CSC 327
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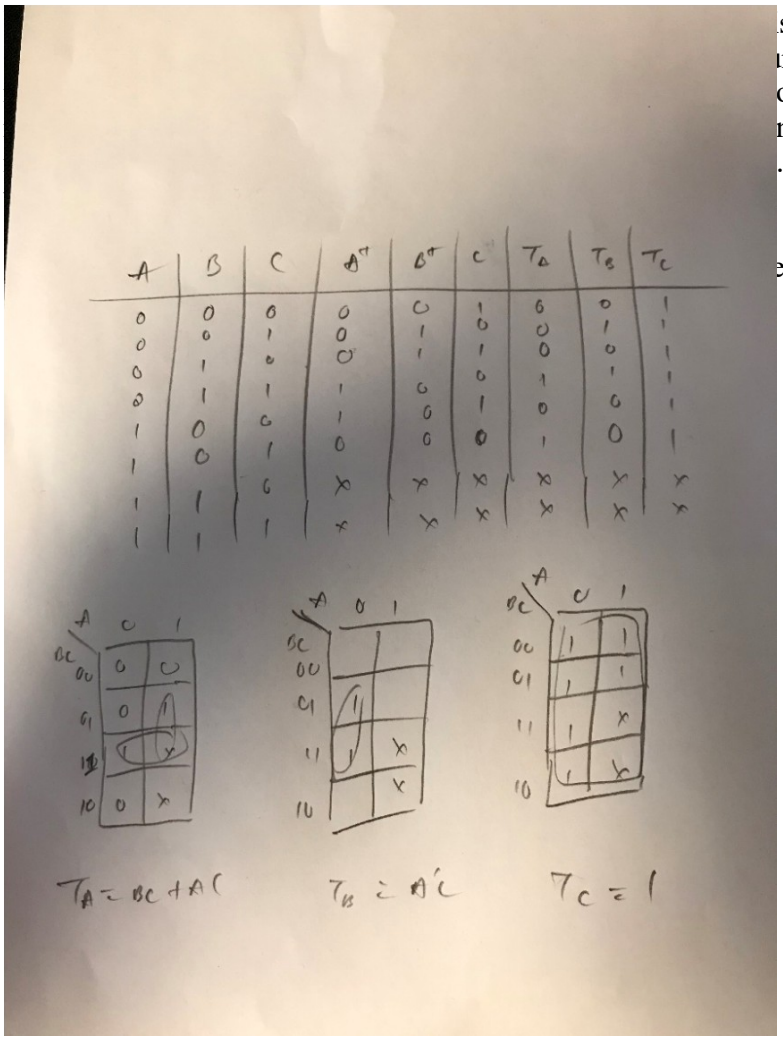
Final Lab

Experiment Description

The goal of this Lab is to create a digital clock with two seven-segment displays that continually display seconds and one seven-segment display that displays minutes. We should also be able to reset the display to 000 at any moment..

