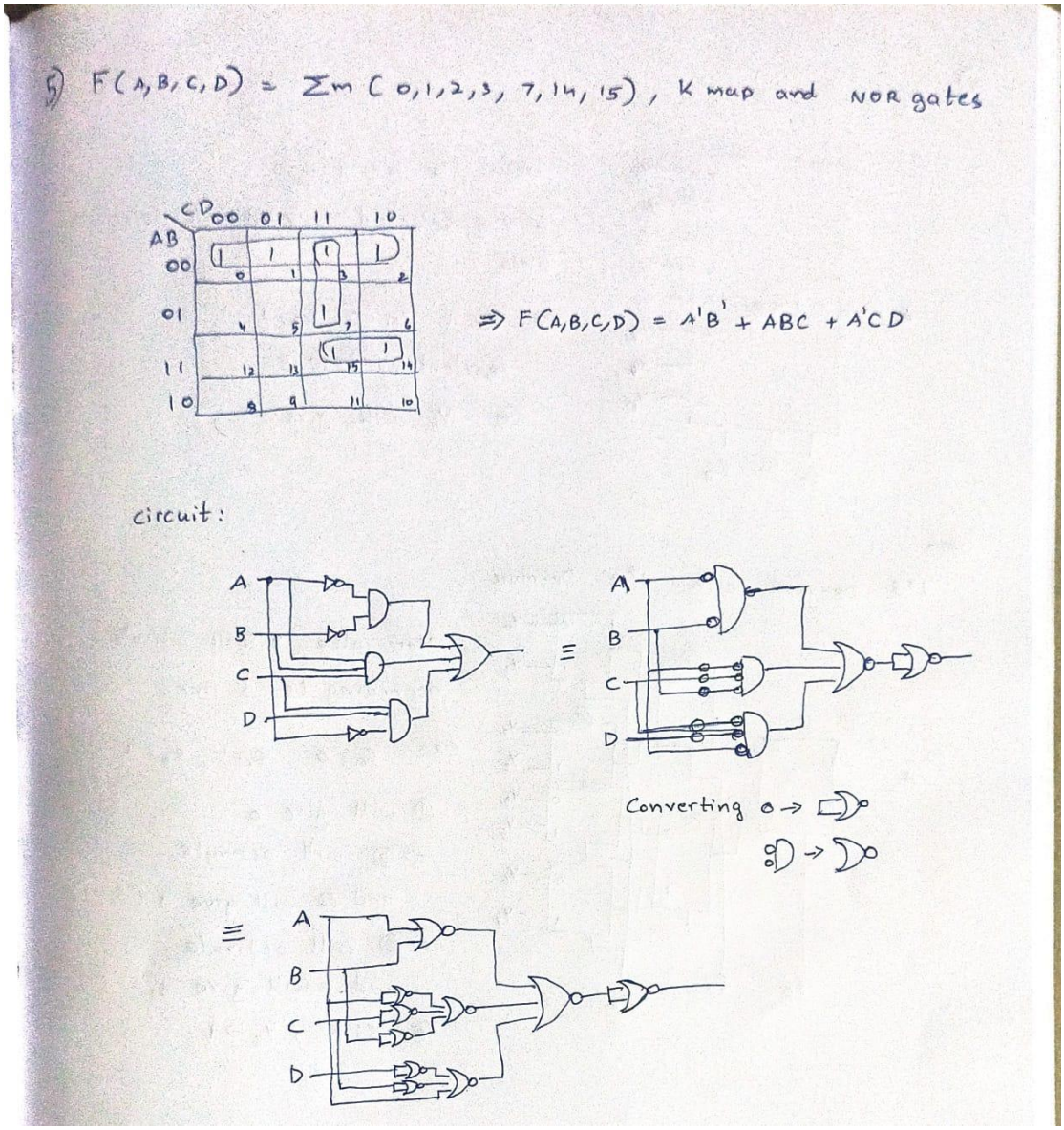
When input is 4, output is 36



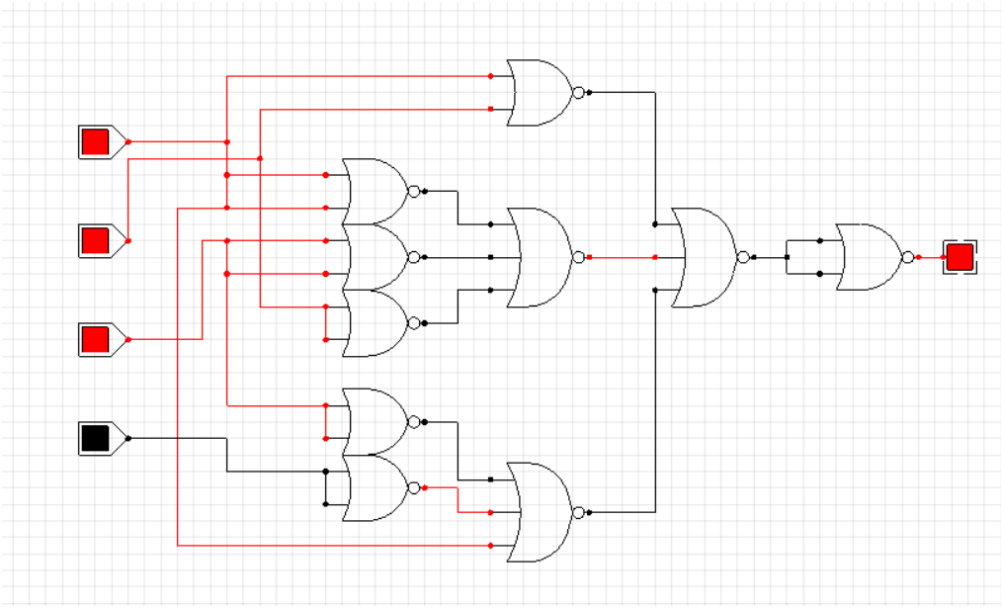
When input is 10, output is 90:


128
64
32
16
8
4
2
1

