ENGI-9865 Project

File / Directory	Note
software/	The software side of our project. Explained in detail below.
src_doc/	The source (.tex and .cls files and all pictures embed in the report) of the document of 9865.final.pdf.
testbench/	The testbench project.
9865.final.pdf	The final project report.
block_breaker.qar	The Quartus II project archive that **containing only hardware side of our project.**

Steps to run our project is listed below.

1. How to run testbench

First unpack block_breaker.qar to restore the Quartus II project.

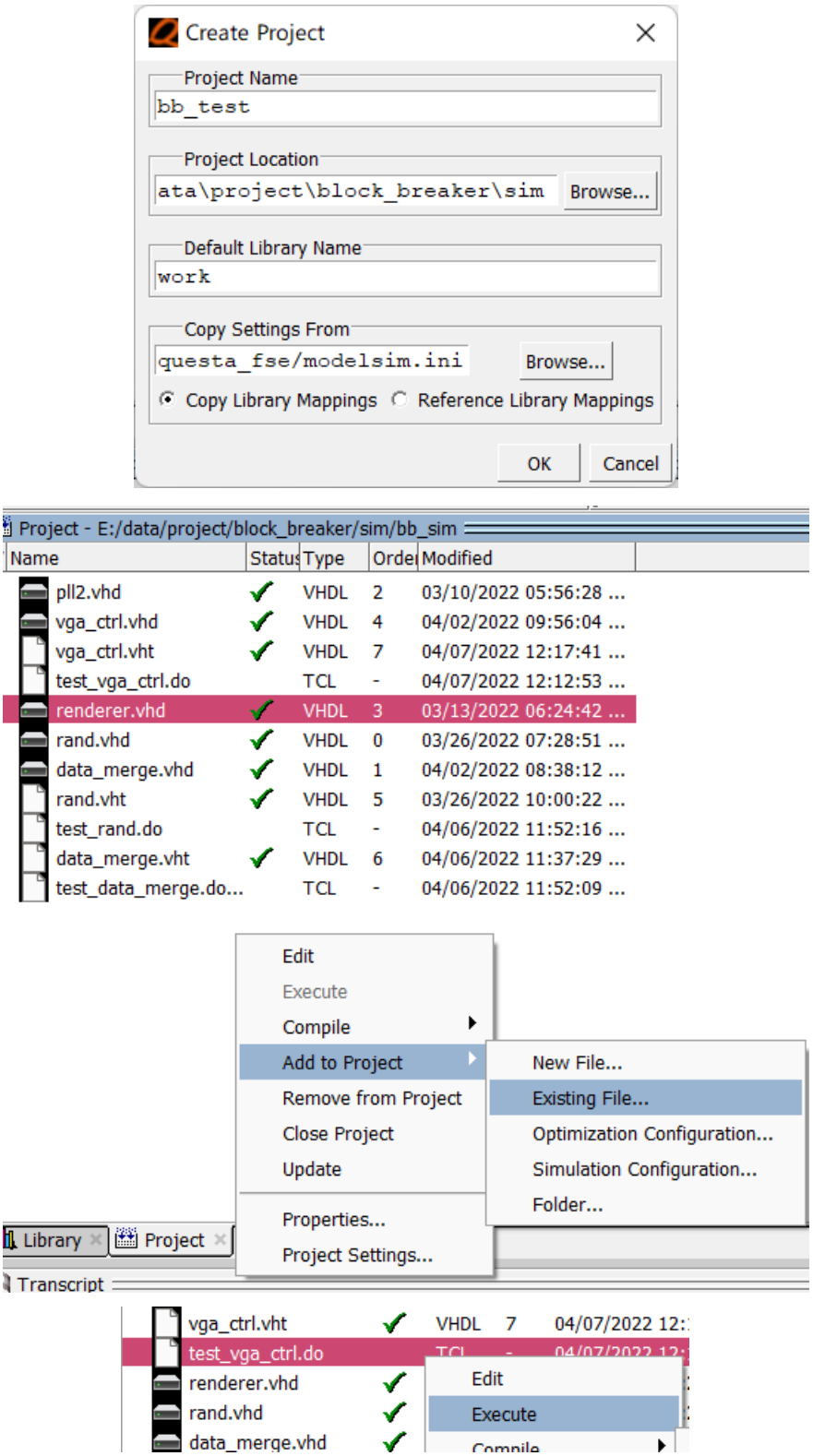
Assuming the restored project root folder is called “block_breaker”, then

```
$ cp -r testbench/ block_breaker/
```

