

Lab 1

Combinational Logic Design Using Schematic Capture

Objectives

- To get familiar with the Xilinx Schematic Editor Tool.
- To design and implement simple combinational logic circuits using the Schematic Editor and Simulator.

Laboratory Instructions

- Create a directory with your name on the C drive of your lab PC. Use this directory to create your project, store your results, bitstreams, etc. during the lab session.
- You can bring complete project files on a floppy disk and then use the **Copy Project** command from the Project Manager menu to copy it into the directory you created above.
- Alternatively, you can create a new project in your directory on the C drive and then copy your files to that new project directory. Remember to **Add** your .SCH file to the project.
- Perform functional simulation of your design and have it checked by the lab instructor or your TA.
- Refer to [appendix A](#) for instructions on performing functional simulation.
- In case you modify your source file, remember to copy it back to your floppy disk.
- Test and demonstrate your circuit to the lab instructor or your TA.
- Before you leave the lab please **remove** the files and directories that you created on your lab PC and leave our workplace clean and tidy.

Design Problems

Using the Xilinx Foundation Series Tools design, test and demonstrate circuits, which implement the following functions.

1. $f(a,b,c) = abc + a'bc + abc'$
2. $f(x,y,z) = y' \cdot z + x' \cdot y \cdot z' + x (y' \cdot z + y \cdot z')$
3. Design a circuit that implements the 2-to-1 multiplexor.
4. Design a circuit that implements the following truth table:

x	y	z	m
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

5. Design a circuit with four inputs (a,b,c,d) and one output (x) that produces a "1" at the output if there is an equal number of 0's and 1's at the inputs.