OHAJI JUDE-THADDEUS
15/ENG01/040 COMPUTER ENG
COE 506 ASSIGNMENT

(1) $A(x_1 x_2 x_3 x_4) = \sum m(3, 7, 8, 9, 11, 15)$

$B(x_1 x_2 x_3 x_4) = \sum m(3, 4, 5, 7, 10, 14, 15)$

$C(x_1 x_2 x_3 x_4) = \sum m(1, 5, 7, 11, 15)$

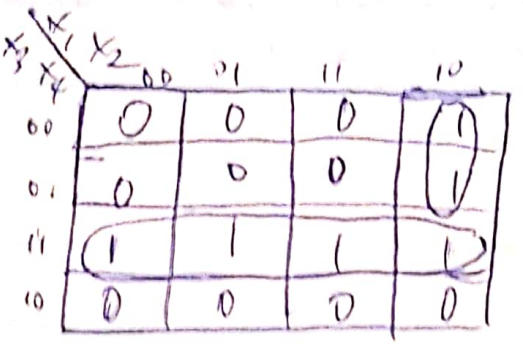
Truth table

x_1	x_2	x_3	x_4	A	B	C
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	0	0
0	0	1	1	1	1	0
0	1	0	0	0	1	0
0	1	0	1	0	1	1
0	1	1	0	0	0	0
0	1	1	1	1	1	1
1	0	0	0	0	0	0
1	0	0	1	1	0	0
1	0	1	0	0	1	0
1	0	1	1	1	0	1
1	1	0	0	0	0	0
1	1	0	1	0	0	0
1	1	1	0	0	1	0
1	1	1	1	1	1	1

Representation of the outputs in Boolean Boolean Expression

:

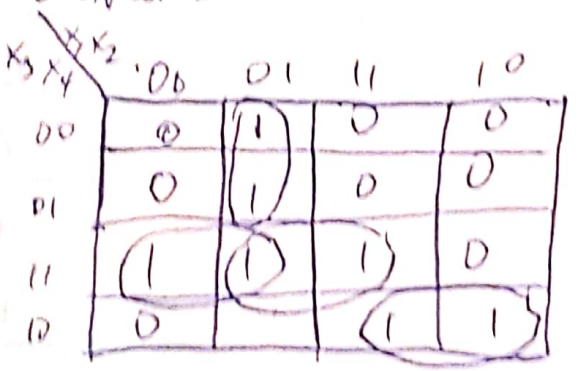
Output A :



x_3x_4 \ x_1x_2	00	01	11	10
00	0	0	0	1
01	0	0	0	1
11	1	1	1	1
10	0	0	0	0

$A = x_1 \bar{x}_2 \bar{x}_3 + x_3 x_4$

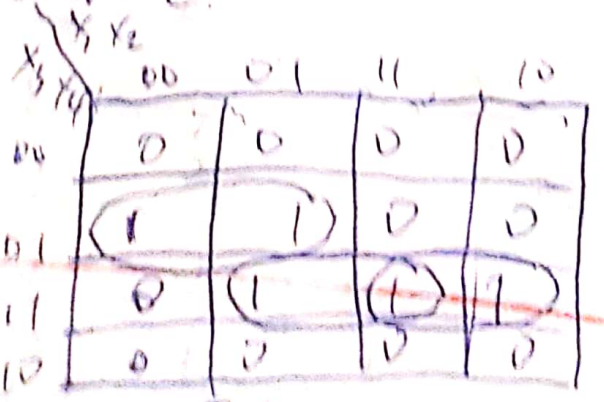
Output B :



x_3x_4 \ x_1x_2	00	01	11	10
00	0	1	0	0
01	0	1	0	0
11	1	1	1	0
10	0		1	1

$B = \bar{x}_1 x_2 \bar{x}_3 + \bar{x}_1 x_3 x_4 + x_2 x_3 x_4 + x_1 x_3 \bar{x}_4$