Then, to run testbench,

```
$ vsim
```

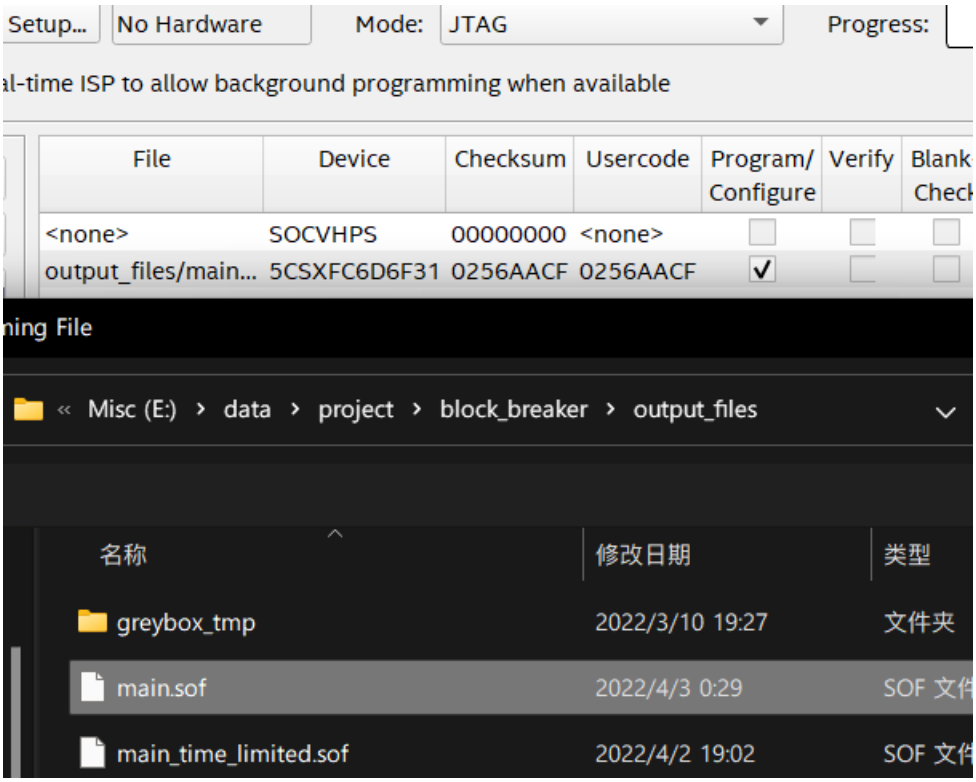
Using vsim command or some others ways to launch the QuestaSim or ModelSim software, **creating a new QuestaSim/ModelSim project**, the project name can be arbitrary, the project root should be in the testbench folder, then choose “Add Existing Files”, and select everything inside the testbench folder.



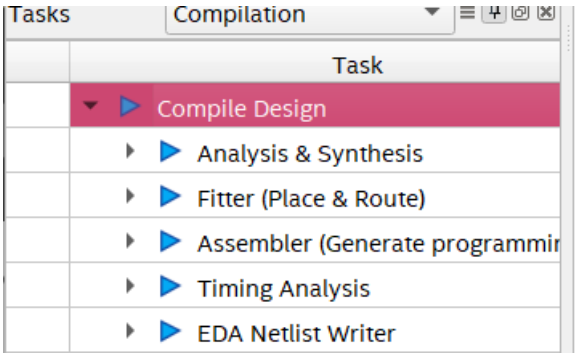
Finally, switch to project tab and select one TCL file (.do files), right click, and select “Execute”, after several seconds should the auto-generated test report appears.

2. How to download the hardware side to the DE-10 board

In the unpacked (restored) Quartus II project, there is already a prepared .sof file located in output_files/main.sof. Using programmer to download this file directly to the board.



To re-compile the project for a new .sof file: Just double click “Compile Design”.



