

Assignments 1 ADTA 5560 Recurrent Neural Networks for Sequence Data

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ADTA 5560 Recurrent Neural Networks for Sequence Data

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University of North Texas

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1. PART I: Confirm UNT Student Email Address (10 Points)

1.1 What is the student's UNT student email address (...@my.unt.edu)?

- **YogChaudhary@my.unt.edu**

1.2 Has the student received the Welcome-to-the-Class message via his/her email?

- **Yes, I did**

1.3 If NO to Question 1.2, can the student access the student email (...@my.unt.edu)?

- **N/A**

1.4 Is the student a UNT employee?

- **N/A**

1.5 If YES to Question 1.4, does he/she prefer using the UNT employee email for class communication?

- **N/A**

1.6 If YES to Question 1.5, what is the student's UNT employee email?

- **N/A**

2. PART II: Select an Operating System (10 Points)

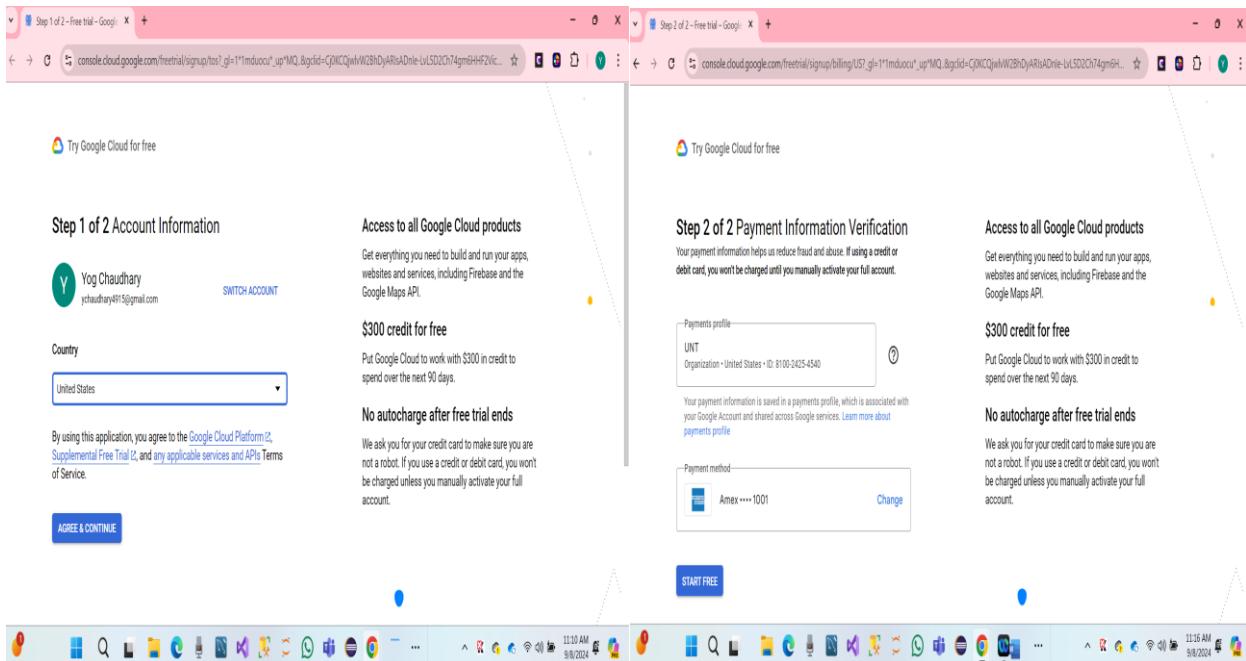
I will be using Windows as an OS for this course, and good knowledge of drive, directions and folders, files, the ownership status of these components, and administrative privileges. I can create new folders, access existing ones along with their actual contents, and create and save files within these folders. Download software applications, store them in specific folders, and install these applications in real, physical directories. Additionally, I can troubleshoot issues using various resources, such as online research, vendor support, and public technical forums. Therefore, I can use Windows effectively for

cloud-based deep-learning tasks. Windows offers a user-friendly interface for all these actions, making it convenient for this course.

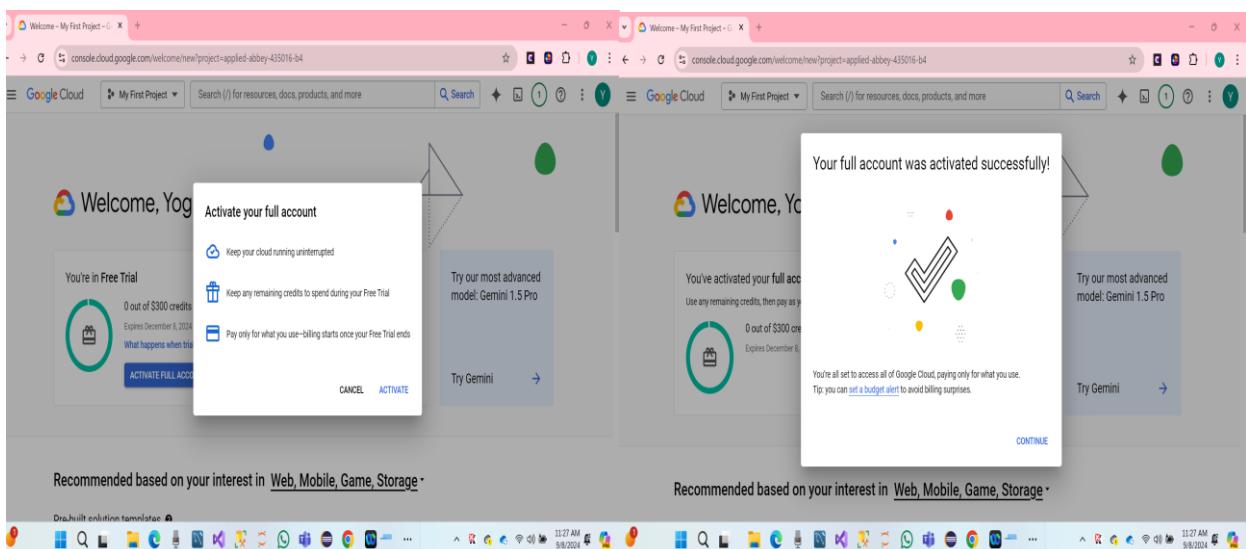
3. PART III: Set Up Deep Learning Virtual Machine (VM) in GCP (20 Points)

3.1 We have successfully set up a remote on Google Cloud (GCP) by the following steps.

- Click on open GCP
- Click on the free Trail
- Enable computing engine.



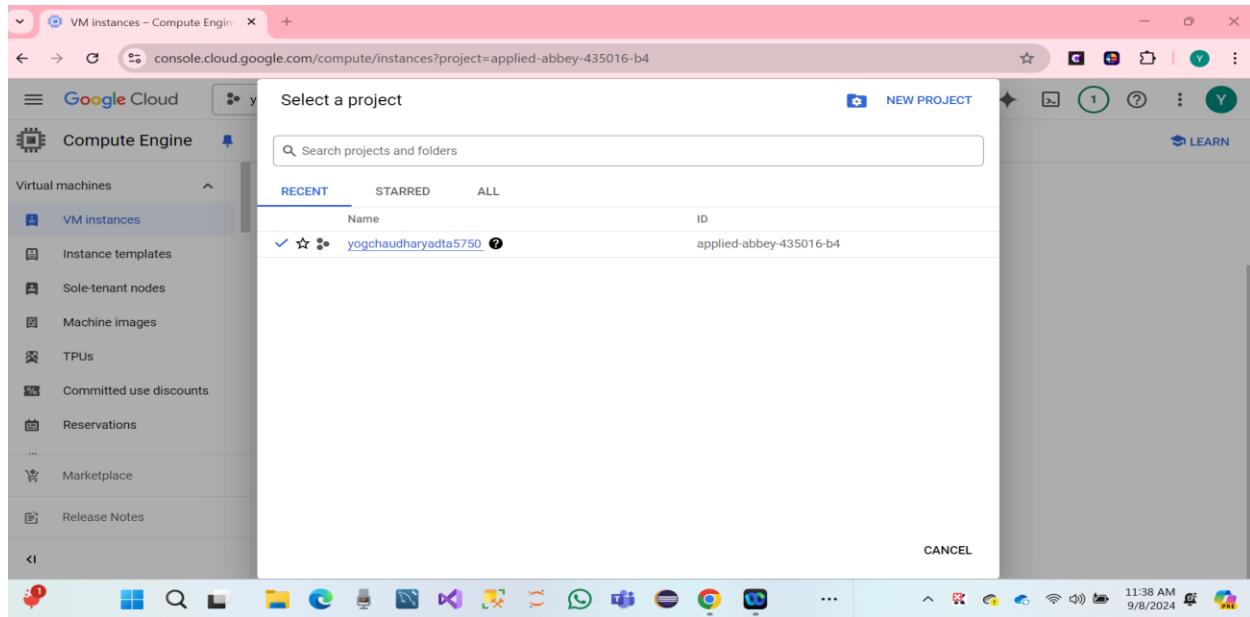
- Click on Activate and continue.



