

Homework #5 Google Cloud Platform (GCP) with Python

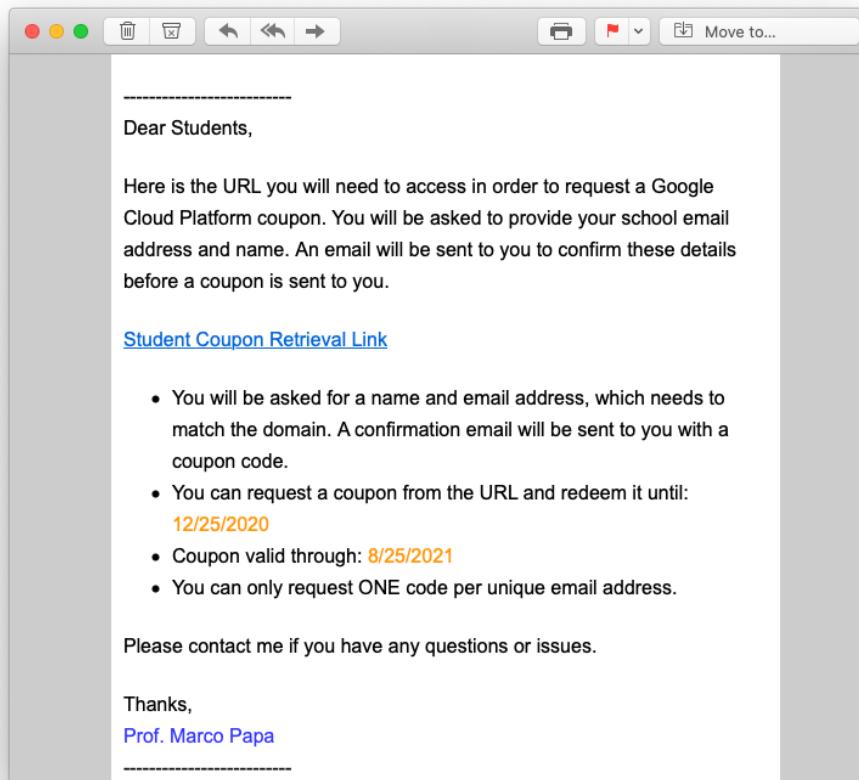
This semester we are allowing all students to explore cloud computing as offered by the Google Cloud Platform using Python. Using the instructions below one can establish a service using Google App Engine. Once established, you will be able to move your Python program developed for Assignment #6 to your Google App Engine instance and have it executed there.

1. Sign up for Google Cloud Platform

If you do not have a credit card, Google provides you with a coupon code via the Google Cloud Platform Education Grants program (see **section 1.1**). If you do have a credit card, you can sign up for the Google Cloud Platform “Free Trial” (see **section 1.2**).

1.1 Get Google Cloud Platform Education Grants credit

On Piazza and by e-mail, you will receive a communication like the one displayed below. The communication contains information on how to request a Google Cloud Platform coupon. Click on the text **Student Coupon Retrieval Link**, or the link provided in the Piazza post.



You will be redirected to a web form as shown below:

The screenshot shows a web browser window with the title "Higher Education Grants - Google Chrome". The URL is https://google.secure.force.com/GCPEDU/?cid=IAoM0... The page is titled "Cloud Platform Education Grants" and features a blue header with the Google Cloud Platform logo. The main content area contains a message about using credits from the program to access Google Cloud Platform, followed by a form for entering personal information. The form fields include "First Name", "Last Name", and "School Email". It also includes a note about domain listing and a link to contact an instructor. A "Submit" button is at the bottom, and a "Privacy Policy" link is at the bottom right of the form area.

Cloud Platform Education Grants

Use credits provided to you via the Google Cloud Platform Education Grants program to access Google Cloud Platform. Get what you need to build and run your apps, websites and services.

Thank you for your interest in Google Cloud Platform Education Grants. Please fill out the form below to receive a coupon code for credit to use on Google Cloud Platform.

First Name

Last Name

School Email
 @usc.edu

If you do not see your domain listed, please contact your course instructor: papa@usc.edu

By clicking "Submit" below, you agree that we may share the following information with your educational institution and course instructor (papa@usc.edu): (1) personal information that you provide to us on this form and (2) information regarding your use of the coupon and Google Cloud Platform products.

Submit

[Privacy Policy](#)

Enter your **First Name**, **Last Name** and your **USC e-mail address**. @usc.edu will be pre-filled. **Click on Submit**. If you entered a valid USC e-mail address, an email will be sent to that USC email address to verify that you own such address. A sample email is shown below:

Dear [Laurie](#),

Thank you for your interest in downloading a Google Cloud Platform Coupon Code. Please click on this [link](#) to verify your email address and a code will be sent to your email account.

Notice that anyone with the URL from USC can request a coupon, so please be careful and do not share the Student Coupon Retrieval Link or the link to verify your email.

Once your USC email address is “verified”, you will receive a second email with a Google Cloud Platform Coupon Code, as shown below.

Dear [Laurie](#),

Here is your Google Cloud Platform Coupon Code: **4G8B-E0XC-6J2H-65TR**

Click [\[here\]](#) to redeem.

Danger!

Important step: Before clicking on the link labeled [\[here\]](#), you should open your default browser, and **login** to a **Gmail** account. Every USC student has been provided with a Gmail account.

Once logged into Gmail, you can click on [\[here\]](#), or you can go to this page:

<https://console.cloud.google.com/education>

to redeem your coupon. The web form below will be displayed.

The screenshot shows a web browser window titled "Education grants" at the URL <https://console.cloud.google.com/education>. The page is part of the Google Cloud Platform interface. At the top right, there's a user profile for "Marco Papa" with an email address "papa.marco@gmail.com" and a "View profile" button. Below the profile, there's another section for "Marco Papa" with the email "papa@usc.edu". On the left, there's a form for entering a "Coupon code" and a dropdown for "Country of residence" set to "United States". There are also checkboxes for receiving updates and terms and conditions checkboxes. At the bottom, there are "Accept and continue" and "Clear" buttons.

You need to paste your coupon into the field labeled **Coupon code**. Select **Yes** or **No** to receive announcements. Make sure that the active profile in the top right is the one associated with your Gmail account. **Click on Accept and continue**. You will now be taken to the Google Cloud Platform's **Home** section. You can navigate to the **Billing** section and navigate to **Account Management** to see the amount of your credit, as shown below.

The screenshot shows the Google Cloud Platform Billing interface. On the left, there is a sidebar with various options: Overview, Reports, Cost table, Cost breakdown, Commitments, Budgets & alerts, Billing export, and Account management (which is currently selected). The main content area displays a summary of the billing account, including the ID (01A8AA-BFC2C4-CE79DA), a credit balance of \$50.00, and 343 days remaining until the credit expires on Sep 4, 2020. Below this, it lists a project linked to the account: "My First Project" with Project ID i-beaker-254121. To the right, there are sections for "Web Technologies" and "PERMISSIONS". Under "PERMISSIONS", there is a table showing a single member: "Billing Account Administrator (1 member)" with the role "Authorized to see and manage all aspects of billing accounts".