Design and Implementation Procedure

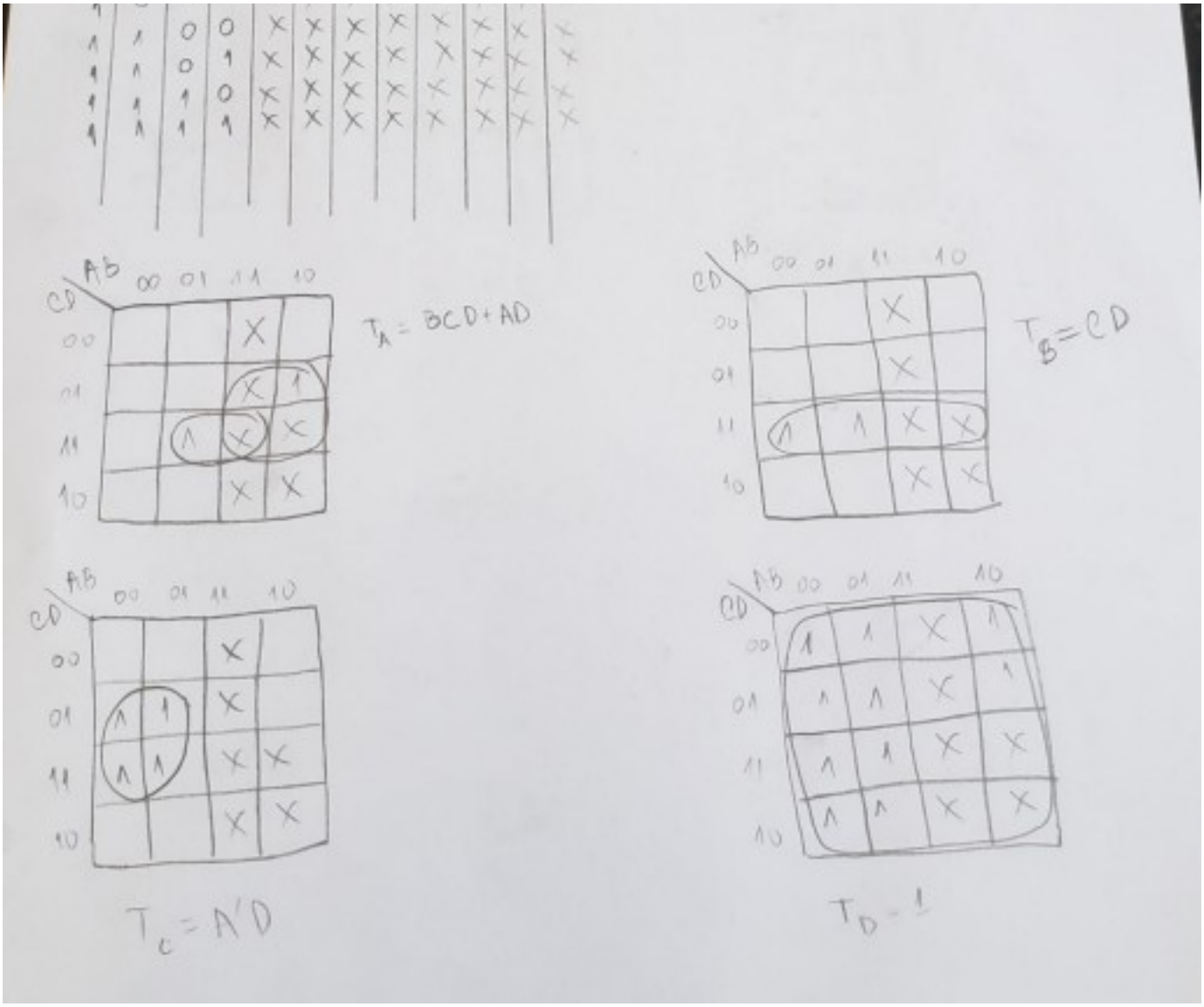
Part-I



s lab. The first is a BCD counter (which counts from
nts from 0 to 9 and repeats) (which counts 0 to 5 and
ous design approach. For the counters, it is
nt and next states, as well as the TFF inputs
. The state equations for the FFs are then obtained

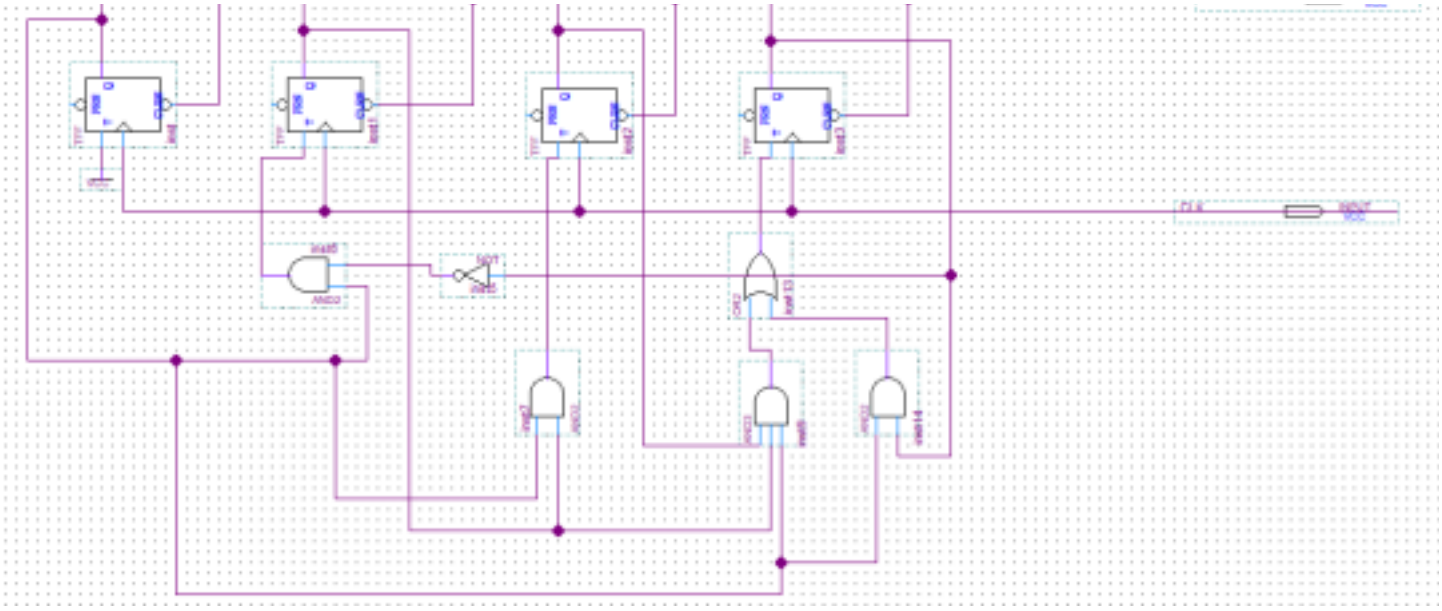
er and derive the state equations.

