**Having multiple lab parts in one project**

When you put multiple lab parts in one project, there are two things to consider. First is how to toggle between your multiple constraints files for synthesis and implementation. Second is how to efficiently flash the board with your code(s) without having to rerun synthesis and implementation.

<u>Setting up multiple constraints files in one project</u>

1. Make a new project.
2. Add your source and testbench files.
3. Close your project.
4. Go into your project directory and navigate to
   `[directory]/[projectname]/[projectname].srcs`
   There should be a folder titled "constrs_1".
   If it's not there, create a new folder and call it something other than "constrs_1".
5. Copy your constraints file into the "constrs_1" folder. Note that you will have to have different names for each constraint file.
6. Now open your project in Vivado.
7. Add your constraints files. Be sure to click the "copy files into project" checkbox in the source adder window.

<u>Synthesis/implementation with multiple constraints files</u>

1. In your project, right-click on the constraints file in the sources tree.
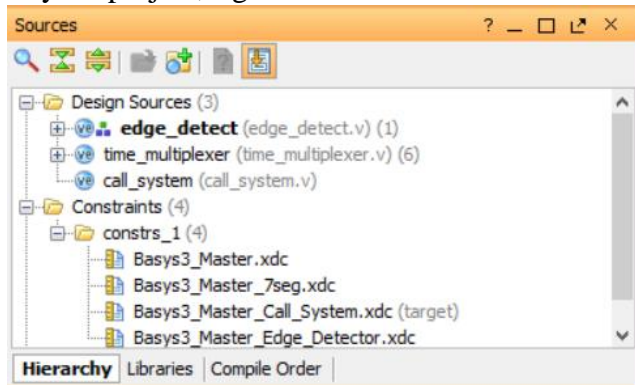
2. Click on "Set Used In…"
3. Check/uncheck the checkboxes as desired.

Flashing the board with multiple constraints files

Every time you run synthesis and implementation, a .bit file is generated, which is what you use
to program your board. However, when you toggle between different labs, it becomes painful to
have to rerun synthesis and implementation for each component of the lab. Vivado only needs
the .bit file to program your board; we can exploit that to save time.

Once you generate the bitstream for your final code,

1. Go into your project directory and navigate to
   `[directory]/[projectname]/[projectname].runs/impl_1`
   You should see a file titled `[name_of_top_module].bit`.
2. Copy and paste that into a convenient place (i.e. desktop).
3. Now connect to your board.
4. Click on "Program Device" in the top green bar. A dialog box should pop up.
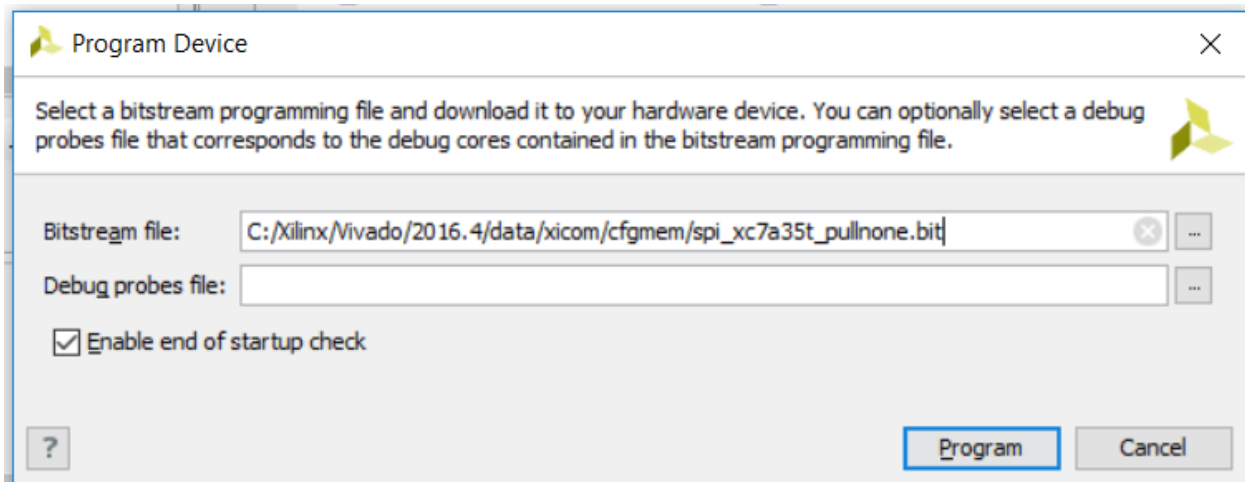
5. Click on the three dots to the right of the input box labeled "Bitstream file" and navigate
   to where you stored the .bit file. Select the .bit file.
6. Click "Program".