

## Incline Compute

Before beginning these steps, please ensure that the python installation has been completed.

### Assignment

This assignment contains no programming, and is a casual writeup to explore computational differences between a consumer grade cpu and a server.

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### Setup

**Incline** On incline, follow the steps in the `python_incline` document to make sure the environment is setup correctly. Your local computer should already have the required `numpy` package installed.

Place all shell scripts in the default home directory.

**Google Colab** Run the example notebook provided to make sure the example code runs. Make sure to select the GPU runtime.

### Assignment Steps

#### lscpu

On your parallel compute system, run: `sbatch lscpu_output.sh`

and compare the output `lscpu_output.txt` with your local computer's specs.

On your local compute system, run: `lscpu`

- What stands out?
- What comparisons can you make in terms of CPU count and cache?

#### Compute

**Incline** Make sure that the python script `incline_compute.py` is in the home directory. On incline, run:

```
sbatch run_incline_compute.sh
```

**Google Colab** Convert the `incline_compute.py` script into a cell in your live online notebook.

**Local** On your local computer, load your python environment and run the python script. Each partner should run this locally for the final graph. You might like to keep an activity monitor open while running this script. All outputs are in the base unit of seconds.

```
python3 incline_compute.py
```

### GPU

However, if you have a local nvidia gpu available and cuda 11 installed, please try the following:

```
./run_incline_compute_cp.sh
```

For different versions of cuda, you can replace `cupy-cuda11x` with a match on the major version.

### Graph

To summarize the computational differences, make a graph of the run times provided in the output with the following axes:

- X-axis: Number of elements: 10, 50, 100, 250, 500, 750, 1000, 2500, 5000, 7500, 10000
- Y-axis: Time in seconds
- Labels: CPU Name (s)

Use any software to provide an image.