

07.1a: Terraform AWS Guestbook7.1a.4. Launching configuration

the IP address of the EC2 instance is shown below, so I don't need to include my Odin username in every screenshot.

- Take a screenshot showing the completion of the command including its output
- Take a screenshot that includes the VM's IP addresses

7.1a.6. Adding ssh access

- Take a screenshot of the successful ssh login from Cloud Shell.

7.1a.7. Adding the Guestbook application

- Take a screenshot of the output of the command that includes the IP address of the instance

7.1a.8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.

07.1g: Terraform GCP Guestbook7.1g.4. Launching configuration

- Take a screenshot that includes the VM's IP addresses

7.1g.5. Adding an external IP address

- Take a screenshot showing the completion of the command including its output
- Take a screenshot that includes the VM's IP addresses

7.1g.6. Adding ssh access

- Take a screenshot of the successful ssh login from Cloud Shell.

7.1g.8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.

07.2g: Kubernetes Guestbook

- What is the name of the Instance Template dynamically generated to create the two nodes (VMs)?
- What is the name of the Instance Group dynamically generated that the two nodes belong to?
- What are the names of the two nodes?

7.2g.5. Prepare a container image

- Take a screenshot of the container image created

7.2g.7. Deploy the configuration

- Take a screenshot of the output of the following command when all 3 replicas reach a "Running" state.

7.2g.8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.
- Take a screenshot of the managed guestbook pods and the service being exposed.
- Take a screenshot of the load balancer and its details
- Take a screenshot of the addresses allocated and indicate the ones associated with

nodes versus the one associated with the load balancer.

#### 7.2g.12. Deploy and view application

- Take a screenshot of the Guestbook including the URL with the entry in it.

### 07.3g: APIs (Slack, Knowledge Graph

#### 07.3g.2. Code

- Does Google provide a Python package specifically for accessing the Knowledge Graph API?

#### 07.3g.3. Code

- Show the source line that constructs the query we wish to send to the Knowledge Graph API.
- Show the source line that then executes the query and saves the response. What is the name of the method that sends the query to the Knowledge Graph API?
- What is the Python data type that is used to represent the formatted message?
- What are the three main attributes of the formatted message passed back to Slack?

#### 07.3g.8. Test the command

- Take a screenshot of its response for your lab notebook.

### 07.4g: ML APIs

#### 07.4g.3. Vision

- Show the output for your lab notebook
- What is the name of the function?
- What type of Vision client is instantiated in it?
- What method is invoked in the Vision client to perform the detection?
- What is the name of the attribute in the response object that contains the results we seek?
- Take a screenshot of the output for the above commands
- What method is invoked in the Vision client to perform the detection?

#### 07.4g.4. Speech

- Show the output for your lab notebook
- What is the name of the function?
- What method is invoked in the Speech client to perform the detection?
- What is the name of the attribute in the response object that contains the results we seek?

#### 07.4g.5. Translate

- Show the output for your lab notebook
- What is the name of the function?
- What method is invoked in the Translate client to perform the detection?
- What is the name of the attribute in the response object that contains the results we seek?

#### 07.4g.6. Natural Language

- Show the output for your lab notebook

#### 07.4g.8. Code

- What is the name of the function that performs the transcription?

What is the name of the function that performs the translation?

What is the name of the function that performs the entity analysis on the translation?

What is the name of the function that performs the entity analysis on the image?

#### 07.4g.9. Test integration

- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?
- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?
  - If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?

#### 07.4g.13. Video Intelligence

- What are the 3 labels with the highest confidence that the Video Intelligence API associates with the video and what are the confidences for each?
- What is the name of the client class in the package that is used?
- What method is used in that class to perform the annotation?

#### 07.4g.16. Application

- Take a screenshot for your lab notebook that includes the URL.

#### 07.4g.17. Code

- What line of code creates the query for previous detections?
- What line of code sends the query to Cloud Datastore?
- Show the line that retrieves the name of the storage bucket to use.
- What form field is used to specify the uploaded photo?
- Show the line that copies the photo's contents to the storage bucket.
- What method in Vision's annotation client is used to perform the analysis?
- What fields are stored in Cloud Datastore for each image?
- What happens at the end of the upload\_photo route?

## 07.1a: Terraform AWS Guestbook

### 7.1a.4. Launching configuration

the IP address of the EC2 instance is shown below, so I don't need to include my Odin username in every screenshot.

☰

EC2 > Instances > i-0091f3c925de48a33

🔍 🖨

Instance summary for i-0091f3c925de48a33 (course-vm) Info

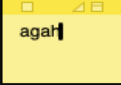
🔄

Connect

Instance state ▼

Actions ▼

Updated less than a minute ago

<div>Instance ID</div> <div>📄 i-0091f3c925de48a33</div>	<div>Public IPv4 address</div> <div>📄 18.236.187.126   <a href="#">open address</a> 📄</div>
<div>Private IPv4 addresses</div> <div>📄 172.31.28.55</div>	<div>IPv6 address</div> <div>–</div>
<div>Instance state</div> <div>🟢 Running</div> <div></div>	<div>Public IPv4 DNS</div> <div>📄 ec2-18-236-187-126.us-west-2.compute.amazonaws.com   <a href="#">open address</a> 📄</div>
<div>Hostname type</div> <div>IP name: ip-172-31-28-55.us-west-2.compute.internal</div>	<div>Private IP DNS name (IPv4 only)</div> <div>📄 ip-172-31-28-55.us-west-2.compute.internal</div>
<div>Instance type</div> <div>t2.micro</div>	<div>Answer private resource DNS name IPv4 (A)</div>
<div>Auto-assigned IP address</div> <div>📄 18.236.187.126 [Public IP]</div>	<div>Elastic IP addresses</div> <div>–</div>
	<div>VPC ID</div> <div>📄 vpc-03b0a03a98e256e37 📄</div>

- Take a screenshot showing the completion of the command including its output

```
Plan: 1 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + ec2instance = (known after apply)

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

aws_instance.guestbook: Creating...
aws_instance.guestbook: Still creating... [10s elapsed]
aws_instance.guestbook: Creation complete after 13s [id=i-082a30c9bf112baf2]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

Outputs:

ec2instance = "52.13.14.247"
[ec2-user@ip-172-31-28-55 tf]$
```

- Take a screenshot that includes the VM's IP addresses

The screenshot displays the AWS Management Console interface for an EC2 instance. The browser address bar shows the URL <https://us-west-2.console.aws.amazon.com/ec2/...>. The console header includes the AWS logo, 'Services' menu, search bar, and user profile 'ahmad agah'. The breadcrumb navigation shows 'EC2 > Instances > i-082a30c9bf112baf2'. The main content area is titled 'Instance summary for i-082a30c9bf112baf2' with an 'Info' link. Below the title are buttons for 'Refresh', 'Connect', 'Instance state', and 'Actions'. A status message indicates 'Updated less than a minute ago'. The instance details are organized into two columns:

Property	Value
Instance ID	i-082a30c9bf112baf2
Public IPv4 address	52.13.14.247   <a href="#">open address</a>
Private IPv4 addresses	172.31.26.253
Instance state	Running (with a yellow 'agah' label)
Public IPv4 DNS	ec2-52-13-14-247.us-west-2.compute.amazonaws.com   <a href="#">open address</a>
Private IP DNS name (IPv4 only)	ip-172-31-26-253.us-west-2.compute.internal
Answer private resource DNS name	-
Instance type	t2.micro
Auto-assigned IP address	52.13.14.247 [Public IP]
Elastic IP addresses	-
VPC ID	vpc-03b0a03a98e256e37

The footer contains links for 'Feedback', 'Privacy', 'Terms', and 'Cookie preferences', along with the copyright notice '© 2024, Amazon Web Services, Inc. or its affiliates.'