3. How to restore and compile the software side (NIOS-II)

First configurate the Eclipse IDE and NIOS-II development environment for Quartus II, by following this official instruction:

https://www.intel.com/content/www/us/en/support/programmable/articles/000086893.html

Then configurate all environment variables, adding the following to the $PATH. This step is vitally important but there are no helps related to this on the internet.

```
Path\to\intelFPGA_lite\21.1\questa_fse\win64
Path\to\intelFPGA_lite\21.1\nios2eds\bin\gnu\H-x86_64-mingw32\bin
Path\to\intelFPGA_lite\21.1\nios2eds\bin
Path\to\intelFPGA_lite\21.1\quartus\bin64
Path\to\intelFPGA_lite\21.1\nios2eds\sdk2\bin
```

Before adding these, replace the paths to the absolute path of your own intelFPGA installation location.

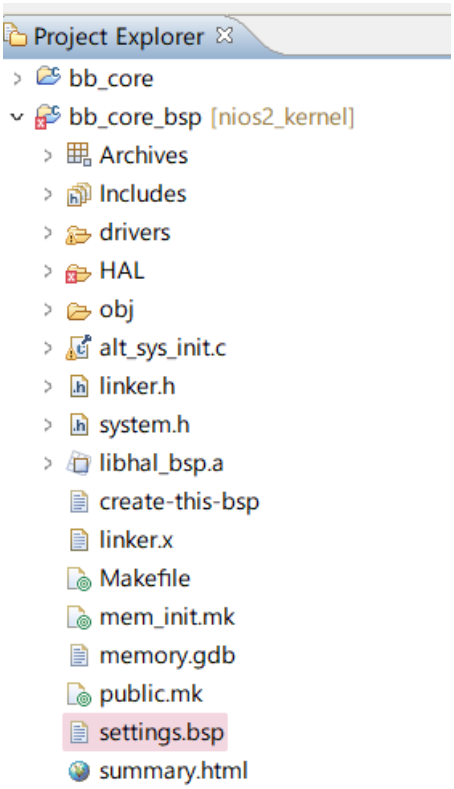
Then,

```
$ cp -r software/ block_breaker/
```

Then launch the eclipse from Quartus II (Menu: Tools -> Nios II Software Build Tools for Eclipse),

and **set the block_breaker/software directory as the workspace.**

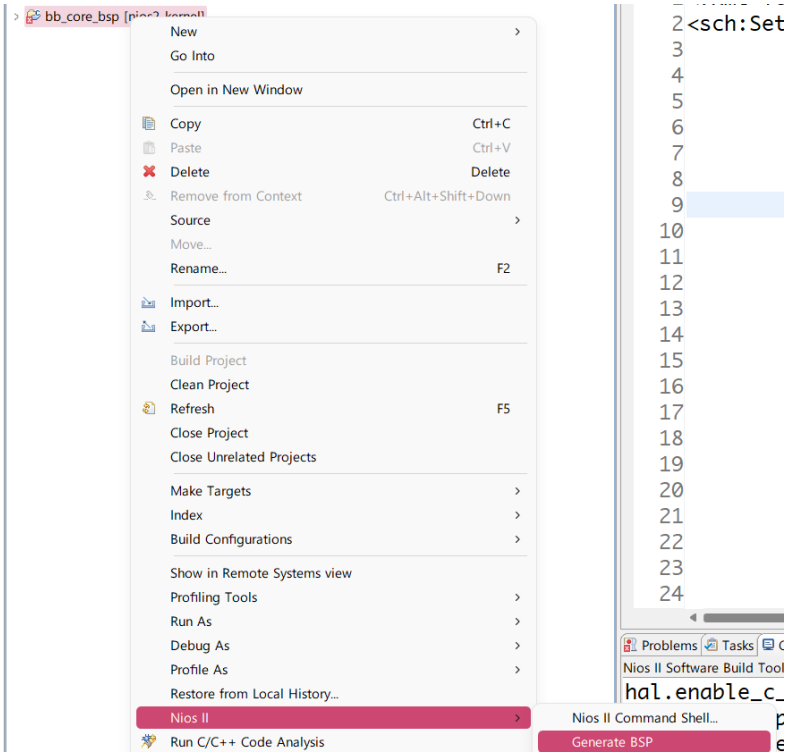
(See next page)

