Lab 1 (20-09-2021)

Design, Implement and simulate the following circuits in Logisim

a) BCD to seven segment decoder. Use the seven segment display in logisim for output. The pin details can be found in *Help - Library Reference*

b) Connect the BCD to seven segment decoder to the output of the 4 bit adder implemented in last class. Test for inputs such that A+B $\leq$ 9

c) A four variable logic function that is equal to 1 if any three or all four of its variables are equal to 1 is called a majority function. Design a minimum cost POS circuit using NOR gates that implements this majority function

d) A given system has four sensors that produce an output of 0 or 1. The system operates properly when exactly one of the sensors has its output equal to 1. An alarm must be raised when two or more sensors have the output of 1. Design the simplest circuit that can be used to raise the alarm. Use a red LED to indicate ALARM and a green LED to indicate the system operated properly.

Need to upload lab report in the following format in moodle at the end of the lab session as a PDF file

Question

Design – Truth table, Karnaugh maps and explanation required

Circuit diagram from logisim

Results obtained – Test input and outputs