Exercise 1 (Ability to run ModelSim From Home):

- To perform homeworks and work on the project you will find it handy to have ModelSim installed on your own machine.

- Windows users can install the "Lite" edition of Quartus which comes with the free version of ModelSim.

- MAC Users:
    - Can use XenApp to run remote on CAE machine
    - Can use remote login to Linux Machine

- It is strongly encouraged for you to have ModelSim capability from home. The next slide discusses installing the student edition on a windows machine.

Installing ModelSim Student Edition:

- Download from Canvas site (ModelSim Prime Lite Download)

- Once the setup executable is downloaded run as administrator (right click "run as administrator").

- Follow the installations instructions.

Setup Your Ex01 Folder & Download/Study Testbench:

- Create an **Ex01** folder in a logical location *(not your downloads area)*. On a CAE machine you should create an **ece551** folder under your **I:** drive, and an **Ex01** folder under that.

- On the class webpage in the table of "In Class" Exercises download the supporting file **counter_tb.sv** and put it in your newly created Ex01 folder

- Look over the code for ***counter_tb.sv***. It is a test bench for a 4-bit up/down counter with enable. It instantiates the DUT, and applies stimulus and self-checks the results.

Generate the DUT using VS Code & Co-Pilot:

- Launch VS Code and create a new file called **counter.sv**. Having the extension **.sv** should make it recognize this as a **s**ystem **v**erilog file.

- Using comments // at the beginning of the file. Prompt co-pilot to generate the DUT code. Some things to specify:
  - 4-bit up/down counter with enable
  - With signals **clk**, **rst_n**, **en**, and **up_dwn_n**
  - Output called **cnt** should count up when **up_dwn_n** is high and down when it is low.

- The resulting code should be an **always** block with some nested **if/else** clauses inside it.

- Save the file to your **Ex01** folder

Creating a ModelSim Project, Compiling, & Simulating:

- Launch ModelSim and create a new project

- Add the two files for this exercise to the project.

- Compile the code. Fix any compilation errors.

- Start simulation on **_counter_tb.v_**.

- Add waves of the DUT to the waveform viewer, and run the simulation.

- Run the simulation and look for the "YAHOO!" message in the transcript window. (If no YAHOO, debug & regen DUT code)

- Perform a screen capture of the waveforms *(zoomed full & radix hex)*. Submit the image to the dropbox for Exercise01