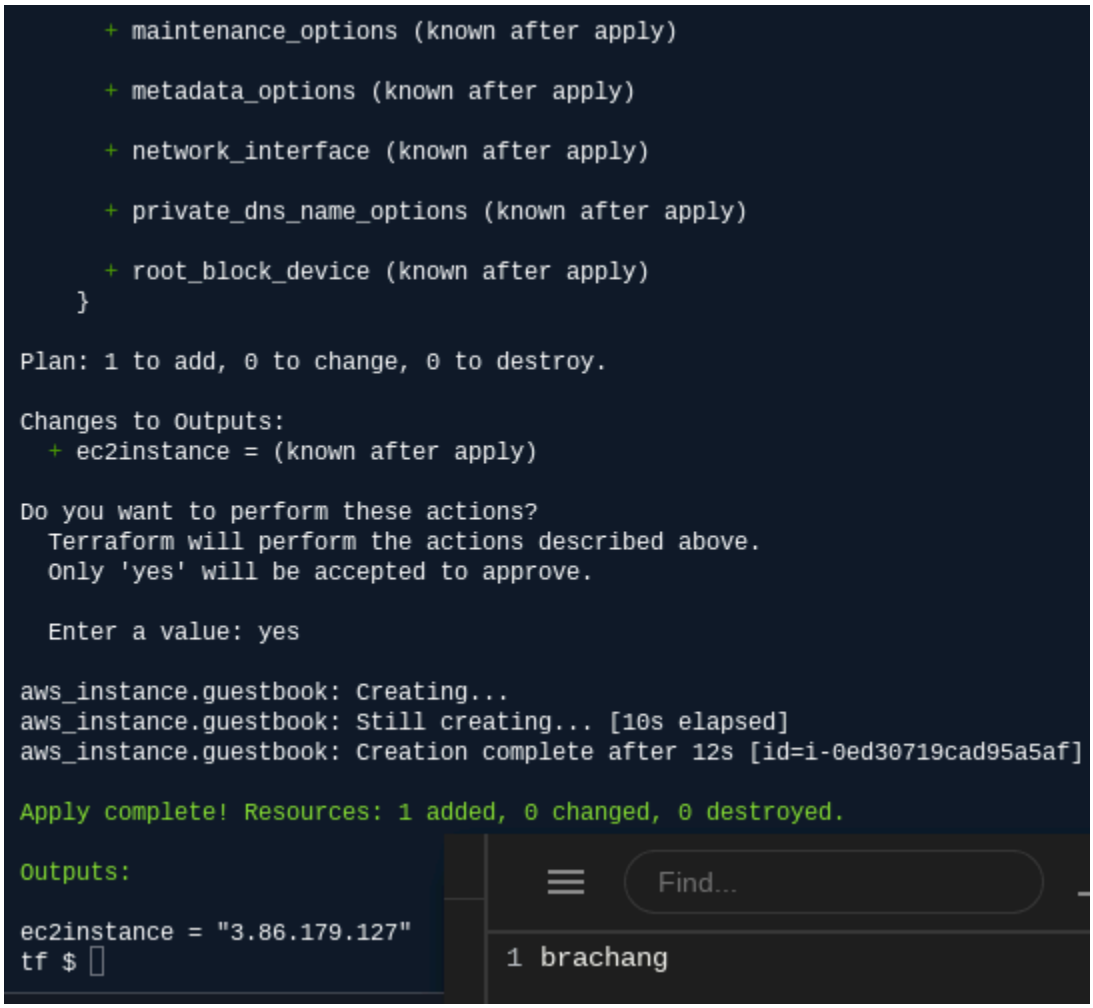
Bradley Chang

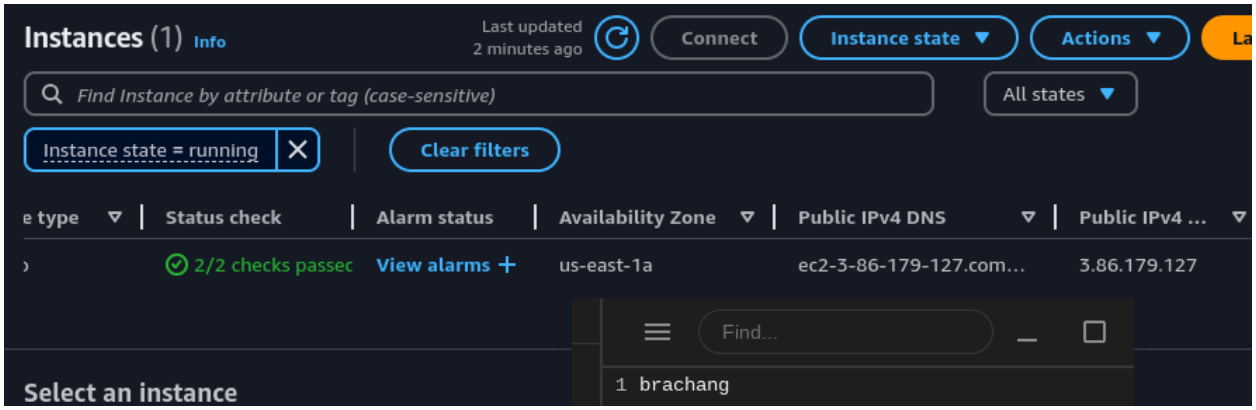
7.1a Terraform AWS Guestbook

4. Launching configuration

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

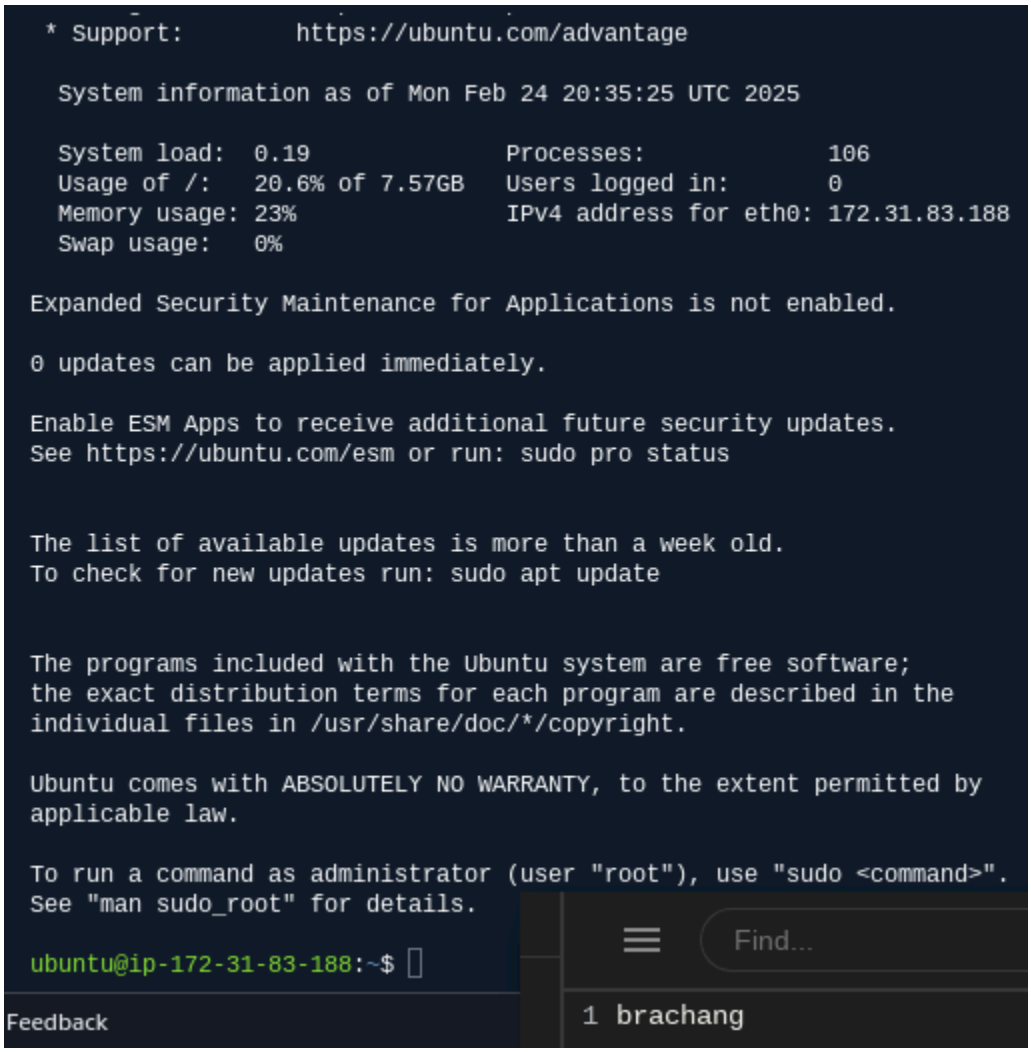


