

Assignment 2, Cloud Application Development

Exercise 1: Google App Engine

Objective: Deploy a simple web application on Google App Engine.

Instructions:

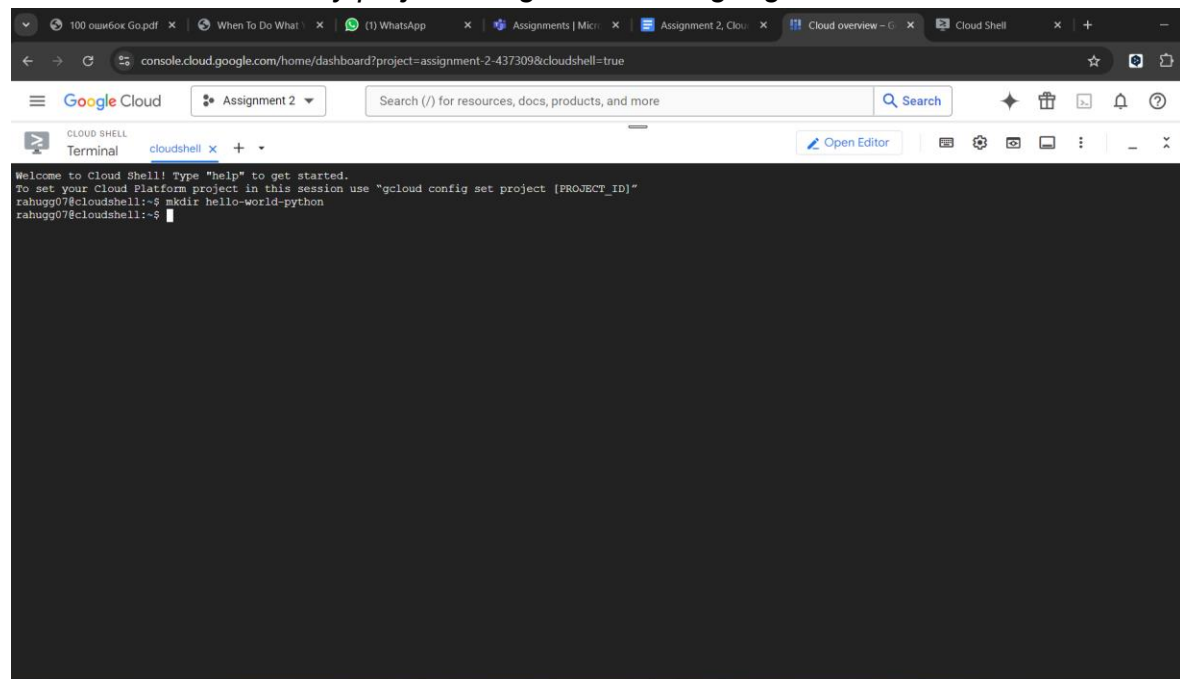
1. Setup:

- Ensure you have a Google Cloud account.x`
- Install the Google Cloud SDK on your local machine.

2. Create a Project:

- Create a new project in the Google Cloud Console.

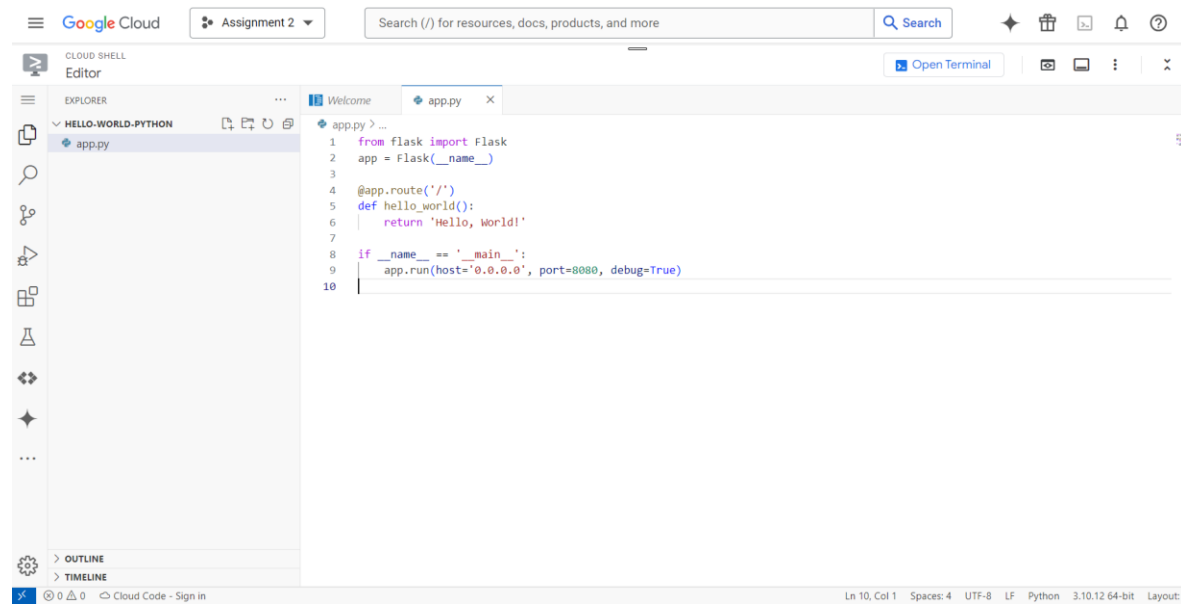
I created a folder for my project assignment 2 via google cloud console



3. Prepare the Application:

- Write a simple "Hello, World!" web application using Python (Flask).
I created a file named app.py and wrote this code for printing the hello

world



app.py:

```
from flask import Flask
```

```
app = Flask(__name__)
```

```
@app.route('/')
```

```
def hello_world():
```

```
    return 'Hello, World!'
```