## 7.1a.6. Adding ssh access

- Take a screenshot of the successful ssh login from Cloud Shell.

```
ec2instance = "34.219.142.232"
[ec2-user@ip-172-31-28-55 tf]$ ssh ubuntu@34.219.142.232
The authenticity of host '34.219.142.232 (34.219.142.232)' can't be established.
ED25519 key fingerprint is SHA256:JL/vQkXLJxwmZwtszqPor/ZHcq9zRAvjbuHiimvD0ag.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '34.219.142.232' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1072-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Thu Nov 14 19:47:34 UTC 2024

System load:  0.25          Processes:            103
Usage of /:   21.3% of 7.57GB Users logged in:        0
Memory usage: 22%          IPv4 address for eth0: 172.31.30.24
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

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

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-30-24:~$
```



## 7.1a.7. Adding the Guestbook application

- Take a screenshot of the output of the command that includes the IP address of the instance

```
Apply complete! Resources: 3 added, 0 changed, 0 destroyed.

Outputs:

ec2instance = "35.93.21.229"
[ec2-user@ip-172-31-28-55 tf]$ ssh ubuntu@35.93.21.229
The authenticity of host '35.93.21.229 (35.93.21.229)' can't be established.
ED25519 key fingerprint is SHA256:0Sbdru+KhAkKQ+4TfLuckbwhXbtRVwf3je98ZL2gaCQ.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '35.93.21.229' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1072-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information disabled due to load higher than 1.0

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

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

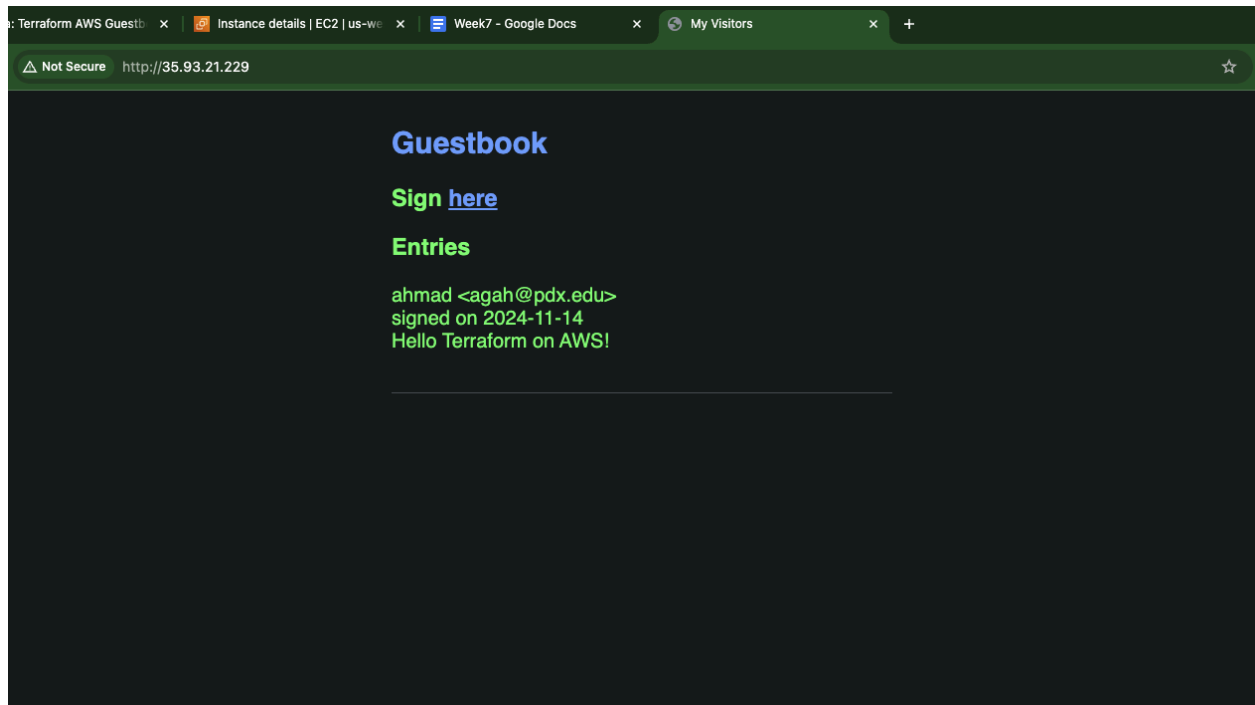
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-30-204:~$ ps auxww | grep gunicorn
root      6975  2.8  2.3 31000 23176 ?        S    19:56   0:00 /usr/bin/python3 /usr/bin/gunicorn --bind :80 --workers 1 --threads 8 app:app
root      6977  2.2  3.0 39276 29928 ?        S    19:56   0:00 /usr/bin/python3 /usr/bin/gunicorn --bind :80 --workers 1 --threads 8 app:app
ubuntu    6979  0.0  0.0   8168   720 pts/1    S+   19:56   0:00 grep --color=auto gunicorn
ubuntu@ip-172-31-30-204:~$
```

## 7.1a.8. View the Guestbook

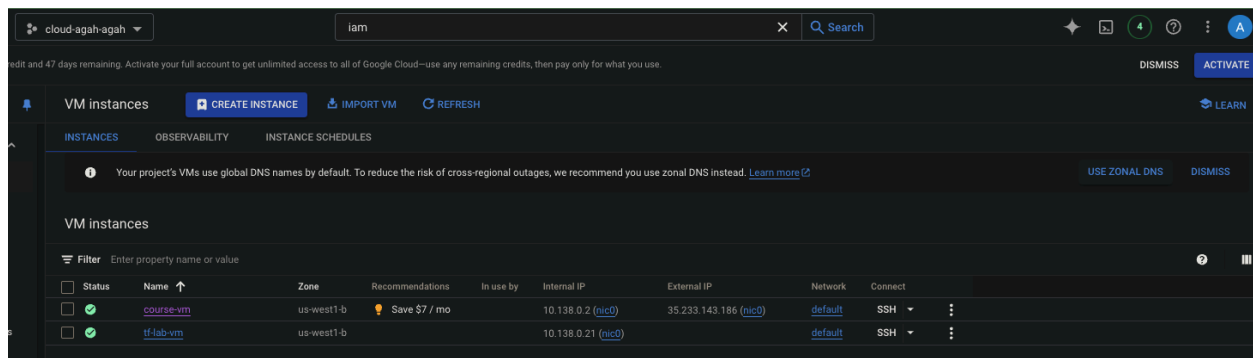
- Take a screenshot of the Guestbook including the URL with the entry in it.