Take a screenshot that includes the VM's IP addresses



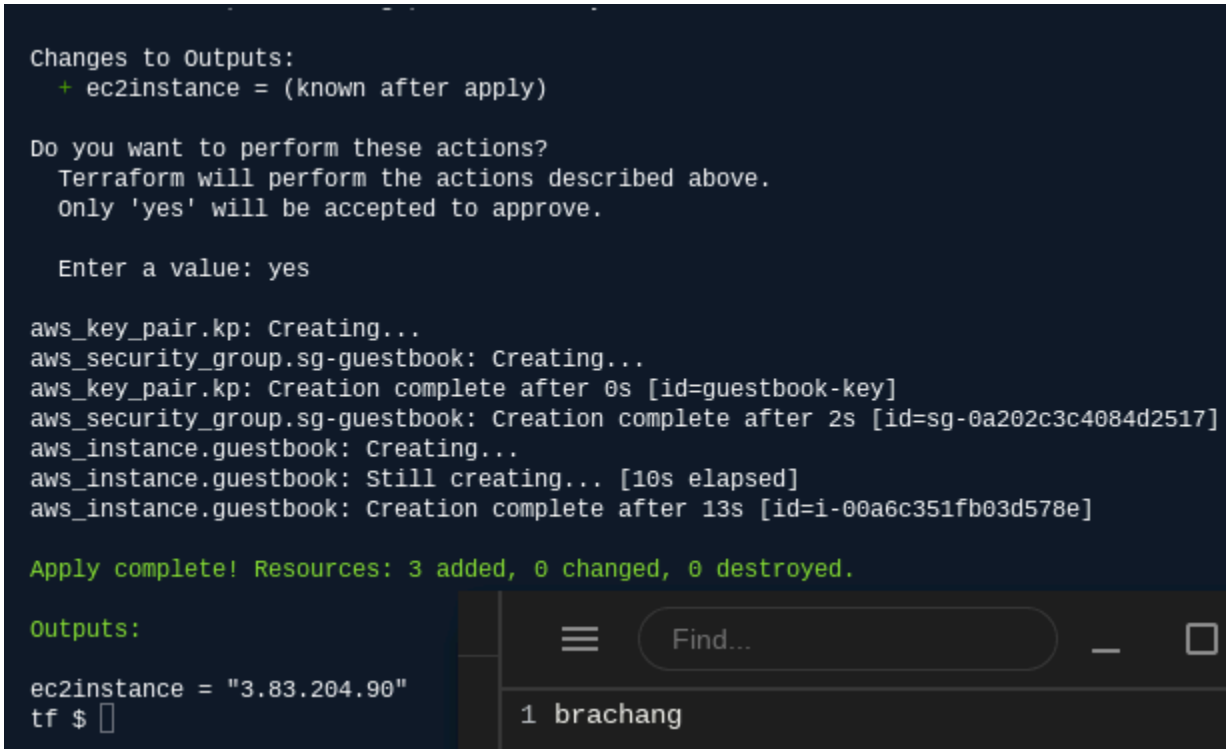
6. Adding ssh access

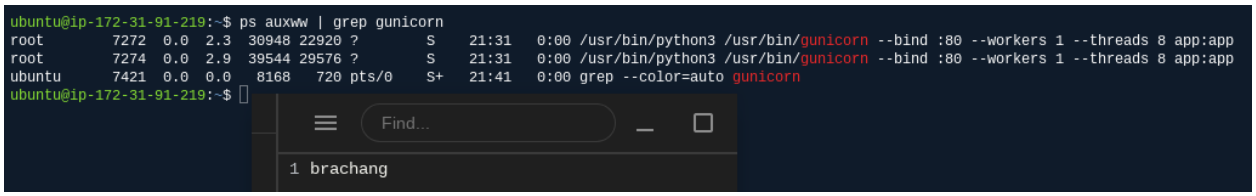
Take a screenshot of the successful ssh login from Cloud Shell.



