

**Department of Computer Engineering
University of Peradeniya**

**CO221: Digital Design - Lab 3
Introduction to Proteus**

Important

- Use TTL 74LS series for ICs
- Use 1K ohm resistors to connect the switch
- Use either 220 ohms or 330 ohms to connect the LEDs

- **Do the Lab individually**

Aims and Objectives

At the end of this lab session, you are expected to be able to develop simple circuits using Proteus ISIS designing environment.

Exercise 1

Using Proteus, implement a circuit to verify the functionality of basic logic gates (AND, OR, NOR, NAND, NOT).

Exercise 2

Consider the following Boolean expression.

$$Z = A + CB + (A + B')(C' + B)$$

1. Using Proteus, implement the logic circuit for the above expression **without simplifying**.
2. Obtain the truth table for the above expression.
3. Simulate the circuit in Proteus and verify the correctness of the outputs using the truth table.

Exercise 3

Design a logic circuit for the following situation;

A lamp outside a front door comes on automatically when it is dark and someone stands on the doormat outside the front door. A pressure sensor under the mat changes from OFF (0) to ON (1) when someone stands on the doormat. The light sensor is ON (1) when it is light and OFF (0) when it is dark. The lamp can also be turned on at any time using a switch.

Inputs: Light Sensor
Pressure Sensor
Switch

Outputs: Lamp