CENG443 **Fall 2023**

PROGRAMMING ASSIGNMENT 1

Due date: 06.11.2023 23:00

Write a CUDA C program which implements SAXPY. SAXPY stands for “Single-Precision A·X Plus Y”. It is a function in the standard Basic Linear Algebra Subroutines (BLAS) library. SAXPY is a combination of scalar multiplication and vector addition: it takes as input two vectors of floats X and Y with N elements each, and a scalar value A. It multiplies each element X[i] by A and adds the result to Y[i].

You can use your local computer or remote resources (like Google colab) and install the essential software.

Notes:

- Your program will get the size of the arrays (N) and the scalar value (A) from the user, and randomly generates values for the array elements (in the CPU). It will perform the calculation on GPU kernel function by assigning one element per thread.
- You can use either cudaMalloc or cudaMallocManaged functions in your implementation.
- Your program should print your GPU device name (name) and the maximum number of threads per block (maxThreadsPerBlock) at the beginning (Use cudaGetDeviceProperties function).
- You are required to run your program with various block dimensions and thread numbers per each block (two or more different configurations assigned by yourself).
- You are required to include **screenshots** of your sample executions in your submission.
- You need to work individually, no group work is allowed.
- No late homework will be accepted.

Submission: You are required to submit your commented source code and sample outputs to cloud-lms. Please create a compressed file including all source files and sample outputs; and name it as yourstudentnumber_P1.zip (e.g. If your student number is 202012345678, the file name must be 202012345678_P1.zip).