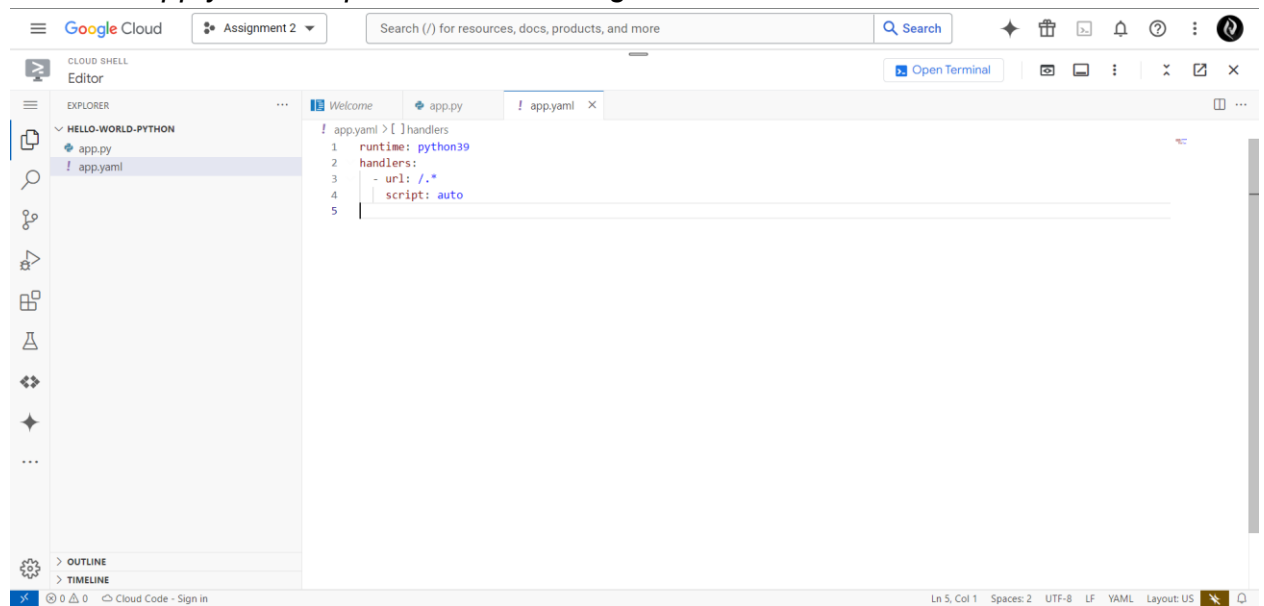
```
if __name__ == '__main__':
```

```
    app.run(host='0.0.0.0', port=8080, debug=True)
```

○

4. Create the App Engine Configuration:

I created app.yaml and pasted the following code:



Create a app.yaml file with the following content:

runtime: python39

handlers:

- url: /*

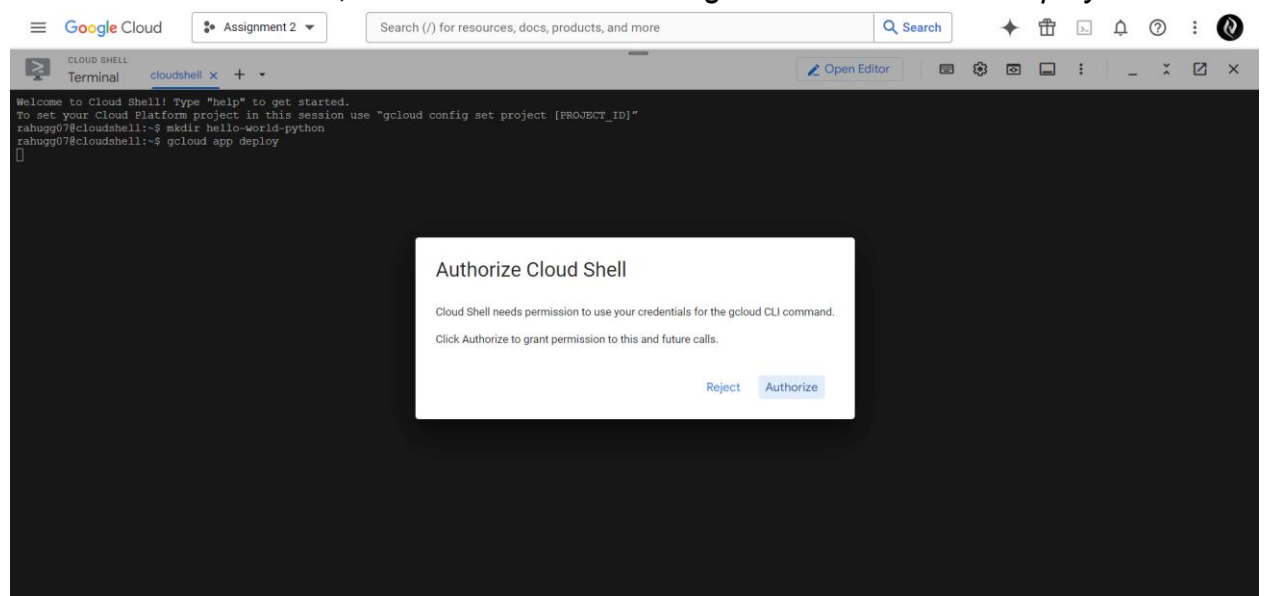
script: auto

○

5. Deploy the Application:

Use the following command to deploy the application to Google App Engine:

I wrote the command, and the next step was indeed to set the default project which I did in the next screenshots, and also I activated billing account in order to deploy it



```
CLOUD SHELL
Terminal (assignment-2-437302) x +
Open Editor

Welcome to Cloud Shell! Type "help" to get started.
To set your Cloud Platform project in this session use "gcloud config set project [PROJECT_ID]"
rahugg07@cloudshell:~$ mkdir hello-world-python
rahugg07@cloudshell:~$ gcloud app deploy
ERROR: (gcloud.app.deploy) You do not currently have an active account selected.
Please run:

$ gcloud auth login

to obtain new credentials.

If you have already logged in with a different account, run:

$ gcloud config set account ACCOUNT

to select an already authenticated account to use.
rahugg07@cloudshell:~$ gcloud app deploy
ERROR: (gcloud.app.deploy) The required property [project] is not currently set.
It can be set on a per-command basis by re-running your command with the [--project] flag.

You may set it for your current workspace by running:

$ gcloud config set project VALUE

or it can be set temporarily by the environment variable [CLOUDSDK_CORE_PROJECT]
rahugg07@cloudshell:~$ gcloud config set project assignment-2-437302
WARNING: (rahugg07@gmail.com) does not have permission to access projects instance [assignment-2-437302] (or it may not exist): The caller does not have permission. This command is authenticated as rahugg07@gmail.com which is the active account specified by the [core/account] property
Are you sure you wish to set property [core/project] to assignment-2-437302?
Do you want to continue (Y/n)? y
Updated property [core/project].
rahugg07@cloudshell:~$ (assignment-2-437302) $ gcloud app deploy
```

Google Cloud

Assignment 2

Search (f) for resources, docs, products, and more

Search

✦ 📄 🔔 ? ⌵

Welcome, Rahug

You've activated your full account
Use any remaining credits, then pay as you go.

