Lab 1: Profiling Tools for Jetson Nano

NOTE: We will be installing essential software dependencies and packages so make sure you have a stable internet connection for your Jetson Nano before proceeding.

Objective: This lab will cover the installation and usage of essential profiling tools used for the Jetson Nano Development Kit.

Preface:

Profiling tools allow you to analyze and optimize the performance of your applications running on the Jetson Nano. This can be especially important for applications that require real-time processing or have strict latency requirements. Some of the benefits of using profiling tools on Jetson Nano devices include:

- Identifying performance bottlenecks
- Optimizing code for power consumption
- Finding and fixing bugs
- Testing and validating performance improvements

We will be visiting some of these ideas and getting familiar with the jetson-stats profiling tool with our lab activity.

Materials Required:

- Jetson Nano Development Kit (basic setup complete)
- ethernet cable / WIFI module
- keyboard and mouse
- display with cables / secondary computer

Assignment Submission Instructions

You will need to turn in the following for full credit (10 + 2 bonus points) on today's lab:

- One screenshot of jetson-stats application (1 pts)
- filled out chart(2 pts) and all questions answered in Jupyter file (9 pts)

All the items above turned in as a .zip file or uploaded to the Github
You can login to canvas on your jetson nano and turn in the assignment.
For Github submissions, create a new branch "Lab 1" to your repo - follow Lab 0 doc for more details.

Part 0 - Setup OS

Follow the instructions from Lab 0 and System Setup.

Part I - Installation Steps

Step 1: Install relevant packages

- forum link to install 3.7(if you don't have it) and pip3: https://linuxize.com/post/how-to-install-python-3-7-on-ubuntu-18-04/
- https://stackoverflow.com/questions/54633657/how-to-install-pip-for-python-3-7-on-ubuntu-18
- open terminal using sidebar or search or Ctrl + Alt + T
- run the following commands (you will be in root)
- Be careful with pip and pip3, they are different

```
sudo su
apt-get install python3-pip
apt-get install python-pip
pip3 install -U jetson-stats
pip3 install memory_profiler
pip install memory_profiler
```

- optional: update current package list using

```
sudo apt update
```

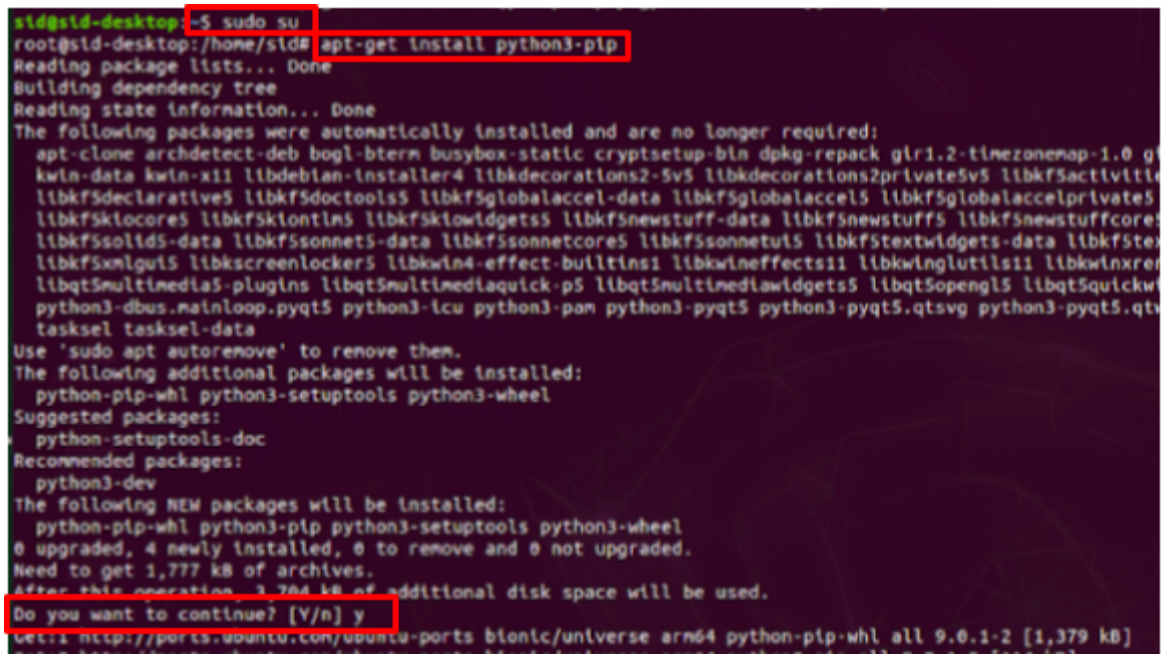
After installation, try to run `pip list` to check