Truth table and K-maps for SIX-COUNTER

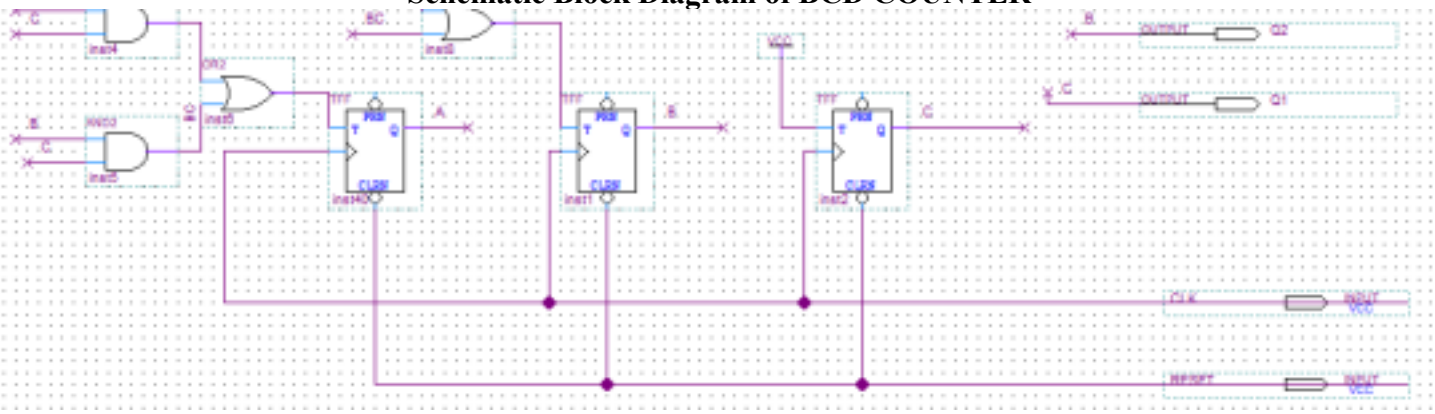


Truth table and K-maps for BCD COUNTER

ii) Build BCD-Counter and Six-Counter on Quartus-II environment and do the simulation to verify that your Circuit is working according to the truth table.

