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ROLL NO: 20EC10043

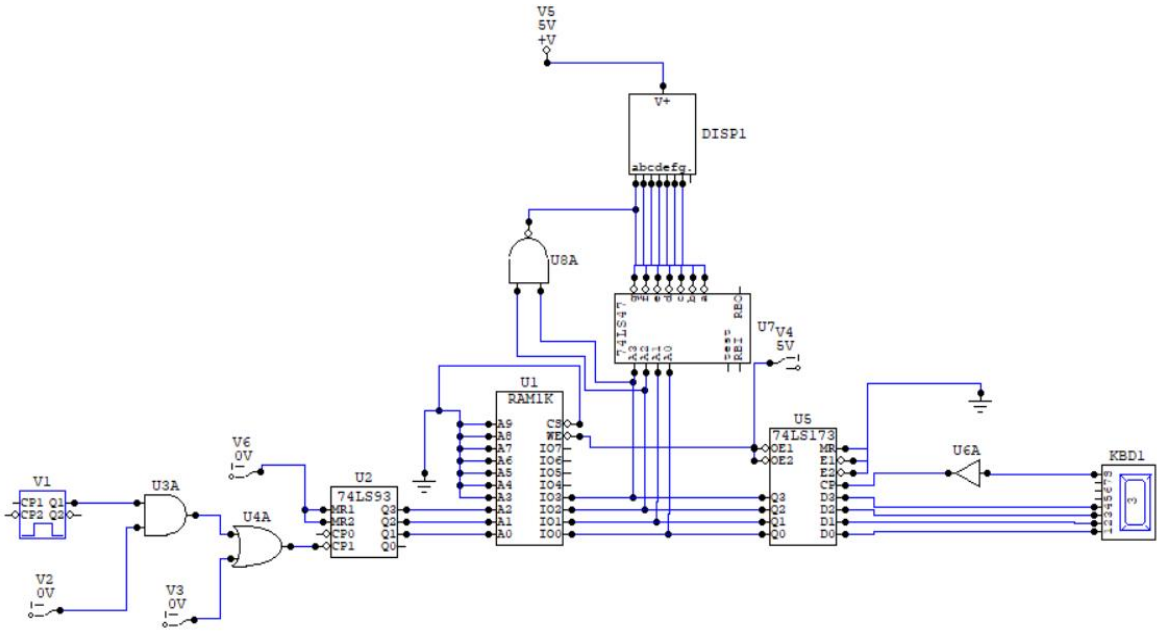
DIGITAL LABORATORY EXPERIMENT 10

AIM:

To store our roll number in RAM, and then repeatedly display it on a 7-segment display.

CIRCUIT DIAGRAM

For this experiment, we need a RAM(1k), IC 74LS173(a 4-bit register), IC 74LS93(a 4-bit counter), ascii keyboard, a buffer (CD 5040), IC 74LS47(BCD-to-7segment decoder), 7-segment CA display, a pulser, few logic lamps and logic gates.



BREIF THEORY AND EXPLAINATION

In this experiment, first we need to enter the digits of our roll number, for which, we take the help of an ascii keyboard and a 4-bit register, to store it in the register before sending it to the RAM to store it a particular address. So, the make the connections in such a way that our output of register is taken as input for RAM storage. Now, we need a way to change state after each element is stored.

To achieve this, we use a combination of logic switches and logic gates and a up counter to help in changing the address of RAM. We do this in the manual way, so we need to make sure that we toggle the switches in the right order, or the desired output might not appear. In this manner, after entering all the digits, and storing them in the RAM, we need to display them on the 7-segment display.

To display the results, we need to use a BCD to 7-segment display decoder. So, the IO0-3 pins are connected to the input pins of IC7447, with this, we can display the digit stored in the particular address at that moment.

In order to change the state, we use the same cp pin to do that, like when we did to store the values one after another, but this time, we need to repeatedly display our roll number, which is difficult to achieve with a manual process, so we take the help of a pulser, to automate that part of the experiment, in this manner, we can achieve our required goal.

We used an AND gate between the decoder and 7-segment display, which we do because, when we need to display E, the top dash will not appear for the given 4bit number, so we need to use a logic combination, which allows us to make the a-pin display lit, so that the top dash will also appear when E is expected to appear.

SNAPSHOTS FROM THE EXPERIMENT

This experiment is more of a simulation video aspect that the manual aspect, so snapshots for the experiment cant we taken and used to give a clear explanation of the experiment. So, I have attached the ckt file along with the report submission, which can be used to check the simulation.

OBSERVATION AND CONCLUSION

As expected, the display works in the way it should be, when to use the following switching sequence,

V6 : 1 -> 0 (Resets any previous value, so as to redo the simulation)

V4 : This acts as the write control, so we can get the digit entered to be stored in the RAM

V3 : This is used to change the states of RAM, manually, so we use it during the writing phase

V2 : This is basically used to on/off the pulser, so use it when the writing part is over, and we need to read it continuously one after another.

In this way, we can get the simulation to run. This takes us to the end of this experiment.