Important Note: if you have redeemed your coupon with your USC e-mail account, instead of your Gmail account, your coupon will not be usable, as the USC G Suite account does not allow the user to create GCP Projects. If you accidentally did this, you can apply the coupon to the correct billing account, by following the steps in this document:

http://csci571.com/hw/hw5/GCP_G_Suite_Workaround.pdf

1.2 Sign up for Google Cloud Platform Free Trial

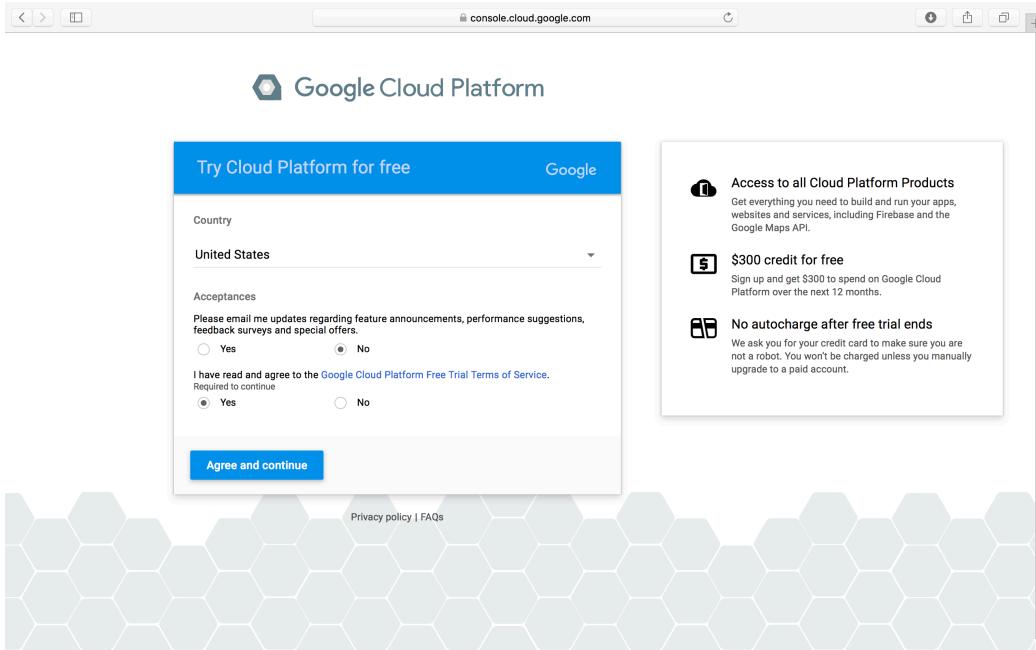
IMPORTANT: you should follow the steps in this section, only of you were unable to obtain the \$50 coupon.

To sign up for the Free Trial, with an additional \$300 credit, you need a credit card. Unfortunately, an American Express or other pre-paid Gift card will not work with Google Cloud.

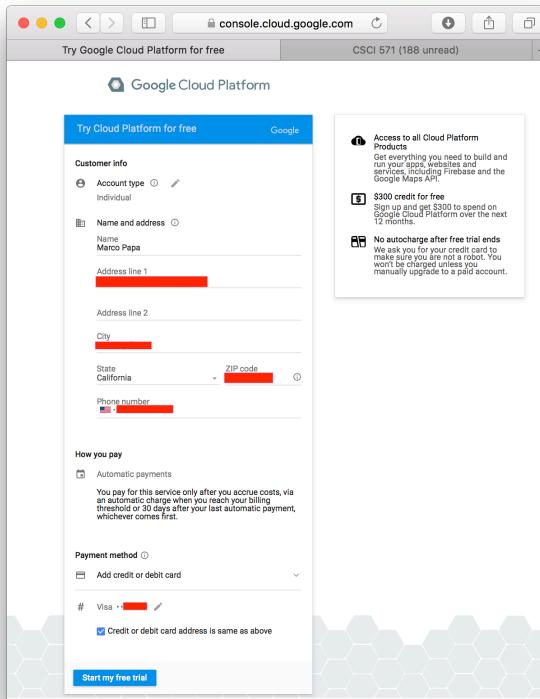
To sign up go to:

<https://console.cloud.google.com/freetrial?pli=1&page=0>

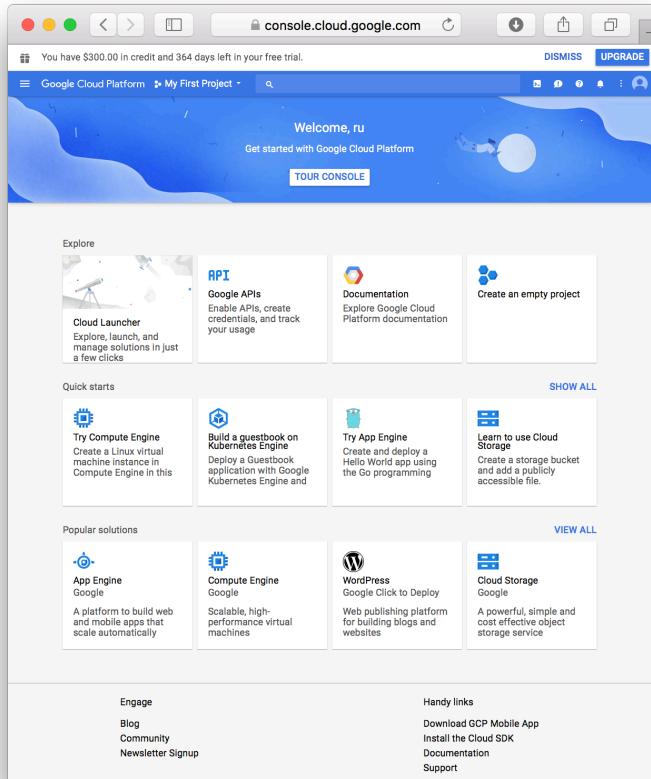
In the Try Cloud Platform for free page, select **Yes** under “I have read and agree to the Google Cloud Platform Free Trial terms of Service” and click on **Agree and continue**.



Select **Account type Individual**. Follow the instructions to enter your account data. You should not be using your @usc.edu e-mail account for your primary contact e-mail address, but instead use your @gmail.com address and finish by clicking **Start my free trial**. You will have to provide a credit or debit card.



After you are signed up, you will see the message “Creating project. This may take a few moments.” You will then be redirected to the **Dashboard** of the **Google Developer Console**.



To confirm your credits, navigate to **Billing > Account Management** from the left navigation bar to see a credit value of \$300 valid for 365 days or you can verify it as below.

The screenshot shows the 'Billing' section of the Google Cloud Platform. On the left is a sidebar with options like Overview, Reports, Cost breakdown, Commitments, Budgets & alerts, Billing export, Transaction, Payment settings, Payment method, and Account management. The main area is titled 'BILLING ACCOUNT OVERVIEW' and shows a 'Current month' report for September 1 - 24, 2019. It displays 'Month-to-date total cost' (\$0.00) and 'End-of-month total cost (forecasted)' (Not enough historical data to project cost). To the right, there's a 'Billing account' section with 'Manage' and 'My Billing Account, 01F770-5AFF1E-4B1967'. It also shows 'Organization' (No organization) and 'Promotional credits' (\$300.00). A note at the bottom of the main area says 'Welcome to the new Billing Overview! Billing permissions, project associations, and credit details can now be found on the account management page.'

If you previously developed any projects using Google APIs, you will find them listed.

1.3. How to get additional student Coupons

If you follow our instructions to install Python (and later on Node.js) you will likely never incur charges that exceed the value of your coupons. But there are always students that want to play around and run services all over the place.

When a student exceeds 60% of the value of a coupon, Google sends a notification, by e-mail, to the instructor. The instructor can get additional coupons for the student by filling out the same form listed on page 2, using the instructor's e-mail address that was used to obtain the grant. The instructor will receive the coupon and deliver it to the student by e-mail.

Google limits the additional coupons to 2 for each student account used in a given course.

2. Setting up a Python development environment

To set up a Python development environment for GCP to develop Python apps that run on Google Cloud, you should follow the steps from this tutorial:

<https://cloud.google.com/python/setup>

The tutorial covers all the following:

- Install the latest version of Python.
- Use `venv` to isolate dependencies.
- Install an editor (optional).
- Install the Cloud SDK (optional).
- Install the Cloud Client Libraries for Python (optional).
- Install other useful tools.

