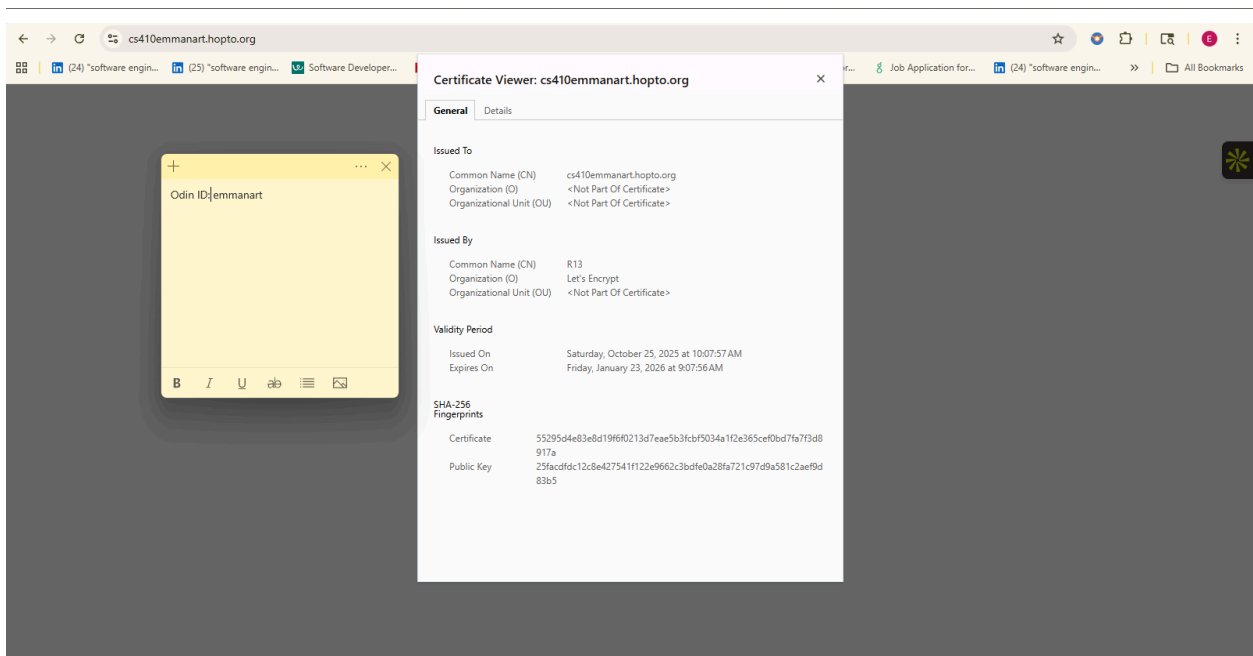
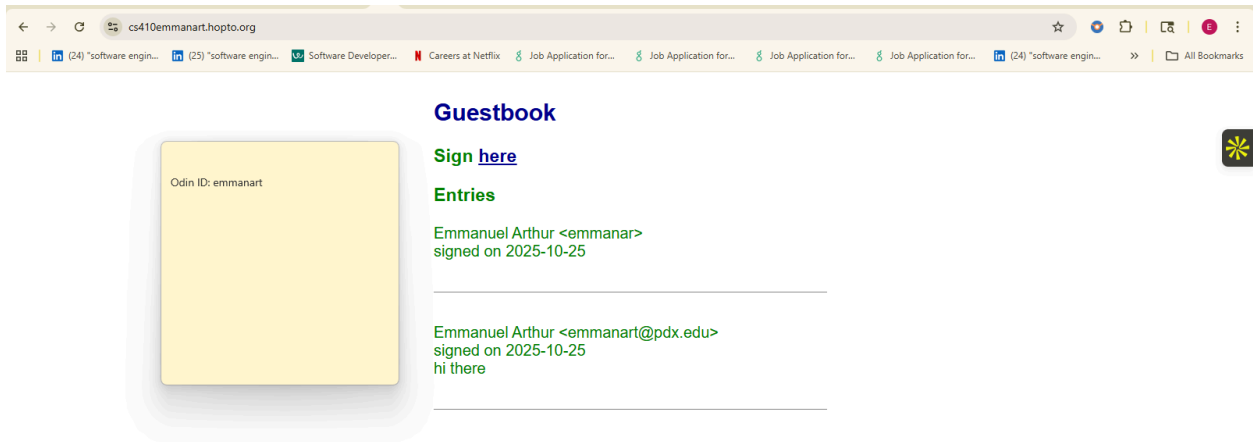


