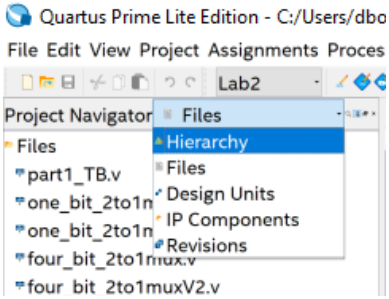
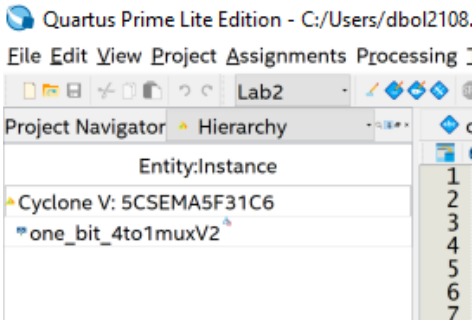
Programming and Configuring the FPGA Device

1. Check you have the correct device:

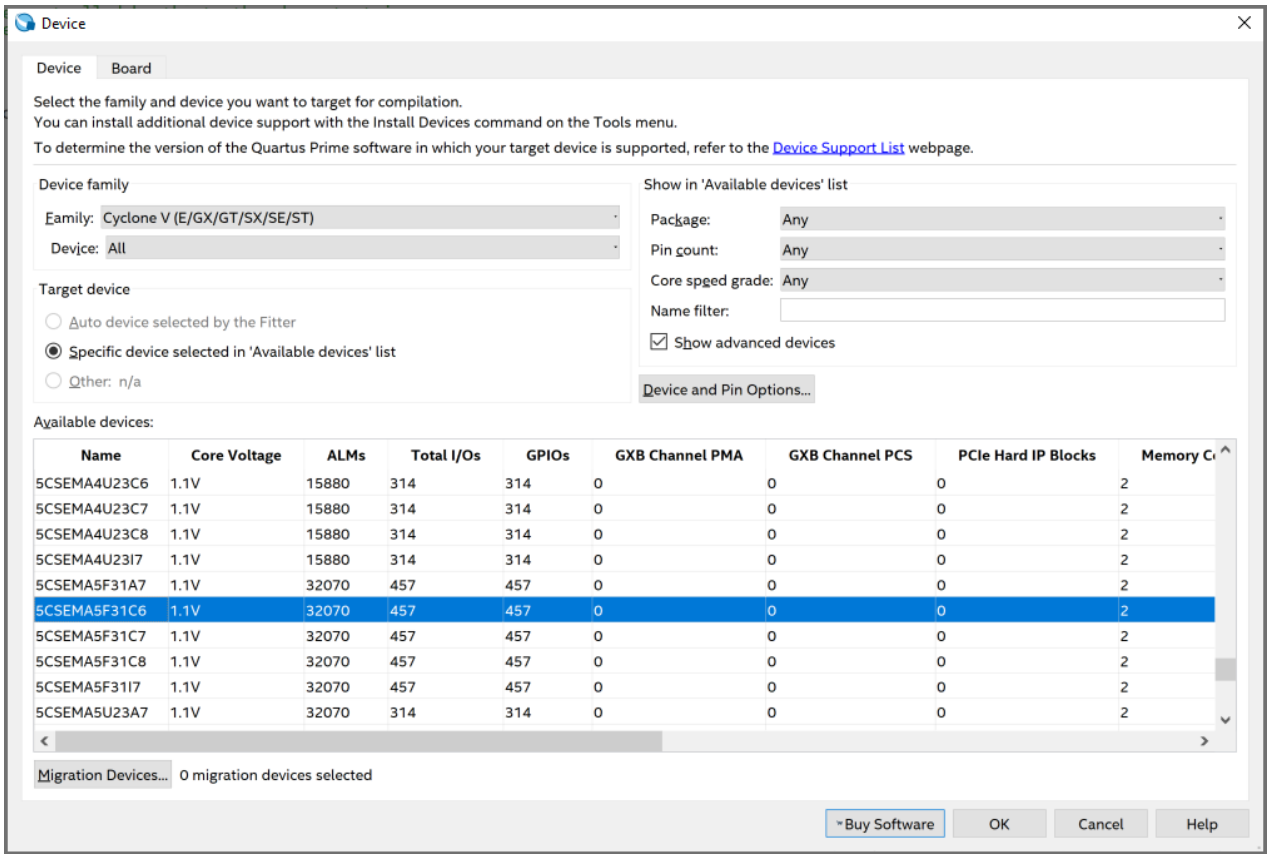
Change to hierarchy in project navigator pane:



Check you have the correct device: 5CSEMA5F31C6:



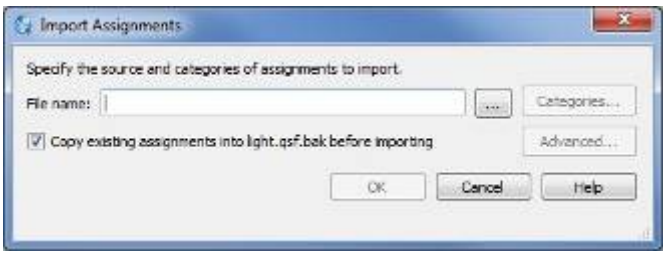
If not, Assignments -> Device, Choose correct device



