AI Deep Learning with TensorFlow on Google Cloud Platform (GCP)
Linux OS Basic Command Lines (REVIEW)

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1. GCP Virtual Machine Based on GCP Deep Learning Image

Google Cloud Platform now provides machine learning images designed for deep learning practitioners. The users can conveniently set up GCP deep learning virtual machine based on these images.

The Google Deep Learning images are a set of prepackaged VM images with a deep learning framework ready to be run out of the box. Currently, there are images supporting TensorFlow, PyTorch, and generic high-performance computing, with versions for both CPU-only and GPU-enabled workflows.

IMPORTANT NOTES:
--) As discussed in the document "HOWTO_GCP_setup_deep_learning_vm.pdf," it is recommended that the user should use the CPU-ONLY version to avoid the high cost of GPU-enabled ones.

All the GCP deep learning images are based on **Debian**, a Linux OS version.

All images come with python 2.7/3.5 with pre-installed core packages:

- numpy
- sklearn
- scipy
- pandas

Additionally, Jupyter Notebook is also a built-in core package available in the images. It means that the user can run Jupyter Notebook server in the remote VM and connect to it from the local computer.

2. Linux OS: Overview

Just like Windows 10 or Mac OS X, Linux is an operating system. An operating system is a software that manages all of the hardware resources associated with your desktop or laptop. To put it simply – the operating system manages the communication between your software and your hardware. Without the operating system (often referred to as the "OS"), the software would not function.

Linux OS consists of multiple core subsystems, and the most important one is the kernel that is actually the "Linux."
Linux OS is very popular as the platform of choice for web servers and other online services thanks to its powerful features and cost effectiveness (Linux is open source). It is also very popular as the platform for cloud virtual machines.

3. Basic Linux Command Lines

Linux OS distributions offer several great GUI's such as GNOME and KDE. However, Linux CLI (Command Line Interface) is still very popular thanks to the command lines are simple, convenient, versatile, and powerful. When working with Linux servers, the user often prefers Linux CLI to the GUI's.

There are several basic Linux command lines that are very helpful to access, create, and remove contents on Linux OS.

3.1 Check the current directory or folder

- $ pwd
    - *NOTE: $ is the prompt, not included in the command line.*

3.2 Check the current user

- $ whoami
    - *NOTE: Linux is multi-user OS. The user can be both the "root" that has all the privilege or normal users with limited privilege.*

3.3 List all the contents in a directory or folder

- $ ls -l
    - *NOTE: List only the contents created by the user.*

- $ ls -all
    - *NOTE: List all the contents including the system files, directories, the .* files and directories.*

3.4 Change from the current directory to another one

- $ cd <a sub-folder>
    - *NOTE: a sub-folder of the current folder.*

- $ cd <full path of the folder>
    - *NOTE: many ways to change the folder or directories. These are only two simple options.*

- $ cd ..
    - *".." represents the immediate parent folder of the current folder*
    - *E.g.: Current folder: ~/folder-A/sub-folder-B → Run "cd .." will change directory to ~/folder-A*

3.5 Create a new directory or folder

- $ mkdir <name of the new sub-folder>
  - *NOTE: a new sub-folder of the current folder.*
- $ mkdir <full path of the new folder>
  - *NOTE: many ways to create folders or directories. These are only two simple options.*