You're working on project **Assignment 2**
Number: 461774195409 ID: assignment-2-437309

Try our most advanced model: Gemini 1.5 Pro

```
CLOUD SHELL
Terminal (assignment-2-437309) x +
Open Editor

rahugg07@cloudshell:~$ (assignment-2-437309) $ ls
gcp-intro  gopath  hello-world-python  REAME-cloudshell.txt
rahugg07@cloudshell:~$ (assignment-2-437309) $ cd hello-world-python/
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $ gcloud app deploy
You are creating an app for project [assignment-2-437309].
WARNING: Creating an App Engine application for a project is irreversible and the region
cannot be changed. More information about regions is at
<https://cloud.google.com/appengine/docs/locations>.

Please choose the region where you want your App Engine application located:

(1) asia-east1 (supports standard and flexible)
(2) asia-east2 (supports standard and flexible and search api)
(3) asia-northeast1 (supports standard and flexible and search api)
(4) asia-northeast2 (supports standard and flexible and search api)
(5) asia-northeast3 (supports standard and flexible and search api)
(6) asia-south1 (supports standard and flexible and search api)
(7) asia-southeast1 (supports standard and flexible)
(8) asia-southeast2 (supports standard and flexible and search api)
(9) australia-southeast1 (supports standard and flexible and search api)
(10) europe-central2 (supports standard and flexible)
```

gcloud app deploy

6. Access the Application:

- Once deployed, access your application using the URL provided by Google App Engine.

Google Cloud Assignment 2 Search (/) for resources, docs, products, and more Search

Welcome, Rahug

You've activated your full account Use any remaining credits, then pay as you go.

You're working on project Assignment 2 Number: 461774195409 ID: assignment-2-437309

Try our most advanced model: Gemini 1.5 Pro

Try Gemini →

Cloud Shell Terminal (assignment-2-437309) x +

```
Services to deploy:
descriptor:      [/home/rahugg07/hello-world-python/app.yaml]
source:          [/home/rahugg07/hello-world-python]
target project:  [assignment-2-437309]
target service:  [default]
target version:  [20241001t095909]
target url:      [https://assignment-2-437309.de.r.appspot.com]
target service account: [assignment-2-437309appspot.gserviceaccount.com]

Do you want to continue (Y/n)? y

Beginning deployment of service [default]...
Created .gcloudignore file. See 'gcloud topic gcloudignore' for details.
Uploading 2 files to Google Cloud Storage
30%
100%
100%
File upload done.
Updating service [default]...working
```

Google Cloud Assignment 2 Search (/) for resources, docs, products, and more Search

You've activated your full account Use any remaining credits, then pay as you go.

You're working on project Assignment 2 Number: 461774195409 ID: assignment-2-437309

Try our most advanced model: Gemini 1.5 Pro

Try Gemini →

Cloud Shell Terminal (assignment-2-437309) x +

```
target version:      [20241001t100140]
target url:          [https://assignment-2-437309.de.r.appspot.com]
target service account: [assignment-2-437309appspot.gserviceaccount.com]

Do you want to continue (Y/n)? y

Beginning deployment of service [default]...
Uploading 0 files to Google Cloud Storage
100%
File upload done.
Updating service [default]...done.
Setting traffic split for service [default]...done.
Deployed service [default] to [https://assignment-2-437309.de.r.appspot.com]

You can stream logs from the command line by running:
$ gcloud app logs tail -s default

To view your application in the web browser run:
$ gcloud app browse
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309)$ gcloud app browse
```

Google Cloud Assignment 2 Search (/) for resources, docs, products, and more Search

You've activated your full account Use any remaining credits, then pay as you go.

You're working on project Assignment 2 Number: 461774195409 ID: assignment-2-437309

Try our most advanced model: Gemini 1.5 Pro

Try Gemini →

Cloud Shell Terminal (assignment-2-437309) x +

```
Do you want to continue (Y/n)? y

Beginning deployment of service [default]...
Uploading 0 files to Google Cloud Storage
100%
File upload done.
Updating service [default]...done.
Setting traffic split for service [default]...done.
Deployed service [default] to [https://assignment-2-437309.de.r.appspot.com]

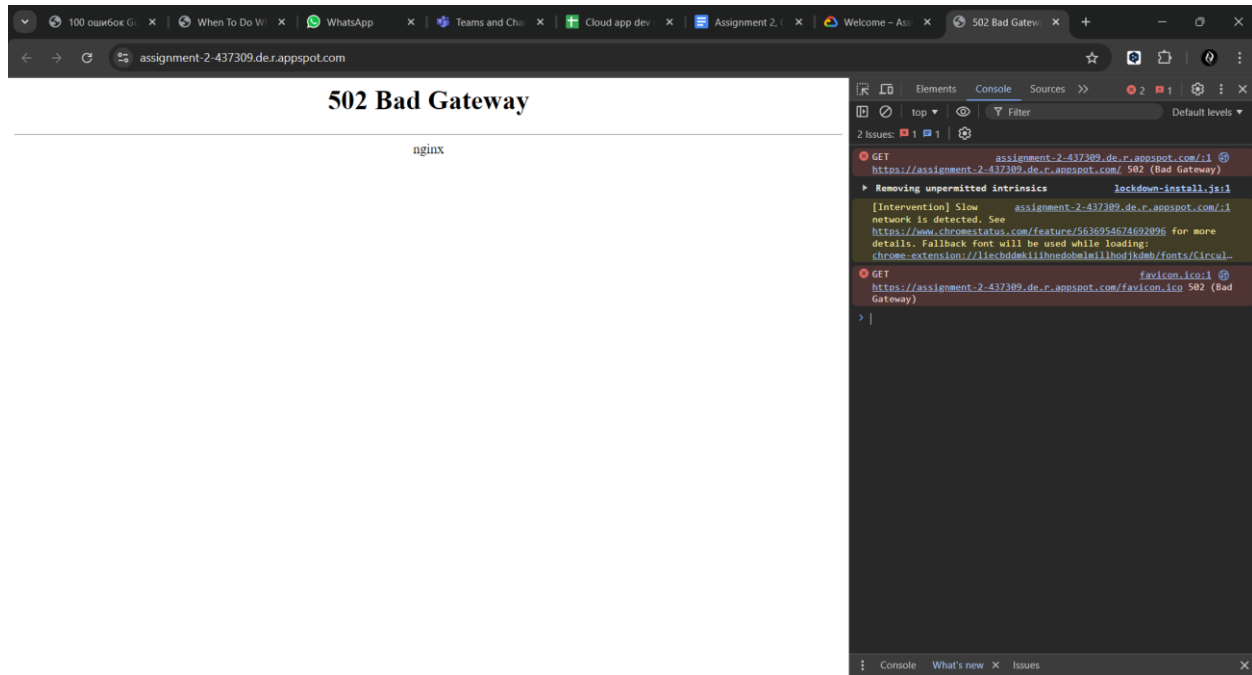
You can stream logs from the command line by running:
$ gcloud app logs tail -s default

To view your application in the web browser run:
$ gcloud app browse
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309)$ gcloud app browse
did not detect your browser. Go to this link to view your app:
https://assignment-2-437309.de.r.appspot.com
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309)$
```