## 07.1g: Terraform GCP Guestbook

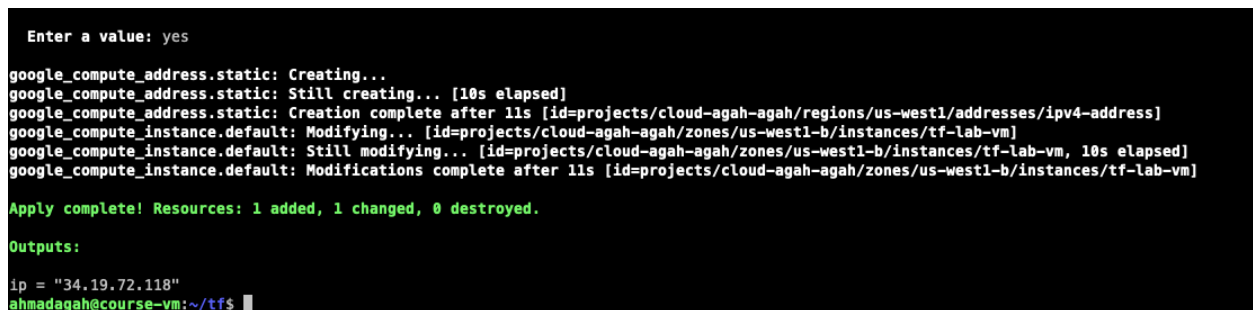
### 7.1g.4. Launching configuration

- Take a screenshot that includes the VM's IP addresses

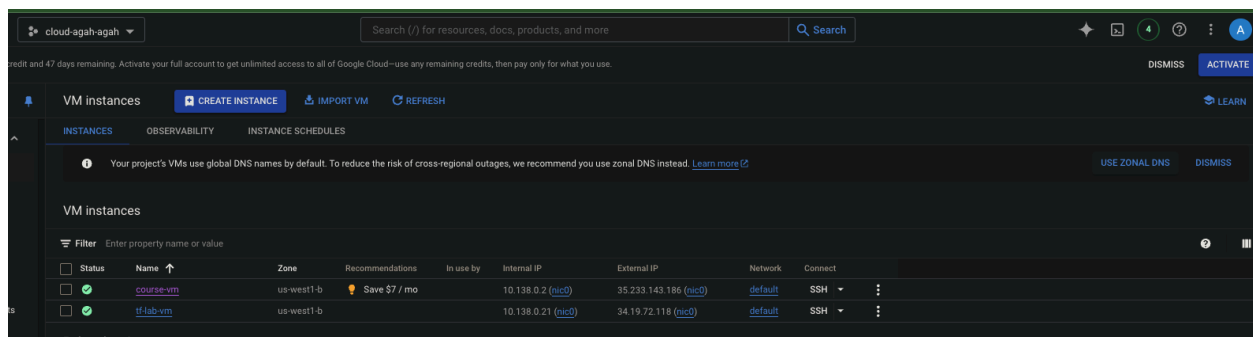


## 7.1g.5. Adding an external IP address

- Take a screenshot showing the completion of the command including its output



- Take a screenshot that includes the VM's IP addresses



## 7.1g.6. Adding ssh access

- Take a screenshot of the successful ssh login from Cloud Shell.

```
Enter a value: yes

google_compute_instance.default: Modifying... [id=projects/cloud-agah-agah/zones/us-west1-b/instances/tf-lab-vm]
google_compute_instance.default: Still modifying... [id=projects/cloud-agah-agah/zones/us-west1-b/instances/tf-lab-vm, 10
google_compute_instance.default: Modifications complete after 11s [id=projects/cloud-agah-agah/zones/us-west1-b/instances

Apply complete! Resources: 0 added, 1 changed, 0 destroyed.

Outputs:

ip = "34.19.72.118"
ahmadagah@course-vm:~/tf$ ssh ahmadagah@34.19.72.118
The authenticity of host '34.19.72.118 (34.19.72.118)' can't be established.
ED25519 key fingerprint is SHA256:N/lfjmVxCeV0reNMyBkGQBYyVBAT3CE0rfK050HkaLY.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '34.19.72.118' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1070-gcp x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Fri Nov 15 01:26:36 UTC 2024

System load:  0.0           Processes:            102
Usage of /:   19.7% of 9.51GB Users logged in:        0
Memory usage: 5%           IPv4 address for ens4: 10.138.0.21
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

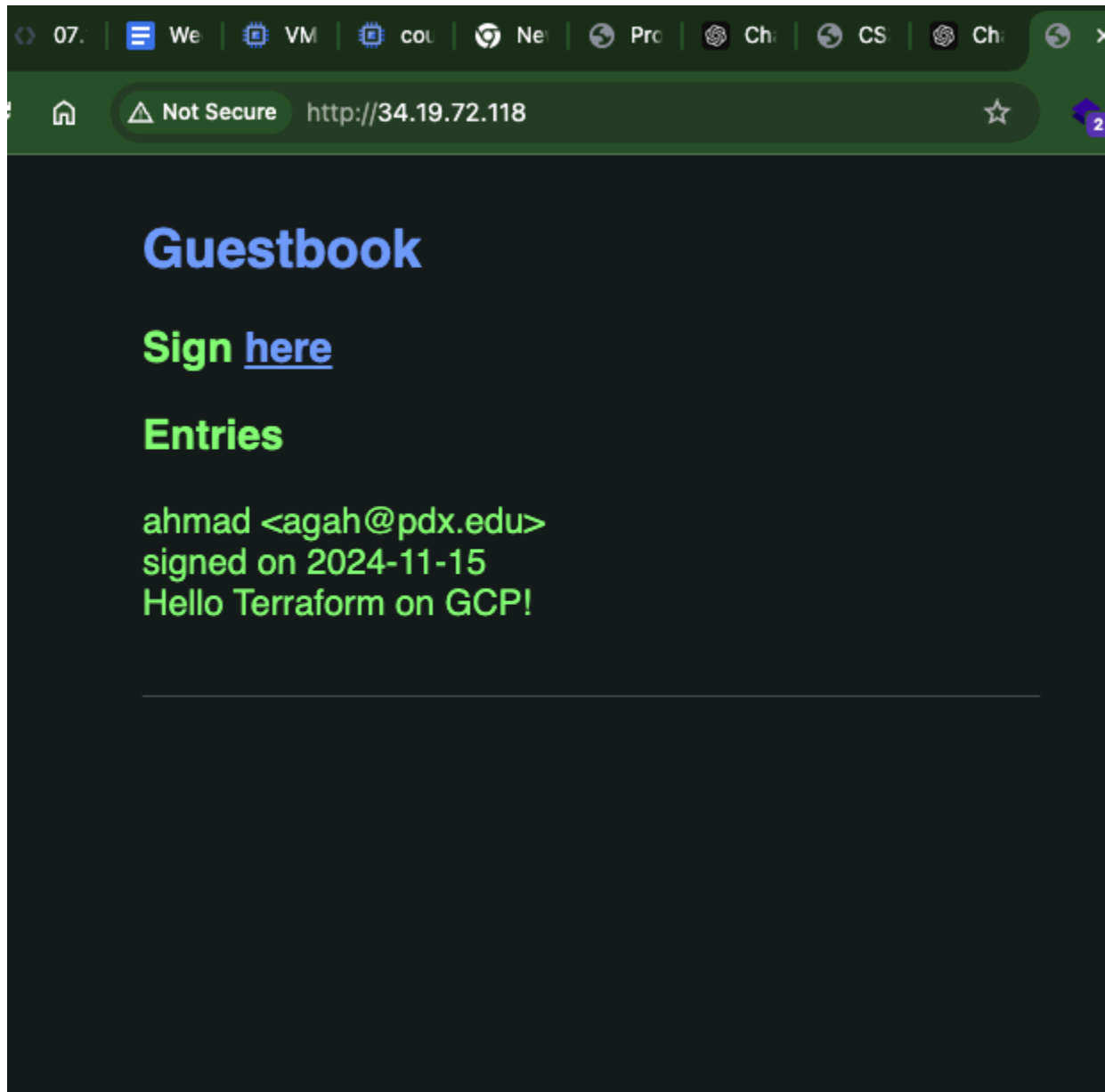
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

ahmadagah@tf-lab-vm:~$
```