The screenshot shows the Google Cloud Marketplace page for the Compute Engine API. At the top, there's a navigation bar with tabs for 'OVERVIEW', 'DOCUMENTATION', 'SUPPORT', and 'RELATED PRODUCTS'. Below the navigation, there's a section titled 'Compute Engine API' with a blue icon. A modal window is open, showing a message: 'Now viewing project "yogchaudharyadta5750" in organization "No organization"'. The status bar at the bottom indicates the time as 11:31 AM and the date as 9/8/2024.

- Click on Enable computer engine.

The screenshot shows the Google Cloud VM instances page. On the left, there's a sidebar with sections like 'Virtual machines', 'Storage', and 'Marketplace'. The main area shows a table for 'VM instances' with columns for Status, Name, Zone, Recommendations, In use by, Internal IP, External IP, and Connect. A large dashed cloud icon is centered on the page. At the bottom, there are buttons for 'CREATE INSTANCE' and 'TAKE THE QUICKSTART'. The status bar at the bottom indicates the time as 11:37 AM and the date as 9/8/2024.

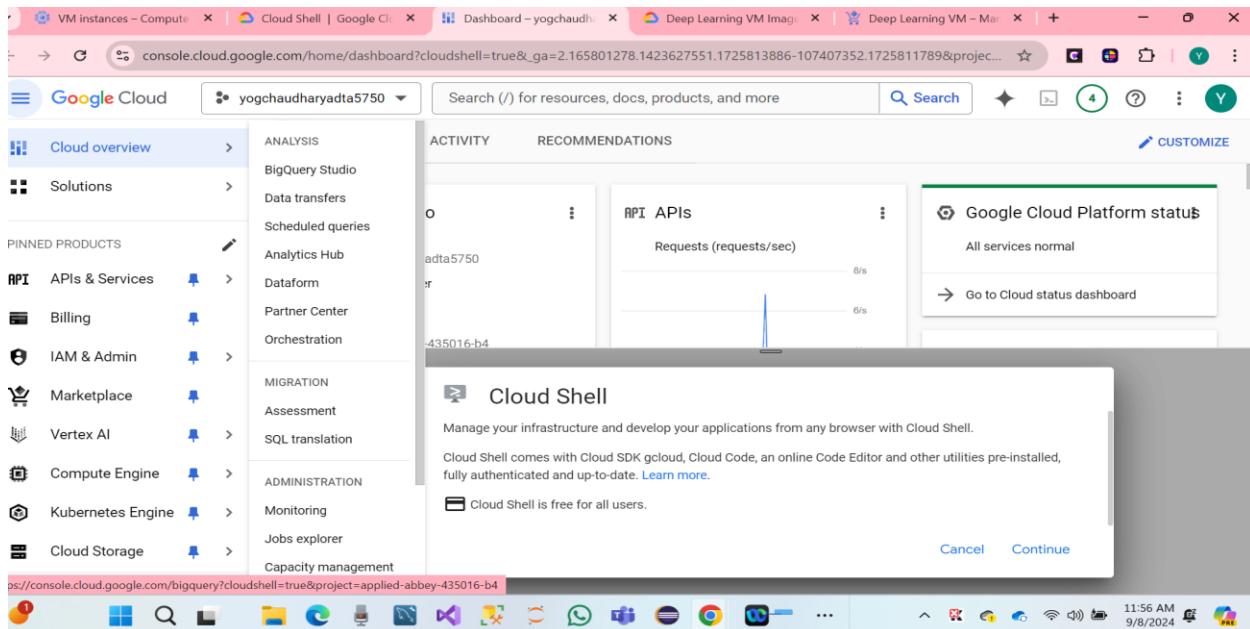


We have created **VM Instances**.

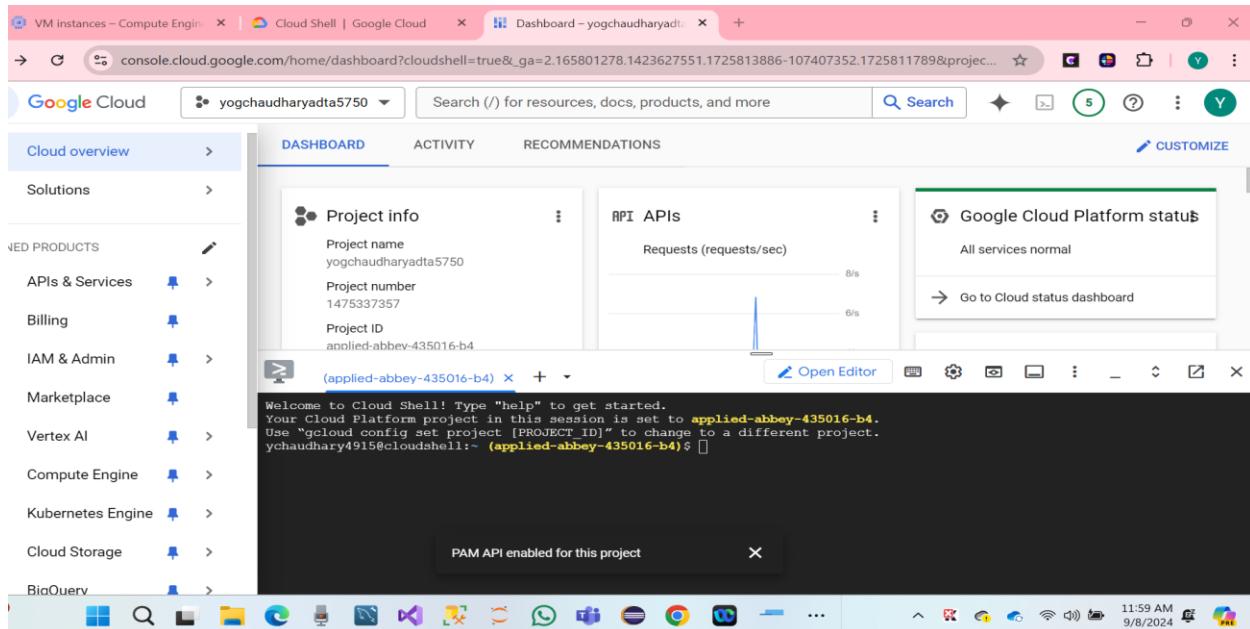
- Click on the search bar and click on cloud shell
- Click on Continue.
- Create Deep Learning VM Using GCP Deep Learning Image.
- Cloud Deep Learning VM Image.

