CSE 234 Logic Circuits and Digital Design

Lab 3

Lab Session (Exact Duration: 60 min):

Design a circuit such that it will output 1, if the sum of the number's decimal digits is 5 or 7. The input is 5-bit numbers.

For instance, if the input is 14 or 25 the sum is 1 + 4 = 5 and 2 + 5 = 7, therefore the output is 1. For instance, if the input is 17, the sum is 1 + 7 = 8 so the output is 0.

a. First draw the truth table for this problem.
b. Then write down the Boolean expression for the output where each row is represented as a product term in sum of products form.
c. Then simplify the resultant Boolean expression. During simplification you have to use one XNOR gate where A XNOR B = A'B' + AB.
d. Design your resultant simplified circuit using Logisim.

Demo Session:

During demo, explain and simulate each step of your design. Do not forget you only have at most 4 minutes for that. Also you will answer any questions asked by the TA.