## 7.1g.8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.



## 07.2g: Kubernetes Guestbook

- What is the name of the Instance Template dynamically generated to create the two nodes (VMs)?

gke-guestbook-default-pool-11fe4be0

- What is the name of the Instance Group dynamically generated that the two nodes belong to?

gke-guestbook-default-pool-11fe4be0-grp

- What are the names of the two nodes?

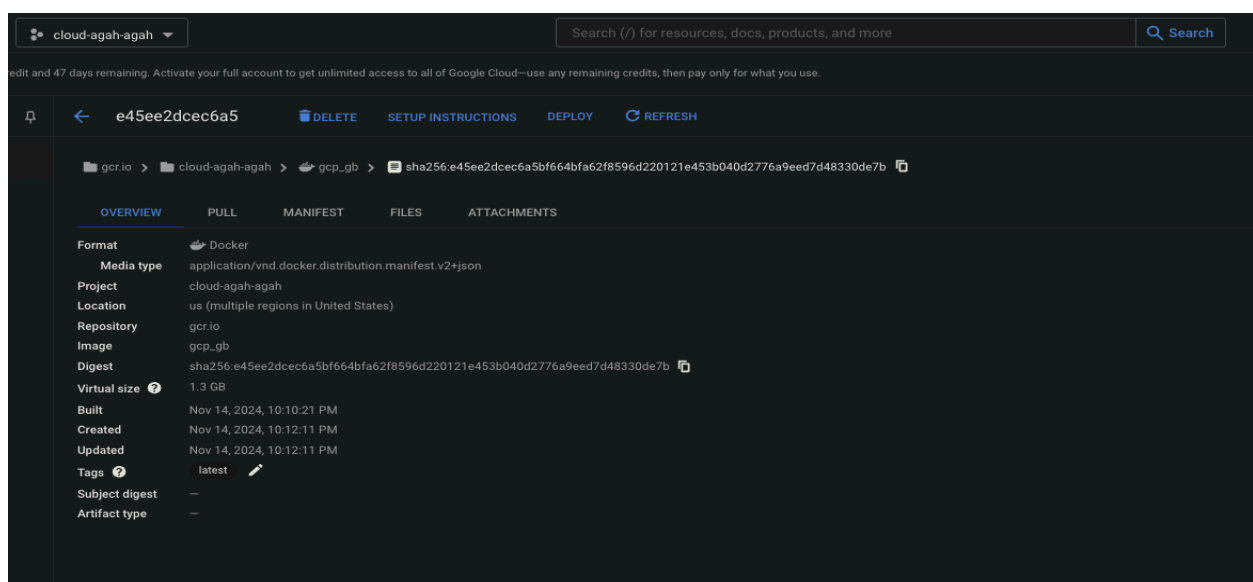
gke-guestbook-default-pool-11fe4be0-rkn4

gke-guestbook-default-pool-11fe4be0-t008

## 7.2g.5. Prepare a container image

I'm not displaying my Odin ID when you see my project name, which includes my Odin ID (cloud-agah-agah). You previously deducted points for not displaying my Odin ID, even if the screenshot contained my Odin ID elsewhere.

- Take a screenshot of the container image created



## 7.2g.7. Deploy the configuration

- Take a screenshot of the output of the following command when all 3 replicas reach a "Running" state.

```
agah@cloudshell:~/cs430-src/05_gcp_datastore (cloud-agah-agah)$ kubectl get pods
NAME                READY   STATUS    RESTARTS   AGE
guestbook-replicas-6xfkv  1/1     Running   0           7m44s
guestbook-replicas-vdwt5  1/1     Running   0           7m44s
guestbook-replicas-vk9bx  1/1     Running   0           7m44s
agah@cloudshell:~/cs430-src/05_gcp_datastore (cloud-agah-agah)$
```

- Take a screenshot of listing services with LoadBalancer indicating an external IP address that is ready for access.

```
agah@cloudshell:~/cs430-src/05_gcp_datastore (cloud-agah-agah)$ kubectl get services
NAME                TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
guestbook-lb        LoadBalancer  34.118.237.137   34.169.83.44     80:31999/TCP     8m44s
kubernetes           ClusterIP     34.118.224.1     <none>           443/TCP          68m
agah@cloudshell:~/cs430-src/05_gcp_datastore (cloud-agah-agah)$
```

## 7.2g.8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.

I'm using a Compute Engine instance instead of Cloud Shell because Cloud Shell doesn't support features like highlighting in Vim, and I can't locate the cursor when entering commands. I'm forwarding the port to 5555, so you'll see `localhost:5555` in the browser.

## Guestbook

Name:

Email:

Message:

Sign

## Entries

ahmad <agah@pdx.edu>  
signed on 2024-11-19  
Hello Kubernetes!

