

LogicDesign-Homework3

● Graded

Student

Adithya Chander

Total Points

5.8 / 6 pts

Question 1

P1

1 / 1 pt

The rubric is hidden for this question.

Question 2

P2

1 / 1 pt

The rubric is hidden for this question.

Question 3

P3

1 / 1 pt

The rubric is hidden for this question.

Question 4

P4

0.8 / 1 pt

The rubric is hidden for this question.

Question 5

P5

1 / 1 pt

The rubric is hidden for this question.

Question 6

P6

1 / 1 pt

The rubric is hidden for this question.

Questions assigned to the following page: [1](#), [2](#), [3](#), [4](#), [5](#), and [6](#)

HW3 - CS120A

1. What is the simplest SOP expression for function $Z(A, B, C)$

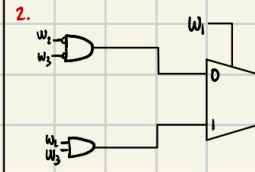
implemented by the two 2-to-1 Muxes in Figure 1?



A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

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

the simplest SOP for Z is $\text{out}'B + \text{out}B'$



3. Using Kmaps, find the simplest SOP and POS expressions of

$$F = \sum_{w,x,y,z} (0, 1, 6, 7, 8, 9, 14, 15)$$

W	X	Y	Z	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

canonical sum of products (SOP)

$$F = \sum_{(w,x,y,z)} (0, 1, 6, 7, 8, 9, 14, 15) = xy + x'y'$$

canonical product of sums (POS)

$$F = \prod_{(w,x,y,z)} (0, 1, 6, 7, 8, 9, 14, 15) = (x+y)(x'+y')$$

5. find POS with

Kmaps for

$$F = \prod_{w,x,y} (1, 4, 5, 6, 7)$$

W	X	Y	F
0	0	0	1
1	0	0	1
2	0	1	1
3	0	1	1
4	1	0	0
5	1	0	0
6	1	1	0
7	1	1	0

W	X	Y	F
0	0	0	1
1	0	0	1
2	0	1	1
3	0	1	1
4	1	0	0
5	1	0	0
6	1	1	0
7	1	1	0

$$W' \cdot (x+y)$$

4. Using Kmaps, find the simplest SOP expression of the following functions

$$F = \sum_{w,x,y,z} (1, 3, 5, 6, 7)$$

$$F = \prod_{w,x,y} (1, 4, 5, 6, 7)$$

x	y	z	F
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

w	x	y	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

$$(x'+z')(x'+y)$$

complement signs since POS

$$x' + z' \Rightarrow x + z$$

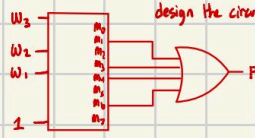
$$z \text{ change } (x'+y) \Rightarrow x+y$$

$$x'x' + x'z + x'y + yz'$$

$$\text{canonical SOP } z + xy$$

$$\text{canonical POS } (x'+z')(x'+y)$$

6. design the circuit



W	X	Y	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

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Section 001 / 025

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