3.2 We have Set Up Remote Deep Learning Server in GCP

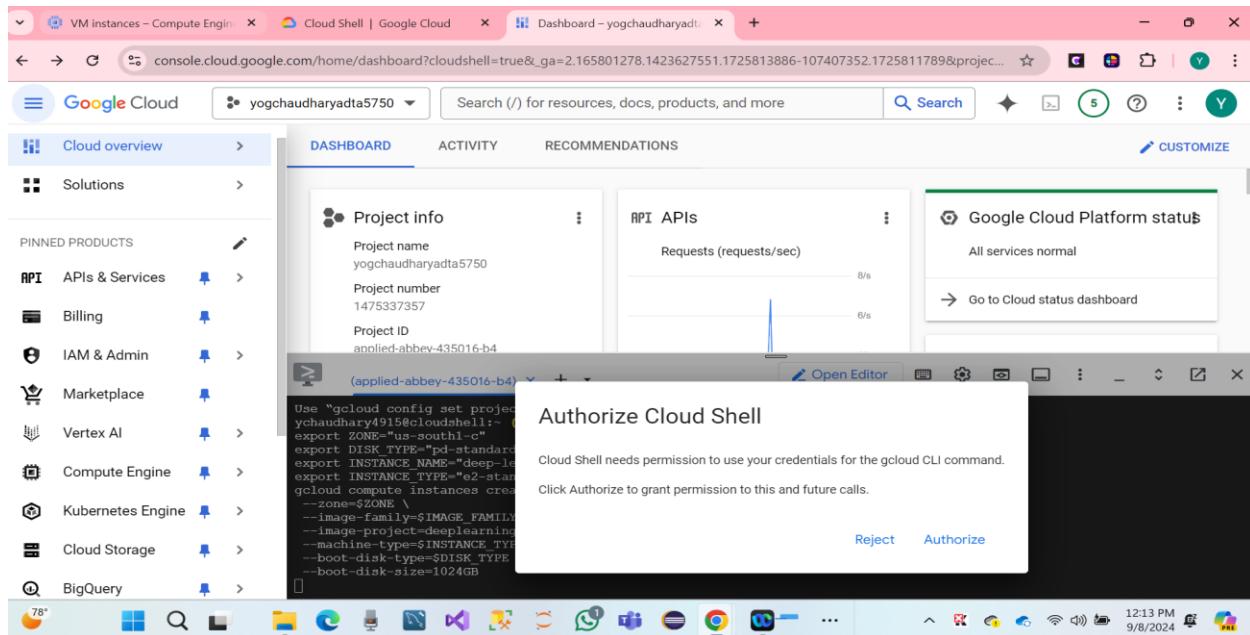
- Click on link: <https://cloud.google.com/deep-learning-vm/>



- Click on cloud shell to continue.



- We have a Drag tab to a new window.
- Open the cloud shell and copy and paste the code below.



- We have to click on Cloud Shell Authorized.
- Hare we, our search bar showing Deep Learning console.
- Name of VM Instance **tf2-keras-ann-vm**

- Hare Screenshot.

The screenshot shows the Google Cloud Compute Engine interface. The left sidebar is collapsed, and the main area displays the 'VM instances' section under the 'Compute Engine' tab. A single VM instance, 'tf2-keras-ann-vm', is listed in the table. The table columns include Status, Name, Zone, Recommendations, In use by, Internal IP, External IP, and Connect. The instance details are: Status (Up), Name (tf2-keras-ann-vm), Zone (us-east1-c), Internal IP (10.142.0.2 (nic0)), External IP (34.73.100.4 (nic0)), and Connect (SSH). Below the table, there are several related actions: Explore Backup and DR, View billing report, Monitor VMs, Explore VM logs, Set up firewall rules, Patch management, and Load balance between VMs. The status bar at the bottom shows the date and time as 9/9/2024 11:50 PM.

- Verify the TensorFlow Enterprises version of the VM Image.

The screenshot shows the 'tf2-keras-ann-vm' instance details page. The left sidebar is collapsed, and the main area displays the 'DETAILS' tab for the instance. Under the 'Storage' section, the 'Boot disk' table shows one disk entry: Name (tf2-keras-ann-vm), Image (tf-2-8-cpu-v20230925-debian-10-py37), Interface type (SCSI), Size (1024 GB), Device name (tensorflow-vm-tmp1-boot-disk), Type (Standard persistent disk), Architecture (—), and Encryption (Google-managed). There is also a 'Local disks' section which is currently empty. The status bar at the bottom shows the date and time as 9/9/2024 11:52 PM.

- Deep Learning VM on GCP has been set up successfully.

❖ Access GCP Remote VM Console.

The screenshot shows the Google Cloud Compute Engine VM instances page. A single VM instance named "tf2-keras-ann-vm" is listed in the "us-east1-c" zone. A context menu is open for this instance, displaying options such as Start / Resume, Stop, Suspend, Reset, Delete, and Create a group based on this VM (PREVIEW). The sidebar on the left lists various Compute Engine resources.

Note: Stop it when not Using.

Install GCLOUD SDK

- Click on the link: Download.

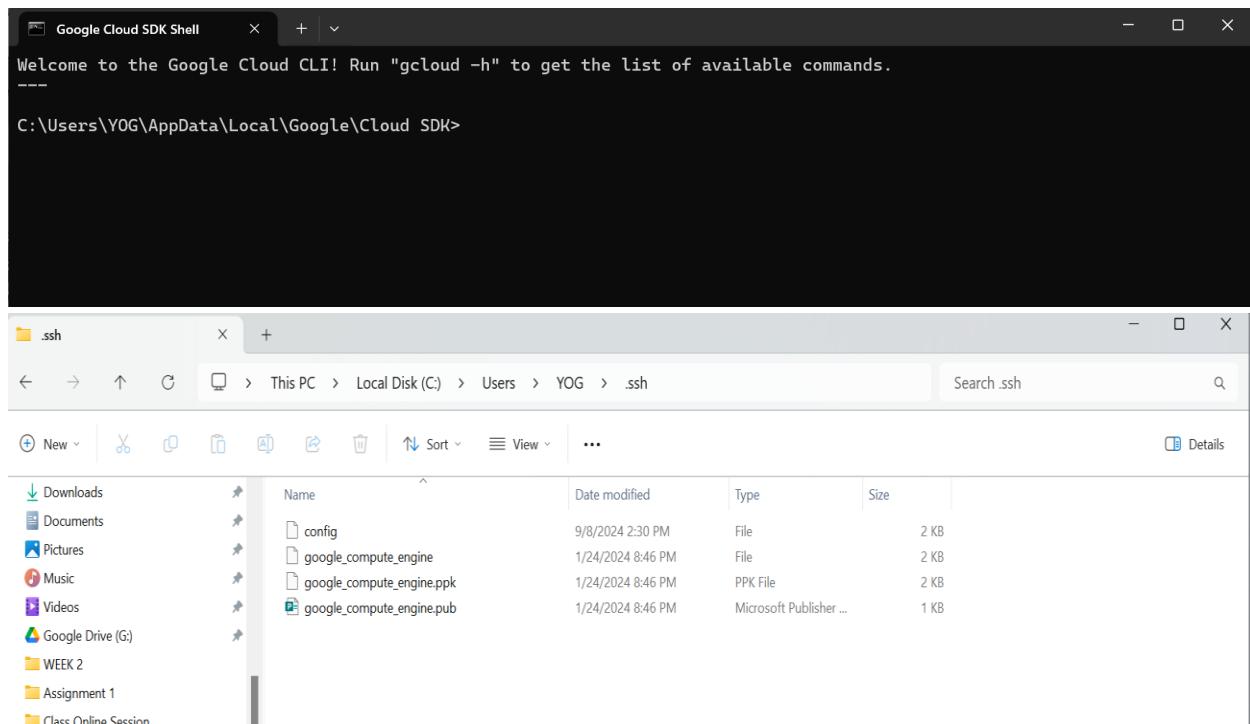
The screenshot shows the Google Cloud documentation page for the Google Cloud SDK. It displays the "Install the Google Cloud CLI" guide and the "Welcome to Google Cloud CLI Setup" wizard. The wizard is currently at step 1, titled "Before you begin". It provides instructions to install the latest gcloud CLI version (491.0.0) and optional Cloud Client Libraries. The setup window includes a "Send feedback" button and a "Next >" button.

- We have to do a Finalize SDK Setting.

```
C:\WINDOWS\SYSTEM32\cmd + \ You are signed in as: [ychaudhary4915@gmail.com].  
Pick cloud project to use:  
[1] applied-abbe...-b4  
[2] Enter a project ID  
[3] Create a new project  
Please enter numeric choice or text value (must exactly match list item): 1  
Your current project has been set to: [applied-abbe...-b4].  
Do you want to configure a default Compute Region and Zone? (Y/n)? n  
The Google Cloud CLI is configured and ready to use!  
* Commands that require authentication will use ychaudhary4915@gmail.com by default  
* Commands will reference project 'applied-abbe...-b4' by default  
Run 'gcloud help config' to learn how to change individual settings  
This gcloud configuration is called [default]. You can create additional configurations if you work with multiple accounts and/or projects.  
Run 'gcloud topic configurations' to learn more.  
Some things to try next:  
* Run 'gcloud --help' to see the Cloud Platform services you can interact with. And run 'gcloud help COMMAND' to get help on any gcloud command.  
* Run 'gcloud topic --help' to learn about advanced features of the CLI like arg files and output formatting  
* Run 'gcloud cheat-sheet' to see a roster of go-to 'gcloud' commands.  
C:\Users\YOG\AppData\Local\Google\Cloud SDK>
```

Finally, GCLOUD SDK Has been successful.

