Department of Computer Engineering
Faculty of Engineering, University of Peradeniya

CO221 : Digital Design | Project
Phase 01 Specification

Deadline: 22nd August, 2019

As the first phase, you are required to develop a computer simulation of the system we discussed before in the overall project specification. The operation of the ALU is expected to be implemented only using combinational logic circuits.

You are allowed to use any 7400 series IC if you can find them but the ICs that we can provide from the lab are given at the end of the document. You will need them when you are implementing the circuit physically in Phase 02.

The outcome of Phase 01 should be a computer simulation via Proteus or similar software.

Also you are required to submit the computer simulation (a single zip file) before the deadline to the link in FEeLs.

Notes:

- Since you will be implementing this system on real hardware, you should do a proper hardware design considering current and voltage.

- In ALU, bitwise XOR operation must be implemented using basic gates (AND, OR and NOT).

- For multiplication, you need to consider only the last 2 bits of each operand. This will simplify the design of multiplier inside the ALU.

- On anything which is not explicitly stated on the description you can do reasonable assumptions. But make sure you are able to explain those when required. Also if there are any ambiguities you are welcome to use the discussion forum in FEeLS to clarify those.

- For instruction loading, you would need to use registers. So far, you haven't covered theory on registers but it is not necessary for you to know the theory to start the project. Registers are memory elements that remember binary values. When a clock pulse (square wave) is given on the clock input of a register, values on the input pins are stored.

Until we give a clock pulse again, this saved data does not change even when the inputs change. You may use 74273 IC which is an 8-bit register. Refer the datasheet on how to use it.

- If you run into any problem somewhere, you can always use the forum or meet the instructors and get the problems solved rather than just giving up.

Components that we can provide:

- IC : 7400, 7402, 7404, 7408, 7410, 7411, 7427, 7432, 7447, 7474, 7486, 74151, 74153, 7483, 74273
- DIP switches
- IC bases
- LEDs