Lab 3: Migrating to DPC++

Goal:

In this Lab, students will learn how to solve a problem with minimal knowledge of hardware programming and to run their program on FPGA or GPU using unified programming model which significantly simplifies application development. For this purpose, students will develop a DPC++ version of AES. students will first learn how to convert C++ code to DPC++. Based on the material provided to students, they will learn Device selection, Execution model, as well as Hierarchical parallelism in DPC++.

Steps overview:

1- Getting familiar with concepts DPC++
2- Performing an exercise with DPC++
3- Convert AES C++ code to DPC++

Getting familiar with concepts DPC++

Please attend the first lab session, or use the video provided for you. Slides will cover the DPC++_simple_guide.pdf and the video is a narration of slides. When you fell that you understand the main concepts go to the next step. Otherwise, contact the TA for an 1-1 meeting.

Performing an exercise with DPC++

Please follow the instruction provide for you in the exercise folder. At the end, you must complete all 5 tasks to be able to move to the next step.

Convert AES C++ code to DPC++

For this step, we have provided an AES C++ code (verified working) as a start point. Based on the experience from the previous step, you must try to offload all the computational part of the code to an accelerator. For this purpose, you must to shift your thinking from loops to kernels, so you can easier write effective parallel programs using DPC++.

When you finished the ,migration to DPC++, validate the functionality of your code by using *decrypt* application which is provided for you.