---



- Take a screenshot of the managed guestbook pods and the service being exposed.

ps://console.cloud.google.com/kubernetes/replicationcontroller/us-west1-b/gu... 14

cloud-agah-agah Search (/) for resources, docs, products, and more Search

and 43 days remaining. Activate your full account to get unlimited access to all of Google Cloud—use any remaining credits, then pay

Replication Co... REFRESH EDIT DELETE ACTIONS KUBE

No data is available for the selected time frame. No data is available for the selected time frame. No data is available for the selected time frame

UTC-8 10:00 PM 0 UTC-8 10:00 PM 0 UTC-8 10:00 PM 0

Cluster [guestbook](#)

Namespace default

Created Nov 18, 2024, 9:20:25 PM

Labels app: guestbook tier: frontend

Annotations SHOW ANNOTATIONS

Logs ? Container logs, Audit logs

Pods 3 current / 3 desired

Label selector app = guestbook tier = frontend

Pod specification

Labels app: guestbook tier: frontend

Termination grace period 30

Restart policy Always

Containers [guestbook-app](#) agah

Managed pods

Name	Status	Restarts	Created on ↑
<a href="#">guestbook-replicas-4mnfw</a>	Running	0	Nov 18, 2024, 9:20:25 PM
<a href="#">guestbook-replicas-dp8cq</a>	Running	0	Nov 18, 2024, 9:20:25 PM
<a href="#">guestbook-replicas-klrdf</a>	Running	0	Nov 18, 2024, 9:20:25 PM

Exposing services ?

Name ↑	Type	Endpoints
<a href="#">guestbook-lb</a>	Load balancer	<a href="#">34.169.83.44:80</a>

- Take a screenshot of the load balancer and its details

cloud-agah-agah

network services

Search

and 43 days remaining. Activate your full account to get unlimited access to all of Google Cloud—use any remaining credits, then pay

DISMISS

← Load balancer details

EDIT

DELETE

→ VIEW IN NETWORK TOPOLOGY

a48f136a1e7c14d7582b3a0e4c12a42f

Target-pool Network Load Balancer

Frontend

Protocol ↑	IP version	IP:Port	Network Tier ?
TCP	IPv4	34.169.83.44:80	Premium

Backend

Name	Region	Health check
a48f136a1e7c14d7582b3a0e4c12a42f	us-west1	<a href="#">k8s-f6bfd0b718ba9109-node</a>

ADVANCED CONFIGURATIONS

Instance ↑	Zone	34.169.83.44
<a href="#">gke-guestbook-default-pool-11fe4be0-rkn4</a>	us-west1-b	✓
<a href="#">gke-guestbook-default-pool-11fe4be0-t008</a>	us-west1-b	✓

agah

- Take a screenshot of the addresses allocated and indicate the ones associated with nodes versus the one associated with the load balancer.

IP addresses

RESERVE EXTERNAL STATIC IP ADDRESS

SHOW INFO PANEL

ALL INTERNAL IP ADDRESSES **EXTERNAL IP ADDRESSES** IPV4 ADDRESSES IPV6 ADDRESSES

Filter Enter property name or value

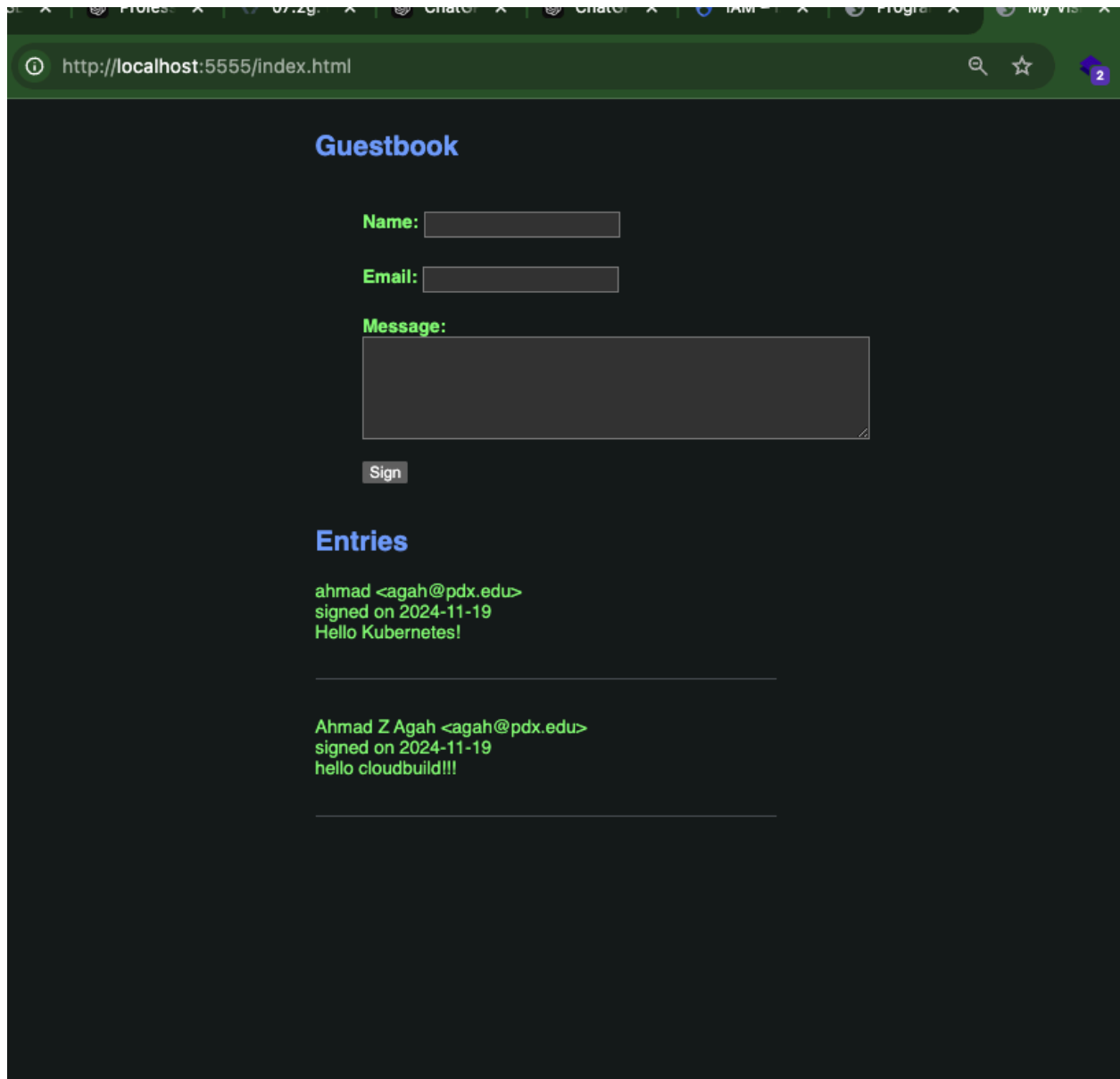
	Name	IP address	Access type	Region	Type ↓	Version	In use by
<input type="checkbox"/>	—	34.19.50.31	External	us-west1	Ephemeral	IPv4	VM instance <a href="#">gke-guestbook-pool-11fe4be0-rkn4</a> (Zor)
<input type="checkbox"/>	—	34.145.94.65	External	us-west1	Ephemeral	IPv4	VM instance <a href="#">gke-guestbook-pool-11fe4be0-t008</a> (Zor)
<input type="checkbox"/>	—	34.169.83.44	External	us-west1	Ephemeral	IPv4	Forwarding rule <a href="#">a48f136a1e7c14d7582t</a>
<input type="checkbox"/>	—	35.233.143.186	External	us-west1	Ephemeral	IPv4	VM instance <a href="#">course-vm-west1-b</a>

34.19.50.31 and 34.145.94.65 are associated with the VM instances in the gke-guestbook-default-pool, indicating these are IP addresses assigned to the nodes

34.169.83.44 is used by a forwarding rule, which suggests it is the IP address associated with the load balancer

## 7.2g.12. Deploy and view application

- Take a screenshot of the Guestbook including the URL with the entry in it.



