CPEN 230L: Introduction to Digital Logic Laboratory
Lab T0: Installing, setting up and running Icarus Verilog and GTKWave

Objectives
- Install and set up Icarus Verilog and GTKWave
- Learn to model and simulate the functionality of simple logic circuits by using Verilog

Part 1. Installing Icarus Verilog and GTKWave

- Install a text Editor on your own computer (examples: Visual Studio Code, emacs, vim, notepad++, etc.). Visual Studio Code can be found at https://code.visualstudio.com/
  If you already have a text editor you are comfortable with skip this step.
- If your computer is a PC with Windows OS install MobaXterm Home Edition v10.4 (portable edition): https://mobaxterm.mobatek.net/download-home-edition.html/
- If your computer is a PC with Windows OS install Icarus Verilog and GTKWave as follows. Go to the url: http://bleyer.org/icarus and download the installation file
  iverilog-10.0-x86_setup.exe
- If your computer is a PC setup the path for Icarus Verilog and GTKWave as shown in the link
  Instructions to set up the PATH
- If your computer is a Mac follow the instructions in the link Instructions for MAC users
- Test the installation of Icarus Verilog and GTKWave by compiling, simulating, and viewing the simulation waveforms for the supporting files simple.v and simple_tb.v.
  - Create a directory (aka folder) LabT0_a and download simple.v and simple_tb.v into it
  - Compile the files simple.v and simple_tb.v into the output file a.out
    ```
    iverilog –o a.out simple.v simple_tb.v
    ```
  - Using the testbench simple_tb.v it is possible to check the functionality of the circuits modeled in simple.v. To do so execute the output file generated through the compilation of the two files simple.v and simple_tb.v:
    ```
    vvp a.out
    ```
  - Verify the functionality of the circuits by looking at the simulation's waveforms (simple.vcd)
    ```
    gtkwave simple.vcd
    ```

Part 2: Model and simulate various implementations of a multiplexing circuit

- Create a directory LabT0_b. Download the supporting files mux.v and mux_tb.v into the directory LabT0_b.
- Open the two files with a text editor and make sure to thoroughly understand every single line of the two files.
- Compile the two files.
- Execute the output files generated through the compilation command.
- Verify the functionality of the circuits by looking at the simulation's waveforms. When you are satisfied that your results are correct, show your waveforms to your lab instructor.

Reminder: Always clean up at the end of the lab session. Leave everything in better shape than you found it.