Deliverables:

- A deployed web application on Google App Engine.

- A screenshot of the running application.



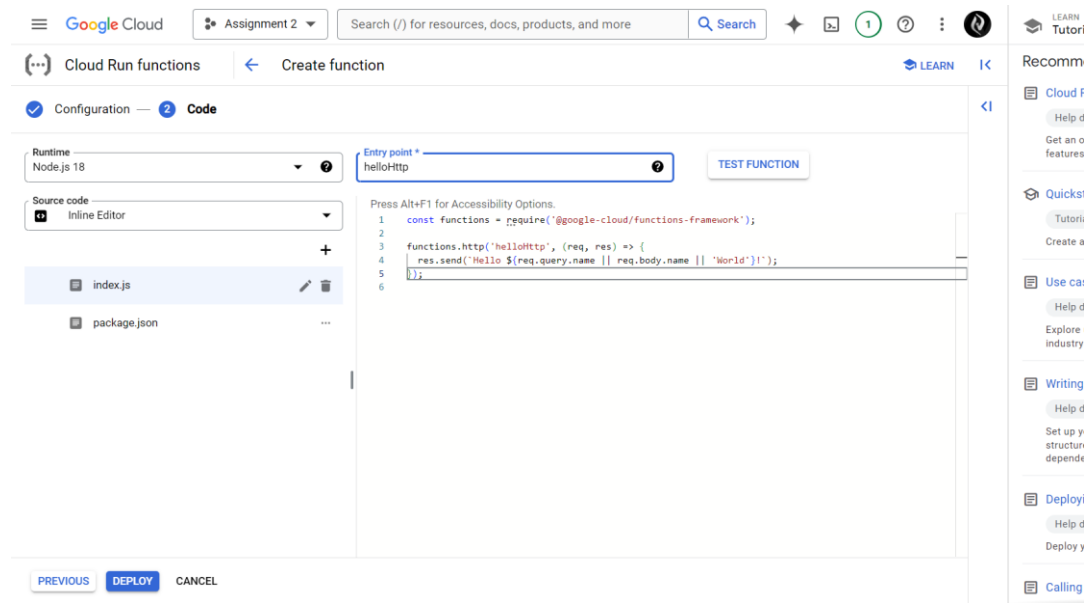
Exercise 2: Building with Google Cloud Functions

Objective: Create a Google Cloud Function that processes HTTP requests.

Instructions:

1. **Setup:**
 - Ensure you have a Google Cloud account.
 - Install the Google Cloud SDK on your local machine.
2. **Create a Function:**
 - Create a new Google Cloud Function using the following configuration:
 - **Name:** helloWorldFunction
 - **Trigger:** HTTP
 - **Runtime:** Node.js 18 (or another supported runtime)

▪ Entry Point: helloWorld



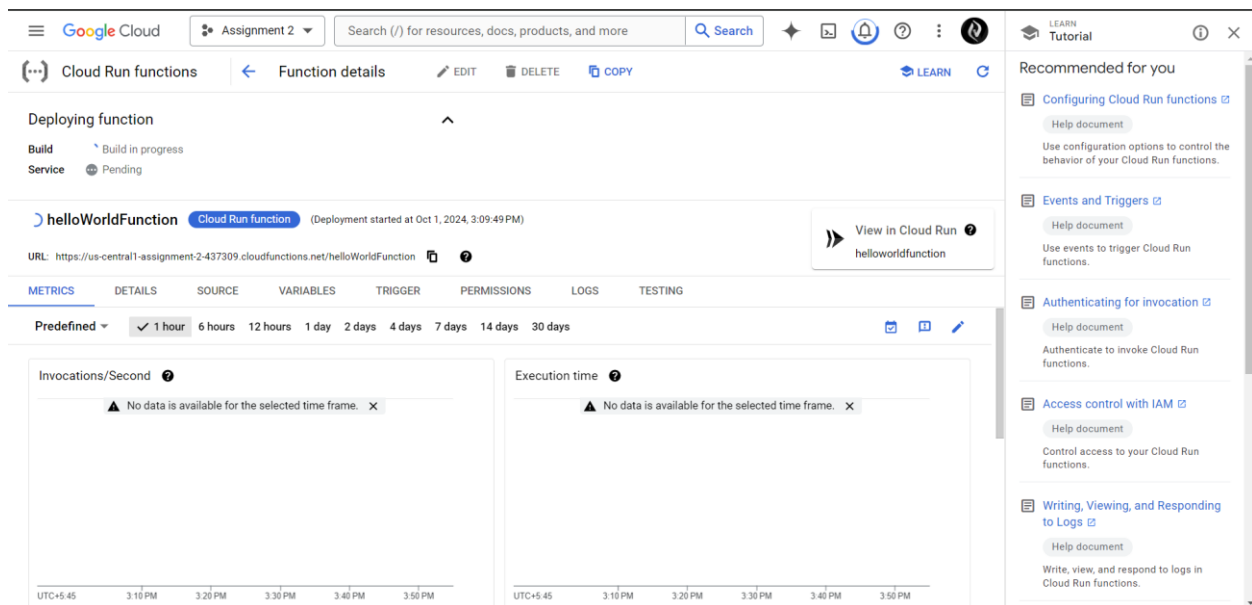
3. Write the Code:

- Write a simple function that returns "Hello, World!" when accessed via HTTP.

