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

Summarize your learnings from the lab here.

Learned how to use the truth table to derive k-map, minterms,and maxterms. Then simulate our expressions in order to program the device switches and lights.

Lab Questions

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

- Because it's a 3-DIMENSIONAL map.

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

- SOP = minterm, focus on 1's
- POS = maxterms, focus on 0's

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

- If L0 ^ L1 does not equal 0 then signals don't match, if L0 ^ L2 does not equal 0 then signals don't match. By checking that output is not 0 it uses XOR logic to make sure output matches input..

Code Submission

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

NOTES:

(~A & ~B & ~C & D) |

(~A & ~B & C & ~D) |

(~A & ~B & C & D) |

(~A & B & ~C & ~D) |

(~A & B & C & ~D) |

(A & ~B & C & ~D) |

(A & B & ~C & ~D) |

(A & B & C & ~D) |

	AB	~A ~B	~A B	A B	A ~B
CD		00	01	11	10
~C ~D	00	0	1	1	0
~C D	01	1	0	0	0
C D	11	1	0	0	0
C ~D	10	1	1	1	1

fm(A, B, C, D) = (C~D) + (~A~BD) + (B~D)

fM(A, B, C, D) = (~B | ~D) & (~A | B | C) & (~A | ~D) & (B | C | D)