## 07.3g: APIs (Slack, Knowledge Graph

### 07.3g.2. Code

- Does Google provide a Python package specifically for accessing the Knowledge Graph API?

No, Google does not provide a dedicated Python package specifically for the Knowledge Graph API. Instead, developers use the Google API Client Library for Python, such as `googleapiclient.discovery`, to access various Google APIs, including the Knowledge Graph API. The `googleapiclient.discovery.build` function is used to create an interface for interacting with the Knowledge Graph API

### 07.3g.3. Code

- Show the source line that constructs the query we wish to send to the Knowledge Graph API.

```
req = kgsearch.entities().search(query=query, limit=1)
```

- Show the source line that then executes the query and saves the response. What is the name of the method that sends the query to the Knowledge Graph API?

```
res = req.execute()
```

The method that sends the query to the Knowledge Graph API is `execute()`.

This method is called on the `req` object (the request object created previously) to send the query to the API and retrieve the response. The response is then stored in the `res` variable.

- What is the Python data type that is used to represent the formatted message?

The Python data type used to represent the formatted message is a **dictionary**.

```
message = {  
    "response_type": "in_channel",  
    "text": f"Query: {query}",  
}
```

```
"attachments": [],  
}
```

- What are the three main attributes of the formatted message passed back to Slack?

#### **response\_type:**

- Specifies how the response should be displayed in Slack.
- Example value: `"in_channel"`, which means the response will be visible to everyone in the channel.

#### **text:**

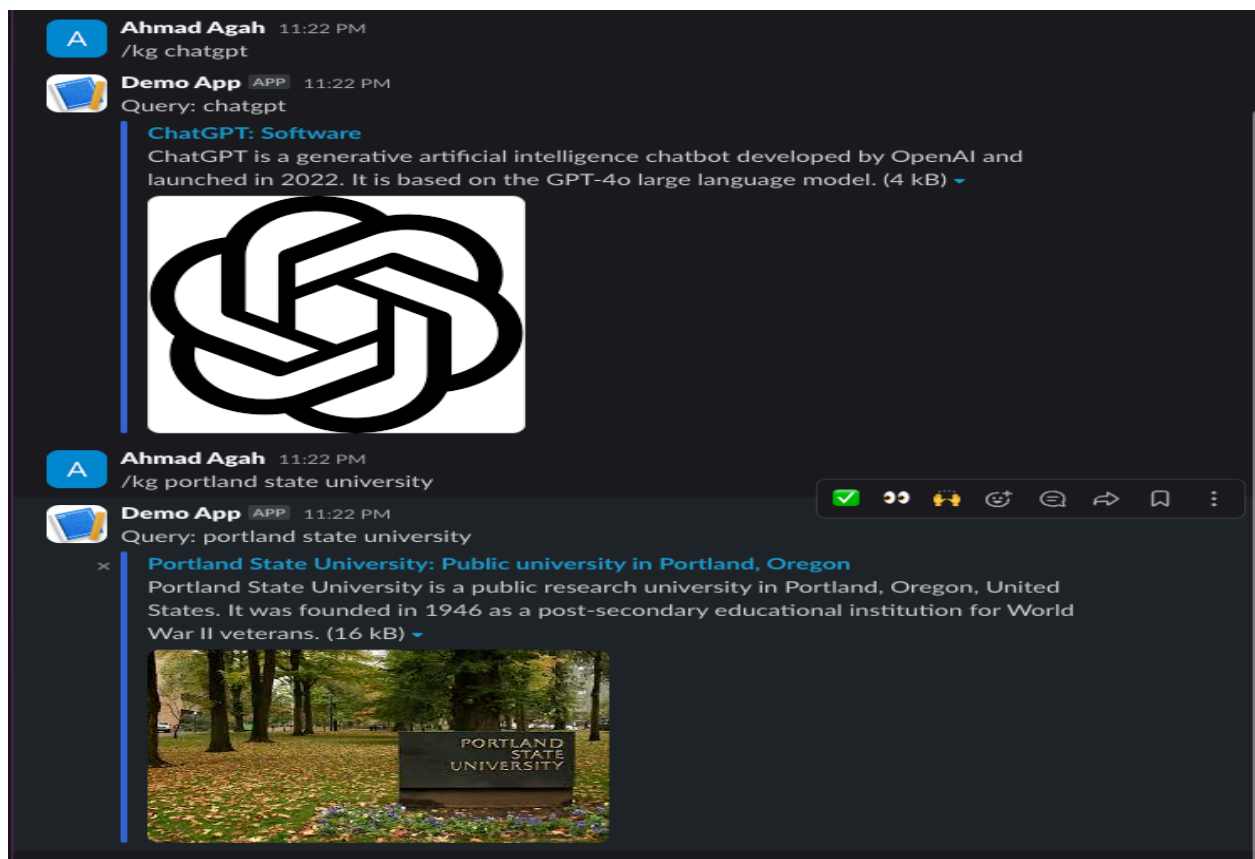
- The main text content of the message, which typically includes the original query or a summary.
- Example value: `f"Query: {query}"`, showing the search term the user submitted.

#### **attachments:**

- An array that contains additional rich content for the message, such as detailed descriptions, links, images, and formatted text.
- Each attachment is a dictionary that can include attributes like `title`, `title_link`, `text`, `image_url`, and `color`.

## 07.3g.8. Test the command

- Take a screenshot of its response for your lab notebook.



## 07.4g: ML APIs

### 07.4g.3. Vision

- Show the output for your lab notebook

```
(env) ahmadagah@course-vm:~/python-docs-samples/vision/snippets/detect$ python detect.py labels-uri gs://cloud-samp
les-data/ml-api-codelab/birds.jpg
Labels:
Bird
Ratite
Cloud
Sky
Beak
Plant
Green
Neck
Ostrich
Casuariiformes
(env) ahmadagah@course-vm:~/python-docs-samples/vision/snippets/detect$
```

- What is the name of the function?

The function is `detect_labels_uri`.

- What type of Vision client is instantiated in it?

The type of Vision client instantiated is `vision.ImageAnnotatorClient()`.

- What method is invoked in the Vision client to perform the detection?

The method invoked is `label_detection`.

- What is the name of the attribute in the response object that contains the results we seek?

