E100 PreLab 7 - Logic Circuits II

A Car Alarm

The figure below shows a car alarm circuit. Three switches are used to give the status of the driver-side door, the ignition, and the head lights. Design the logic circuit with these three switches as input so the alarm is activated (A=1) if either:

(1) The headlights are on (L=1) while the ignition is off (I=0)

or

(2) The door is open (D=1) while the ignition is on (I=1).

For your reference, a truth table is given below.

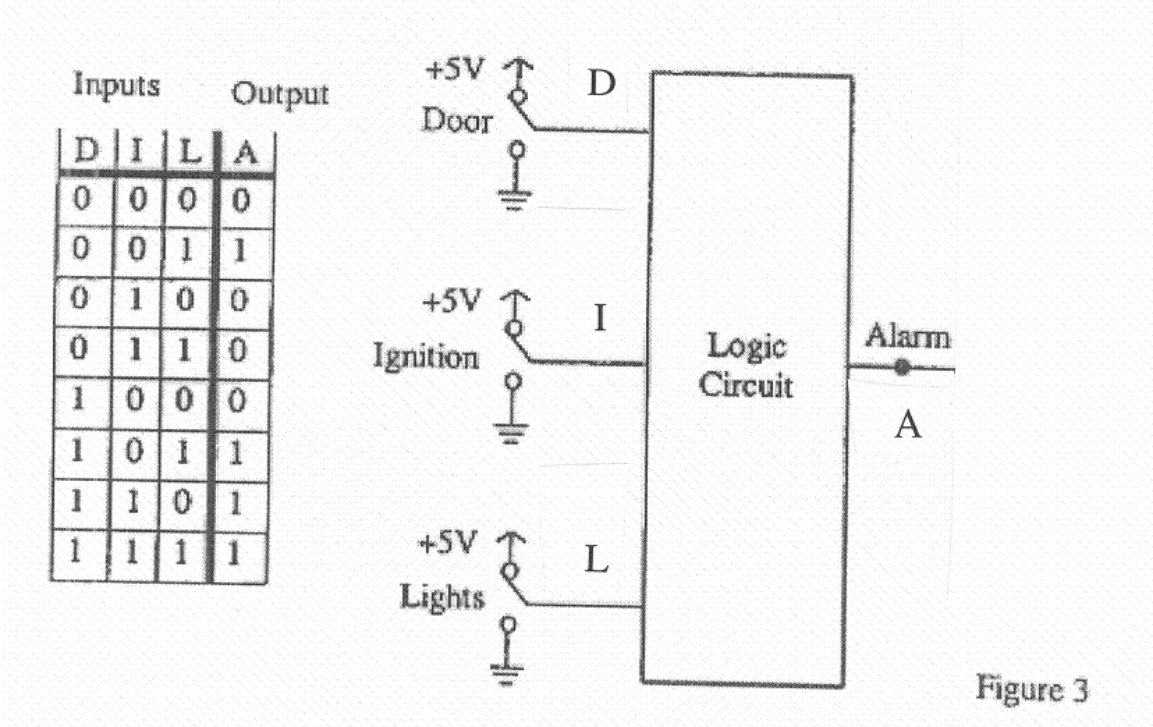

Figure 3

Design a logic circuit to realize the truth table. Use a Karnaugh map to minimize the logic needed. First, use inverter, AND and OR gates to implement the logic function. Then convert that circuit to an

implementation that uses only NAND gates. You'll build the circuit using NAND gates in the lab.

Show the Karnaugh map and your final NAND-gate circuit to your TA at the start of the lab period.

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