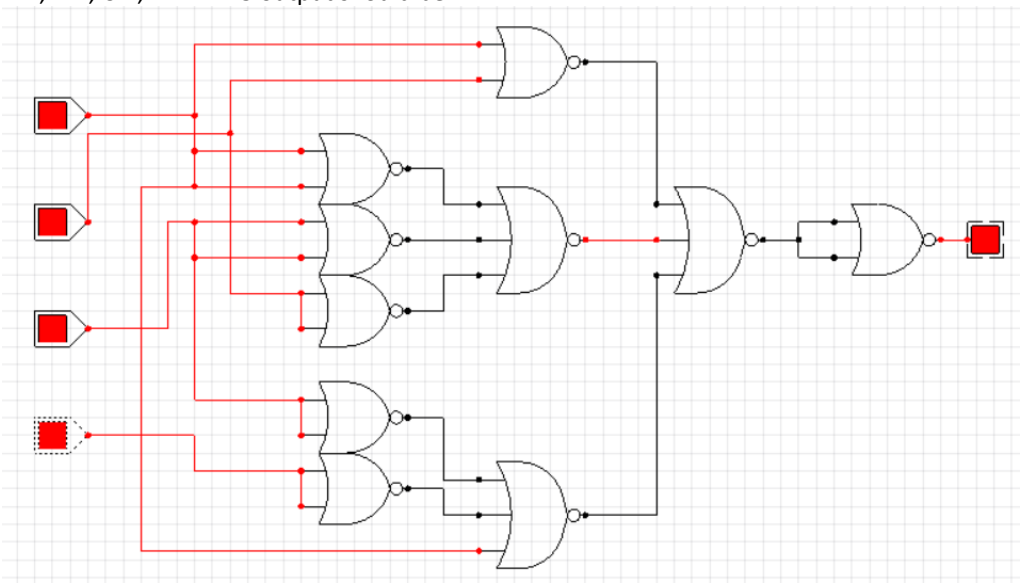
5.



When
A-1, B-1, C-1, D-0 => 14 output should be 1



A-1, B-1, C-1, D-1 => 15 output should be 1



A-1, B-0, C-0, D-0 => 8 output should be 0