CS2100 - Tutorial 9 - Logic Gates & Simplification

1(a). To generate truth table for POS:

For each sum term:

find out which combinations of variables give '1's

Rest are '0's

(b). SOP ↔ POS

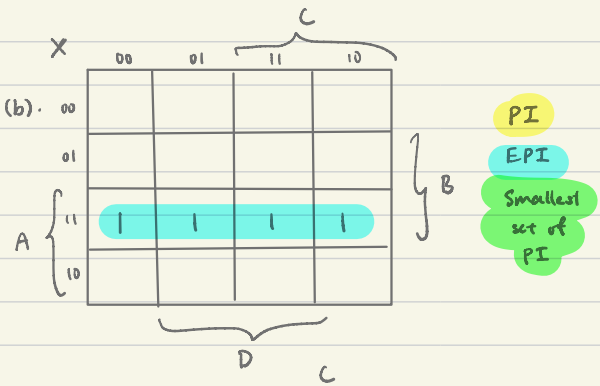
1. Σ (product terms)

?

2(a).

A	B	C	D	XYZ
0	0	0	0	000
0	0	0	1	000
0	0	1	0	000
0	0	1	1	001
0	1	0	0	001
0	1	0	1	001
0	1	1	0	010
0	1	1	1	010
1	0	0	0	010
1	0	0	1	011
1	0	1	0	011
1	0	1	1	011
1	1	0	0	100
1	1	0	1	100
1	1	1	0	100
1	1	1	1	101

(b).



X: $A \cdot B$

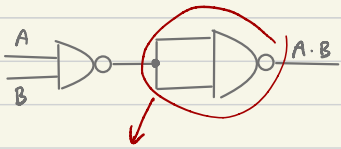
Y: $A \cdot B' + A' \cdot B \cdot C$

Z: $A \cdot C \cdot D + A \cdot B' \cdot D + A \cdot B' \cdot C + B' \cdot C \cdot D + A' \cdot B \cdot C'$

2 (c). X: $A \cdot B$

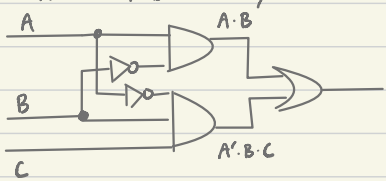
(i).

(ii).

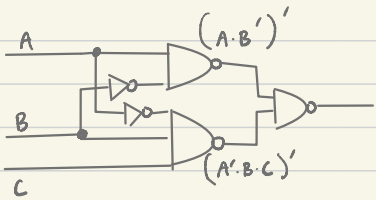


Y: $A \cdot B' + A' \cdot B \cdot C$

(i).

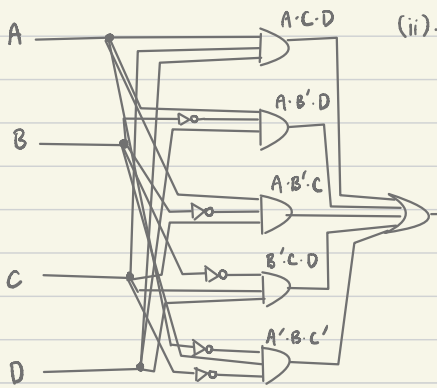


(ii).

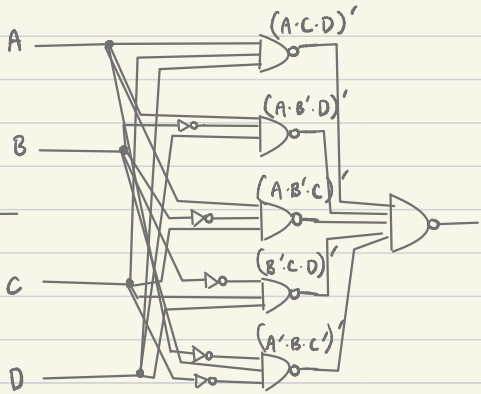


Z: $A \cdot C \cdot D + A \cdot B' \cdot D + A \cdot B' \cdot C + B' \cdot C \cdot D + A' \cdot B \cdot C'$

(i).



(ii).



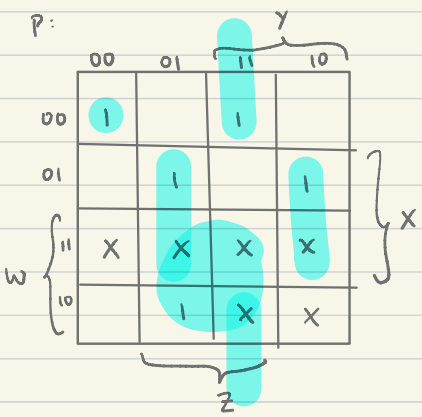
3 (a).

X	Y	Z	W	P
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0

X	Y	Z	W	P
1	0	0	0	0
1	0	0	1	1
1	0	1	0	X
1	0	1	1	X
1	1	0	0	X
1	1	0	1	X
1	1	1	0	X
1	1	1	1	X

X : don't care

(b).



P: $w \cdot z + x \cdot y \cdot z' + x \cdot y' \cdot z + x' \cdot y \cdot z + w' \cdot x' \cdot y' \cdot z'$