Lab 4.1

- Take a screenshot of the site along with its Let's Encrypt certificate and include it in your lab notebook



Lab 4.2

- Take a screenshot of the results for your lab notebook

Step 7/9 : RUN pip install -r requirements.txt
--> Running in 9a13ec3fffe8
Collecting flask
 Downloading flask-3.0.3-py3-none-any.whl (101 kB)
Collecting blinker>=1.6.2
 Downloading blinker-1.8.2-py3-none-any.whl (9.5 kB)
Collecting itsdangerous>=2.1.2
 Downloading itsdangerous-2.2.0-py3-none-any.whl (16 kB)
Collecting click>=8.1.3
 Downloading click-8.1.8-py3-none-any.whl (98 kB)
Collecting Werkzeug>=3.0.0
 Downloading werkzeug-3.0.6-py3-none-any.whl (227 kB)
Collecting Jinja2>=3.1.2
 Downloading jinja2-3.1.6-py3-none-any.whl (134 kB)
Collecting importlib-metadata>=3.6.0; python version < "3.10"
 Downloading importlib_metadata-8.5.0-py3-none-any.whl (26 kB)
Collecting MarkupSafe>=2.1.1
 Downloading MarkupSafe-2.1.5-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (26 kB)
Collecting zipp>=3.20
 Downloading zipp-3.20.2-py3-none-any.whl (9.2 kB)
Installing collected packages: blinker, itsdangerous, click, MarkupSafe, Werkzeug, Jinja2, zipp, importlib-metadata, flask
Successfully installed Jinja2-3.1.6 MarkupSafe-2.1.5 Werkzeug-3.0.6 blinker-1.8.2 click-8.1.8 flask-3.0.3 importlib-metadata-8.5.0 itsdangerous-2.2.0 zipp-3.20.2
--> Removed intermediate container 9a13ec3fffe8
--> b1cfe677bdad
Step 8/9 : ENTRYPOINT ["python3"]
--> Running in 174e279d18a1
--> Removed intermediate container 174e279d18a1
--> 444be438bd75
Step 9/9 : CMD ["app.py"]
--> Running in 3684a29afd46
--> Removed intermediate container 3684a29afd46
--> d0d602db8635
Successfully built d0d602db8635
Successfully tagged helloubuntu:latest
emmanart@course-vm:~/cs430-src/04_container_dockerhub\$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
helloubuntu latest d0d602db8635 11 seconds ago 471MB
ubuntu 20.04 b7bab04fd9aa 6 months ago 72.8MB
emmanart@course-vm:~/cs430-src/04_container_dockerhub\$


Doin ID: emmanart

- Run the image directly from Docker Hub and show a screenshot of the output of the command in your lab notebook.

```
latest: digest: sha256:e1e5cee21cf938ed2c3c6f167d3655add0e11ccb3bd3ebc7d11a3d3215a6fd27 size: 1373
emmanart@course-vm:~/cs430-src/04_container_dockerhnb$ docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
emmanart/helloubuntu latest          d0d602db8635   16 minutes ago  471MB
helloubuntu          latest          d0d602db8635   16 minutes ago  471MB
ubuntu               20.04          b7bab04fd9aa    6 months ago    72.8MB
emmanart@course-vm:~/cs430-src/04_container_dockerhnb$ docker rmi helloubuntu emmanart/helloubuntu
Untagged: helloubuntu:latest
Untagged: emmanart/helloubuntu:latest
Untagged: emmanart/helloubuntu@sha256:e1e5cee21cf938ed2c3c6f167d3655add0e11ccb3bd3ebc7d11a3d3215a6fd27
Deleted: sha256:d0d602db8635206b98aa02d7607c16f729ccc8b0461c0b37dc6fc015b9a3bd69
Deleted: sha256:444b6438bd75bfb5aa4c1a3d219526f7c8139ac0ff6a4ed153394f8a11a9773
Deleted: sha256:blcfe677bdad8f44bc4e58e72da30f886db57514d31af260823c7190e2b7ecb
Deleted: sha256:e55b0a1398677e1837a16bd92c10ba1fd18fc064fe824b063aa32366a1402121
Deleted: sha256:6973690db9664027282df521b4b08bbd601a1b19d5cc042e99b07330ab23501
Deleted: sha256:29f3ba0211dc79bb0048afbeb8b536789bacc3cfcfc6c8c55417d5773a142f0a
Deleted: sha256:776b786edecb56c6299aec479695b3d0d395339c6c868cd6fb17e5926ff3fe76
Deleted: sha256:24b1e5bb134858e577b395123fc3904acdffa1749288ee851f227f4932518748
Deleted: sha256:651ce10aeal582a0cb8e55193ee093d8e8a40d10c961acffa9e1446da220a7
Deleted: sha256:6f261391b516708f0f2b129ab9d2f1b143abd5e632c791272e94069e62fe33d
Deleted: sha256:e050b27d5ce06fd69cb07d04d5486fd35574941492e6ac24f222a546455b43
Deleted: sha256:f3590fe4b1b473f760559761cef812be2e493e6955e383bce568417ec6d52163
emmanart@course-vm:~/cs430-src/04_container_dockerhnb$ docker run -d -p 8000:5000 --name hellou emmanart/helloubuntu
Unable to find image 'emmanart/helloubuntu:latest' locally
latest: Pulling from emmanart/helloubuntu
13b7e930469f: Already exists
ce74f9b3f9bc: Pull complete
71384c5f850d: Pull complete
d1f3dlee9a98: Pull complete
a07cae8546ed: Pull complete
Digest: sha256:e1e5cee21cf938ed2c3c6f167d3655add0e11ccb3bd3ebc7d11a3d3215a6fd27
Status: Downloaded newer image for emmanart/helloubuntu:latest
e7faf344122cd784842eab43f1de042a4eb5eaf2762c798b5d09b82a37d98483
```