2. Pin Assignment

This maps gives variable names to switches/LEDs on the FPGA development board. The easiest way is as follows:

Assignments > Import Assignments. This opens the dialogue:



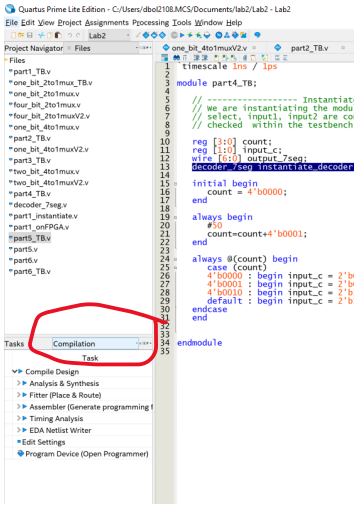
Import the file 'DE1-SOC_pin_assignments.qsf', available from the course website. You can check that pins have been assigned correctly by looking in Assignments > Pin Planner. You need to modify the inputs to match the pin names specified in the .CSV file.

3. Instantiate file

The template files show how you can connect your code to the switches, LEDs and HEX displays. Compare these to your testbench files. They are very similar.

4. Compile your code:

Change the task plane to compilation:

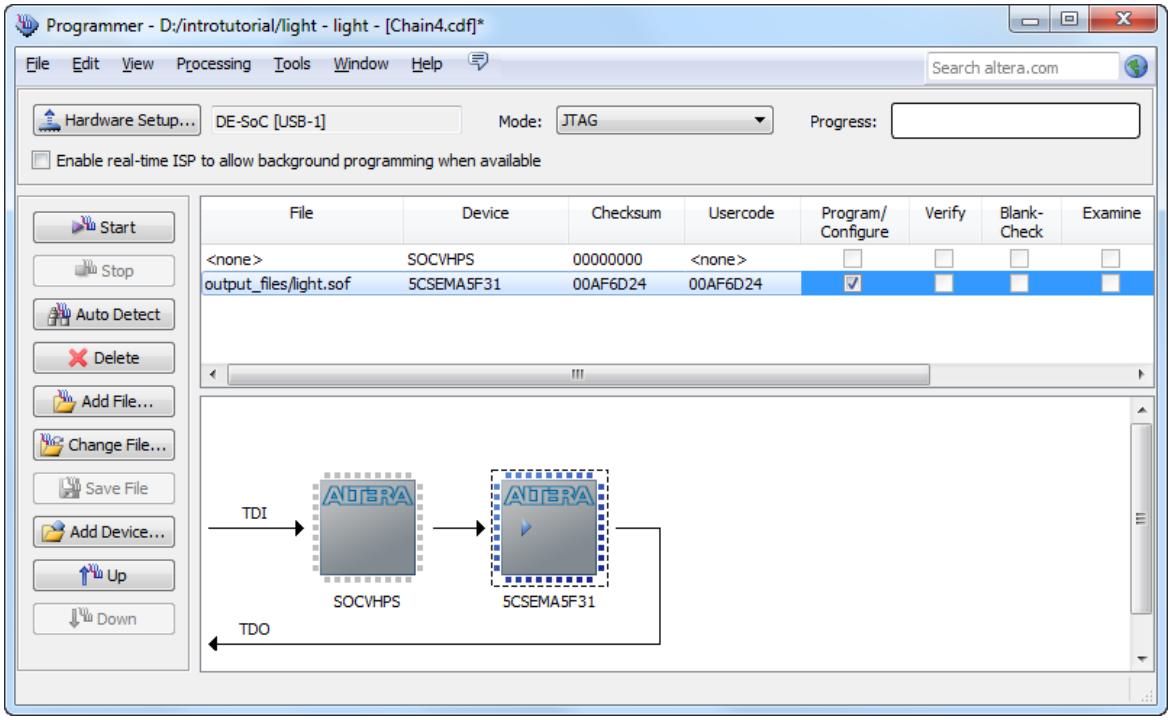


Set your instantiate file as top module (e.g. part1_instantiate). Now Compile design.

5. Program the FPGA

Double click on Open-Programmer (or Tools -> Programmer)

Press autodetect. If necessary, choose JTAG, DE1-SOC.



Observe that the configuration file *.sof is listed in the window. (above this is light.sof. Yours should be part1_instantiate.sof, or part2_instantiate.sof etc.)

If the file is not already listed, then click Add File and select it. This is a binary file produced by the Compiler's Assembler module, which contains the data needed to configure the FPGA device.

Ensure the Program/Configure box is checked. This setting is used to select the FPGA in the Cyclone V SoC chip for programming.

If the SOCVHPS device is not shown, click Add Device (SoC Series V SOCVHPS) then click OK. Ensure that your device order is consistent with the figure above.

Press Start: An LED on the board will light up when the configuration data has been downloaded successfully. If you see an error reported by Quartus Prime software indicating that programming failed, then check to ensure that the board is properly powered on.