- Run GCLOUD SDK Shell
- Hare Screenshot.



4. PART IV: Connect Explore Remote VM Using SSH (10 Points)

Question 4.1:

Based on the lectures, open an SSH connection from the local computer to the remote VM

```
Google Cloud SDK Shell  X  +  v  -  □  X
Welcome to the Google Cloud CLI! Run "gcloud -h" to get the list of available commands.
---
C:\Users\YOG\AppData\Local\Google\Cloud SDK>gcloud auth login
Your browser has been opened to visit:

https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=32555940559.apps.googleusercontent.com&redirect_uri=http%3A%2F%2Flocalhost%3A8085%2F&scope=openid+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fuserinfo.email+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fappengine.admin+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fsqlservice.login+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcompute+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Faccounts.reauth&state=8ue44iS5sSUlx9Dpo1XXwBf097KPt&access_type=offline&code_challenge=LLVBEe3Wm_IABKsjCiTIui21-OgZkRSMrG_vTwt2bQ&code_challenge_method=S256

You are now logged in as [ychaudhary4915@gmail.com].
Your current project is [applied-abbe-435016-b4]. You can change this setting by running:
$ gcloud config set project PROJECT_ID

C:\Users\YOG\AppData\Local\Google\Cloud SDK>
```

```
Google Cloud SDK Shell  X  +  v  -  □  X
Welcome to the Google Cloud CLI! Run "gcloud -h" to get the list of available commands.
---
C:\Users\YOG\AppData\Local\Google\Cloud SDK>gcloud auth login
Your browser has been opened to visit:

https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=32555940559.apps.googleusercontent.com&redirect_uri=http%3A%2F%2Flocalhost%3A8085%2F&scope=openid+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fsqlservice.login+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcompute+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Faccounts.reauth&state=rK9GTiglpGBT8ychaudhary4915Fjh7cAoT7AxpG84aYwgmCV0r9BQ&code_challenge_method=S256
[!] 04:42:11.187 NotebookApp] The port 8888 is already in use, trying another port.
[!] 04:42:11.188 NotebookApp] Serving notebooks from local directory: /home/ychaudhary4915
[!] 04:42:11.188 NotebookApp] Jupyter Notebook 6.5.6 is running at:
[!] 04:42:11.188 NotebookApp] http://localhost:8889/?token=598a8dbf44a2acfc6d7c753159884b5feelf49fa48f37850
[!] 04:42:11.188 NotebookApp] or http://127.0.0.1:8889/?token=598a8dbf44a2acfc6d7c753159884b5feelf49fa48f37850
[!] 04:42:11.189 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[!] 04:42:11.193 NotebookApp] No web browser found: could not locate runnable browser.

You are now logged in as [ychaudhary4915@gmail.com]
Your current project is [applied-abbe-435016-b4].
$ gcloud config set project PROJECT_ID

C:\Users\YOG\AppData\Local\Google\Cloud SDK>gcloud
You should now be able to use ssh/scp with your instance.
For example, try running:

$ ssh tf2-keras-ann-vm.us-east1-c.applied-abbe-435016-b4

C:\Users\YOG\AppData\Local\Google\Cloud SDK>
```

```
[y] ychaudhary4915@tf2-keras-ann-vm: ~
[!] Using username "ychaudhary4915".
[!] Authenticating with public key "DESKTOP-JAL7QCN\YOG@DESKTOP-JAL7QCN"
=====
Welcome to the Google Deep Learning VM
=====

Version: tf2-cpu.2-8.m112
Based on: Debian GNU/Linux 10 (buster) (GNU/Linux 4.19.0-27-cloud-amd64 x86_64\n
)

Resources:
* Google Deep Learning Platform StackOverflow: https://stackoverflow.com/questions/tagged/google-dl-platform
* Google Cloud Documentation: https://cloud.google.com/deep-learning-vm
* Google Group: https://groups.google.com/forum/#!forum/google-dl-platform

To reinstall Nvidia driver (if needed) run:
sudo /opt/deeplearning/install-driver.sh
TensorFlow comes pre-installed with this image. To install TensorFlow binaries i
n a virtualenv (or conda env),
please use the binaries that are pre-built for this image. You can find the bina
ries at
/opt/deeplearning/binaries/tensorflow/
If you need to install a different version of Tensorflow manually, use the commo
n Deep Learning image with the
right version of CUDA

Linux tf2-keras-ann-vm 4.19.0-27-cloud-amd64 #1 SMP Debian 4.19.316-1 (2024-06-2
5) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed Oct 23 14:12:27 2024 from 45.22.61.77
(base) ychaudhary4915@tf2-keras-ann-vm:~$ jupyter notebook --port=8888
```

Question 4.2

Using the basic Linux command lines to explore the contents of the home directory

- Pwd
- whoami
- Ls -l
- Ls -all



Welcome to the Google Deep Learning VM

```

Version: tf2-cpu.2-8.ml12
Based on: Debian GNU/Linux 10 (buster) (GNU/Linux 4.19.0-25-cloud-amd64 x86_64\n)

Resources:
* Google Deep Learning Platform StackOverflow: https://stackoverflow.com/questions/tagged/google-dl-platform
* Google Cloud Documentation: https://cloud.google.com/deep-learning-vm
* Google Group: https://groups.google.com/forum/#!forum/google-dl-platform

To reinstall Nvidia driver (if needed) run:
sudo /opt/deeplearning/install-driver.sh
TensorFlow comes pre-installed with this image. To install TensorFlow binaries in a virtualenv (or conda env), please use the binaries that are pre-built for this image. You can find the binaries at /opt/deeplearning/binaries/tensorflow/
If you need to install a different version of Tensorflow manually, use the common Deep Learning image with the right version of CUDA

Linux tf2-keras-ann-vm 4.19.0-25-cloud-amd64 #1 SMP Debian 4.19.289-2 (2023-08-08) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
(base) ychaudhary4915@tf2-keras-ann-vm:~$ pwd
/home/ychaudhary4915
(base) ychaudhary4915@tf2-keras-ann-vm:~$ whoami
ychaudhary4915
(base) ychaudhary4915@tf2-keras-ann-vm:~$ ls -l
total 0
(base) ychaudhary4915@tf2-keras-ann-vm:~$ ls -all
total 36