3.6 Remove/Delete a file

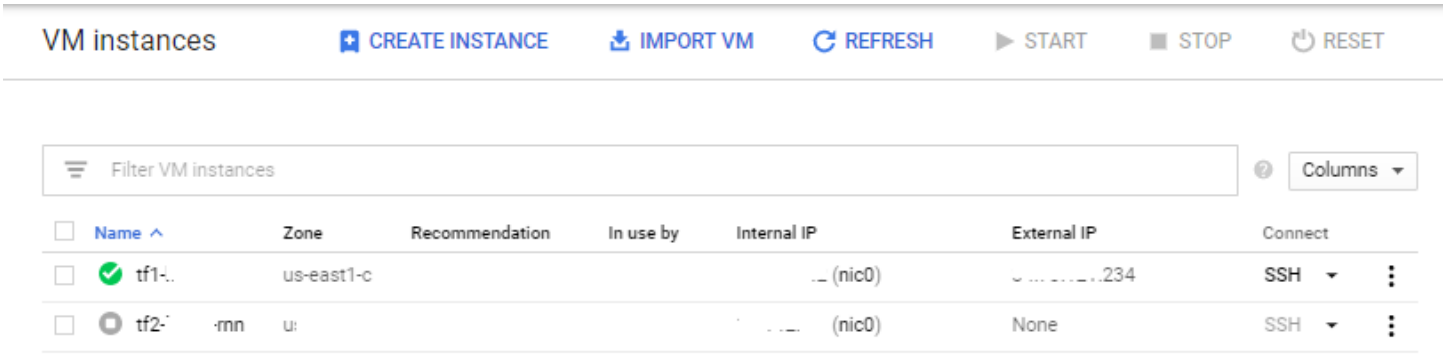
- $ rm <file name>
  - *NOTE: a new sub-folder of the current folder.*
- $ rm <full path of a file>
  - *NOTE: many ways to remove files or folders. These are only two simple options.*

3.7 Remove/Delete a directory or folder

- $ rmdir <name of a sub-folder>
  - *NOTE: a sub-folder of the current folder.*
- $ rmdir <full path of a folder>
  - *NOTE: many ways to delete folders or directories. These are only two simple options.*

4. Examples: pwd, whoami, ls -l

IMPORTANT NOTES:
It is assumed that the student has successfully set up the remote deep learning server on the GCP successfuly. The remote deep learning server has been started and is currently running.



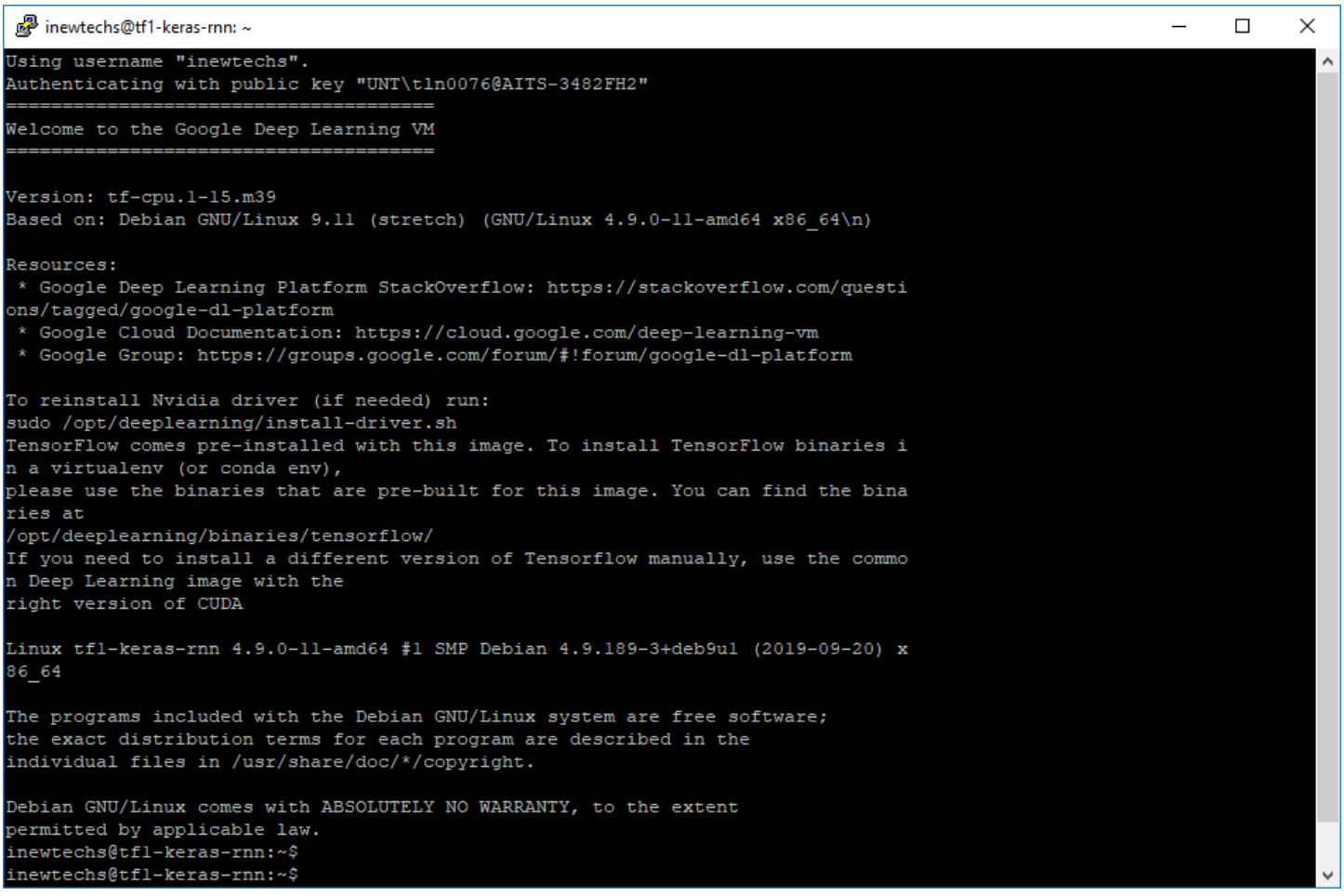
IMPORTANT NOTES:

It is assumed that:

--) The student has successfully installed the Gcloud SDK.

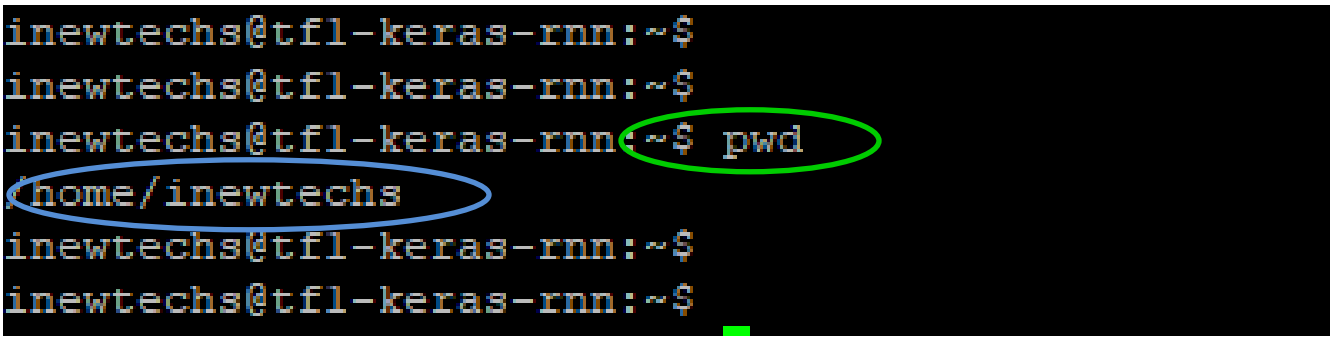
--) The student has successfully started a Gcloud SDK terminal.

--) The student has successfully opened an SSH connection to the remote deep learning server in the terminal.