2.1 Installing Python

The tutorial provides steps to install the latest version of Python 3 on macOS, Windows and Linux.

Note: As of 5/30/2021, App Engine on Google Cloud is compatible with Python 3.7, 3.8 and 3.9. Quoting from:

<https://cloud.google.com/appengine/docs/standard/python3/runtime>

“The Python 3 runtime supports Python 3.7, Python 3.8, and Python 3.9, and it uses the latest stable release of the version that is specified in your app.yaml file.”

Installing on macOS

macOS includes a version of Python by default and uses it for its own purposes (normally version 2.7.X). Verify your Mac's Python installation using the following command:

```
/usr/bin/env python -V
```

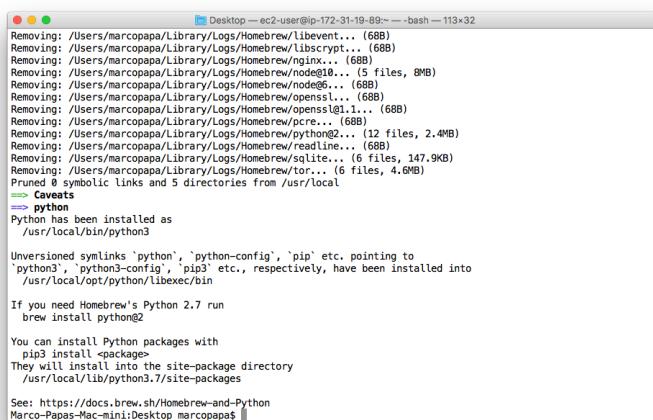
To avoid interfering with macOS, we recommend creating a separate development environment and installing the latest version of Python (version 3.7). To install Python, use **Homebrew**, available at:

<https://brew.sh/>

After installing Homebrew, you can install the latest Python with:

```
brew install python
```

As of this writing, Homebrew will install **Python 3.7.6**. If all is well, the installation will complete, as shown below.



```
Desktop — ec2-user@ip-172-31-19-89: ~ - bash - 113x32
Removing: /Users/marcopapa/Library/Logs/Homebrew/libevent... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/libcrypt... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/npx... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/node@10... (5 files, 8MB)
Removing: /Users/marcopapa/Library/Logs/Homebrew/node@6... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/openssl... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/openssl@1... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/openssl@1.1... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/python@2... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/python@2.7... (12 files, 2.4MB)
Removing: /Users/marcopapa/Library/Logs/Homebrew/readline... (68B)
Removing: /Users/marcopapa/Library/Logs/Homebrew/sqlite... (6 files, 147.9KB)
Removing: /Users/marcopapa/Library/Logs/Homebrew/tor... (6 files, 4.6MB)
Pruned 0 symbolic links and 5 directories from /usr/local
=> Caves
=> python
Python has been installed as
/usr/local/bin/python3

Unversioned symlink 'python', 'python-config', 'pip' etc. pointing to
'python3', 'python3-config', 'pip3' etc., respectively, have been installed into
/usr/local/opt/python/libexec/bin

If you need Homebrew's Python 2.7 run
brew install python@2

You can install Python packages with
pip3 install <package>
They will install into the site-package directory
/usr/local/lib/python3.7/site-packages

See: https://docs.brew.sh/Homebrew-and-Python
Marco-Papas-Mac-mini:Desktop marcopapa$
```

Normally Python 3 will be installed in `/usr/local/bin/python3`. If you have kept the default Python 2.7, you will have to add aliases to your startup files (for Bash and Zsh) for Python 3 and Pip 3 locations, run the following commands:

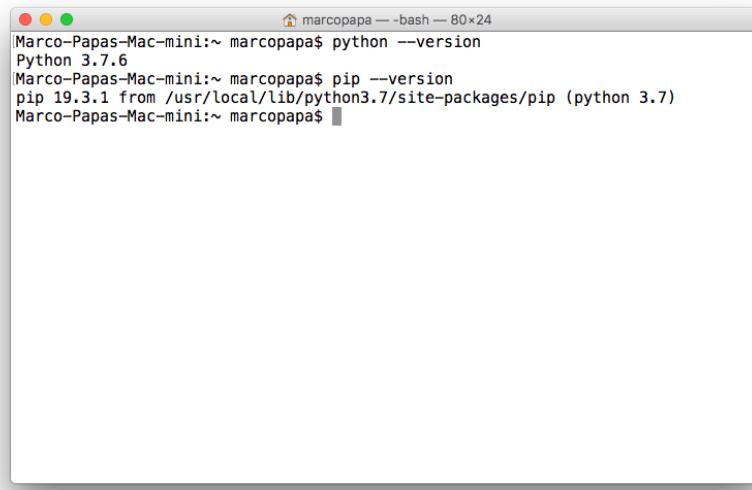
```
echo "alias python=/usr/local/bin/python3.7" >> ~/.zshrc
echo "alias python=/usr/local/bin/python3.7" >> ~/.bashrc
echo "alias pip=/usr/local/bin/pip3" >> ~/.zshrc
echo "alias pip=/usr/local/bin/pip3" >> ~/.bashrc
```

If you are using bash and `~/.bash_profile`, you may have to do this instead:

```
echo "alias python=/usr/local/bin/python3.7" >> ~/.bash_profile
echo "alias pip=/usr/local/bin/pip3" >> ~/.bash_profile.
```

You will have to re-start Terminal, so the aliases will take effect. Start a new terminal session and verify Python 3 is available as `python` and `python3`, and that `pip` is also installed, by running the following commands:

```
python -version
pip --version
```



Note for macOS Big Sur. Big Sur also comes with only Python 2.7.16 installed. If you run:

```
% python -version
Python 2.7.16
%
```

And if you run:

```
% python3 -version
xcode-select: note: no developer tools were found at
'/Applications/Xcode.app'.
requesting install. Choose an option in the dialog to download the command line
developer tools.
%
```

And a popup is displayed that asks you to download and install the “command line developer tools”. After the software installed:

```
% python3 --version  
Python 3.8.2  
%
```

Since Python 2 is still the default, you will have to do similar updates to your Bash and Zsh startup files, to default to Python 3, which slightly different paths.

```
echo "alias python=/usr/bin/python3.7" >> ~/.zshrc  
echo "alias python=/usr/bin/python3.7" >> ~/.bashrc  
echo "alias pip=/usr/bin/pip3" >> ~/.zshrc  
echo "alias pip=/usr/bin/pip3" >> ~/.bashrc
```

Installing on Windows

Since Windows does not come with Python, download the installers for the latest versions of Python from the Python website at:

<https://www.python.org/downloads/windows/>

as of this writing, we recommend you download **Python 3.7.6**, the same version that we recommend for macOS. Complete the installation by adding the proper PATH and verifying the version of Python 3 and pip installed, as outlined in the tutorial.

2.2 Use venv to isolate dependencies

venv is a tool that creates isolated Python environments. Use the **venv** command to create a virtual copy of the entire Python installation.

Follow the tutorial to do the following:

- Create a *virtual copy* in a folder named venv
- Set your shell to use the venv paths for Python by *activating* the virtual environment
- *Install packages* without affecting other projects or your global Python installation
- If you want to stop using the virtual environment and go back to your global Python, you can *deactivate* it

2.3 Installing a Python editor

There are several, popular editors for Python. In particular **Sublime Text**, **Atom** and **PyCharm**. We recommend that you use **PyCharm**, as it is free for students from JetBrains, and available at:

<https://www.jetbrains.com/pycharm/>

The free “educational” version of **PyCharm** can be downloaded here:

<https://www.jetbrains.com/education/download/#section=pycharm-edu>

PyCharm is available for macOS, Windows and Linux.