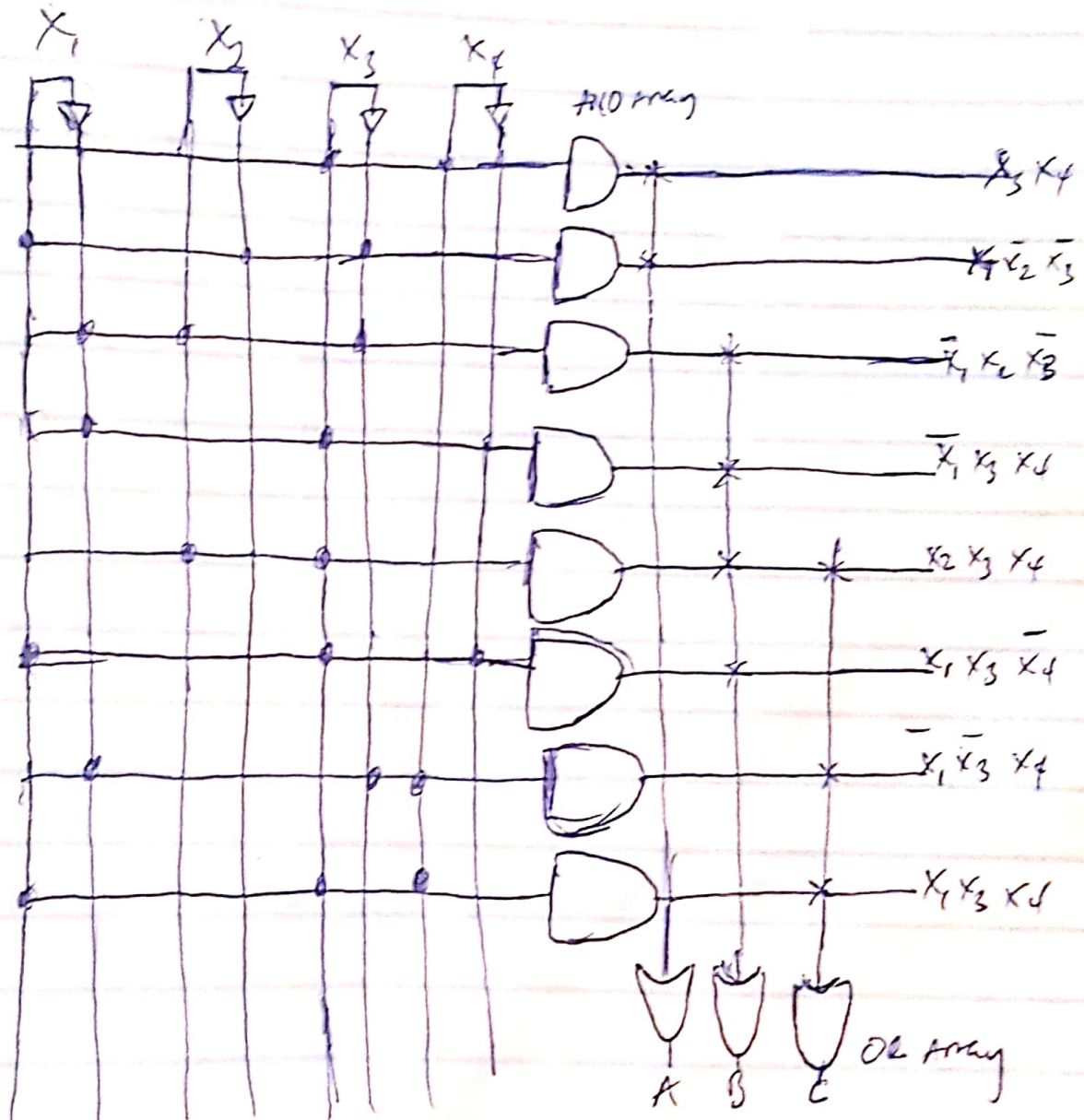
Output C :



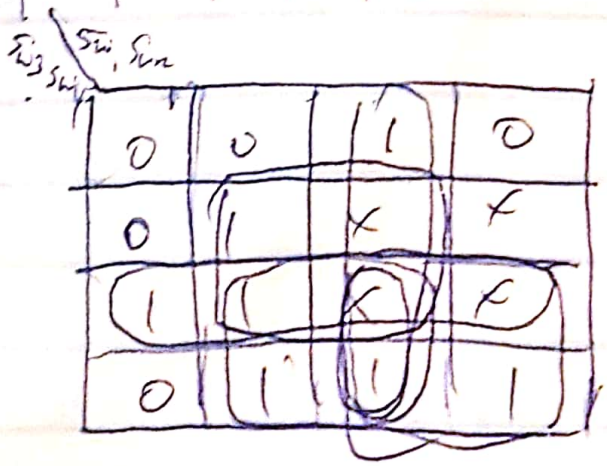
x_3x_4 \ x_1x_2	00	01	11	10
00	0	0	0	0
01	1	1	0	0
11	0	1	1	1
10	0	0	0	0