```

Question 4.3

Create a new sub-folder named “JPTR_NTBK” under the home directory

- Mkdir JPTR_NTBK
- Cd JPTR_NTBK



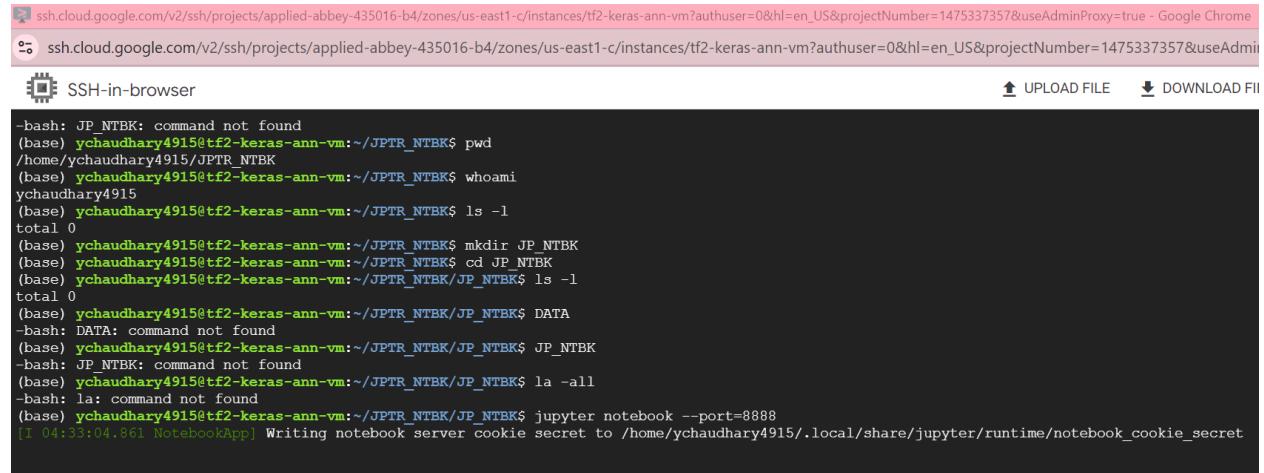
```

total 0
(base) ychaudhary4915@tf2-keras-ann-vm:~$ ls -all
total 36
drwxr-xr-x 6 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:19 .
drwxr-xr-x 6 root root 4096 Sep 10 04:16 ..
-rw-r--r-- 1 ychaudhary4915 ychaudhary4915 220 Apr 18 2019 .bash_logout
-rw-r--r-- 1 ychaudhary4915 ychaudhary4915 3957 Sep 10 04:19 .bashrc
drwxr-xr-x 3 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:19 .config
drwxr-xr-x 2 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:19 .docker
drwx----- 3 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:19 .gnupg
-rw-r--r-- 1 ychaudhary4915 ychaudhary4915 807 Apr 18 2019 .profile
drwx----- 2 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:19 .ssh
(base) ychaudhary4915@tf2-keras-ann-vm:~$ mkdir JPTR_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~$ cd JPTR_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ ls
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ ls -all
total 8
drwxr-xr-x 2 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:22 .
drwxr-xr-x 7 ychaudhary4915 ychaudhary4915 4096 Sep 10 04:22 ..
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ pwd
/home/ychaudhary4915/JPTR_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ DATA
-bash: DATA: command not found
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ JP_NTBK
-bash: JP_NTBK: command not found
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ pwd
/home/ychaudhary4915/JPTR_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ whoami
ychaudhary4915
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ ls -l
total 0
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ mkdir JP_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ cd JP_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ ls -l
total 0
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ DATA

```

Question 4.4

Change the current directory to the newly created folder

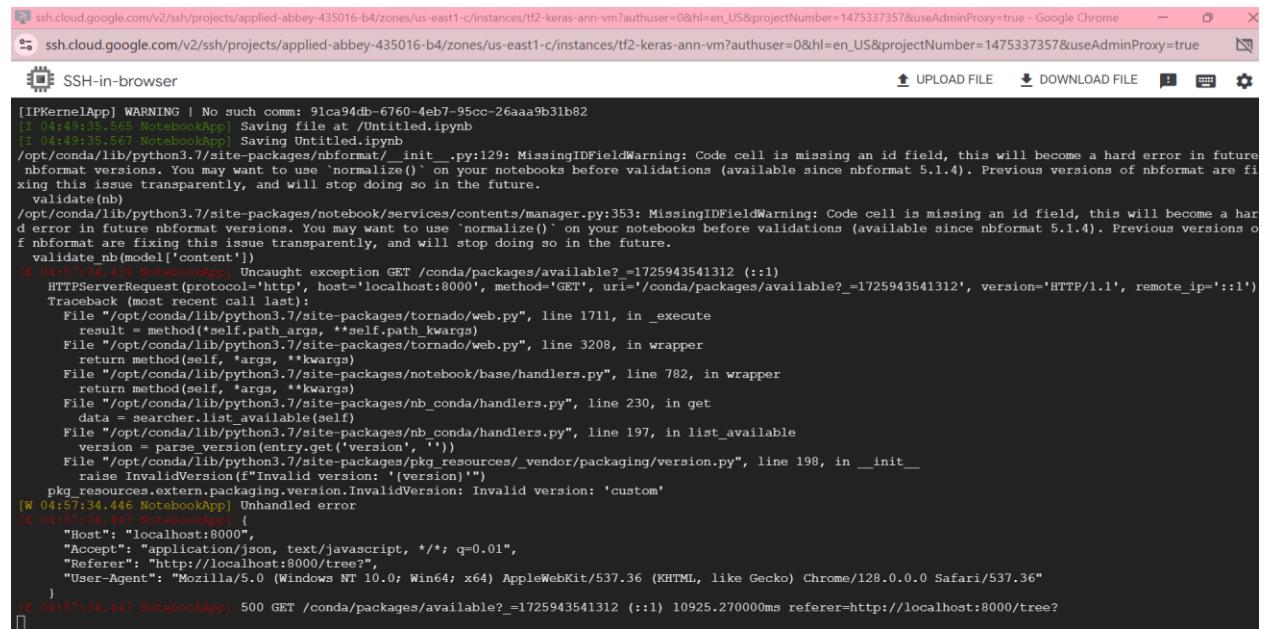


```
-bash: JP_NTBK: command not found
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ pwd
/home/ychaudhary4915/JPTR_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ whoami
ychaudhary4915
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ ls -l
total 0
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ mkdir JP_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK$ cd JP_NTBK
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ ls -l
total 0
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ DATA
-bash: DATA: command not found
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ JP_NTBK
-bash: JP_NTBK: command not found
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ la -all
-bash: la: command not found
(base) ychaudhary4915@tf2-keras-ann-vm:~/JPTR_NTBK/JP_NTBK$ jupyter notebook --port=8888
[1 04:33:04.861 NotebookApp] Writing notebook server cookie secret to /home/ychaudhary4915/.local/share/jupyter/runtime/notebook_cookie_secret
```

5. PART V: Start and Connect to Jupyter Notebook in Remote VM (30 Points)

Question 5.1:

Based on the lectures, start the Jupyter Notebook server in the remote virtual machine



```
[IPKernelApp] WARNING | No such comm: 91ca94db-6760-4eb7-95cc-26aaa9b31b82
[1 04:49:35.560 NotebookApp] Saving file at /Untitled.ipynb
[2 04:49:35.567 NotebookApp] Saving Untitled.ipynb
/opt/conda/lib/python3.7/site-packages/nbformat/_init_.py:129: MissingIDFieldWarning: Code cell is missing an id field, this will become a hard error in future nbformat versions. You may want to use 'normalize()' on your notebooks before validations (available since nbformat 5.1.4). Previous versions of nbformat are fixing this issue transparently, and will stop doing so in the future.
    validate(nb)
/opt/conda/lib/python3.7/site-packages/notebook/services/contents/manager.py:353: MissingIDFieldWarning: Code cell is missing an id field, this will become a hard error in future nbformat versions. You may want to use 'normalize()' on your notebooks before validations (available since nbformat 5.1.4). Previous versions of nbformat are fixing this issue transparently, and will stop doing so in the future.
    validate_nb(model['content'])
[B 04:57:34.439 NotebookApp] Uncaught exception GET /conda/packages/available?_=1725943541312 (::1)
    HTTPServerRequest(protocol='http', host='localhost:8000', method='GET', url='/conda/packages/available?_=1725943541312', version='HTTP/1.1', remote_ip='::1')
Traceback (most recent call last):
  File "/opt/conda/lib/python3.7/site-packages/tornado/web.py", line 1711, in _execute
    result = method(*self.path_args, **self.path_kwargs)
  File "/opt/conda/lib/python3.7/site-packages/tornado/web.py", line 3208, in wrapper
    return method(self, *args, **kwargs)
  File "/opt/conda/lib/python3.7/site-packages/notebook/base/handlers.py", line 782, in wrapper
    return method(self, *args, **kwargs)
  File "/opt/conda/lib/python3.7/site-packages/nb_conda/handlers.py", line 230, in get
    data = searcher.list_available(self)
  File "/opt/conda/lib/python3.7/site-packages/nb_conda/handlers.py", line 197, in list_available
    version = parse_version(entry.get('version', ''))
  File "/opt/conda/lib/python3.7/site-packages/pkg_resources/_vendor/packaging/version.py", line 198, in __init__
    raise InvalidVersion(f"Invalid version: '{version}'")
pkg_resources.extern.packaging.version.InvalidVersion: Invalid version: 'custom'
[W 04:57:34.446 NotebookApp] Unhandled error
[S 04:57:34.446 NotebookApp]
    "Host": "localhost:8000",
    "Accept": "application/json, text/javascript, */*; q=0.01",
    "Referer": "http://localhost:8000/tree/",
    "User-Agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/128.0.0.0 Safari/537.36"
}
[B 04:57:34.447 NotebookApp] 500 GET /conda/packages/available?_=1725943541312 (::1) 10925.270000ms referer=http://localhost:8000/tree?
```