7. Adding the Guestbook application

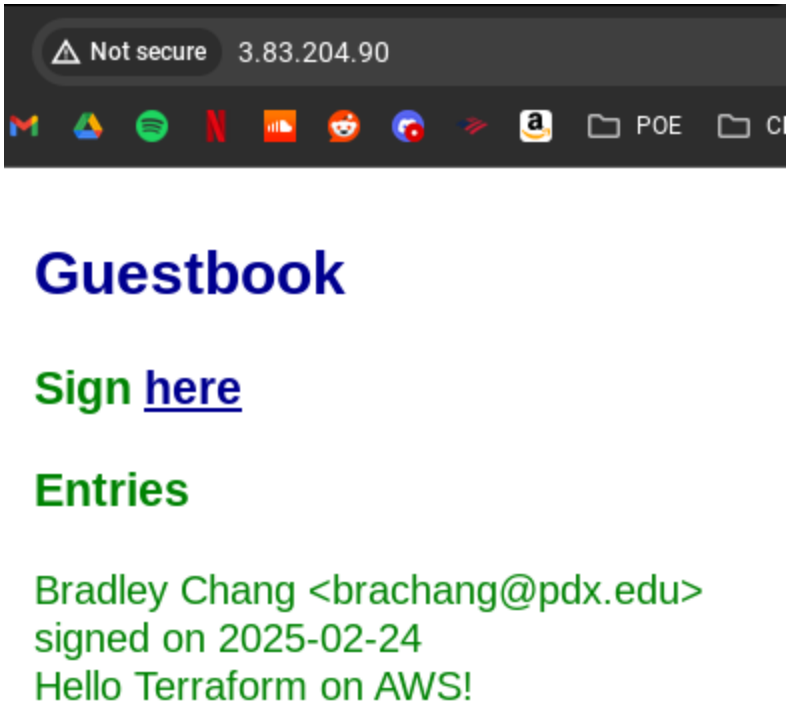
Take a screenshot of the output of the command that includes the IP address of the instance





8. View the Guestbook

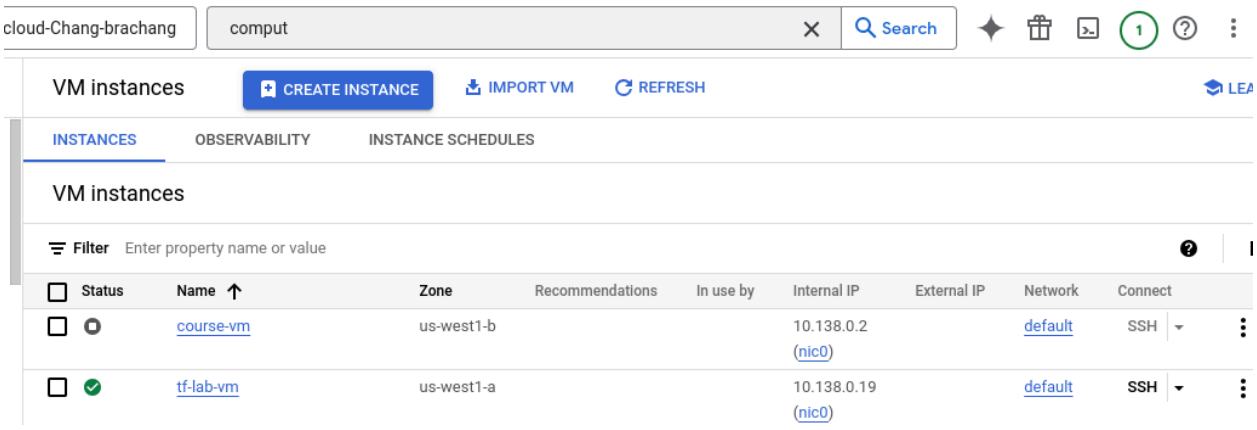
Take a screenshot of the Guestbook including the URL with the entry in it.



7.1b: Terraform GCP Guestbook

4. Launching configuration

Take a screenshot that includes the VM's IP addresses

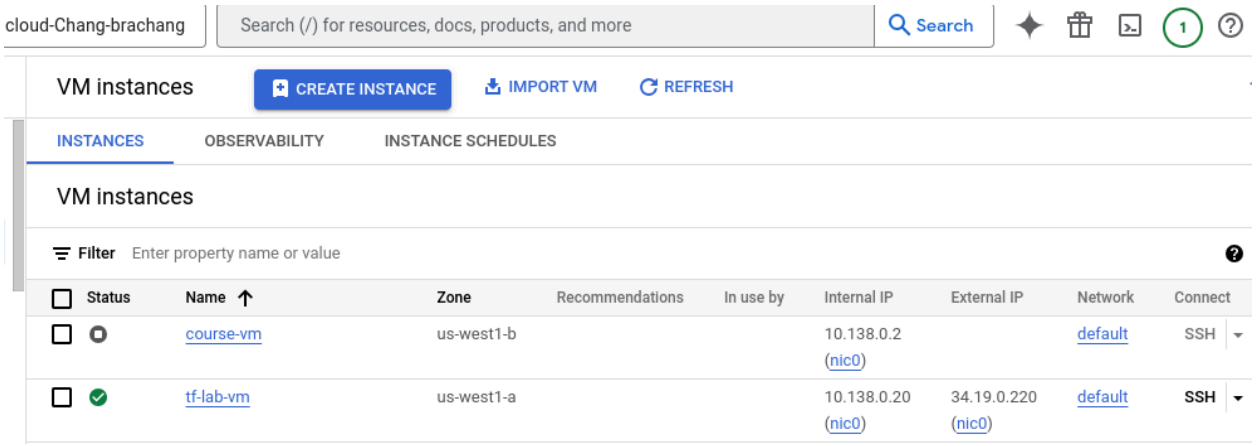


5. Adding an external IP address

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

```
          + subnetwork_project          = (known after apply)

          + access_config {
              + nat_ip       = (known after apply)
              + network_tier = (known after apply)
            }
        }
    }

Plan: 2 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + ip = (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

google_compute_address.static: Creating...
google_compute_address.static: Still creating... [10s elapsed]
google_compute_address.static: Creation complete after 11s [id=projects/cloud-chang-brachang/regions/us-west1/addresses/ipv4-address]
google_compute_instance.default: Creating...
google_compute_instance.default: Still creating... [10s elapsed]
google_compute_instance.default: Still creating... [20s elapsed]
google_compute_instance.default: Creation complete after 27s [id=projects/cloud-chang-brachang/zones/us-west1-a/instances/tf-lab-vm]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.

Outputs:

ip = "34.19.0.220"
brachang@cloudshell:~/tf (cloud-chang-brachang)$
```