$C = \bar{x}_1 \bar{x}_3 x_4 + x_2 x_3 x_4 + x_1 x_3 \bar{x}_4$

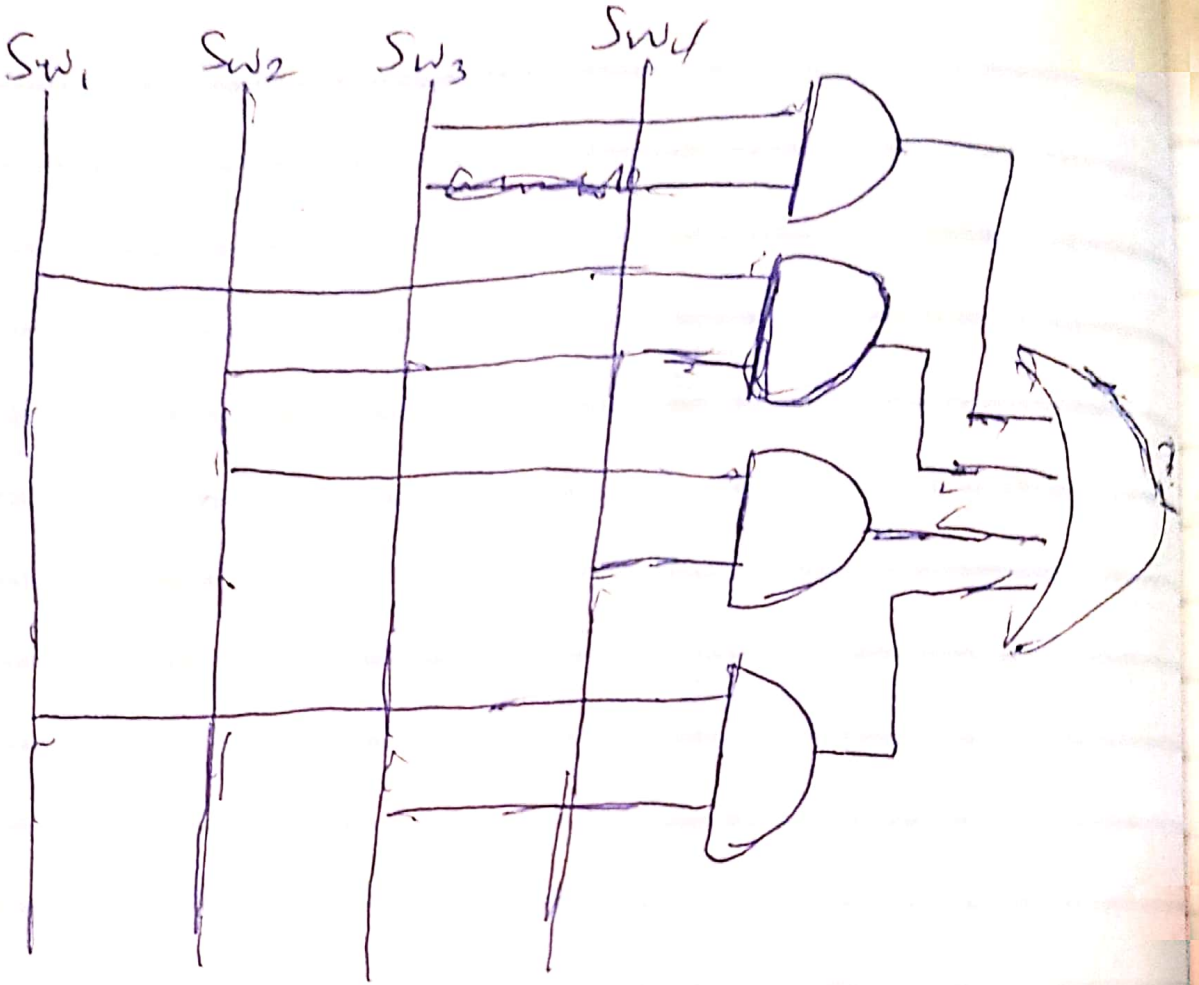
Logic circuit Design: Implementation using PLA



(2)



$X = \bar{S}w_3 \bar{S}w_4 + \bar{S}w_1 \bar{S}w_2 + \bar{S}w_2 \bar{S}w_4 + \bar{S}w_1 \bar{S}w_3$



Code:

```
Library ieee;
Use ieee.std_logic_1164.all;
entity switches is
port (swa, swb, swc, swd : in std_logic; x : out std_logic);
        end switches
Architecture dataflow of switches
x <= ((swc and swd) or
      (swa and swb) or
      (swb and swd) or
      (swa and swc));
end dataflow;
```