

CS470 Spring 2007

Homework Assignment 1

Due Feb. 3, 2009

Problem 1:

This assignment illustrates *Sum of Products* and *Product of Sums* as alternative implementations. It also illustrates testing by comparison, a concept used for both hardware and software testing.

a. Obtain both minimized SOP and POS expressions for the following function F. Hint: To get a POS expression, first get a minimized SOP expression for its complement (\bar{F}) first and then Use DeMorgan's theorem to complement both sides.

AB\CD	00	01	11	10
00	x			1
01		1	1	
11			1	
10	1			1

b. Using Logisim, implement a circuit that will include

Two combinational block implementing the two expressions above. Label the outputs F_{SOP} and F_{POS} .

An exclusive-OR gate to compare the two outputs

Three input pins with labels A, B and C, and an output pin labeled *Comp*.

c. Verify that the two implementations are indeed equivalent for all input combinations (except perhaps for a don't care combination) . Submit the .circ file using RAMCT.