Example index.js:

```
exports.helloWorld = (req, res) => {  
  res.send('Hello, World!');  
};
```

○



4. Deploy the Function:

Use the following command to deploy the function:

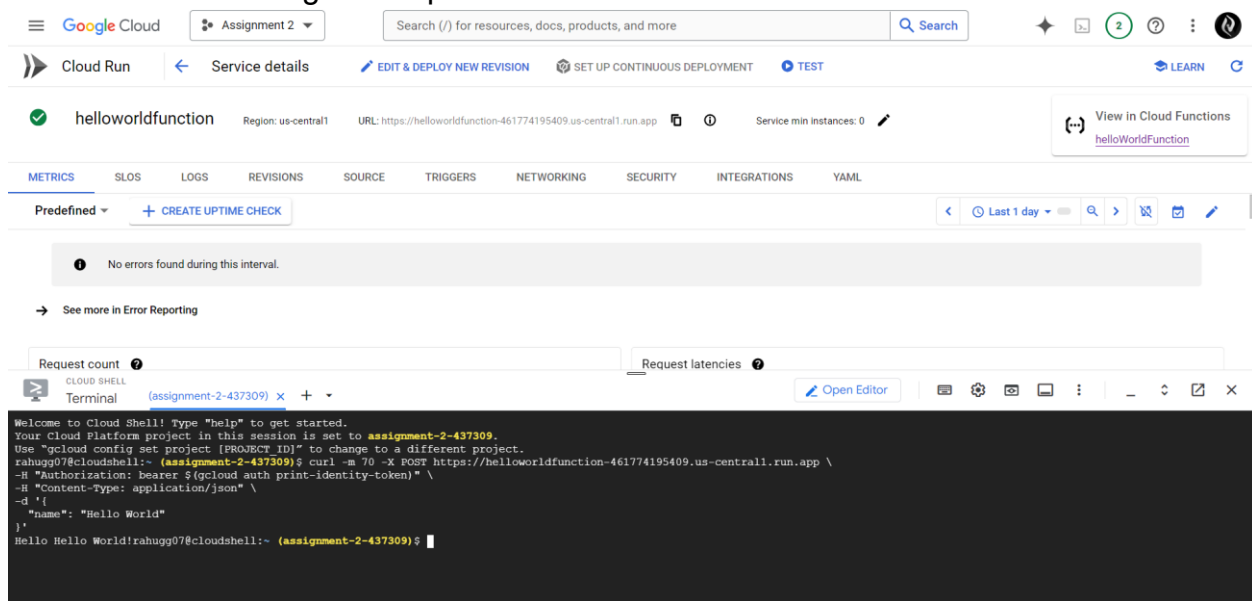
```
gcloud functions deploy helloWorldFunction --runtime nodejs18 --trigger-http
```

5. Invoke the Function:

- Once deployed, use the provided URL to test the function by accessing it via a web browser or curl.

Deliverables:

- A deployed Google Cloud Function.
- A screenshot showing the response from the function.



- Text RESULT:** I created a cloud function helloworld and then configured the node.js file to be able to see the message hello world as a result via curl I got a response from my cloud function

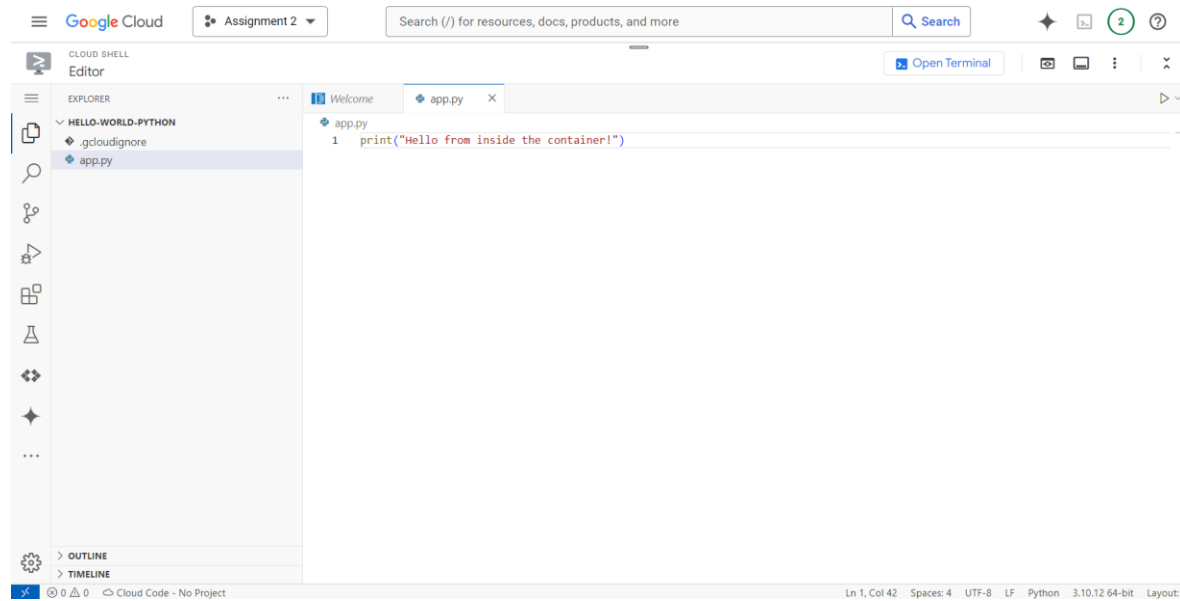
Exercise 3: Containerizing Applications

Objective: Containerize a simple application using Docker.

Instructions:

- Setup:**
 - Ensure Docker is installed on your local machine.
- Create a Simple Application:**

- Write a simple Python application.



Example app.py:

```
print("Hello from inside the container!")
```

○

3. Create a Dockerfile:

- Write a Dockerfile to containerize the application.

