COL215: Digital Logic and System Design

Special Laboratory Semester, AY 2021-22

Department of Computer Science & Engineering

Lab Assignment - 2

Seven-Segment Display Logic

Learning Objective:

The objective of this assignment is to learn how to display decimal/hexadecimal digits using 7-segment displays. The logic designed in this assignment will be useful for subsequent assignments.

Specification:

Design a combination circuit that takes a decimal/hexadecimal digit encoded using 4 bits and produces 7-bit output for seven segment displays of BASYS3 FPGA board. Do extensive simulation of the design using Xilinx simulator, and then implement the circuit on BASYS-3 FPGA board.

Details:

BASYS3 boards have 4 numbers of 7-segment displays. Each of these four consists of 7 LEDs (Light Emitting Diodes) forming 7 segments. These diodes have a common anode and individual cathodes. To display a digit, it is required to give a '1' as input to the anode and a '0' or '1' to each segment depending upon whether that segment needs to be lighted ('0') or not ('1').

This assignment focuses on a single digit display. In a later assignment we will deal with all four displays and produce anode signals to control which digit(s) need to be displayed.