Take a screenshot that includes the VM's IP addresses



6. Adding ssh access

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

```
Warning: Permanently added '34.19.0.220' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1075-gcp x86_64)

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

 System information as of Mon Feb 24 23:05:04 UTC 2025

  System load:  0.0               Processes:             101
  Usage of /:   20.3% of 9.51GB   Users logged in:       0
  Memory usage: 5%                IPv4 address for ens4: 10.138.0.20
  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.

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

7. Adding the Guestbook application

What resources are being added, changed, or destroyed?

The google_compute_instance is being replaced.

Here's everything that's being changed, added, or destroyed:

(cloud-chang-brachang)

```
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
-/+ destroy and then create replacement

Terraform will perform the following actions:

  # google_compute_instance.default must be replaced
-/+ resource "google_compute_instance" "default" {
      ~ cpu_platform            = "Intel Broadwell" -> (known after apply)
      ~ creation_timestamp      = "2025-02-24T14:43:46.184-08:00" -> (known after apply)
      ~ current_status          = "RUNNING" -> (known after apply)
      - enable_display          = false -> null
      ~ id                      = "projects/cloud-chang-brachang/zones/us-west1-a/instances/tf-lab-vm" -> (known after apply)
      ~ instance_id             = "7108802933962131662" -> (known after apply)
      ~ label_fingerprint       = "vezUS-42LLM=" -> (known after apply)
      - labels                  = {} -> null
      ~ metadata_fingerprint    = "0-ypEWKGlB8=" -> (known after apply)
      + metadata_startup_script = <<-EOT # forces replacement
            #!/bin/bash
            apt update
            apt install -yq build-essential python3-pip gunicorn git
            pip install flask
            git clone https://github.com/wu4f/cs430-src /root/cs430-src
            cd /root/cs430-src/03_nginx_gunicorn_certbot
            gunicorn --bind :80 --workers 1 --threads 8 app:app
        EOT
      + min_cpu_platform        = (known after apply)
        name                    = "tf-lab-vm"
      - resource_policies       = [] -> null
      ~ self_link               = "https://www.googleapis.com/compute/v1/projects/cloud-chang-brachang/zones/us-west1-a/instances/tf-lab-vm" -> (known after appl
y)
      ~ tags                    = [
          + "http-server",
        ]
      ~ tags_fingerprint        = "42WmSpB8rSM=" -> (known after apply)
```

(cloud-chang-brachang)

```
      ~ boot_disk {
          ~ device_name               = "persistent-disk-0" -> (known after apply)
          + disk_encryption_key_sha256 = (known after apply)
          + kms_key_self_link         = (known after apply)
          ~ source                    = "https://www.googleapis.com/compute/v1/projects/cloud-chang-brachang/zones/us-west1-a/disks/tf-lab-vm" -> (known after a
pply)
            # (2 unchanged attributes hidden)

          ~ initialize_params {
              - enable_confidential_compute = false -> null
              ~ image                       = "https://www.googleapis.com/compute/v1/projects/ubuntu-os-cloud/global/images/ubuntu-2004-focal-v20250213" -> "ubun
tu-os-cloud/ubuntu-2004-focal-v20250213"
              ~ labels                      = {} -> (known after apply)
              ~ provisioned_iops            = 0 -> (known after apply)
              ~ provisioned_throughput      = 0 -> (known after apply)
              - resource_manager_tags       = {} -> null
              ~ resource_policies           = [] -> (known after apply)
              ~ size                        = 10 -> (known after apply)
              ~ type                        = "pd-standard" -> (known after apply)
            }
        }

      ~ network_interface {
          ~ internal_ipv6_prefix_length = 0 -> (known after apply)
          + ipv6_access_type            = (known after apply)
          + ipv6_address                = (known after apply)
          ~ name                        = "nic0" -> (known after apply)
          ~ network                     = "https://www.googleapis.com/compute/v1/projects/cloud-chang-brachang/global/networks/default" -> "default"
          ~ network_ip                  = "10.138.0.20" -> (known after apply)
          - queue_count                 = 0 -> null
          ~ stack_type                  = "IPV4_ONLY" -> (known after apply)
          ~ subnetwork                  = "https://www.googleapis.com/compute/v1/projects/cloud-chang-brachang/regions/us-west1/subnetworks/default" -> (known af
ter apply)
          ~ subnetwork_project          = "cloud-chang-brachang" -> (known after apply)
```

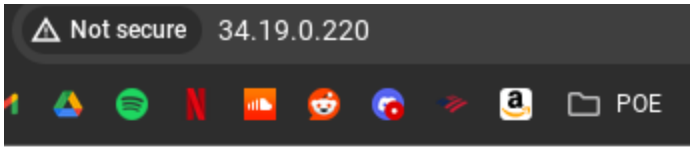
```
(cloud-chang-brachang) ×

          - queue_count                 = 0 -> null
          ~ stack_type                  = "IPV4_ONLY" -> (known after apply)
          ~ subnetwork                  = "https://www.googleapis.com/compute/v1/projects/cloud-chang-brachang/regions/us-west1/subnetworks/default" -> (known af
ter apply)
          ~ subnetwork_project          = "cloud-chang-brachang" -> (known after apply)

          ~ access_config {
              ~ network_tier = "PREMIUM" -> (known after apply)
                # (1 unchanged attribute hidden)
            }
        }

      - scheduling {
          - automatic_restart   = true -> null
          - availability_domain = 0 -> null
          - min_node_cpus       = 0 -> null
          - on_host_maintenance = "MIGRATE" -> null
          - preemptible         = false -> null
          - provisioning_model  = "STANDARD" -> null
        }

      - shielded_instance_config {
          - enable_integrity_monitoring = true -> null
          - enable_secure_boot          = false -> null
          - enable_vtpm                 = true -> null
        }
    }