Example Dockerfile:

```
# Use an official Python runtime as a parent image
```

```
FROM python:3.9-slim
```

```
# Set the working directory in the container
```

```
WORKDIR /app
```

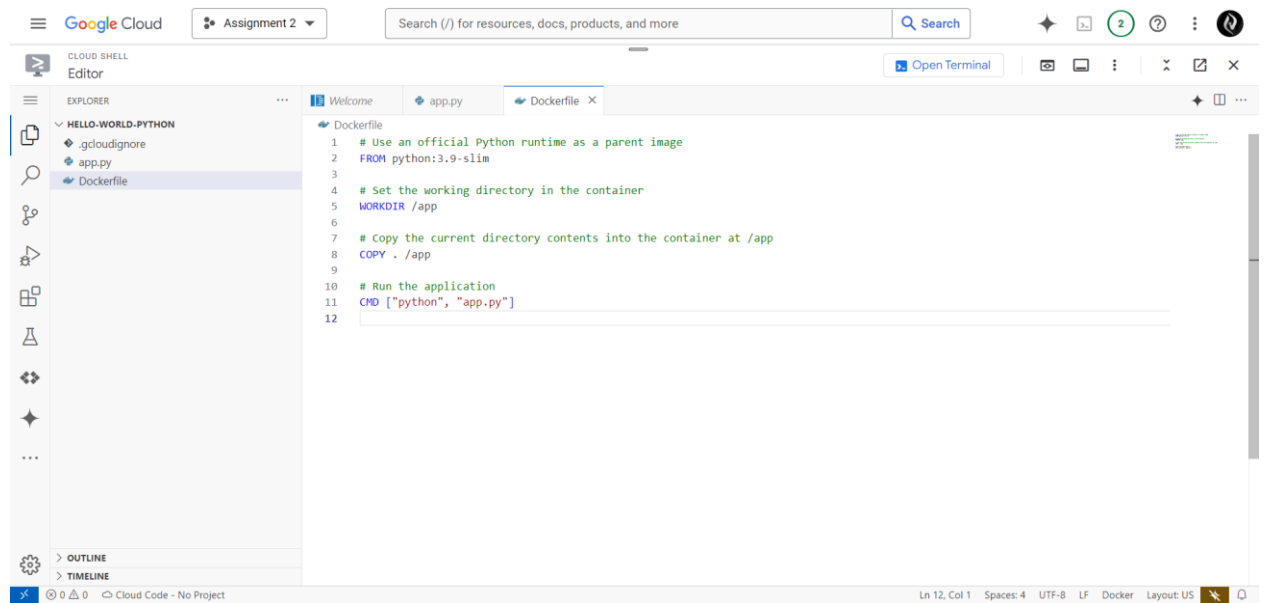
```
# Copy the current directory contents into the container at /app
```

```
COPY . /app
```

```
# Run the application
```