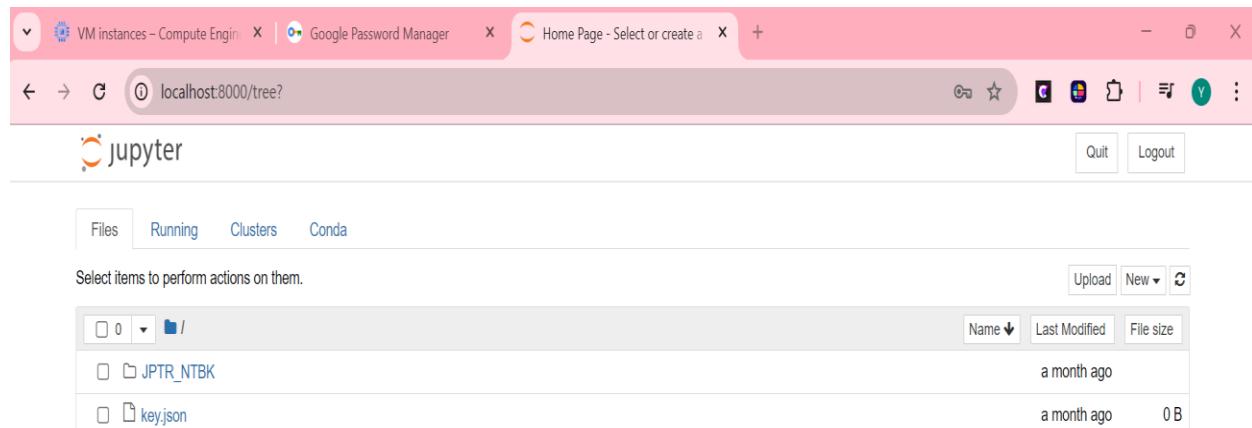
Question 5.2:

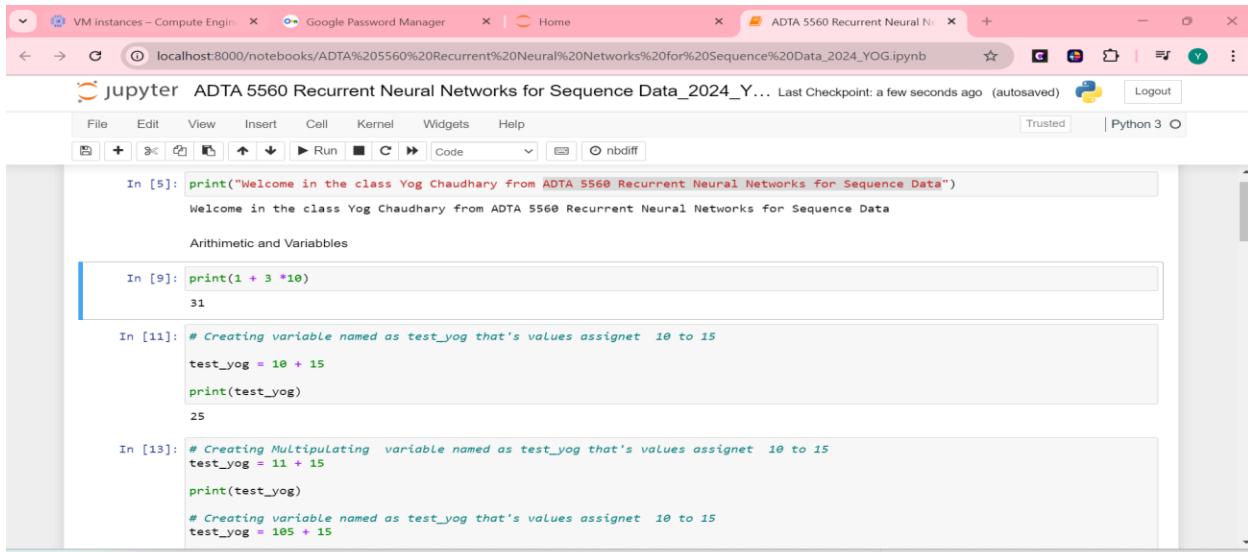
gcloud compute ssh ychaudhary4915@tf2-keras-ann-vm --project applied-abbeY-435016-b4 --zone us-east1-c -- -L 8000:localhost:8888

```
SSH-in-browser
UPLOAD FILE DOWNLOAD FILE
d error in future nbformat versions. You may want to use `normalize()` on your notebooks before validations (available since nbformat 5.1.4). Previous versions o
f nbformat are fixing this issue transparently, and will stop doing so in the future.
validate_nb(model['content'])
[E 04:57:34.446 NotebookApp] Uncaught exception GET /conda/packages/available?_=1725943541312 (::1)
HTTPServerRequest(protocol='http', host='localhost:8000', method='GET', uri='/conda/packages/available?_=1725943541312', version='HTTP/1.1', remote_ip='::1')
Traceback (most recent call last):
  File "/opt/conda/lib/python3.7/site-packages/tornado/web.py", line 1711, in _execute
    result = method(*self.path_args, **self.path_kwargs)
  File "/opt/conda/lib/python3.7/site-pac
    return method(self, *args, **kwargs)
  File "/opt/conda/lib/python3.7/site-pac
    return method(self, *args, **kwargs)
  File "/opt/conda/lib/python3.7/site-pac
    return method(self, *args, **kwargs)
  File "/opt/conda/lib/python3.7/site-pac
    data = searcher.list_available(self)
  File "/opt/conda/lib/python3.7/site-pac
    version = parse_version(entry.get('vei
  File "/opt/conda/lib/python3.7/site-pac
    raise InvalidVersion(f"Invalid version
  pkg_resources.extern.packaging.version.In
[W 04:57:34.446 NotebookApp] Unhandled error
[E 04:57:34.447 NotebookApp]:
  "Host": "localhost:8000",
  "Accept": "application/json, text/javas
  "Referer": "http://localhost:8000/tree?"
  "User-Agent": "Mozilla/5.0 (Windows NT
}
[E 04:57:34.447 NotebookApp] 500 GET /conda/p
[W 05:07:48.303 NotebookApp] Notebook Untitled
[I 05:11:35.210 NotebookApp] Saving file at /
[I 05:11:35.211 NotebookApp] Saving ADTA 5750
[I 05:13:35.216 NotebookApp] Saving file at /
[I 05:13:35.217 NotebookApp] Saving ADTA 5750
[I 05:15:35.218 NotebookApp] Saving file at /
[I 05:15:35.218 NotebookApp] Saving ADTA 5750
[I 05:17:35.228 NotebookApp] Saving file at /
[I 05:17:35.229 NotebookApp] Saving ADTA 5750
Google Cloud SDK Shell - gck x + v
Welcome to the Google Cloud CLI! Run "gcloud -h" to get the list of available command
S.
---
C:\Users\YOG\AppData\Local\Google\Cloud SDK>gcloud compute ssh ychaudhary4915@tf2-ker
as-ann-vm --project applied-abbev-435016-b4 --zone us-east1-c -- -L 8000:localhost:88
88
```

Question 5.3:

Use Jupyter Notebook that is currently running in the Remote Server (in a browser on the local computer).