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


Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.
brachang@cloudshell:~/tf (cloud-chang-brachang)$
```

What part of the configuration forces a replacement to occur?

The metadata_startup_script forces a replacement

8. View the Guestbook

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



Guestbook

Sign here

Entries

Bradley Chang <brachang@pdx.edu>
signed on 2025-02-24
Hello Terraform on GCP!

07.2g: Kubernetes Guestbook

4. Create Kubernetes cluster

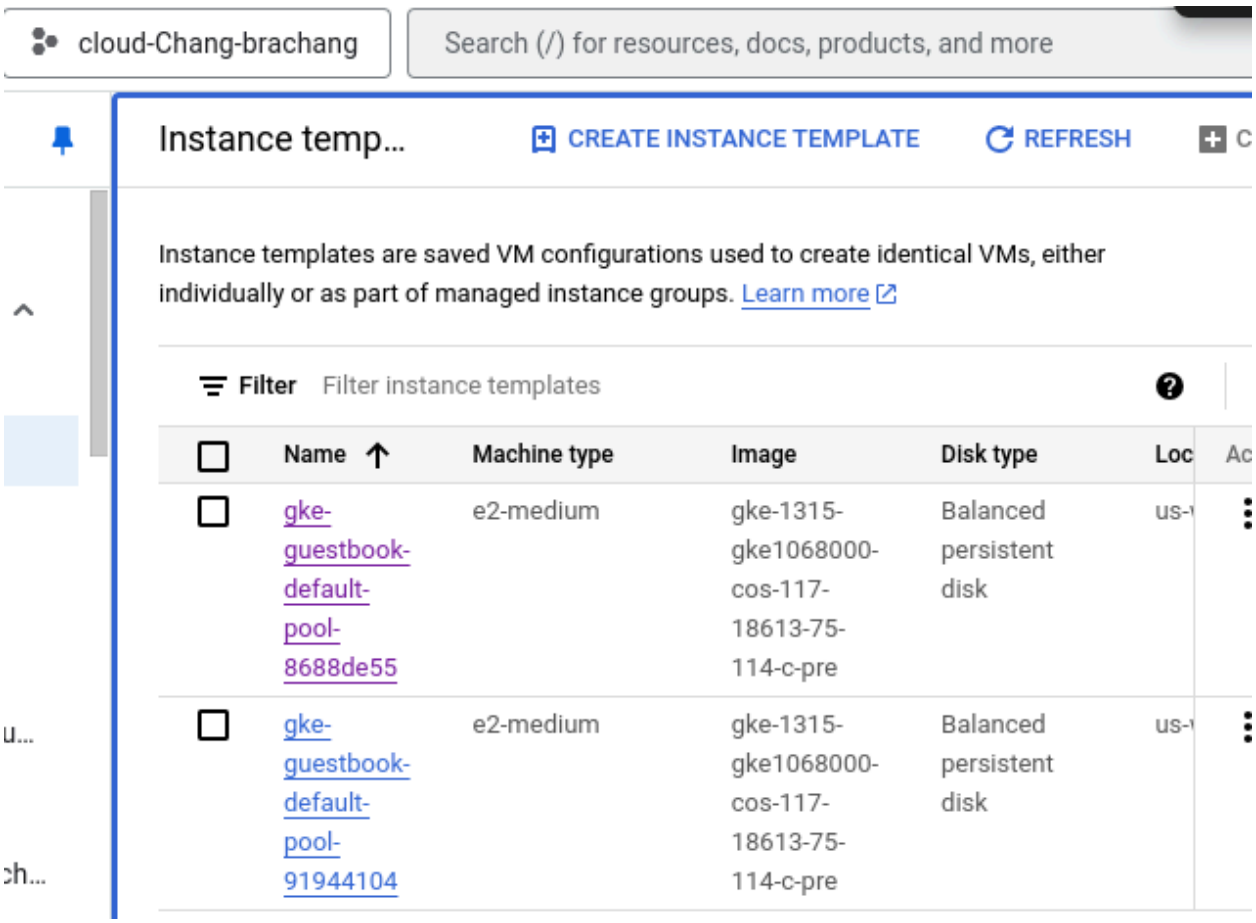
What is the name of the Instance Template dynamically generated to create the two nodes (VMs)?

gke-guestbook-default-pool-8688de55

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

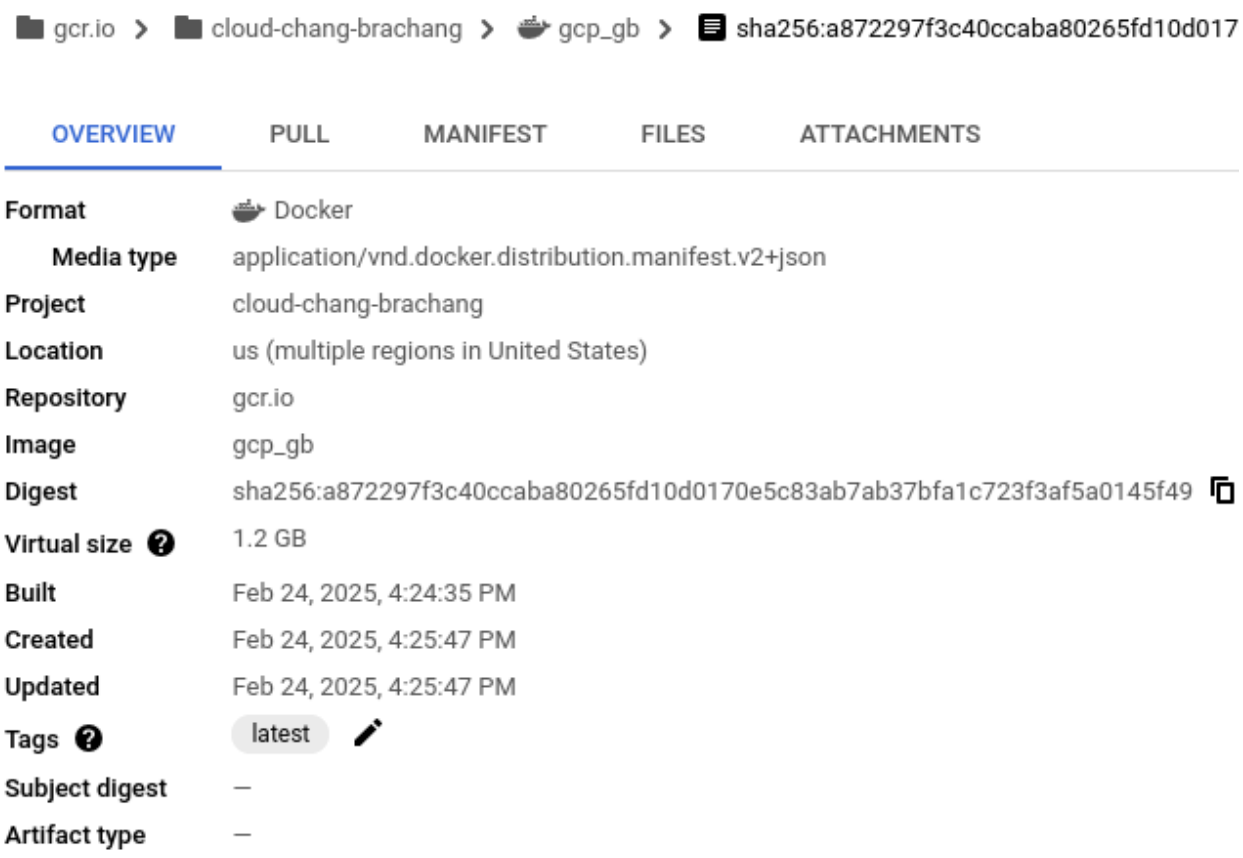
gke-guestbook-default-pool-8688de55-grp

What are the names of the two nodes?



5. Prepare a container image

Take a screenshot of the container image created



7. Deploy the configuration

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

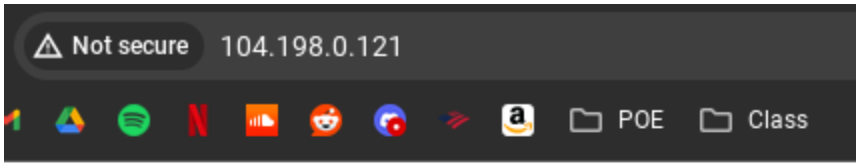
```
brachang@cloudshell:~/cs430-src/05_gcp_datastore (cloud-chang-brachang)$ kubectl get pods
NAME                        READY   STATUS    RESTARTS   AGE
guestbook-replicas-8krg7    1/1     Running   0          104s
guestbook-replicas-wmz52    1/1     Running   0          104s
guestbook-replicas-wp6sc    1/1     Running   0          104s
brachang@cloudshell:~/cs430-src/05_gcp_datastore (cloud-chang-brachang)$
```

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