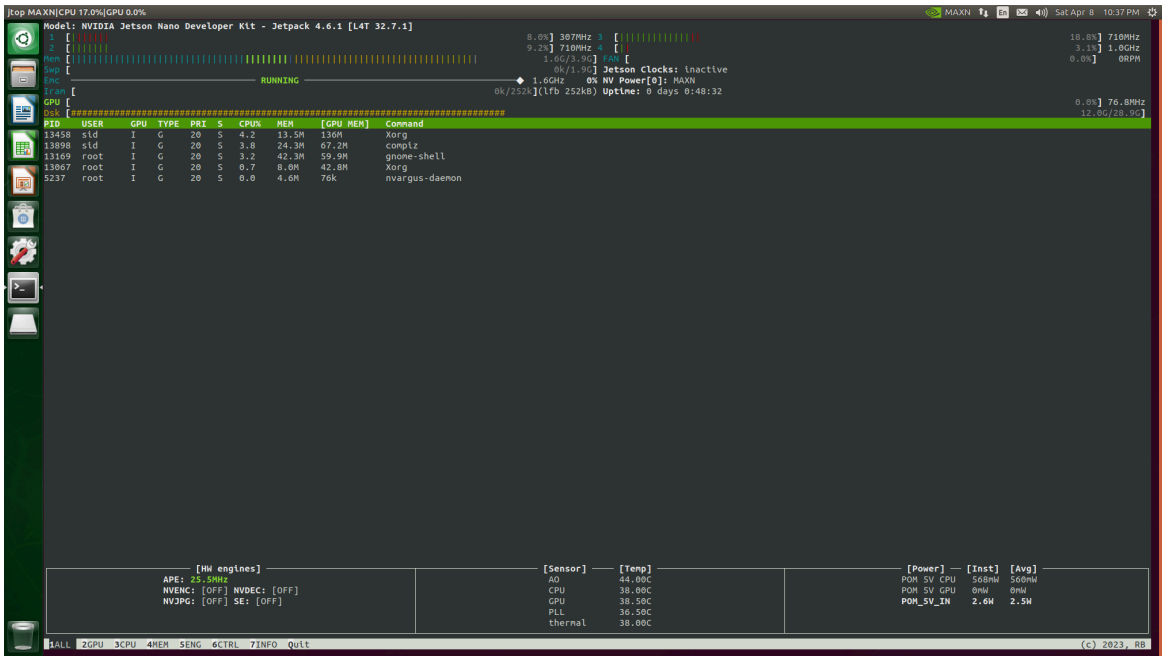
Step 2: Run jetson-stats

- repo and documentation for jetson-stats: https://github.com/rbonghi/jetson_stats
- simply run using **jtop**

```
jtop
```

- check to make sure program is functional





Part II - Install Jupyter lab

Step 1: Install relevant packages

- open terminal using sidebar or search or Ctrl + Alt + T
- run the following commands

```
# Install some dependencies first
sudo apt install nodejs npm
sudo pip3 install packaging
sudo pip3 install setuptools wheel
# if above command not working, use below one
sudo pip3 install -U pip setuptools wheel
sudo pip3 install jupyter jupyterlab
# using following command to check if it's installed successfully
jupyter lab --generate-config
```

After successful installation, run jupyter lab

- run the following commands
- The browser will popup

```
jupyter notebook
# use Ctrl + c to shut down
```

Choose your file to open

NOTE: There is an In [ ] in front of each cell. If the number in brackets turn into *****, it means it is **running** this cell. If it turns to numbers, that means it is finished.

Part III - Further Exploring Constraints

In this section you run specific code snippets and document the memory usage, latency and performance of your Jetson Nano.

NOTE: Download the Python notebook file from the google drive (link in Step 1). Make sure you can access and run them using your Jetson Nano itself. Follow the notebook and answer the questions to successfully complete this part.
This will require a stable internet connection and enough storage space.

Step 1: Download the Lab1.ipynb notebook file from Canvas

- Basic tutorial here

Step 2: Follow the instructions on the Python notebook

- Profiling and Timing Code | Python Data Science Handbook (jakevdp.github.io)

Part IV - Fill the following chart (2 pts)

Simply go through the jetson-stats application (with no applications or tasks in the background) and fill in the chart below.

Jetson Nano Model	
Jetpack version	
memory storage	
CPU temperature	
GPU temperature	
GPU shared ram	
# of ARMv8 Processor cores	
power usage	

Additional questions in the Jupyter Notebook (7 pts + 2 bonus pts)