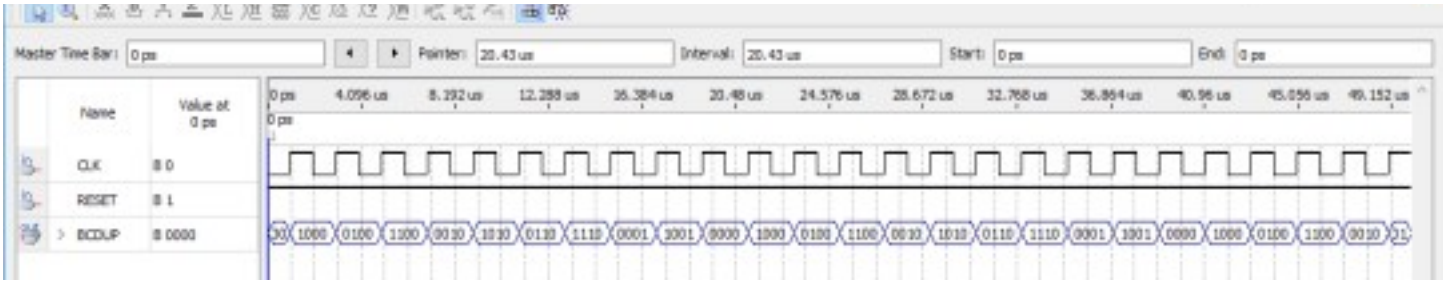


Schematic Block Diagram of BCD COUNTER



Schematic Block Diagram of SIX COUNTER

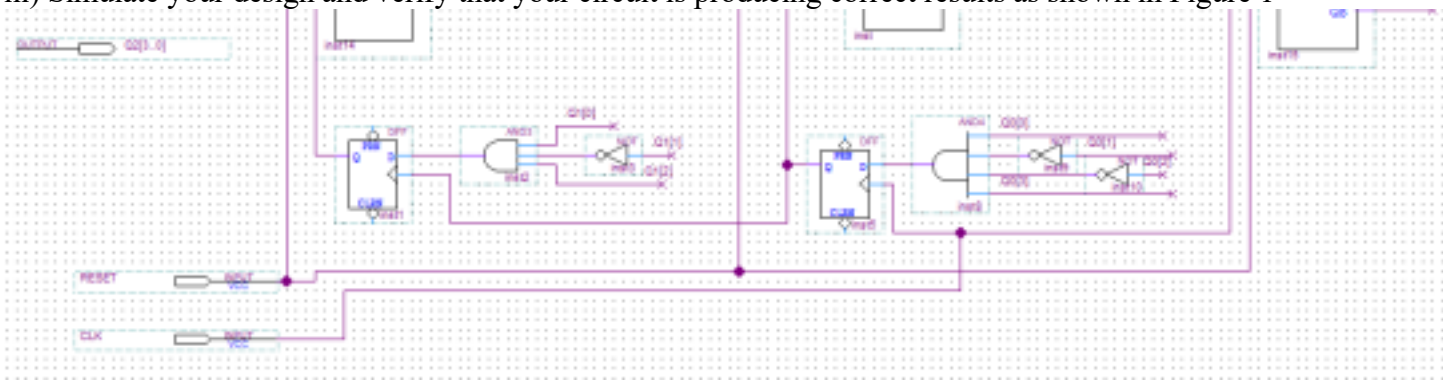
Simulation:



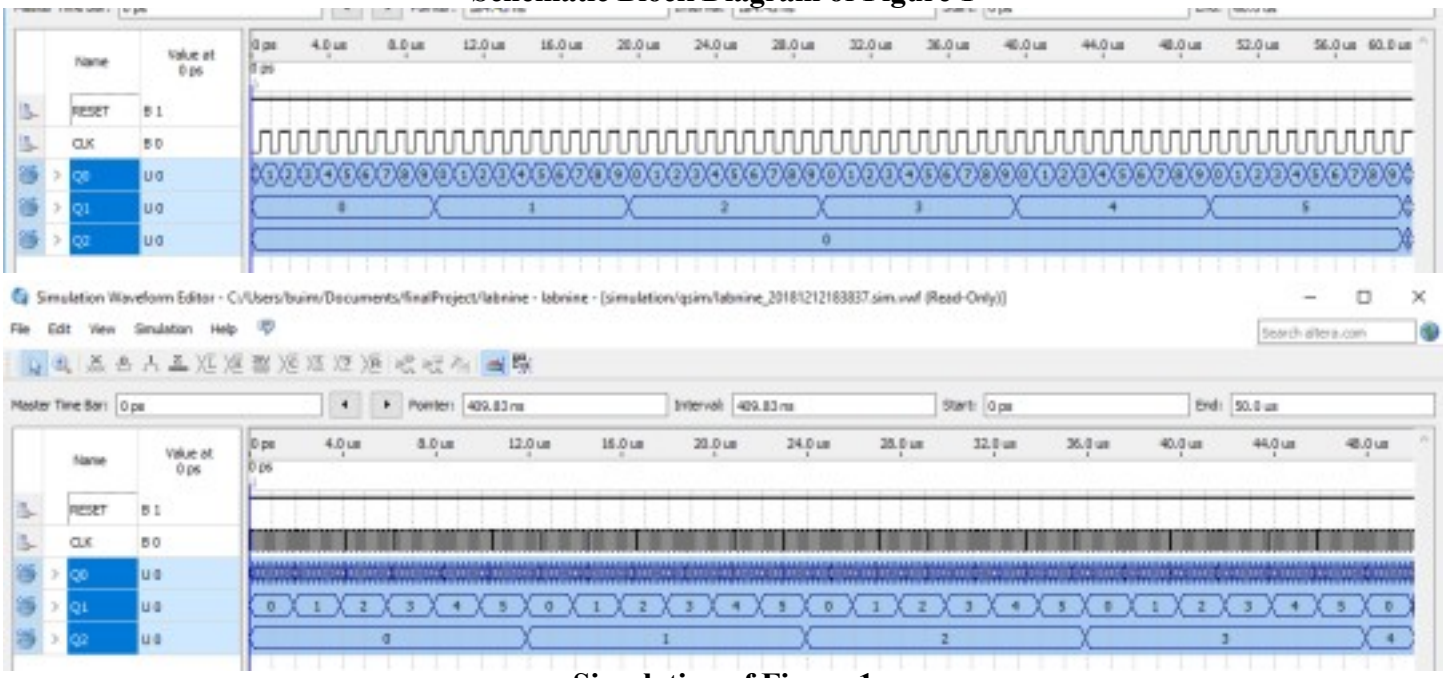
Simulation of BCD COUNTER

Simulation of SIX COUNTER

iii) Simulate your design and verify that your circuit is producing correct results as shown in Figure 1



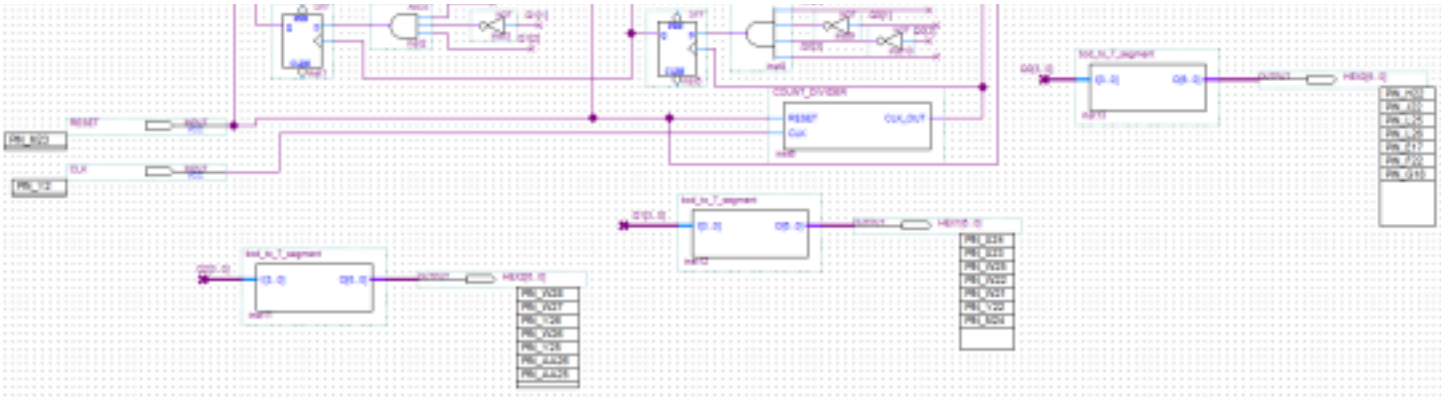
Schematic Block Diagram of Figure 1



Simulation of Figure 1

Part-II

In this part of the Lab we are going to build the Digital clock using the Counters we designed in the previous stage. The suggested block diagram of our design is given in Figure 2. After we have connected the circuit according to Figure 2, do the necessary pin assignments and compile our design before download it on the De2-115 board.



Schematic Block Diagram of Figure 2

Experimental Results

For a properly working counter, we may expect simulation result of a counter. With the help of our simulation outcome justify that our circuit is working appropriately and successfully with truth table.
Create, design and implement a Binary Counter that counts 0 to 9 and repeats and a Six Counter that counts 0 to 5 and the circuits are functioning according to the counter.

Conclusions

Finally, the goal of this lab was to learn how to construct boolean functions from state tables in order to create digital circuits. We learned more about flip flops and how to utilize them to create a synchronous counter.