```
brachang@cloudshell:~/cs430-src/05_gcp_datastore (cloud-chang-brachang)$ kubectl get services
NAME           TYPE           CLUSTER-IP      EXTERNAL-IP     PORT(S)        AGE
guestbook-lb   LoadBalancer   34.118.232.18   104.198.0.121   80:30693/TCP   2m26s
kubernetes     ClusterIP      34.118.224.1    <none>          443/TCP        27m
brachang@cloudshell:~/cs430-src/05_gcp_datastore (cloud-chang-brachang)$
```

8. View the Guestbook

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



Guestbook

Sign here

Entries

Bradley Chang <brachang@pdx.edu>
signed on 2025-02-25 00:35:09.303205+00:00
Hello Kubernetes!

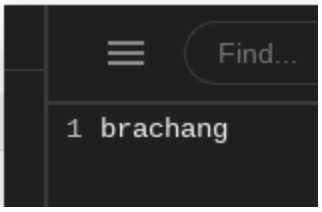
Take a screenshot of the managed guestbook pods and the service being exposed.

Managed pods

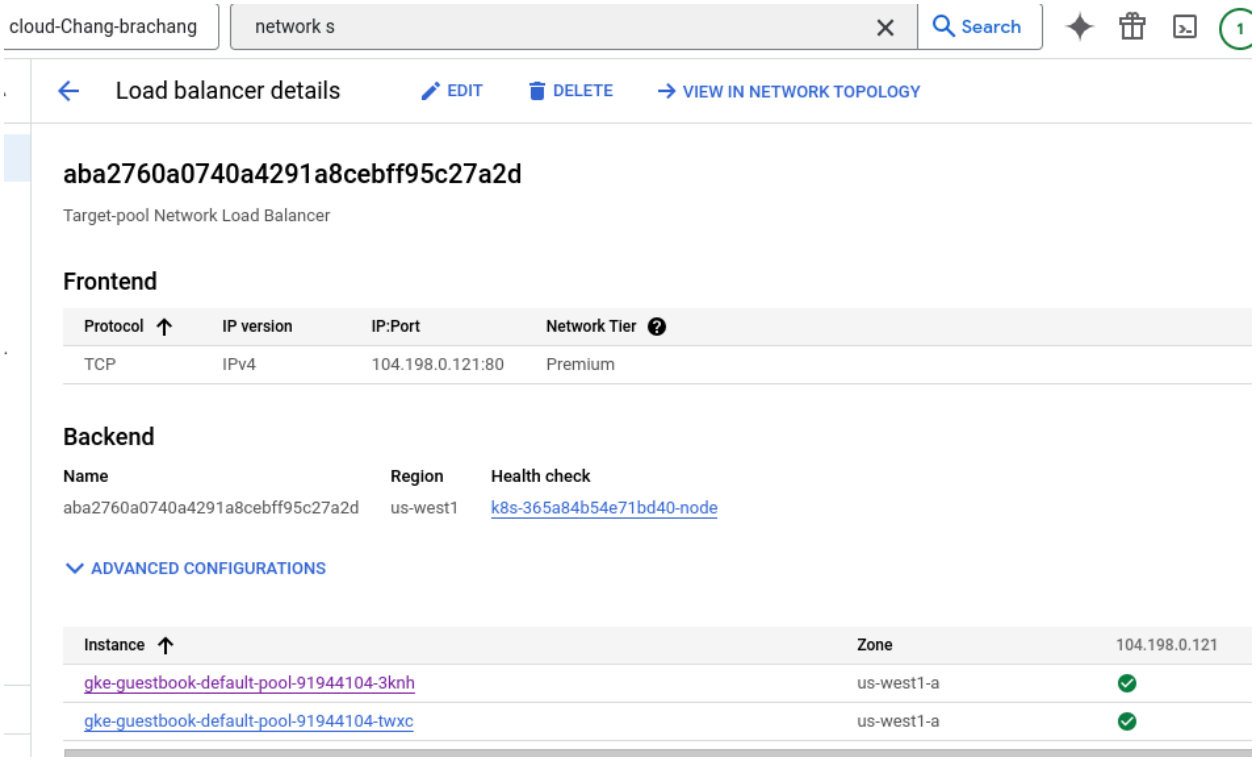
Name	Status	Restarts	Created on
guestbook-replicas-8krg7	Running	0	Feb 24, 2025, 4:31:24 PM
guestbook-replicas-wmz52	Running	0	Feb 24, 2025, 4:31:24 PM
guestbook-replicas-wp6sc	Running	0	Feb 24, 2025, 4:31:24 PM

Exposing services

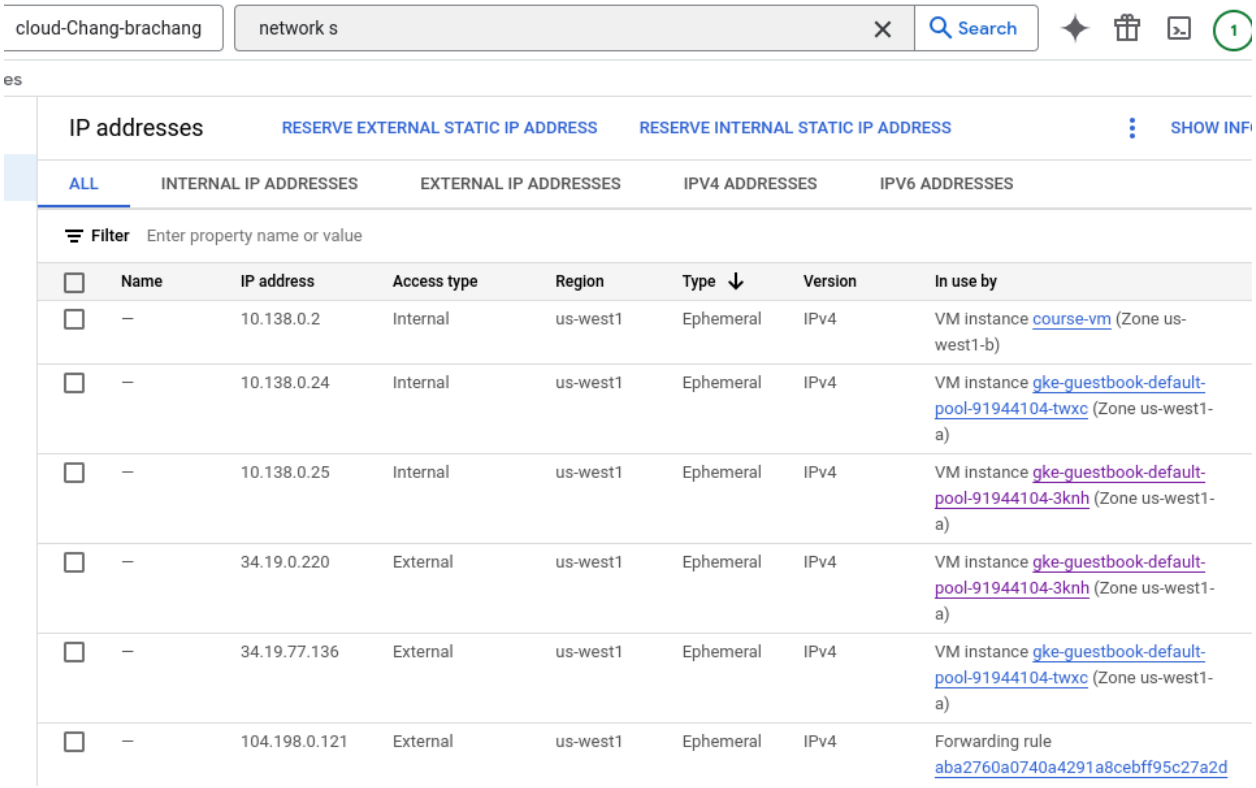
Name	Type	Endpoints