Odin ID: emmanart

- Take a screenshot of the container image and its size for your lab notebook.



emmanart/helloubuntu:latest

MANIFEST DIGEST sha256:e1e5cee21cf938ed2c3c6f167d3655add0e11ccb3bd3ebc7d11a3d3215a6fd27

OS/ARCH
linux/amd64

COMPRESSED SIZE
168.95 MB

LAST PUSHED
9 minutes by emmanart

TYPE
Image

MANIFEST DIGEST
sha256:e1e5cee2...

Image Layers

Vulnerabilities

Image Layers

Command

1 ARG RELEASE

2 ARG LAUNCHPAD_BUILD_ARCH

3 LABEL org.opencontainers.image.ref.name=ubuntu

4 LABEL org.opencontainers.image.version=20.04

5 ADD file ... in / 26.24 MB

6 CMD ["/bin/bash"]

7 LABEL maintainer=yourname@pdx.edu

8 /bin/sh -c apt-get update -y 37.9 MB

9 /bin/sh -c apt-get install -y 102.79 MB

10 COPY dir::bb6a098c8d0ed6fabdc9cfb8875b13add084586365e843e7cbbd23ece7b838820 in /app 2.99 KB

11 WORKDIR /app

12 /bin/sh -c pip install -r 2.82 MB

13 ENTRYPOINT ["python3"]

14 CMD ["app.ov"]

ARG RELEASE

Odin ID: emmanart

- What layer adds the most to the container image? How much does it add?

The layer “ /bin/sh -c apt-get install -y” adds the most and its size is 102.79 MB

- Take a screenshot of the image generated and its size for your lab notebook. How much smaller is the image than the Ubuntu one?

