

Lab 04 - SOP/POS and KMaps

In this lab, you've learned how to apply KMaps, Sum Of Products and Products of sums to simplify digital logic equations. Then, you've proven out that they work using an implemented design on your Basys3 boards.

Rubric

Item	Description	Value
Summary Answers	Your writings about what you learned in this lab.	25%
Question 1	Your answers to the question	25%
Question 2	Your answers to the question	25%
Question 3	Your answers to the question	25%

Lab Summary

In this lab we learned how to take a truth table and read the values from it to create a KMap. From that KMap we took the min points and max points and found the most simplified equations for both the Sum Of Products and the Product Of Sums. We then wrote the logic for both into a Verilog program that we ran on our board to test the logic.

Lab Questions

1 - Why are the groups of 1's (or 0's) that we select in the KMap able to go across edges?

This is because the way we set up our KMap the edges only differ by one digit. For example the left most column value would be 00 and the rightmost column value would be 10. We can use this to simplify our logic equation.

2 - Why are the names Sum of Products and Products of Sums?

This is because the Product of Sums uses Or (+) to get the sum of multiple And (*) statements, getting the sum of the products. Inversely the Product of Sums uses And(*) statements to get the product of multiple Or(+) statements. Product of Sums refers to maxterm (0) and Sum of Products refers to minterm (1).

3 - Open the test.v file – how are we able to check that the signals match using XOR?

The XOR gate is used to check that the values of the LED values match. Using an XOR gate means that to get an output of 0 both inputs must match. So checking that led 0 and led 1 have the same value ensures our minterm logic is correct and testing that led[0] and led[2] have the same value ensures that our maxterm logic is correct.

Code Submission

Upload a .zip of all your code or a public repository on GitHub.