3. Creating a Project and Application using CLI

The Cloud SDK is a set of command-line tools for Google Cloud. It contains **gcloud**, and **gsutil**, which you can use to access App Engine, Compute Engine, Cloud Storage, and other products and services from the command line. The Cloud SDK is available at:

<https://cloud.google.com/sdk/>

The Cloud SDK is available for **Linux**, Ubuntu, CentOS, **macOS** and **Windows**. Quickstarts for each platform are available here:

<https://cloud.google.com/sdk/docs/quickstarts>

1. The “*Quickstart for Python 3 in the App Engine Standard Environment*” page is available at:

<https://cloud.google.com/appengine/docs/standard/python3/quickstart>

2. The QuickStart tutorial provides all the steps needed to do all the following:

- Downloading and installing the Cloud SDK
- Creating a new project
- Initialize App Engine app
- Enable billing for the project
- Downloading and installing Git
- Install the App Engine extension for Python 3
- Download the Hello World app written with **Flask**
- Run Hello World on your local machine
- Deploy and run Hello World on App Engine
- Clean-up to stop billing

3. Download and install the **Google Cloud SDK** “latest” version for your platform (Mac OS, Windows) from:

<https://cloud.google.com/sdk/docs/>

While in most of the GCP docs it is documented that `gcloud` needs to run on Python 2, according to the Note in the above site “As of Cloud SDK version 274.0.0, the `gcloud` CLI has GA support for running using a **Python 3.5 and up** interpreter (run `gcloud topic startup` for exclusions and more information on configuring your Python interpreter).”

4. Extract the file on your local file system.
5. (Optional) Add the Cloud SDK tools to your PATH. Run the script (from the root of the folder you extracted in the last step) using this command:

```
./google-cloud-sdk/install.sh
```

```

marcopapa@Mac-mini ~ % ./google-cloud-sdk/install.sh
Welcome to the Google Cloud SDK!

To help improve the quality of this product, we collect anonymized usage data
and anonymized stacktraces when crashes are encountered; additional information
is available at <https://cloud.google.com/sdk/usage-statistics>. This data is
handled in accordance with our privacy policy
<https://cloud.google.com/terms/cloud-privacy-notice>. You may choose to opt in this
collection now (by choosing 'Y' at the below prompt), or at any time in the
future by running the following command:

    gcloud config set disable_usage_reporting false

Do you want to help improve the Google Cloud SDK (y/N)? N

Your current Cloud SDK version is: 342.0.0
The latest available version is: 342.0.0

Components
+-----+-----+-----+
| Status | Name | ID | Size |
+-----+-----+-----+
| Not Installed | App Engine Go Extensions | app-engine-go | 4.8 MiB |
| Not Installed | Appctl | appctl | 18.5 MiB |
| Not Installed | Cloud Bigtable Command Line Tool | cbt | 7.6 MiB |
| Not Installed | Cloud Bigtable Emulator | bigtable | 6.6 MiB |
| Not Installed | Cloud DataLab Command Line Tool | databab | < 1 MiB |
| Not Installed | Cloud Datastore Emulator | cloud-datastore-emulator | 18.4 MiB |
| Not Installed | Cloud Firestore Emulator | cloud-firestore-emulator | 40.5 MiB |
| Not Installed | Cloud Pub/Sub Emulator | pubsub-emulator | 60.4 MiB |
| Not Installed | Cloud SQL Proxy | cloud_sql_proxy | 7.4 MiB |
| Not Installed | Emulator Reverse Proxy | emulator-reverse-proxy | 14.5 MiB |
| Not Installed | Google Cloud Build Local Builder | cloud-build-local | 6.2 MiB |
| Not Installed | Google Container Registry's Docker credential helper | docker-credential-gcr | 2.2 MiB |
| Not Installed | Kustomize | kustomize | 22.8 MiB |
| Not Installed | Minikube | minikube | 49.9 MiB |
| Not Installed | Nomos CLI | nomos | 22.5 MiB |
| Not Installed | On-Demand Scanning API extraction helper | local-extract | 11.6 MiB |
| Not Installed | Skaffold | skaffold | 17.8 MiB |
| Not Installed | anthos-auth | anthos-auth | 16.7 MiB |
| Not Installed | config-connector | config-connector | 45.1 MiB |
| Not Installed | gcloud Alpha Commands | alpha | < 1 MiB |
| Not Installed | gcloud Beta Commands | beta | < 1 MiB |
| Not Installed | gcloud app Java Extensions | app-engine-java | 52.4 MiB |
| Not Installed | gcloud app PHP Extensions | app-engine-php | 21.1 MiB |
| Not Installed | gcloud app Python Extensions | app-engine-python | 6.1 MiB |
| Not Installed | gcloud app Python Extensions (Extra Libraries) | app-engine-python-extras | 27.1 MiB |
| Not Installed | kpt | kpt | 12.2 MiB |
| Not Installed | kubectl | kubectl | < 1 MiB |
| Not Installed | kubectl-oidc | kubectl-oidc | 16.7 MiB |
| Not Installed | pkg | pkg | < 1 MiB |
| Installed | BigQuery Command Line Tool | bq | core | 18.6 MiB |
| Installed | Cloud SDK Core Libraries | core | 3.9 MiB |
| Installed | Cloud Storage Command Line Tool | gsutil | |

To install or remove components at your current SDK version [342.0.0], run:
$ gcloud components install COMPONENT_ID
$ gcloud components remove COMPONENT_ID

To update your SDK installation to the latest version [342.0.0], run:
$ gcloud components update

Modify profile to update your $PATH and enable shell command
completion?

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

The Google Cloud SDK installer will now prompt you to update an rc
file to bring the Google Cloud CLIs into your environment.

Enter a path to an rc file to update, or leave blank to use
[/Users/marcopapa/.zshrc]:
Backing up [/Users/marcopapa/.zshrc] to [/Users/marcopapa/.zshrc.backup].
[/Users/marcopapa/.zshrc] has been updated.

==> Start a new shell for the changes to take effect.

For more information on how to get started, please visit:
https://cloud.google.com/sdk/docs/quickstarts

marcopapa@Mac-mini ~ %

```

6. Run a command to install the cloud component that includes the App Engine extension for Python:

```
gcloud components install app-engine-python
```

```

Desktop — ec2-user@ip-172-31-19-89: ~ - bash — 113x41
Marco-Papas-Mac-mini:Desktop marcopapa$ gcloud components install app-engine-python

Your current Cloud SDK version is: 275.0.0
Installing components from version: 275.0.0

These components will be installed.
+-----+-----+-----+
| Name | Version | Size |
+-----+-----+-----+
| Cloud Datastore Emulator | 2.1.0 | 18.4 MiB |
| gRPC python library | 1.20.0 | 1.9 MiB |
| gRPC python library | 1.20.0 | 1.9 MiB |
| gcloud app Python Extensions | 1.9.88 | 6.1 MiB |
+-----+-----+-----+

For the latest full release notes, please visit:
https://cloud.google.com/sdk/release_notes

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

+-----+
| Creating update staging area |
| Installing: Cloud Datastore Emulator |
| Installing: gRPC python library |
| Installing: gRPC python library |
| Installing: gcloud app Python Extensions |
| Creating backup and activating new installation |
+-----+

Performing post processing steps...done.

Update done!
Marco-Papas-Mac-mini:Desktop marcopapa$ 