4.1 Check the current directory or folder

- $ pwd
  - *NOTE: $ is the prompt, not included in the command line.*



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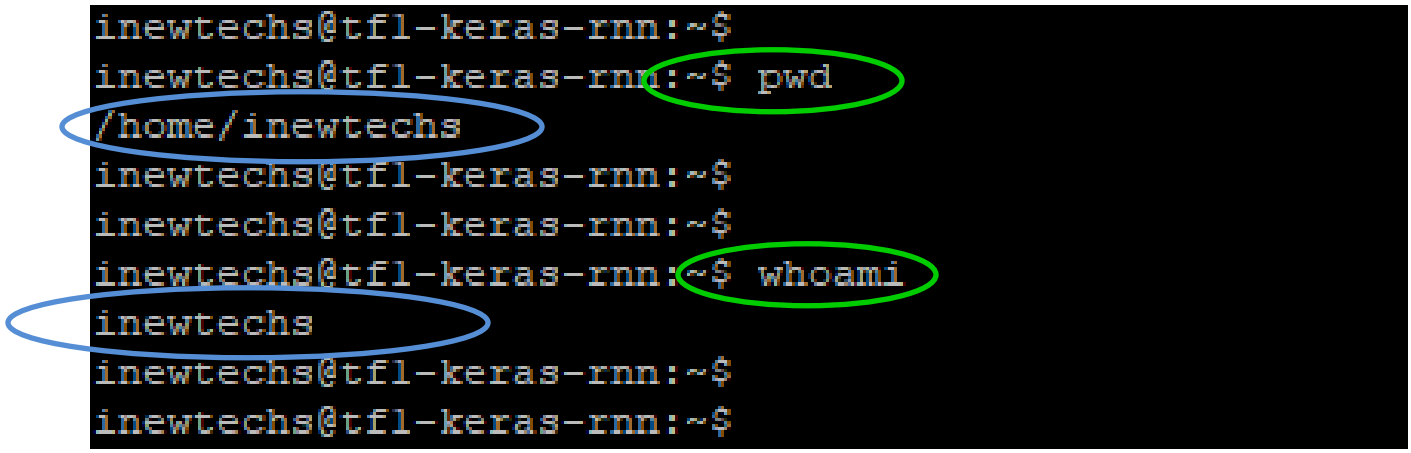
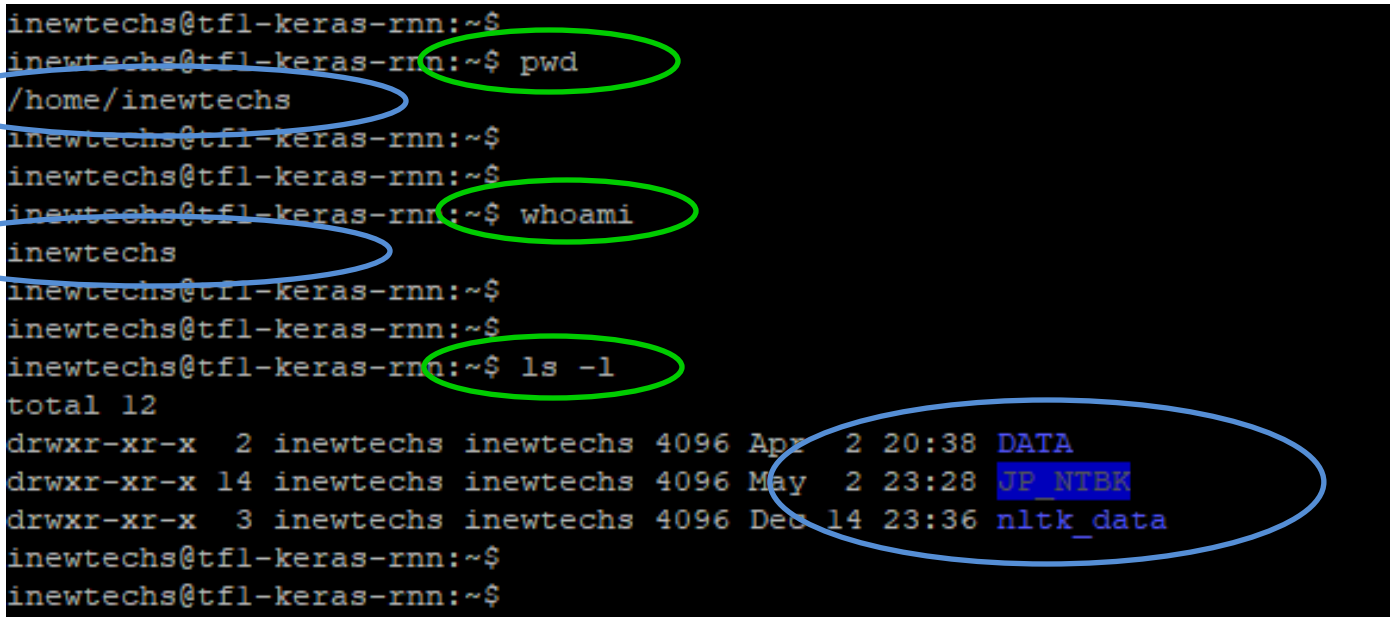
- $ whoami
  - *NOTE: Linux is multi-user OS. The user can be both the "root" that has all the privilege or normal users with limited privilege.*