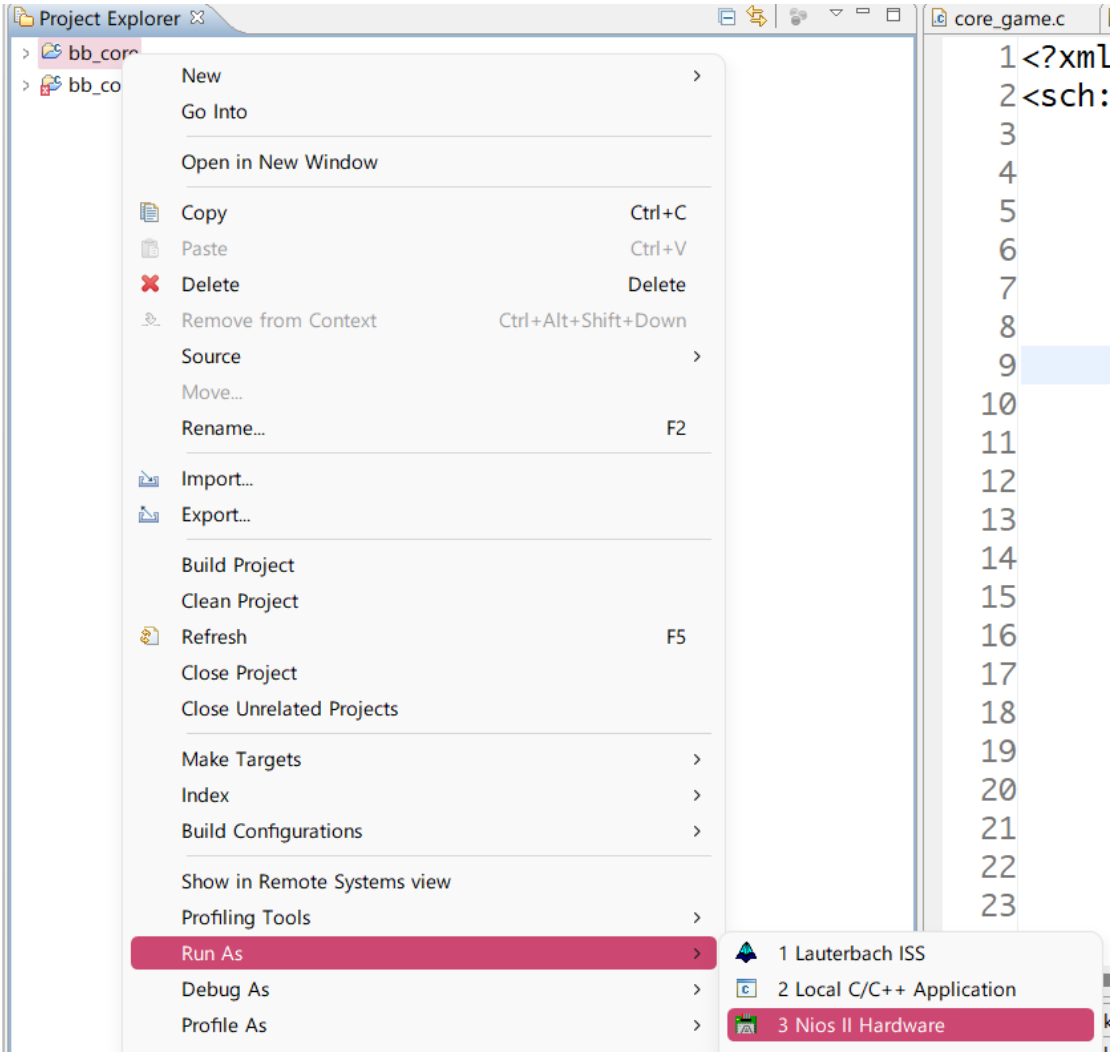


Editing the settings.bsp, replacing all "**E:\data\project\block_breaker**"

Partterns to the absolute path to the block_breaker folder.

Then generate BSP:





Finally, connect the board to computer, **first download the hardware side,** then compile and download the software side, operate as the picture shows.

4. How to run software test using Easy Test

```
$ cd software/bb_core/test

$ sh run_test
```

Zhen Guan (202191382, zguan@mun.ca)

Jiabao Guo (202096888, jiabaog@mun.ca)