```

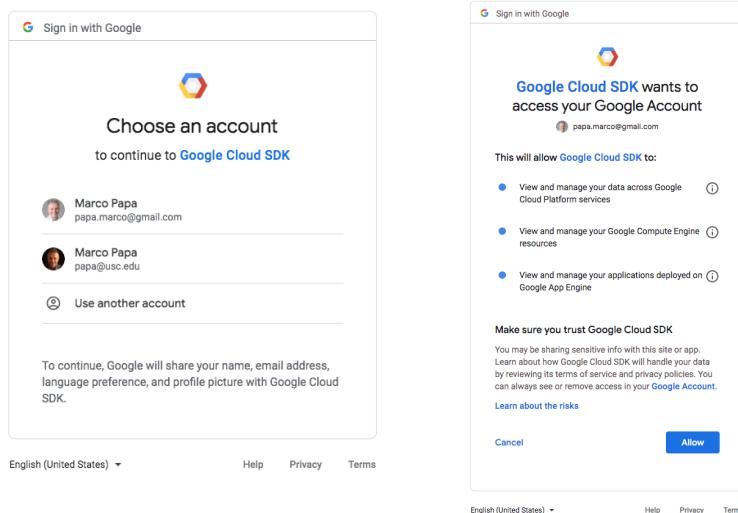
7. Initialize the gcloud tool to initialize the SDK:

`gcloud init`

You will be asked to “log in (Y/n)?” Answer Y.

You will be asked to “Pick a current project” or “Create new project”. Select “create” and when asked, enter a name as appropriate.

You will be asked to **Choose an account** and **Allow** access as shown below.



```

marcopapa@Mac-mini ~ % gcloud init
Welcome! This command will take you through the configuration of gcloud.

Your current configuration has been set to: [default]

You can skip diagnostics next time by using the following flag:
  gcloud init --skip-diagnostics

Network diagnostic detects and fixes local network connection issues.
  Checking network connection...done.
  Reachability Check passed.
  Network diagnostic passed (1/1 checks passed).

You must log in to continue. Would you like to log in (Y/n)? Y

Your browser has been opened to visit:
  https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=328874488248&scope=https://www.googleapis.com/auth/cloud-platform+https://www.googleapis.com/auth/userinfo.email+https://www.googleapis.com/auth/cloud-platform+https://www.googleapis.com/auth/fingerprinting.admin+https://www.googleapis.com/auth/nfc+https://www.googleapis.com/auth/accounts.readonly&state=ZQj8yAWFzofst7vMKnrc1S4SC2ejh&access_type=offline&code_challenge=AxQcS-vFvkqOkj1UuwWrNejAc45v0Wj_V49hIwrjpHAA&code_challenge_method=S256

You are logged in as: [papa.marco@gmail.com].

Pick cloud project to use:
[1] csci571-lamp
[2] facultyinstitute-174920
[3] linuxforfun-174920
[4] my-first-python-project-94534
[5] myfirstpython-94534
[6] myfunction6project-1888
[7] quixotic-dynamite-165616
[8] Create a new project
Please enter numeric choice or text value (must exactly match list item): 8

Enter a Project ID. Note that a Project ID CANNOT be changed later.
Project ID must be 6-30 characters (lowercase ASCII, digits, or hyphens) in length and start with a lowercase letter. second-python-745309
Waiting for [operations/cp_7314899340884989568] to finish...done.

Your current project has been set to: [second-python-745309].

Not setting default zone/region (this feature makes it easier to use [gcloud compute] by setting an appropriate default value for the zone and --region flag).
See https://cloud.google.com/compute/docs/gcloud-compute section on how to set default compute region and zone manually. If you would like [gcloud init] to be able to do this for you the next time you run it, make sure the Compute Engine API is enabled for your project on the https://console.developers.google.com/apis page.

Created a default .boto configuration file at [/Users/marcopapa/.boto]. See this file and [https://cloud.google.com/storage/docs/gsutil/commands/config] for more information about configuring Google Cloud Storage.
Your Google Cloud SDK is configured and ready to use!

* Commands that require authentication will use papa.marco@gmail.com by default
* Commands will reference project 'second-python-745309' 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 SDK like arg files and output formatting
marcopapa@Mac-mini ~ %

```

Project IDs must start with a lowercase letter and can have lowercase ASCII letters, digits, or hyphens. Project IDs must be between 6 and 30 characters. For example:

myfirstpython-94534

8. Verify the project was created and see its details:

gcloud projects describe myfirstpython-94534

For example, you'll see something like this:

```

createTime: '2020-01-08T18:34:36.846Z'
lifecycleState: ACTIVE
name: myfirstpython-94534
projectId: myfirstpython-94534
projectNumber: '675437181434'

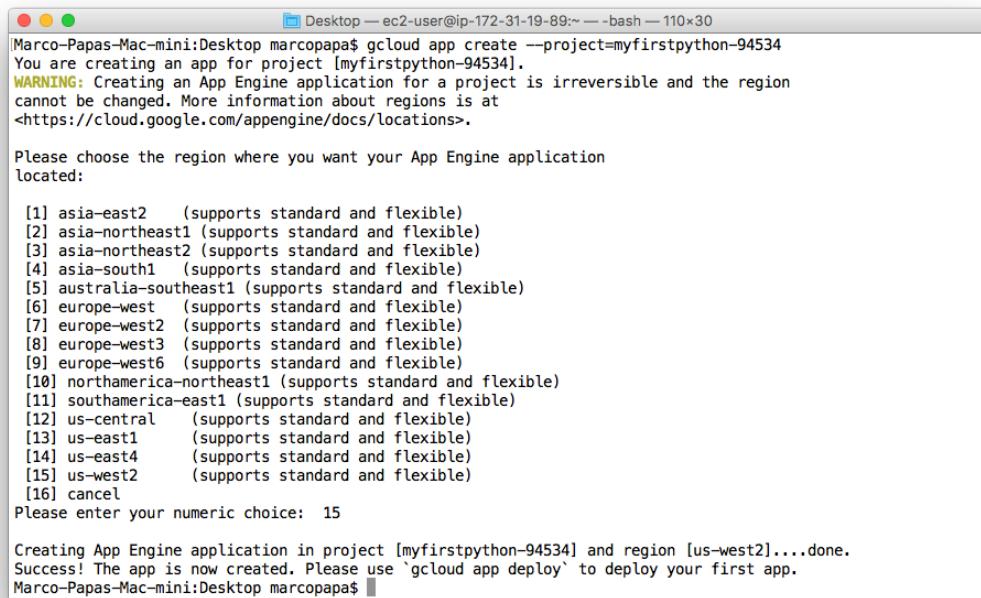
```

9. Initialize the App Engine app with your newly created project and choose its region (or example us-west2):

gcloud app create --project=[YOUR_PROJECT_ID]

for example:

```
gcloud app create --project=myfirstpython-94534
```



```
[Marco-Papas-Mac-mini:Desktop marcopapa$ gcloud app create --project=myfirstpython-94534
You are creating an app for project [myfirstpython-94534].
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-east2      (supports standard and flexible)
[2] asia-northeast1 (supports standard and flexible)
[3] asia-northeast2 (supports standard and flexible)
[4] asia-south1     (supports standard and flexible)
[5] australia-southeast1 (supports standard and flexible)
[6] europe-west     (supports standard and flexible)
[7] europe-west2    (supports standard and flexible)
[8] europe-west3    (supports standard and flexible)
[9] europe-west6    (supports standard and flexible)
[10] northamerica-northeast1 (supports standard and flexible)
[11] southamerica-east1 (supports standard and flexible)
[12] us-central      (supports standard and flexible)
[13] us-east1        (supports standard and flexible)
[14] us-east4        (supports standard and flexible)
[15] us-west2        (supports standard and flexible)
[16] cancel

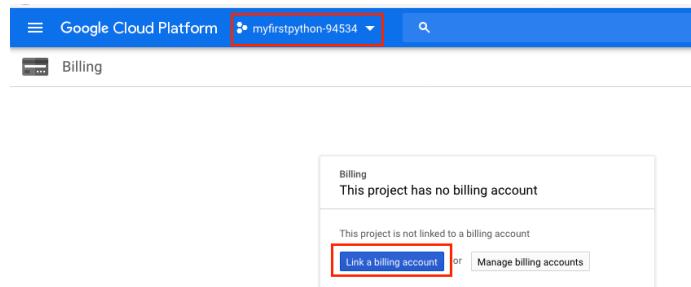
Please enter your numeric choice: 15

Creating App Engine application in project [myfirstpython-94534] and region [us-west2]....done.
Success! The app is now created. Please use `gcloud app deploy` to deploy your first app.
Marco-Papas-Mac-mini:Desktop marcopapa$ ]
```