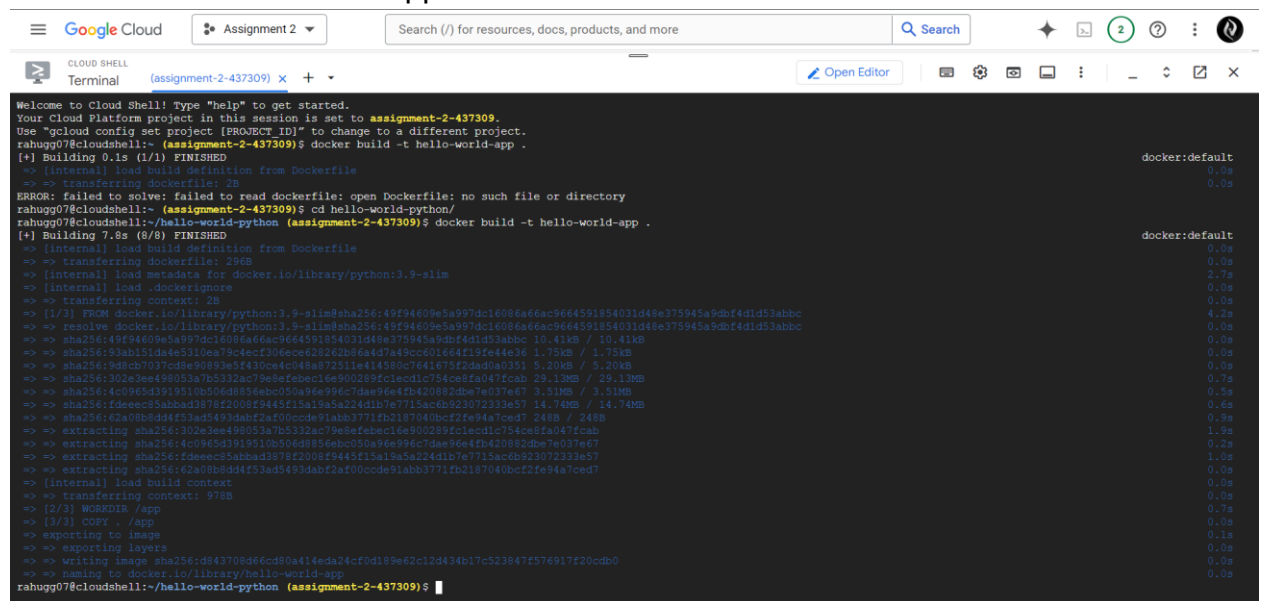
```
CMD ["python", "app.py"]
```

4. Build the Docker Image:



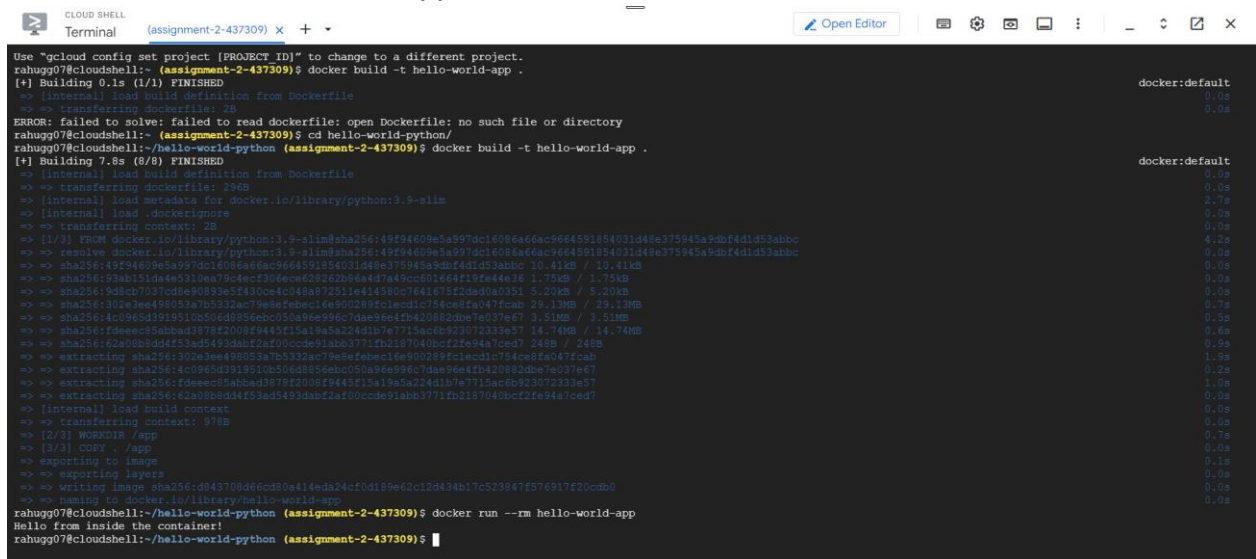
Build the Docker image using the following command:

`docker build -t hello-world-app .`



5. Run the Docker Container:

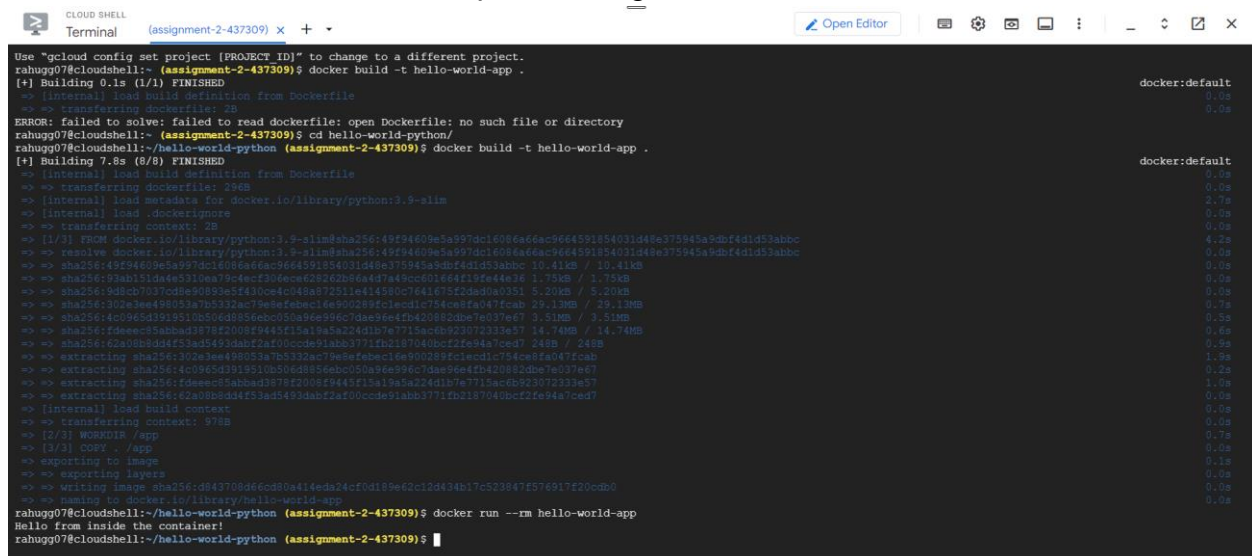
Run the container using the following command:
docker run --rm hello-world-app



```
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahugg07@cloudshell:~ (assignment-2-437309) x +
[+] Building 0.1s (1/1) FINISHED
=> [internal] load build definition from Dockerfile
=> transferring dockerfile: 294B
ERROR: failed to solve: failed to read dockerfile: open Dockerfile: no such file or directory
rahugg07@cloudshell:~ (assignment-2-437309) x +
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $ docker build -t hello-world-app .
[+] Building 7.8s (8/8) FINISHED
=> [internal] load build definition from Dockerfile
=> transferring dockerfile: 294B
=> [internal] load metadata for docker.io/library/python:3.9-slim
=> [internal] load .dockerignore
=> transferring context: 2B
=> [1/3] FROM docker.io/library/python:3.9-slim@sha256:48f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc
=> sha256:48f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc 10.41kB / 10.41kB
=> sha256:93ab131da4e5310ea79c4ecf306ac628226b6a4d7a49cc601664f19fe44e36 1.75kB / 1.75kB
=> sha256:988cb7037cd8e90893e5f430ce4c048a87251e414580c7641675f2dad0a0351 5.20kB / 5.20kB
=> sha256:302a3ee498053a7b5332ac79e8efebec16e900289f1ced1c754ce8fa047fcb 29.13MB / 29.13MB
=> sha256:4c0965d3919310b506d8856ebc050a9e696c7dae9e4fb420882dbe7e037e67 3.51MB / 3.51MB
=> sha256:fdeec83abdad3978f2008f9443f1ba19a5a224d1b7e7715acdb923072339e57 1.06kB / 1.06kB
=> sha256:62adb8dd4f53ad5491dabf2af00cde91abb3771fb2187040bcf2fe94a7ced7 248B / 248B
=> extracting sha256:302a3ee498053a7b5332ac79e8efebec16e900289f1ced1c754ce8fa047fcb 1.9s
=> extracting sha256:4c0965d3919310b506d8856ebc050a9e696c7dae9e4fb420882dbe7e037e67 0.2s
=> extracting sha256:fdeec83abdad3978f2008f9443f1ba19a5a224d1b7e7715acdb923072339e57 1.0s
=> extracting sha256:62adb8dd4f53ad5491dabf2af00cde91abb3771fb2187040bcf2fe94a7ced7 0.0s
=> [internal] load build context
=> transferring context: 578B
=> [2/3] WORKDIR /app
=> [3/3] COPY . /app
=> exporting to image
=> writing image sha256:d843708d66cd80a414eda24cf0d18e62c12g434b17c523847f576917f220cd80
=> naming to docker.io/library/hello-world-app
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $ docker run --rm hello-world-app
Hello from inside the container!
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $
```