4.3 List all the contents in a directory or folder

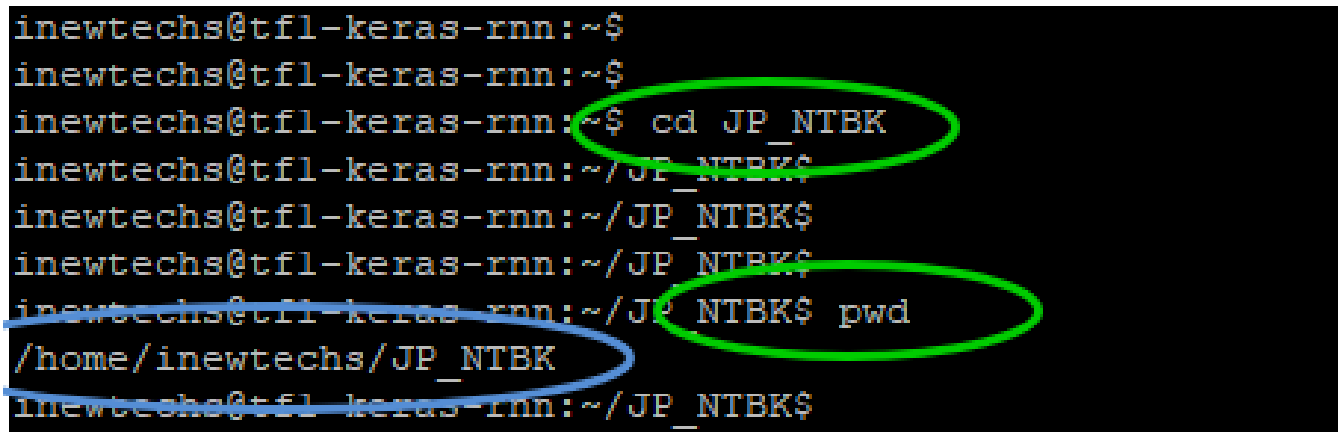
- $ ls -l
  - *NOTE: List only the contents created by the user.*



5. Examples: cd, mkdir

5.1 Change from the current directory to another one

- $ cd <a sub-folder>
  - *NOTE: a sub-folder of the current folder.*



5.2 Create a new directory or folder

- $ mkdir <name of the new sub-folder>
  - *NOTE: a new sub-folder of the current folder.*

```
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$ ls -l
total 12
drwxr-xr-x  2 inewtechs inewtechs 4096 Apr  2 20:38 DATA
drwxr-xr-x 14 inewtechs inewtechs 4096 May  2 23:28 JP_NTBK
drwxr-xr-x  3 inewtechs inewtechs 4096 Dec 14 23:36 nltk_data
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$ mkdir NEW_SUB_FOLDER
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$ ls -l
total 16
drwxr-xr-x  2 inewtechs inewtechs 4096 Apr  2 20:38 DATA
drwxr-xr-x 14 inewtechs inewtechs 4096 May  2 23:28 JP_NTBK
drwxr-xr-x  2 inewtechs inewtechs 4096 Jun  7 22:10 NEW_SUB_FOLDER
drwxr-xr-x  3 inewtechs inewtechs 4096 Dec 14 23:36 nltk_data
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$
```

```
inewtechs@tfl-keras-rnn:~$
inewtechs@tfl-keras-rnn:~$ cd NEW_SUB_FOLDER
inewtechs@tfl-keras-rnn:~/NEW_SUB_FOLDER$
inewtechs@tfl-keras-rnn:~/NEW_SUB_FOLDER$
inewtechs@tfl-keras-rnn:~/NEW_SUB_FOLDER$ ls -l
total 0
inewtechs@tfl-keras-rnn:~/NEW_SUB_FOLDER$
```