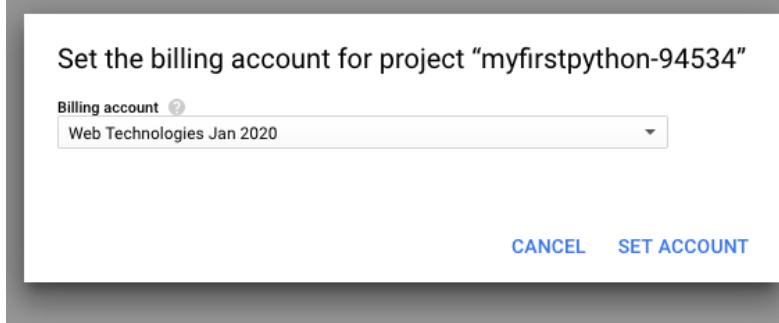
10. **Enable billing** for the project. You will do this in the Cloud console at:

<https://console.cloud.google.com/projectselector/billing?lang=python3>

You will have to select the project and click **Link a billing account**.



Select the billing account you created with your Google credits.



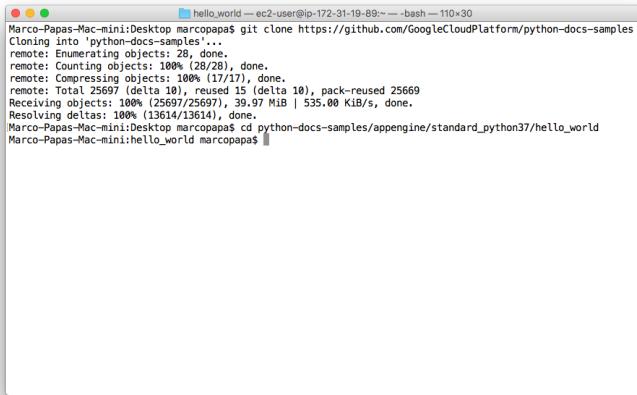
11. Install Git

12. Download the Hello World app from Github:

```
git clone  
https://github.com/GoogleCloudPlatform/python-docs-samples
```

13. Change to the directory that contains the sample code:

```
cd python-docs-samples/appengine/standard_python3/hello_world
```



14. Test the app on your local machine:

- Windows ONLY:** download and install **PowerShell** as indicated in the tutorial.
- Create an isolated Python environment, in a folder “external” to your project.

```
python3 -m venv env  
  
source env/bin/activate  
  
(Note: run env/Scripts/activate in Windows)
```

c. Change to the directory that contains the sample code:

```
cd  
python-docs-samples/appengine/standard_python3/hello_world
```

d. If the file requirements.txt does not exists, create it with:

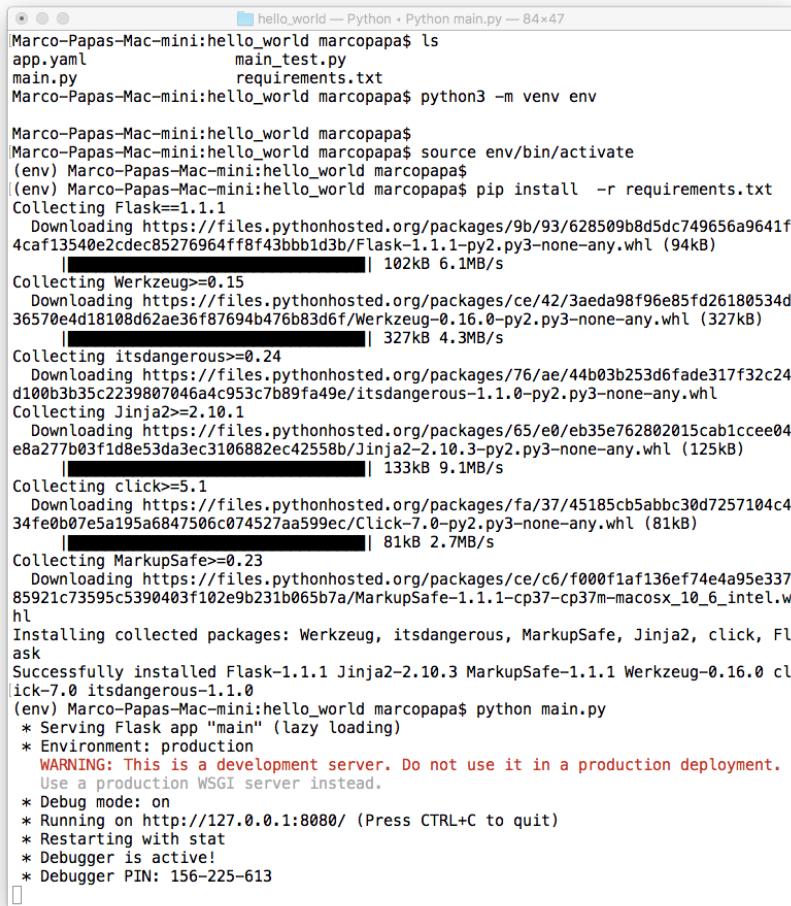
```
pip freeze > requirements.txt
```

e. Install dependencies (this step will install Flask):

```
pip install -r requirements.txt
```

