

1. Theory

Get acquainted with the basic principles of GPU computations, their advantages and disadvantages. You are expected to have the basic understanding on how these technologies work, what is GPU, why and when should we use it. You can use lecture material, internet or other sources. For example, you can get a basic idea on the principles by using tutorials on [CUDA](#) or [OpenCL](#) (see sources on the hyperlinks).

The theoretical part should not be reflected in the report, but you may be asked general understanding questions when you defend the lab.

2. Using Google Colab for GPU computations

Setup the [Google Colaboratory](#) to work on the GPU and get the basic knowledge on how to use it in different modes. To complete this task, you can use lecture material, internet or other sources. For example, you may find helpful [the instructions from Google](#) or other [online tutorials](#).

Just in case I am telling you that for this lab you should use standard Python rather than PySpark.

1. Wire a function that loads a dataset from one of the previous labs. Make any sort of operation with this dataset (for example, change every value for one column).
2. Use the [timeit library](#) to measure the execution time for your function.
3. Test the performance of the function in four different conditions: **Google Colab CPU**, **Google Colab GPU**, **local CPU**, **local GPU**. You can use local GPU either via local connection of Google Colaboratory to Jupyter Notebook or simply from your own Jupyter Notebook.

You can either use device switching in Google Colab, with `tf.device('/device:CPU:0')` : function of Tensorflow, or any other method of your preference.