The screenshot shows a Jupyter Notebook interface with two tabs open. The top tab displays the output of a print statement: "Welcome in the class Yog Chaudhary from ADTA 5560 Recurrent Neural Networks for Sequence Data". The bottom tab shows three code cells demonstrating arithmetic operations and variable assignment.

```

In [5]: print("Welcome in the class Yog Chaudhary from ADTA 5560 Recurrent Neural Networks for Sequence Data")
Welcome in the class Yog Chaudhary from ADTA 5560 Recurrent Neural Networks for Sequence Data

Arithimetic and Variables

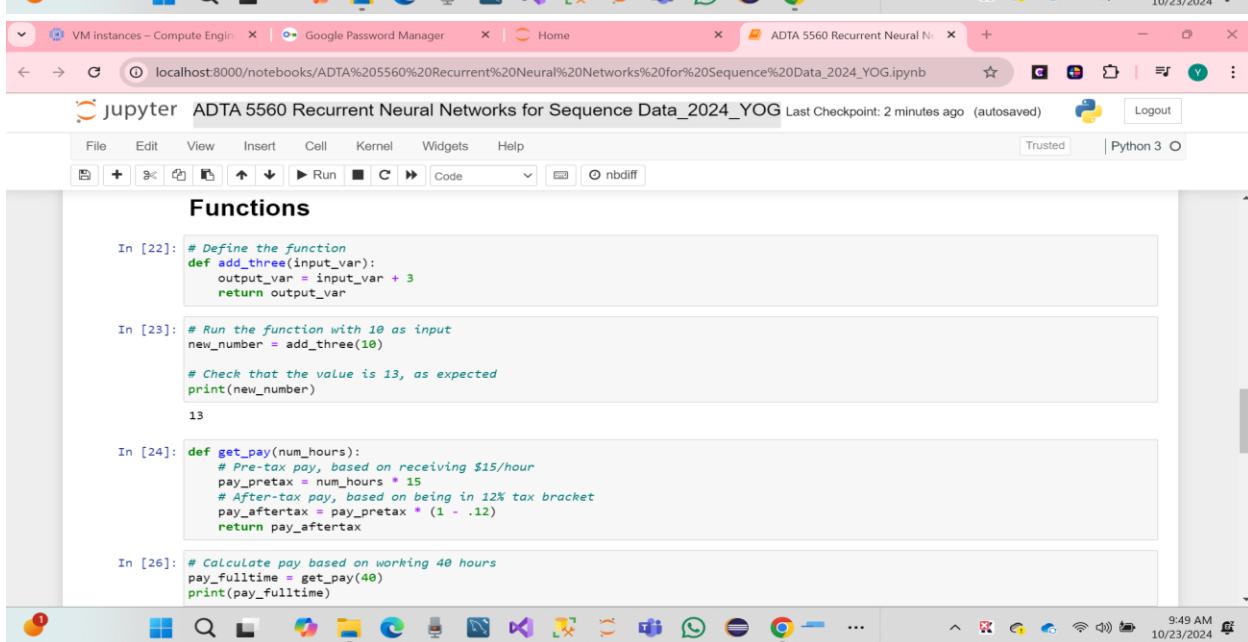
In [9]: print(1 + 3 * 10)
31

In [11]: # Creating variable named as test_yog that's values assignet 10 to 15
test_yog = 10 + 15
print(test_yog)
25

In [13]: # Creating Multipilating variable named as test_yog that's values assignet 10 to 15
test_yog = 11 + 15
print(test_yog)

# Creating variable named as test_yog that's values assignet 10 to 15
test_yog = 105 + 15

```

The screenshot shows a Jupyter Notebook interface with two tabs open. The top tab displays the output of a print statement: "Functions". The bottom tab shows four code cells demonstrating function definition and usage.

```

Functions

In [22]: # Define the function
def add_three(input_var):
    output_var = input_var + 3
    return output_var

In [23]: # Run the function with 10 as input
new_number = add_three(10)

# Check that the value is 13, as expected
print(new_number)
13

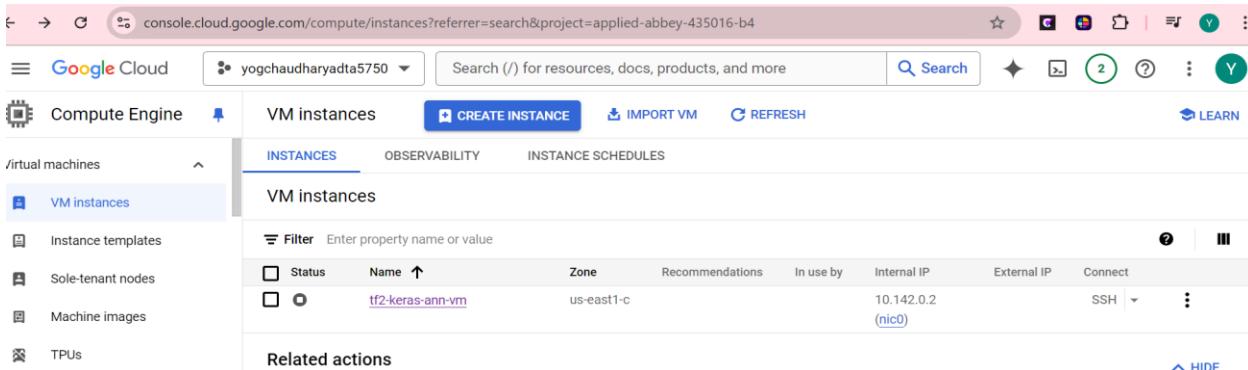
In [24]: def get_pay(num_hours):
    # Pre-tax pay, based on receiving $15/hour
    pay_pretax = num_hours * 15
    # After-tax pay, based on being in 12% tax bracket
    pay_aftertax = pay_pretax * (1 - .12)
    return pay_aftertax

In [26]: # Calculate pay based on working 40 hours
pay_fulltime = get_pay(40)
print(pay_fulltime)

```

- Successfully jupyter notebook programming.

❖ After that VM Instance STOP.



The screenshot shows the Google Cloud Compute Engine interface. The left sidebar shows "Virtual machines" with "VM instances" selected. The main area displays a table of VM instances, with one entry for "tf2-keras-ann-vm" in the "us-east1-c" zone. The status of this instance is listed as "STOPPED".

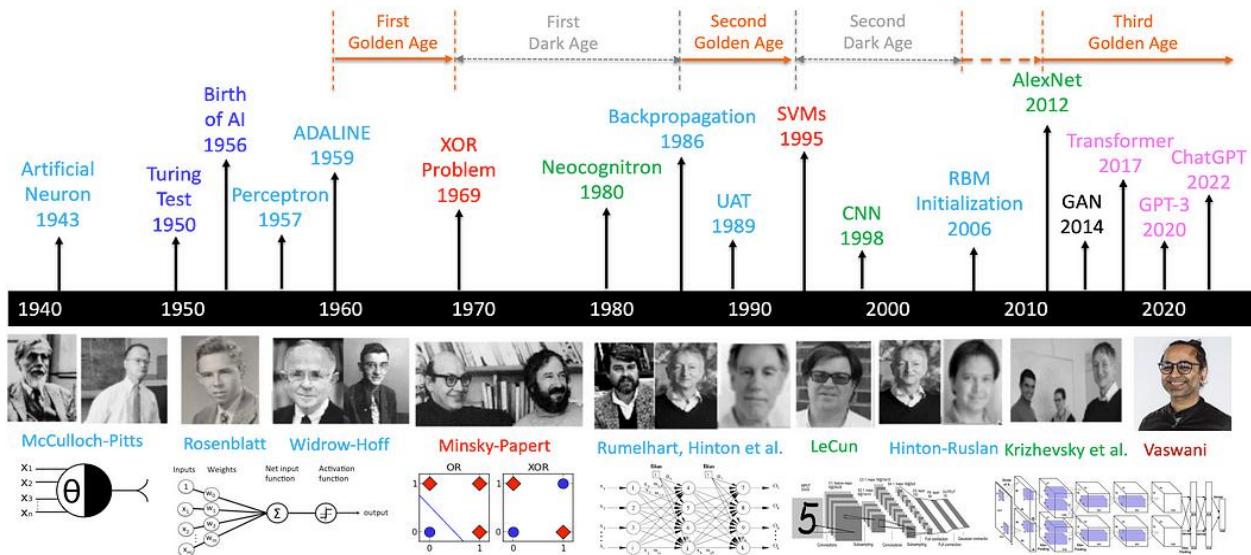
Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
STOPPED	tf2-keras-ann-vm	us-east1-c			10.142.0.2 (nic0)		SSH

6. PART VI: History of AI and Big Data (20 Points)

- ❖ The start of AI: The history of Artificial Intelligence (AI)
- ❖ The periods in which AI seemed to be stalled for many years and WHY?
- ❖ The recent significant achievements, especially in the deep learning area, and the role of Big Data.