guestbook-lb	Load balancer	104.198.0.121:80



Take a screenshot of the load balancer and its details



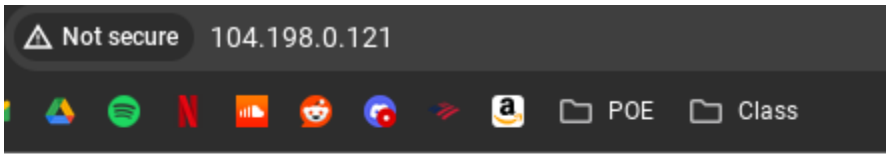
Take a screenshot of the addresses allocated and indicate the ones associated with nodes versus the one associated with the load balancer.



The load balancer is the last IP address while the nodes are the addresses from the 2nd to 4th ones.

12. Deploy and view application

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



Bradley Chang <brachang@pdx.edu>
signed on 2025-02-25 01:02:29.159730+00:00
Hello Cloud Build!

07.3g: APIs (Slack, Knowledge Graph)

2. Code

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

No it does not.

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()

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

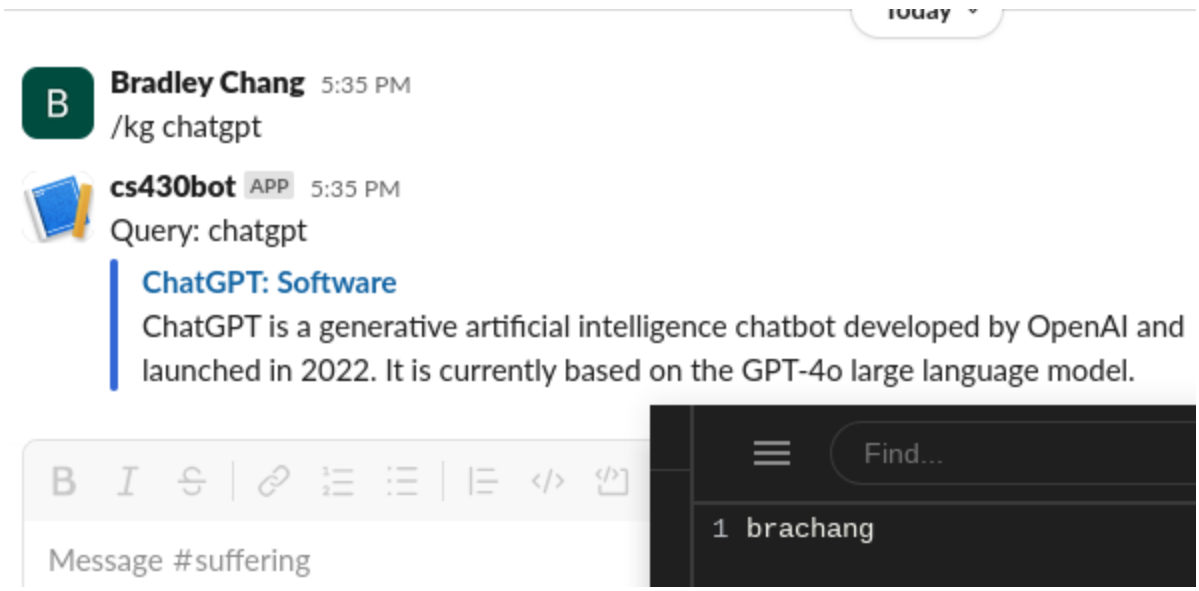
A dictionary

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

Response type, text, attachments

8. Test the command

Take a screenshot of its response for your lab notebook.



7.4g: ML APIs

3. Vision

Show the output for your lab notebook

