



Lab 1: Intro to Logic with Multimedia Logic
Worth 35 points (30 lab + 5 report)

Lab Objectives:

In this lab, you will learn how to use the Multimedia Logic application in Windows to do schematic entry and simulation. MML is a free schematic entry and simulation tool. If you would like to get the tool for home here is a link to it <http://www.softronix.com/logic.html>. You will use this program to build some simple circuits.

Lab1 Preparation:

1. Read through this Lab1 assignment.
2. Review basic Logic Gates (Beginning of Chapter 3 of P&P).

Schematic Comments Requirement

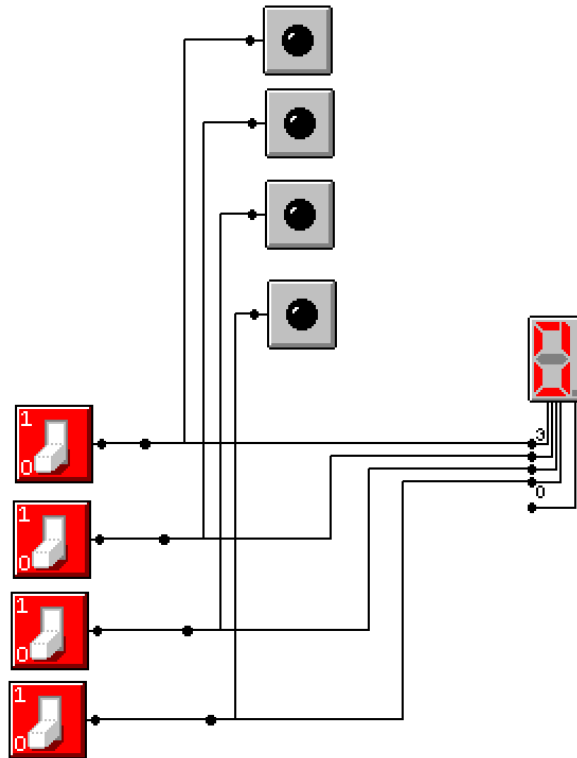
- Please put minimal block comments at the top of all schematics (pages) including your name and UCSC email address on the top one. You should also include more information such as Due Date, Lab number (Lab1), lab title, your section and TA/tutor.
- Please comment your schematics (pages) neatly and succinctly. At a minimum label the page and the various input and output

Part A (5pts): Warm Up

Do the tutorial for Multimedia Logic (Help->Tutorial) or look at the MML_Tutorial.pdf provided. This simple tutorial will walk you through building and simulating simple circuit, save the resulting file as Lab1.t.utorial.lgi, Use the "Text" tool to put the required comments on your schematic.

Part B (5pts): Playing with Numbers

Now, build the schematic below. See if you can make it cleaner than the one given. Simulate the circuit and play around with the switches, getting a feel for inputting a binary number and seeing the result on the display.



Part C (5pts): Truth Table to Gates

Start a new schematic page and label it PART C. Design logic that implements the following truth table.

IN[2]	IN[1]	IN[0]	Output
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

$A' B' C'$

$A' B' C$

$A' BC$

ABC'

Things to note for Part C:

- Connect the inputs to “Switch” tools and the output to an LED to verify your circuit works correctly.
- As in part A put correct comments in your schematic.
- Be sure to test your logic afterwards. Make sure that for all inputs the right output is on the LEDs.

Part D (5pts): Guessing Game

Now you will create a fun guessing game in logic! Create a design on a new page labeled PART D that allows the user to play "guess the number", where the secret number is between 0 and 3. Here are the steps you to follow:

- Use the random number generator circuit element. You only need to connect two of the outputs (any two will do), the outputs are the pins on the right side of the box.
- Use a push-button switch to drive the random number “generation”. Connect the switch to "C+".
- Use two switches for user input, this will be the “guess”.
- Use combinational logic to test for equality; basically, is the output of the random number the same as that of the switches? Hint: Think logical “and”.
- Use an LED to indicate whether the user's guess was correct or not.

Lab README.txt Requirements

In the lab write-up (worth 5 points), we will be looking for the following things. We do not break down the point values; instead, we will assess the lab report as a whole while looking for the following content in the report.

- Your name, email, ID, lab assignment, and section number.
- Think about how you would make the digit display if you didn't have one. Write out how you would approach doing so.
- Make some sort of guess on how that random number generator works? How can things be really random in a computer with logic gates being so, well, logical?

To alleviate file format issues we want lab reports in plain text. Feel free to use a word processor if you like to type it up but please submit a plain text file.

Files Needed to Be in Lab1 Folder

- Lab1_tutorial.lgi
- Lab1.lgi
- README.txt