In this exercise, you will write an OpenCL™ kernel and launch it from the host-code that you started writing in exercise 1.

Step 1. Writing and Compiling the Kernel

____ 1. Reopen the **SimpleOpenCL** project in Eclipse if it's not already open.

____ 2. Open **SimpleKernel.cl** by selecting **File -> Open File...** in the Eclipse menu and navigating to /home/student/fpga_trn/OpenCL/OCL_17_1/SimpleKernel.cl

____ 3. Write a kernel named **SimpleKernel** with **two** float input arguments, **one** float output argument, and **one** uint argument for the size of the arrays.

a. The 1st three arguments of the kernel should be pointers stored in global memory.

b. The 4th argument is passed in by value.

c. Run a loop iterating through all the elements of the arrays

d. Inside the loop, perform any math function you want on one element of the two inputs and store the result to one element of the output argument. Use the loop index to dereference the input and output arrays.

Refer to the slides to see the available math operations..

Your kernel can be something very simple, for example just a multiply or add operation or it can be something more involved.

____ 4. Using a terminal, go to the **/home/student/fpga_trn/OpenCL/OCL_17_1/** folder

____ 5. If you have not done it previously in this terminal, type "source opencl_init.sh"

This script sets the environment variables needed for the Intel® FPGA SDK for OpenCL™ kernel compile. It points the compiler to the proper board support package and configures the path, among other things.

____ 6. Compile the kernel by typing the following command

```
aoc -march=emulator -board=a10gx SimpleKernel.cl
```

This compiles the kernel using the offline compiler targeting the Intel® Arria® 10 FPGA reference board in emulation mode.

You likely will see warnings regarding the absence of the restrict keyword.