```
brachang@cloudshell:~/py
.jpg
Labels:
Bird
Ratite
Common ostrich
Flightless bird
Beak
Vertebrate
Wildlife
Terrestrial animal
Greater rhea
Feather
brachang@cloudshell:~/py
```

What is the name of the function?

def detect_labels_uri(uri)

What type of Vision client is instantiated in it?

client = vision.ImageAnnotatorClient()

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

response = client.label_detection(image=image)

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

labels = response.label_annotations

Take a screenshot of the output for the above commands

```
brachang@cloudshell:~/python-docs-samples/vision/snippets/detect (cloud-chang-brachang)$ python detect.py logos psu_logo.jpg
Logos:
Portland State University
brachang@cloudshell:~/python-docs-samples/vision/snippets/detect (cloud-chang-brachang)$
```

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

def detect_logos(path)

4. Speech

Show the output for your lab notebook

```
(env) brachang@cloudshell:~ (cloud-chang-brachang)$ cd ~/python-docs-samples/speech/snippets
(env) brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$ python transcribe.py resources/audio.raw
Transcript: how old is the Brooklyn Bridge
(env) brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$
```

What is the name of the function?

transcribe_file

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

response = client.recognize(config=config, audio=audio)

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

response.results

5. Translate

Show the output for your lab notebook

```
(env) brachang@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-chang-brachang)$ python snippets.py translate-text en '你有沒有帶外套'
Text: 你有沒有帶外套
Translation: Do you have a coat?
Detected source language: zh-TW
(env) brachang@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-chang-brachang)$
```

What is the name of the function?

translate_text

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

translate_client = translate.Client()

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

result = translate_client.translate(text, target_language=target)

6. Natural Language

Show the output for your lab notebook

```
(env) brachang@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-chang-brachang)$ python language.py 'homework is awful!'
python language.py 'homework is ok'
python language.py 'homework is awesome?'
python language.py 'homework is awesome!'
python language.py 'The protestors in Oregon put on gas masks and wore yellow t-shirts'
"homework is awful!" has sentiment=-0.800000011920929

Entities are:
name: homework
"homework is ok" has sentiment=0.30000001192092896

Entities are:
name: homework
"homework is awesome?" has sentiment=0.4000000059604645

Entities are:
name: homework
"homework is awesome!" has sentiment=0.8999999761581421

Entities are:
name: homework
"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) brachang@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-chang-brachang)$
```

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(uri)

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?

```
(env) brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$ python solution.py de-DE gs://cloud-samples-data/ml-api-codelab/de-ball.w
av gs://cloud-samples-data/ml-api-codelab/football.jpg
Transcription: willst du mit uns Fußball spielen
Translation: do you want to play football with us
Entities: ['football']
Image labels: ['Ball', 'Football', 'Sports', 'Football', 'Ball game', 'Soccer ball', 'Sports venue', 'Soccer-specific stadium']
The audio and image do not appear to be related.
(env) brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$
```

Here it says that they are unrelated likely due to case sensitivity, which the code needs to be adjusted to account for 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?

```
brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$ python solution.py tr-TR gs://cloud-samples-data/
ml-api-codelab/tr-bike.wav gs://cloud-samples-data/ml-api-codelab/bicycle.jpg
Transcription: bisikletimi sokağa bırak
Translation: leave my bike on the street
Entities: ['bike', 'street']
Image labels: ['Bicycle frame', 'Bicycle', 'Bicycle handlebar', 'Bicycle tire', 'Bicycle Wheel Rim', 'Bicycle chain', 'Bicycle whee
l', 'Spoke', 'Bicycle fork', 'Crankset']
The audio and image do not appear to be related.
brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$
```

Again it says that they are unrelated. This is likely because it does not account for the shorter synonym for bicycle which is bike.

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

```
ml-api-codelab/tr-ostrich.wav gs://cloud-samples-data/ml-api-codelab/birds.jpg
Transcription: çok fazla deve kuşu var
Translation: There are too many ostriches
Entities: ['ostriches']
Image labels: ['Bird', 'Ratite', 'Common ostrich', 'Flightless bird', 'Beak', 'Vertebrate', 'Wildlife', 'Terrestrial animal', 'Grea
ter rhea', 'Feather']
The audio and image do not appear to be related.
brachang@cloudshell:~/python-docs-samples/speech/snippets (cloud-chang-brachang)$
```

The program says they are unrelated. It is likely not accounting for multiple ostriches.

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?

Video label description: player

Segment 0: 0s to 178s

Confidence: 0.8446521162986755

Video label description: basketball

Label category description: sports

Segment 0: 0s to 178s

Confidence: 0.9137870669364929

Video label description: sports

Segment 0: 0s to 178s

Confidence: 0.9218811392784119

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

VideoIntelligenceServiceClient

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

annotate_video(input_uri, features)

16. Application

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

Requirements took too long to install that my cloudshell timed out. I'm not wasting any more of my time.

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?

"file" from 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?

face_detection()

What fields are stored in Cloud Datastore for each image?

1. blob_name
2. image_public_url
3. timestamp
4. joy

What happens at the end of the upload_photo route?

The function redirects to the home page.