The attribute is `label_annotations`.



- Take a screenshot of the output for the above commands

```
(env) ahmadagah@course-vm:~/python-docs-samples/vision/snippets/detect$ python detect.py logos PSULogo.jpg
Logos:
Portland State University
Portland State University
Nike
(env) ahmadagah@course-vm:~/python-docs-samples/vision/snippets/detect$
```

- What method is invoked in the Vision client to perform the detection?  
response = client.logo\_detection(image=image)

## 07.4g.4. Speech

- Show the output for your lab notebook

```
(env) ahmadagah@course-vm:~/python-docs-samples/speech/snippets$ python transcribe.py resources/audio.raw
Transcript: how old is the Brooklyn Bridge
(env) ahmadagah@course-vm:~/python-docs-samples/speech/snippets$
```

- What is the name of the function?

transcribe\_file().

- What method is invoked in the Speech client to perform the detection?

The method used in the Speech client is recognize().

- What is the name of the attribute in the response object that contains the results we seek?

The attribute in the response object containing the results is `results`

## 07.4g.5. Translate

- Show the output for your lab notebook

```
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ python snippets.py translate-text en '你有沒有帶外套'  
Text: 你有沒有帶外套  
Translation: did you bring a coat  
Detected source language: zh-TW  
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$
```

- What is the name of the function?

The function name is `translate_text`

- What method is invoked in the Translate client to perform the detection?

The method invoked is `translate` from the `translate_Client` object.

- What is the name of the attribute in the response object that contains the results we seek?

The attributes in the response object are `"translatedText"` for the translated output, `"input"` for the input text, and `"detectedSourceLanguage"` for the detected language of the source text.

## 07.4g.6. Natural Language

- Show the output for your lab notebook

```
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ python language.py 'homework is awful!'
"homework is awful!" has sentiment=-0.800000011920929

Entities are:
name: homework
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ python language.py 'homework is ok'
"homework is ok" has sentiment=0.30000001192092896

Entities are:
name: homework
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ python language.py 'homework is awesome?'
"homework is awesome?" has sentiment=0.4000000059604645

Entities are:
name: homework
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ python language.py 'homework is awesome!'
"homework is awesome!" has sentiment=0.8999999761581421

Entities are:
name: homework
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ python language.py 'The protestors in Oregon put on gas masks and wore yellow t-shirts'
"The protestors in Oregon put on gas masks and wore yellow t-shirts" has sentiment=-0.6000000238418579

Entities are:
name: protestors
name: gas masks
name: Oregon
name: t-shirts
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$
```

## 07.4g.8. Code

What is the name of the function that performs the transcription?

- transcribe\_gcs

What is the name of the function that performs the translation?

- translate\_text

What is the name of the function that performs the entity analysis on the translation?

- entities\_text

What is the name of the function that performs the entity analysis on the image?

- detect\_labels\_uri (Note: This function performs label detection, which identifies objects and labels in an image, rather than analyzing textual entities.)

## 07.4g.9. Test integration

- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?

- 

### **Use of Partial Matching:**

- The updated program now uses `difflib.SequenceMatcher` to compare entities and labels, allowing for partial matches based on a similarity ratio.
- This change ensures that even if the terms are not identical but are sufficiently similar (e.g., "soccer ball" vs. "football"), the program can recognize them as related.

### Threshold-Based Matching:

- A threshold value (e.g.,  $> 0.7$ ) was introduced to determine the minimum similarity ratio for a match. This helps the program identify terms that share a high degree of similarity, capturing more relevant relationships between audio and images.

```
# naive check for whether entities intersect with labels
has_match = False
for entity in entities:
    for label in labels:
        # Use SequenceMatcher to check for partial matches with a
threshold
        if difflib.SequenceMatcher(None, entity, label).ratio() > 0.7:
            print('The audio and image both contain:
{}'.format(entity))
            has_match = True
            break
    if has_match:
        break
```

```

Transcription: willst du mit uns Fußball spielen
Translation: do you want to play football with us
Entities: ['football']
Image labels: ['Sports equipment', 'Soccer', 'Football', 'Plant', 'Ball', 'Player', 'Playing sports', 'Soccer ball', 'Ball game', 'Team sport']
Partial match found: football - Football
The audio and image both contain: football
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$

```

- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?

**Synonym Matching:** A function called `are_synonyms()` was added using WordNet to check if two words are synonyms.

**Semantic Similarity:** A function called `are_semantically_similar()` was added using `spaCy` to compare the semantic similarity between words.

```

def are_synonyms(word1, word2):
    """Check if two words are synonyms using WordNet."""
    synonyms = wordnet.synsets(word1)
    for syn in synonyms:
        if word2 in syn.lemma_names():
            return True
    return False

def are_semantically_similar(word1, word2):
    """Check if two words are semantically similar using spaCy."""
    doc1 = nlp(word1)
    doc2 = nlp(word2)
    return doc1.similarity(doc2) > 0.7 # Adjust the threshold as needed

```

The following piece of code is added to the function `compare_audio_to_image()`

```

# naive check for whether entities intersect with labels
has_match = False
# Check for partial matches, synonym matches, and semantic similarity
for entity in entities:
    for label in labels:
        if difflib.SequenceMatcher(None, entity, label).ratio() > 0.7:
            print(f'Partial match found: {entity} - {label}')

```

```

        has_match = True
    elif are_synonyms(entity, label):
        print(f'Synonym match found: {entity} - {label}')
        has_match = True
    elif are_semantically_similar(entity, label):
        print(f'Semantic match found: {entity} - {label}')
        has_match = True
    if has_match:
        print('The audio and image both contain:
{}'.format(entity))
        break
    if has_match:
        break

```

```

Transcription: bisikletimi sokağa bırak
Translation: leave my bike on the street
Entities: ['bike', 'street']
Image labels: ['Bicycle', 'Clothing', 'Footwear', 'Tire', 'Wheel', 'Bicycles—Equipment and supplies', 'Land vehicle', 'Shoe', 'Bicycle frame', 'Bicycle wheel']
Semantic match found: bike - Bicycle wheel
The audio and image both contain: bike
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ █

```

- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?
- 

The function returns that there was a match because changes were made in the previous step.

```

Transcription: çok fazla deve kuşu var
Translation: There are too many ostriches
Entities: ['ostriches']
Image labels: ['Bird', 'Ratite', 'Cloud', 'Sky', 'Beak', 'Plant', 'Green', 'Neck', 'Ostrich', 'Casuariiformes']
/home/ahmadagah/python-docs-samples/translate/samples/snippets/solution.py:46: UserWarning: [W008] Evaluating Doc.similarity based on empty vectors.
  return doc1.similarity(doc2) > 0.7 # Adjust the threshold as needed
Partial match found: ostriches - Ostrich
The audio and image both contain: ostriches
(env) ahmadagah@course-vm:~/python-docs-samples/translate/samples/snippets$ █

```

## 07.4g.13. Video Intelligence

- What are the 3 labels with the highest confidence that the Video Intelligence API associates with the video and what are the confidences for each?

