## Laboratory 8:

Introduction to CUDA

### Introduction:

To use CUDA, your computer should have Nvidia GPU installed. If you don't have one, you can use our server – your login is connected with the email used on delta fe. john.doe@student.pk.edu.pl → login: john.doe
To log in to our server use:
ssh username@kunegunda.uck.pk.edu.pl
fe: ssh john.doe@kunegunda.uck.pk.edu.pl
Password: erasmus2022

If you are on the outside network you should connect with torus.uck.pk.edu.pl first – you should receive the login and password from our administrators but it is usually surname.name and stdpkpass.

### Steps:

1. Create a working directory (e.g., *Cuda*).
2. Compile (nvcc) and run the program that shows information about the available CUDA device. Familiarize yourself with the device parameters.
3. Familiarize yourself with the sample source code that runs on the graphics card.
4. Familiarize yourself with two levels of parallelization - through blocks and through threads.
5. Compare and analyze the division of work in two programs - with the vector size divided by the number of blocks and with the size indivisible by the number of blocks.
6. Modify the last of the programs with the procedure of adding vectors on the CPU, add time measurement procedures and measure the time for the largest possible size of the vectors. Three times should be measured - the first as the CPU computing time, the second as the time of the GPU calculations without copying the data from memory, and the third as the duration of the entire operation on the graphics card. The results should be presented on a comparative graph for different sizes of vectors.