Deliverables:

- A Docker image that runs a simple application.
- A screenshot of the container output showing "Hello from inside the container!"



```
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahugg07@cloudshell:~ (assignment-2-437309) x +
[+] Building 0.1s (1/1) FINISHED
=> [internal] load build definition from Dockerfile
=> transferring dockerfile: 294B
ERROR: failed to solve: failed to read dockerfile: open Dockerfile: no such file or directory
rahugg07@cloudshell:~ (assignment-2-437309) x +
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $ docker build -t hello-world-app .
[+] Building 7.8s (8/8) FINISHED
=> [internal] load build definition from Dockerfile
=> transferring dockerfile: 294B
=> [internal] load metadata for docker.io/library/python:3.9-slim
=> [internal] load .dockerignore
=> transferring context: 2B
=> [1/3] FROM docker.io/library/python:3.9-slim@sha256:48f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc
=> sha256:48f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc 10.41kB / 10.41kB
=> sha256:93ab131da4e5310ea79c4ecf306ac628226b6a4d7a49cc601664f19fe44e36 1.75kB / 1.75kB
=> sha256:988cb7037cd8e90893e5f430ce4c048a87251e414580c7641675f2dad0a0351 5.20kB / 5.20kB
=> sha256:302a3ee498053a7b5332ac79e8efebec16e900289f1ced1c754ce8fa047fcb 29.13MB / 29.13MB
=> sha256:4c0965d3919310b506d8856ebc050a9e696c7dae9e4fb420882dbe7e037e67 3.51MB / 3.51MB
=> sha256:fdeec83abdad3978f2008f9443f1ba19a5a224d1b7e7715acdb923072339e57 1.06kB / 1.06kB
=> sha256:62adb8dd4f53ad5491dabf2af00cde91abb3771fb2187040bcf2fe94a7ced7 248B / 248B
=> extracting sha256:302a3ee498053a7b5332ac79e8efebec16e900289f1ced1c754ce8fa047fcb 1.9s
=> extracting sha256:4c0965d3919310b506d8856ebc050a9e696c7dae9e4fb420882dbe7e037e67 0.2s
=> extracting sha256:fdeec83abdad3978f2008f9443f1ba19a5a224d1b7e7715acdb923072339e57 1.0s
=> extracting sha256:62adb8dd4f53ad5491dabf2af00cde91abb3771fb2187040bcf2fe94a7ced7 0.0s
=> [internal] load build context
=> transferring context: 578B
=> [2/3] WORKDIR /app
=> [3/3] COPY . /app
=> exporting to image
=> writing image sha256:d843708d66cd80a414eda24cf0d18e62c12g434b17c523847f576917f220cd80
=> naming to docker.io/library/hello-world-app
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $ docker run --rm hello-world-app
Hello from inside the container!
rahugg07@cloudshell:~/hello-world-python (assignment-2-437309) $
```

```
Google Cloud Assignment 2 Search (/) for resources, docs, products, and more Search

CLOUD SHELL
Terminal (assignment-2-437309) x + Open Editor

[+] Building 0.1s (1/1) FINISHED
=> [internal] load build definition from Dockerfile
=> > transferring dockerfile: 2B
ERROR: failed to solve: failed to read dockerfile: open Dockerfile: no such file or directory
rahugg078cloudshell:~/ (assignment-2-437309)$ cd hello-world-python/
rahugg078cloudshell:~/hello-world-python (assignment-2-437309)$ docker build -t hello-world-app .
[+] Building 7.8s (8/8) FINISHED
=> [internal] load build definition from Dockerfile
=> > transferring dockerfile: 296B
=> [internal] load metadata for docker.io/library/python:3.9-slim
=> [internal] load .dockerignore
=> > transferring context: 2B
=> [1/3] FROM docker.io/library/python:3.9-slim@sha256:49f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc
=> resolve docker.io/library/python:3.9-slim@sha256:49f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc
=> sha256:49f94609e5a997dc16086a66ac9664591854031d48e375945a9dbf4d1d53abbc 10.41kB / 10.41kB
=> sha256:93ab151da4e5310ea79c4ecf396ace628226b8e4d7e49cc601664f19fe4e4e36 1.75kB / 1.75kB
=> sha256:9d8cb7037cd8e90893e5f430ce4cd48a872511e414580c7641675f2dad0a0351 5.20kB / 5.20kB
=> sha256:30e3ee498053a7b5332ac79e8efebec16e900289f1c1ecd1c754ce8fa047fcab 29.13MB / 29.13MB
=> sha256:460965d3919b10b56d8856ebc050a96e996c7dae96e4fb4208f2d8e7e037e67 3.51MB / 3.51MB
=> sha256:fdeec85abbd3978f2008f5445f15a19e5a224d1b7e7715ac6b323072333e57 14.74MB / 14.74MB
=> sha256:62a08b8dd4f53ad5493dabf2af70ccde51abb3771fb2187040bcf2fe94a7ced7 248B / 248B
=> extracting sha256:30e3ee498053a7b5332ac79e8efebec16e900289f1c1ecd1c754ce8fa047fcab
=> extracting sha256:4c0965d3919b10b56d8856ebc050a96e996c7dae96e4fb4208f2d8e7e037e67
=> extracting sha256:fdeec85abbd3978f2008f5445f15a19e5a224d1b7e7715ac6b323072333e57
=> extracting sha256:62a08b8dd4f53ad5493dabf2af70ccde51abb3771fb2187040bcf2fe94a7ced7
=> [internal] load build context
=> > transferring context: 978B
=> [2/3] WORKDIR /app
=> [3/3] COPY . /app
=> exporting to image
=> exporting layers
=> writing image sha256:d843708d6cd30a414eda24cf0d189e62c12d434b17c523847f576917f20cd80
=> naming to docker.io/library/hello-world-app
rahugg078cloudshell:~/hello-world-python (assignment-2-437309)$ docker run --rm hello-world-app
Hello from inside the container!
rahugg078cloudshell:~/hello-world-python (assignment-2-437309)$ docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS   NAMES
rahugg078cloudshell:~/hello-world-python (assignment-2-437309)$
```

Text RESULT: I created an app.py and wrote the docker file for configurations then via command docker and then I built docker image and ran it through the docker command as a result there is a message in the console “Hello from inside the container!”