The three labels with the highest confidence that the Video Intelligence API associates with the video and their respective confidences are:

1. **Basketball**: Confidence of **0.913787069364929**
2. **Stadium**: Confidence of **0.5119114518165588**
3. **Games**: Confidence of **0.7823163270950317**

- What is the name of the client class in the package that is used?

The client class used in the package is `videointelligence.VideoIntelligenceServiceClient`.

- What method is used in that class to perform the annotation?

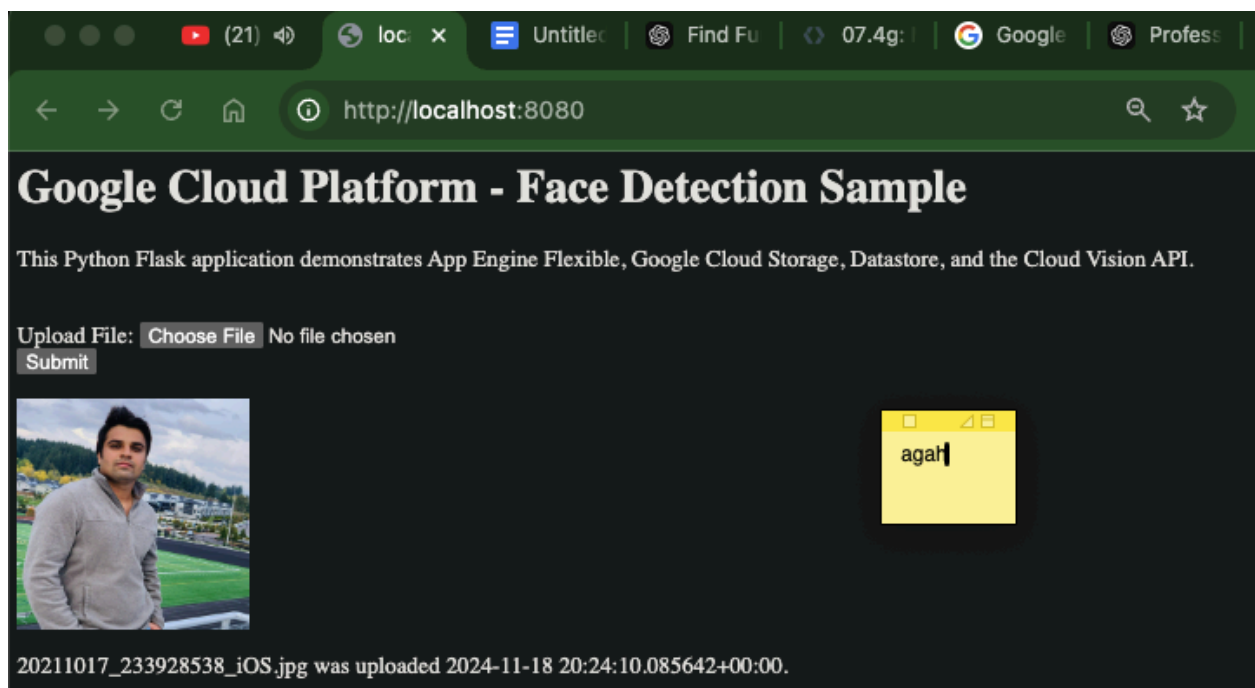
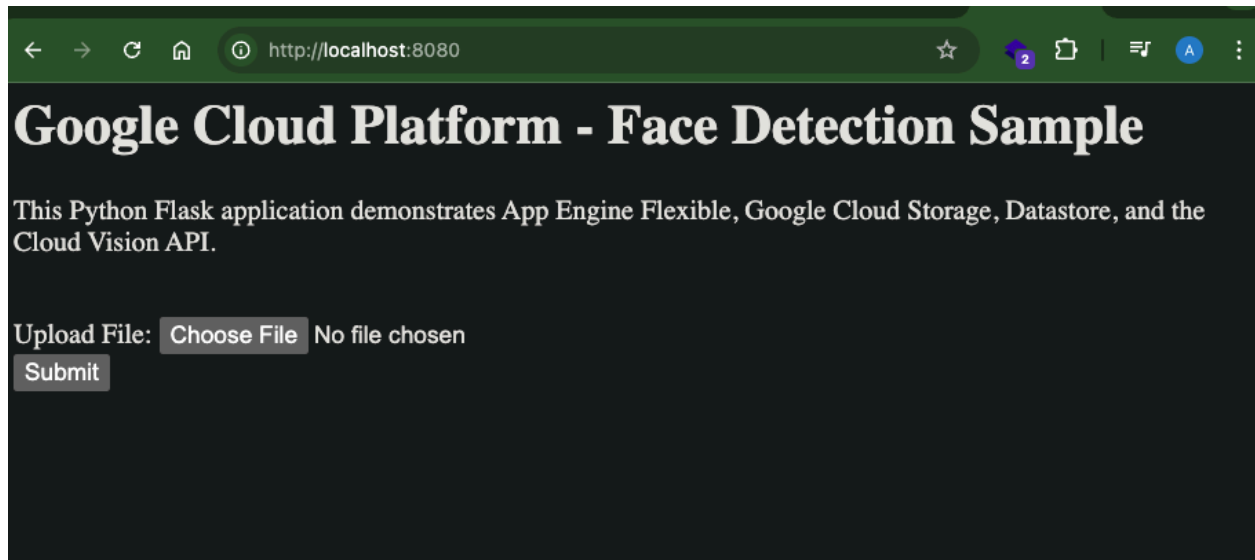
The method used to perform the annotation is `annotate_video()`.

## 07.4g.16. Application

- Take a screenshot for your lab notebook that includes the URL.

I am using local port forwarding to a Compute Engine instance with the following command. I'm just letting you know in case any URLs don't match what you expect. I don't think Cloud Shell is sufficient for understanding these concepts, so I use a Compute Engine ARM instance instead.

```
ssh -L [local_port]:[remote_server]:[remote_port] user@remote-server
```



## 07.4g.17. Code

- What line of code creates the query for previous detections?

`query = datastore_client.query(kind="Faces")`



- What line of code sends the query to Cloud Datastore?

```
image_entities = list(query.fetch())
```

- Show the line that retrieves the name of the storage bucket to use.

```
bucket = storage_client.get_bucket(CLOUD_STORAGE_BUCKET)
```

- What form field is used to specify the uploaded photo?

```
photo = request.files["file"]
```

- Show the line that copies the photo's contents to the storage bucket.

```
blob.upload_from_string(photo.read(), content_type=photo.content_type)
```

- What method in Vision's annotation client is used to perform the analysis?

```
faces = vision_client.face_detection(image=image).face_annotations
```

- What fields are stored in Cloud Datastore for each image?

```
blob_name  
image_public_url  
timestamp  
joy
```

- What happens at the end of the upload\_photo route?

The user is redirected to the homepage:

```
return redirect("/")
```