1. **Operating System:**

I use a windows machine and I am comfortable working on it.

I can perform all the required operations like saving file, directory, administrative privileges, using command line interface etc.

1. **Installing Cloud SDK**

I have successfully installed google cloud SDK in my machine.

**Steps followed**

* Go to <https://cloud.google.com/sdk/docs/install> and click on “Google Cloud CLI installer”
* The package gets downloaded in your local machine.
* Click on install and it gets installed in sometime.

The below screenshot displays the GC SDK.

A screenshot of a computer

Description automatically generated

1. **Connect and explore remote VM using SSH**

**Question 3.1:** Based on the lectures, open an SSH connection from the local computer to the remote VM.

* Use the below command to connect to the remote VM using SSH
  + gcloud compute ssh sonalisabnamsummer2024@deep-learning-vm-example --project sonalisabnamadta5550 --zone us-south1-c
* The below screenshot shows the successful connection to the remote VM.

**A screenshot of a computer

Description automatically generated**

**Question 3.2: Using the basic Linux command lines to explore the contents of the home directory**

* Run the below commands to list the contents of the directory
  + ls

A screen shot of a computer

Description automatically generated

**Question 3.3: Create a new sub-folder named “JPTR\_NTBK” under the home directory**

* Use the below command to create the folder
  + mkdir JPTR\_NTBK

A screenshot of a computer screen

Description automatically generated

**Question 3.4 Change the current directory to the newly created folder**

* The command used is “cd JPTR\_NTBK”.
* The below screenshot shows the same

**A computer screen shot of a program

Description automatically generated**

**Summary:** In this section we were able to successfully connect to the remote virtual machine and explored the contents of the directory. We also created a new directory and made it as the current working directory.

1. **Start and Connect to Jupyter Notebook in Remote VM**

**Question 4.1: Based on the lectures, start the Jupyter Notebook server in the remote virtual machine.**

* Execute the below command in putty to start the jupyter notebook server.
  + jupyter notebook --port=8888
* The below screenshot shows the same

**A screen shot of a computer

Description automatically generated**

**Question 4.2:Connect to the Jupyter Notebook server in the remote virtual machine (by connecting a Local Computer Port, i.e., 8000, to the Remote Server Port, i.e., 8888)**

* Open a new google cloud sdk from your local machine and execute the below command.
  + **gcloud compute ssh sonalisabnamsummer2024@deep-learning-vm-example --project sonalisabnamadta5550 --zone us-south1-c -- -L 8000:localhost:8888**
* A new putty window opens up as shown in the below screenshot.
* **Note:** This instance of gc sdk and putty are new. The previous instances are still running.

**A screenshot of a computer screen

Description automatically generated**

**Question 4.3: Use Jupyter Notebook that is currently running in the Remote Server (in a browser on the local computer)**

* Go to the browser and open a new tab with the url <http://localhost:8000>
* From the previous putty window copy the token and paste it in the password field
* The below screen gets displayed.

**A screenshot of a computer

Description automatically generated**

* Click on “New” to start a new jupyter notebook.

**A screenshot of a computer

Description automatically generated**

**Summary**: We started jupyter notebook from the putty window on localhost port 8000 and use a local gc SDK to forward local port 8000 to google cloud port. This opens up a new putty window where we can see the contents of the directory. With the token in the first putty window we can access the jupyter notebook running on url <http://localhost:8000/> . The code written in this jupyter notebook executes on the remote VM which we created previously. Once the VM is down/stopped, this jupyter notebook will go down too. In order to save our work, we need to download the jupyter notebook and save it.

1. **Write Simple Python Code in Jupyter Notebook in Remote VM**

**5.1: Create a vector (1D array) of size 20. All the elements are initialized with 0 (zero) except for the 8th element that is set with the value 8.**

A white background with black numbers

Description automatically generated with medium confidence

**5.2: Create a vector of size 16 with random values ranging from 0 to 63, print the vector, then sort it and print the vector again.**

**A screenshot of a computer code

Description automatically generated**

**5.3: Create a 5x5 matrix with values ranging from 0 to 24.**

**A screenshot of a computer

Description automatically generated**

**5.4: Create an 8x8 array with random values, then find the min and max values stored in this matrix.**

**A screenshot of a computer program

Description automatically generated**

**5.5: Create a vector of size 32 that is initialized with random values inside the range (0, 99) and then find the mean of all the initial values.**

**A screenshot of a computer code

Description automatically generated**