f. Run the application:

```
python main.py
```

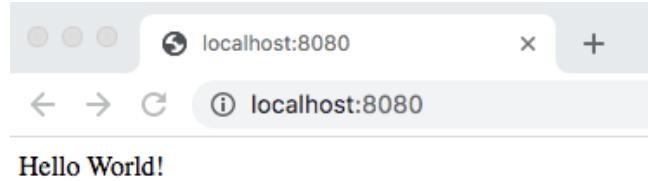


A terminal window titled "hello_world — Python · Python main.py — 84x47" showing the following command-line session:

```
Marco-Papas-Mac-mini:hello_world marcopapa$ ls  
app.yaml  
main.py  
main_test.py  
requirements.txt  
Marco-Papas-Mac-mini:hello_world marcopapa$ python3 -m venv env  
Marco-Papas-Mac-mini:hello_world marcopapa$ source env/bin/activate  
(env) Marco-Papas-Mac-mini:hello_world marcopapa$ (env) Marco-Papas-Mac-mini:hello_world marcopapa$ pip install -r requirements.txt  
Collecting Flask==1.1.1  
  Downloading https://files.pythonhosted.org/packages/9b/93/628509b8d5dc749656a9641f4caf13540e2cdc85276964ff8f43bbb1d3b/Flask-1.1.1-py2.py3-none-any.whl (94kB)  
    |██████████| 102kB 6.1MB/s  
Collecting Werkzeug==0.15  
  Downloading https://files.pythonhosted.org/packages/ce/42/3aeda98f96e85fd26180534d36570e4d18108d62ae36f87694b476b83d6f/Werkzeug-0.16.0-py2.py3-none-any.whl (327kB)  
    |██████████| 327kB 4.3MB/s  
Collecting itsdangerous>=0.24  
  Downloading https://files.pythonhosted.org/packages/76/ae/44b03b253d6fade317f32c24d100b3b35c2239807046a4c953c7b89fa49e/itsdangerous-1.0-py2.py3-none-any.whl  
Collecting Jinja2>=2.10.1  
  Downloading https://files.pythonhosted.org/packages/65/e0/eb35e762802015cab1cce04e8a277b03f1d8e53da3ec3106882ec42558b/Jinja2-2.10.3-py2.py3-none-any.whl (125kB)  
    |██████████| 133kB 9.1MB/s  
Collecting click>=5.1  
  Downloading https://files.pythonhosted.org/packages/fa/37/45185cb5abbc30d7257104c434fe0b07e5a195a6847506c074527aa599ec/Click-7.0-py2.py3-none-any.whl (81kB)  
    |██████████| 81kB 2.7MB/s  
Collecting MarkupSafe>=0.23  
  Downloading https://files.pythonhosted.org/packages/ce/c6/f000f1af136ef74e4a95e33785921c7359c5390403f102e9b231b065b7a/MarkupSafe-1.1.1-cp37-cp37m-macosx_10_6_intel.whl  
Installing collected packages: Werkzeug, itsdangerous, MarkupSafe, Jinja2, click, Flask  
Successfully installed Flask-1.1.1 Jinja2-2.10.3 MarkupSafe-1.1.1 Werkzeug-0.16.0 click-7.0 itsdangerous-1.1.0  
(env) Marco-Papas-Mac-mini:hello_world marcopapa$ python main.py  
* Serving Flask app "main" (lazy loading)  
* Environment: production  
  WARNING: This is a development server. Do not use it in a production deployment.  
  Use a production WSGI server instead.  
* Debug mode: on  
* Running on http://127.0.0.1:8080/ (Press CTRL+C to quit)  
* Restarting with stat  
* Debugger is active!  
* Debugger PIN: 156-225-613
```

g. Open the app in your browser

<http://localhost:8080>



Type CTRL-C to quit serving locally the Flask app.

15. Deploy and run Hello World on App Engine:

gcloud app deploy

```
Marco-Papas-Mac-mini:hello_world marcopapas$ gcloud app deploy
Services to deploy:
descriptor: [/Users/marcopapas/Desktop/python-docs-samples/appengine/standard_python37/hello_world/app.yaml]
source: [/Users/marcopapas/Desktop/python-docs-samples/appengine/standard_python37/hello_world]
target project: [myfirstpython-94534]
target service: [default]
target version: [20200108t113653]
target url: [https://myfirstpython-94534.appspot.com]

Do you want to continue (Y/n)? Y
Beginning deployment of service [default]...
Created .gcloudignore file. See 'gcloud topic gcloudignore' for details.
Uploading 429 files to Google Cloud Storage
File upload done.
Updating service [default]...failed.
ERROR: [gcloud.app.deploy] Error Response: [9] Cloud build 513691ca-bdc2-4ad9-9de8-0b0e6748344b status: FAILURE.
Build error details: Failed to download at least one file. Cannot continue.

Check the build log for errors: https://console.cloud.google.com/gcr/builds/513691ca-bdc2-4ad9-9de8-0b0e6748344b?project=675
437181434
Marco-Papas-Mac-mini:hello_world marcopapas$ gcloud app deploy
Services to deploy:
descriptor: [/Users/marcopapas/Desktop/python-docs-samples/appengine/standard_python37/hello_world/app.yaml]
source: [/Users/marcopapas/Desktop/python-docs-samples/appengine/standard_python37/hello_world]
target project: [myfirstpython-94534]
target service: [default]
target version: [20200108t114129]
target url: [https://myfirstpython-94534.appspot.com]

Do you want to continue (Y/n)? Y
Beginning deployment of service [default]...
Uploading 0 files to Google Cloud Storage
File upload done.
Updating service [default]...done.
Setting traffic split for service [default]...done.
Deployed service [default] to [https://myfirstpython-94534.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
Marco-Papas-Mac-mini:hello_world marcopapas$ gcloud app browse
Opening [https://myfirstpython-94534.appspot.com] in a new tab in your default browser.
Marco-Papas-Mac-mini:hello_world marcopapas$ ||
```

16. View your application in the cloud. Launch your browser with the app at [http://\[YOUR_PROJECT_ID\].\[REGION_ID\].r.appspot.com](http://[YOUR_PROJECT_ID].[REGION_ID].r.appspot.com),

running the command:

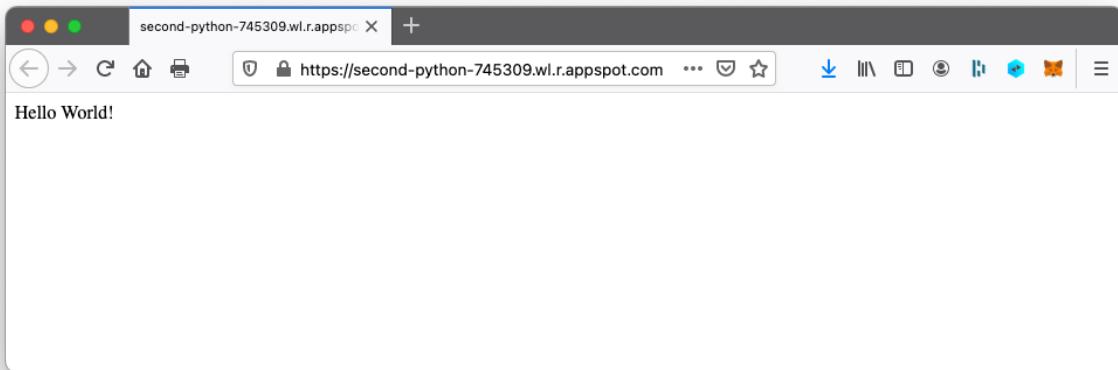
gcloud app browse

Or type the URL in the browser:

<https://myfirstpython-94534.us-west2.r.appspot.com/>

or

<https://second-python-745309.w1.r.appspot.com/>



17. Clean up. First stop using the virtual environment. Type this to the (env) prompt:

```
deactivate
```

18. To avoid incurring charges, **delete your Cloud Platform project** to stop billing on all resources.

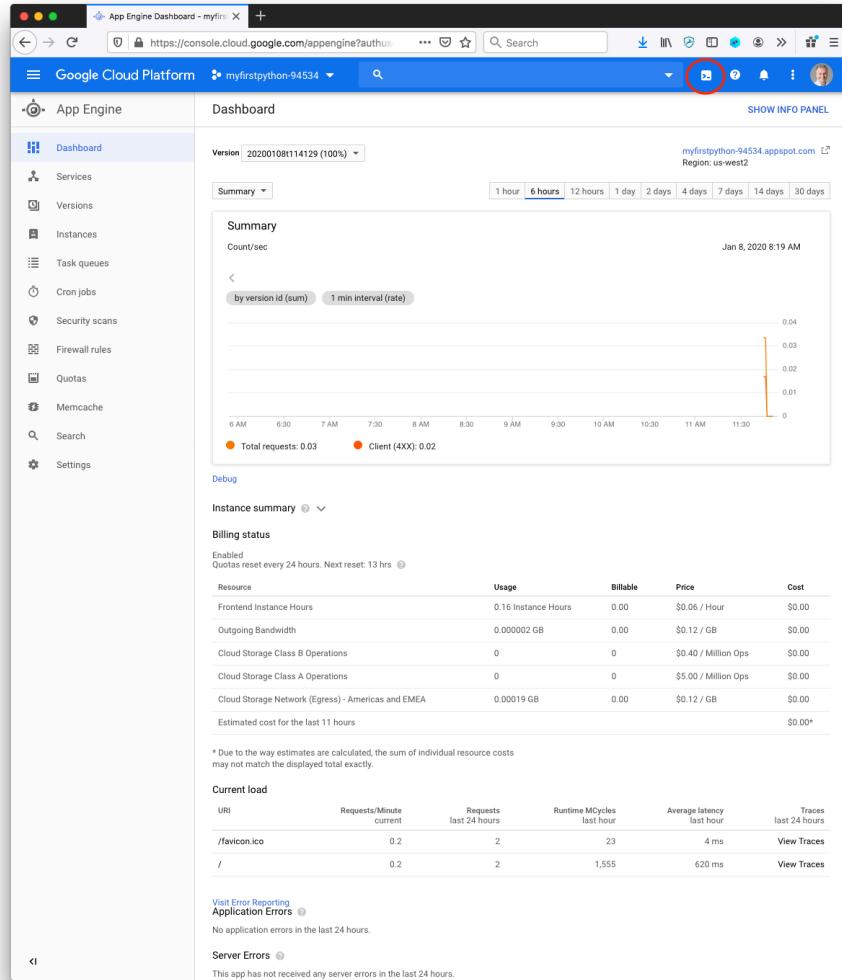
19. The “Hello World” program comes with a file named `requirements.txt`. This file needs to be deployed to GCP. Once you add your code and add some Python libraries, this file needs to be updated. Use pip to install your libraries locally. Then run the following pip command:

```
pip freeze > requirements.txt
```

This pip command will update the `requirements.txt` file with all the needed libraries. The local Python libraries should not be uploaded and deployed to GCP. Instead the libraries included in the deployed `requirements.txt` file will be automatically downloaded and installed by GCP. Every time you add a new library to your local copy, you need to run “`pip freeze`” before deploying to GCP.

4. Check App Engine Dashboard

Click on “triple bar” on top left of the GCP console. Select App Engine. Select your Project ID.

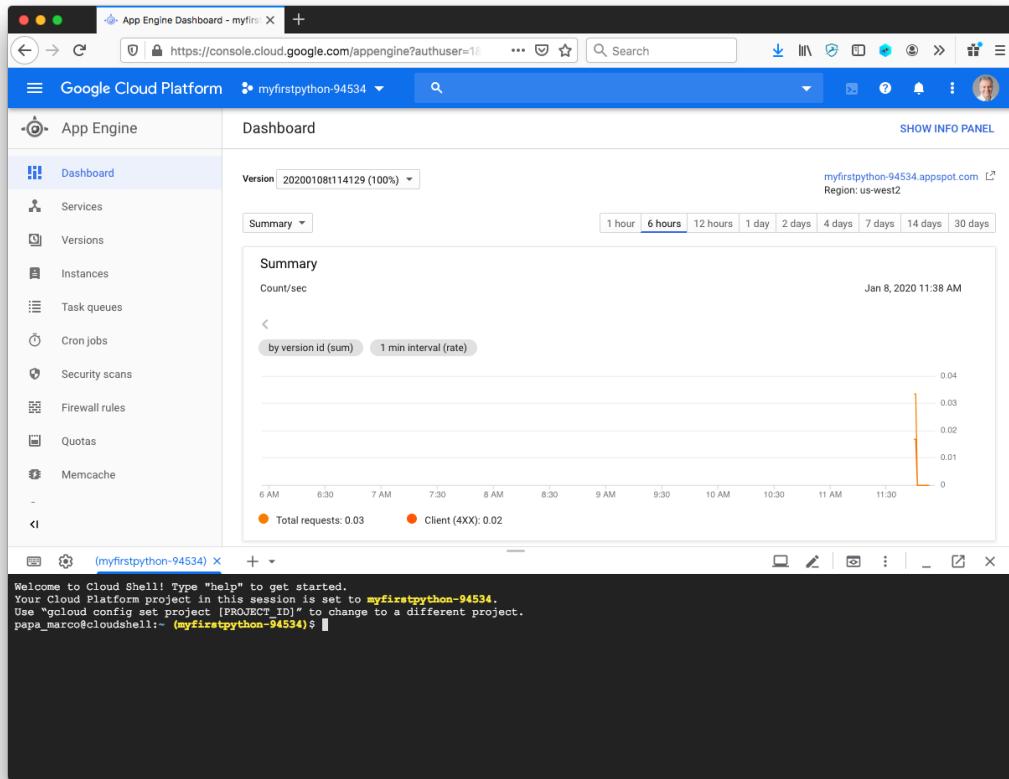


5. Set up Exploring Your instance (Optional)

If you want to explore your server instance you can activate the **Google Cloud Shell**.

Go to the App Engine Dashboard. Select the Hello World project from the dropdown. Now click on the **Activate Google Cloud Shell** icon in the top toolbar (see picture above).

After waiting a few minutes for Google to establish the connection, you will see the shell appear at the bottom of the browser window. You can now use Linux commands to manage your Cloud Platform Console projects and resources.



You can read more about the **Google Cloud Shell** here:

<https://cloud.google.com/cloud-shell/docs/>

6. Monitoring your instance and you bill

Select Google Cloud Platform and go to the Dashboard. If you do not see a **Billing** “tile”, click **CUSTOMIZE** in the upper left toolbar. Turn on the billing tile “switch” and click **DONE**. Under **Billing** you will see if you are incurring any charges. You will likely see \$0.00 estimated charges.

The screenshot shows the Google Cloud Platform dashboard for the project "myfirstpython-94534". The dashboard is divided into several sections:

- Project info:** Displays the project name (myfirstpython-94534), project ID (myfirstpython-94534), and project number (675437181434). It also has a link to "ADD PEOPLE TO THIS PROJECT" and "Go to project settings".
- Resources:** Shows an App Engine instance (1 version) and 3 buckets in Storage.
- Trace:** States "No trace data from the past 7 days" and links to "Get started with Stackdriver Trace".
- Getting Started:** Provides links to various tutorials and tools, such as Deploy a prebuilt solution, Add dynamic logging to a running application, Monitor errors with Error Reporting, Take a VM quickstart, Create a Cloud Function, and Install the Cloud SDK. It also has a link to "Explore all tutorials".
- App Engine:** Shows a chart titled "Summary (count/sec)" for the metric "http/server/response_count: 0". The chart shows a sharp peak around 11:45 AM. Below the chart, there are two entries: "http/server/response_count: 0" (orange dot) and "http/server/response_count: 0" (purple dot).
- API APIs:** Shows a chart titled "Requests (requests/sec)" for the metric "Requests: 0.017". The chart shows two peaks around 11:45 AM and 12 PM. Below the chart, it says "Requests: 0.017" and links to "Go to APIs overview".
- Google Cloud Platform status:** Shows "All services normal" and a link to "Go to Cloud status dashboard".
- Billing:** Shows "Estimated charges USD \$0.00". This section is highlighted with a red box.
- Error Reporting:** States "No sign of any errors. Have you set up Error Reporting?" and a link to "Learn how to set up Error Reporting".
- News:** Lists news items: "Put your archive data on ice with new storage offering" (3 hours ago), "Google Cloud and FDA MyStudies: Harnessing real-world data for medical research" (1 day ago), and "Your guide to Kubernetes best practices" (1 day ago). It also has a link to "Read all news".
- Documentation:** Provides links to "Learn about Compute Engine", "Learn about Cloud Storage", and "Learn about App Engine".

A red box highlights the "CUSTOMIZE" button in the top right corner of the dashboard header.

Have fun exploring Google Cloud Platform!!