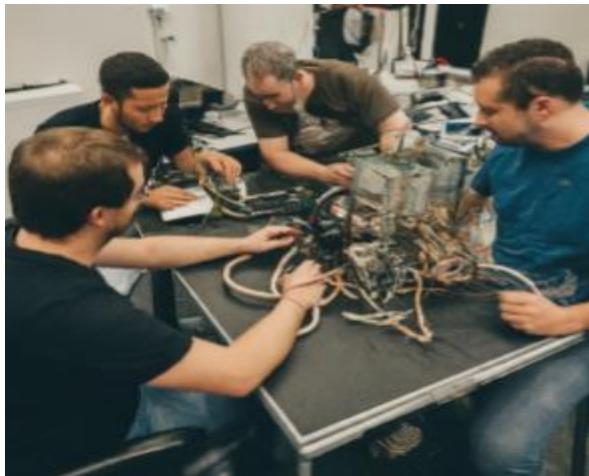
The human foundation of Artificial Intelligence (AI) records or traces the development and system designed to perform tasks, which can typically require intelligence. I went back to the mid-20th century, inspired by the development of the digital computer. Those ideas were to created machine learning and acting like humans. Those included problem-solving, decision -making, understanding language and recognizing, period of patterns the recent research by the deep learning and Big Data.

A Brief History of AI with Deep Learning



The Dawn Of AI: 1940 S Until

- 1943 - Neural Networks: Warren McCulloch and Walter Pitts published the first mathematical model for a neural network.
- 1950 - Turing Test: Alan Turing proposed the idea of testing a machine's ability to exhibit human-like intelligence through the Turing Test.
- 1956 - Dartmouth Conference: Considered the "birth of AI," this conference, organized by John McCarthy, established AI as a formal research field.



The Winter: 1960S and 70s

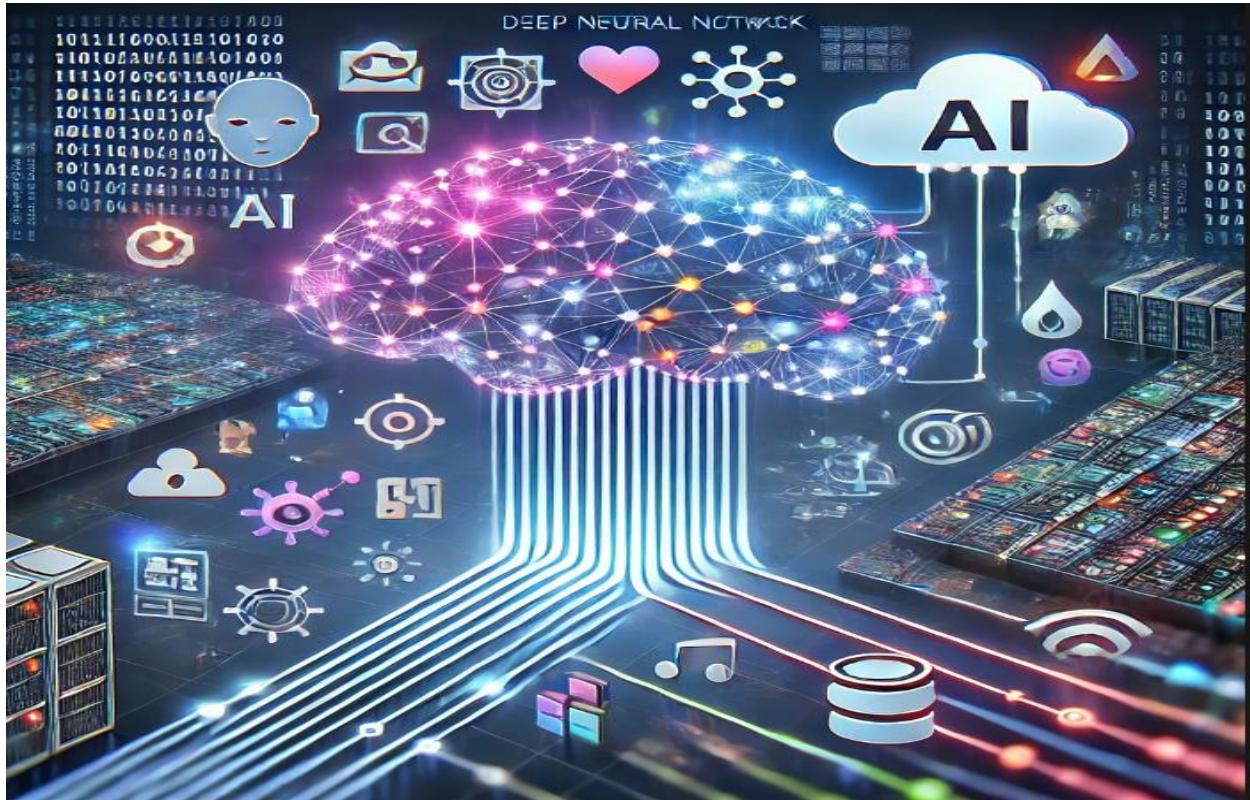
- Limited computational power: Early computers lacked the processing capabilities to handle complex AI algorithms.
- Overly optimistic expectations: Initial breakthroughs led to unrealistic expectations, which couldn't be met, resulting in funding cuts and decreased interest.
- Knowledge-based AI limitations: The focus on symbolic reasoning and logic proved insufficient for real-world tasks requiring adaptation and learning.
- The Rekindled Flame: The 1980s and 90s
- Expert systems gain traction: Knowledge-based systems designed for specific tasks like medical diagnosis show promise.
- Machine learning algorithms advance: Neural networks and decision trees see improvements, leading to applications in pattern recognition and game playing.
- A landmark victory: IBM's Deep Blue defeats chess grandmaster Garry Kasparov in 1997, showcasing the potential of AI.

Machine Learning and Deep Learning (1990s - Present)

AI resources were advances in machine learning and the development of deep learning algorithms are following.

- **Deep Learning:** Deep learning, introduced in the 2000s by researchers like Geoffrey Hinton, utilized multi-layered neural networks to enable machines to learn complex data patterns, revolutionizing fields such as image and speech recognition.
- **Breakthroughs in neural networks:** The development of efficient training algorithms like backpropagation and the availability of Big Data propel Deep Learning.
- **Image recognition leaps forward:** Deep neural networks achieve superhuman performance on image classification tasks.

- **AI goes mainstream:** Applications in natural language processing, robotics, and self-driving cars emerge, transforming various industries.



- Harness AI Power by deep learning a big data. They are multi-layer neural network processing large streams of data, with cloud computing infrastructure in the background supporting applications like image recognition, speech understanding, and natural language processing. Those help to visualize the massive computing power and data required for contemporary AI throughout deep learning process information to generate real-world solutions.

The Role of Big Data

- **Fueling Deep Learning:** The vast amount of data available allows neural networks to learn complex patterns and improve their performance.
- **Challenges and considerations:** Issues like data privacy, bias, and explainability need to be addressed as AI becomes more integrated into society.



The Futures of AI:

The future of AI will be combination or multiple approaches, combining deep learning with symbolic AI, reinforcement learning AI. They will address current limitations, such as interpretability and computational demands, leading to more efficient and versatile systems. Advancements in Large Language Models, generative AI models. The future hold immense protentional for AI to improve our lives in various aspects, from healthcare and education to transportation sustainability, would be continuing to drive innovation, enhancing human-AI collaboration and creativity, while ensuring AI evolves in a balanced and beneficial way for all society.

7. HOWTO Submit

The student must submit all the sections, i.e., submission requirements, in a Microsoft Word document sent to the instructor (Thuan.Nguyen@unt.edu) as an attachment to a UNT email.

The subject of the email must be: “**ADTA 5560: Assignment 1 – Submission.**”

References

LM Po, A Brief History of AI with Deep Learning Aug 31, 2024, Link- <https://medium.com/@lmpo/a-brief-history-of-ai-with-deep-learning-26f7948bc87b>

<https://www.simplilearn.com/how-big-data-can-influence-decision-making-article>
<https://www.kaggle.com/learn/intro-to-programming>

https://www.cloudskillsboost.google/course_templates/536/video/500791