The image is smaller by 12.1 MB

The screenshot shows a Cloud Shell Editor window with a terminal session. The terminal output displays the installation of several Python packages: Jinja2, MarkupSafe, Werkzeug, Flask, Itsdangerous, Click, Blinker, and the Flask-Werkzeug extension. The installation is successful, and the packages are listed as installed. The terminal also shows the command to build and tag a Docker image, which is then pushed to Docker Hub. The final output shows the Docker image size and the time taken to build it.

```
Collecting Jinja2>=3.1.2 (from flask->r requirements.txt (line 1))
  Downloading Jinja2-3.1.2-py3-none-any.whl.metadata (2.9 kB)
Collecting MarkupSafe>=2.1.1 (from flask->r requirements.txt (line 1))
  Downloading MarkupSafe-2.1.1-cp311-cp311-musllinux_1_2_x86_64.whl.metadata (2.7 kB)
Collecting Werkzeug>=3.1.0 (from flask->r requirements.txt (line 1))
  Downloading Werkzeug-3.1.0-py3-none-any.whl.metadata (3.7 kB)
Collecting Flask>=3.1.2-py3-none-any.whl (103 kB)
  Downloading Flask-3.1.2-py3-none-any.whl (103 kB)
Collecting blinker-1.9.0-py3-none-any.whl (8.9 kB)
  Downloading blinker-1.9.0-py3-none-any.whl (8.9 kB)
Collecting click-8.3.0-py3-none-any.whl (107 kB)
  Downloading click-8.3.0-py3-none-any.whl (107 kB)
Collecting itsdangerous-2.2.0-py3-none-any.whl (16 kB)
  Downloading itsdangerous-2.2.0-py3-none-any.whl (16 kB)
Collecting Jinja2-3.1.2-py3-none-any.whl (134 kB)
  Downloading Jinja2-3.1.2-py3-none-any.whl (134 kB)
Collecting MarkupSafe-3.0.3-cp311-cp311-musllinux_1_2_x86_64.whl (23 kB)
  Downloading MarkupSafe-3.0.3-cp311-cp311-musllinux_1_2_x86_64.whl (23 kB)
Collecting Werkzeug-3.1.3-py3-none-any.whl (224 kB)
  Downloading Werkzeug-3.1.3-py3-none-any.whl (224 kB)
Installing collected packages: MarkupSafe, itsdangerous, click, blinker, Werkzeug, Jinja2, flask
Successfully installed blinker-1.9.0 click-8.3.0 flask-3.1.2 itsdangerous-2.2.0 Jinja2-3.1.2 MarkupSafe-3.0.3 Werkzeug-3.1.3
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager, possibly rendering your system unusable. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv. Use the --root-user-action option if you know what you are doing and want to suppress this message.
[notice] A new release of pip is available: 25.2 -> 25.3
[notice] To update, run: pip install --upgrade pip
--> Removed intermediate container fb60d3d41df0
--> 00f0210f6772
Step 6/7 : ENTRYPOINT ["python3"]
--> Running in bd7f66296602
--> Removed intermediate container bd7f66296602
--> efdef0df9e8a
Step 7/7 : CMD ["app.py"]
--> Running in c9a3af5ca6ae
--> Removed intermediate container c9a3af5ca6ae
--> 9ecb7203850a
Successfully built 9ecb7203850a
Successfully tagged helloalpine:latest
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
helloalpine   latest    9ecb7203850a   49 seconds ago  60.7MB
python        alpine    24ef78ff5ffe   2 weeks ago    47MB
ubuntu        20.04     b7bab04f09aa   6 months ago   72.8MB
emmanart@course-vm:~/cs430-src/04_container_dockerhub$
```

- Show the output of this command in a screenshot for your lab notebook. What might have happened?

```
Cloud Shell Editor
Gemini CLI is available in Cloud Shell terminal! Type gemini to try it. Learn more
Don't show again Dismiss

Downloading blinker-1.9.0-py3-none-any.whl (8.5 kB)
Downloading click-8.3.0-py3-none-any.whl (107 kB)
Downloading itsdangerous-2.2.0-py3-none-any.whl (16 kB)
Downloading Jinja2-3.1.4-py3-none-any.whl (134 kB)
Downloading MarkupSafe-3.0.0-cp314-cp314-musllinux_1_2_x86_64.whl (23 kB)
Downloading Werkzeug-3.1.3-py3-none-any.whl (224 kB)
Installing collected packages: markupsafe, itsdangerous, click, blinker, Werkzeug, Jinja2, flask
Successfully installed blinker-1.9.0 click-8.3.0 flask-3.1.2 itsdangerous-2.2.0 Jinja2-3.1.6 markupsafe-3.0.3 Werkzeug-3.1.3
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager, possibly rendering your environment unusable. For more information, see https://pip.pypa.io/warnings/venv. Use the --root-user-action option if you know what you are doing and want to suppress this message.
[notice] A new release of pip is available: 25.2 -> 25.3
[notice] To update, run: pip install --upgrade pip
--> Removed intermediate container fb60d3d41df0
--> 00f021cf6f72
Step 6/7 : ENTRYPOINT ["python3"]
--> Running in bd7f66296602
--> Removed intermediate container bd7f66296602
--> cfdc0dfbe8a
Step 7/7 : CMD ["app.py"]
--> Running in c9a3af5ca6ae
--> Removed intermediate container c9a3af5ca6ae
--> 9ecb7203850a
Successfully built 9ecb7203850a
Successfully tagged helloalpine:latest
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
helloalpine latest 9ecb7203850a 49 seconds ago 60.7MB
python alpine 24ef78ff5ffe 2 weeks ago 47MB
ubuntu 20.04 b7bab04fd9aa 6 months ago 72.8MB
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker run -p 8000:5000 --name helloa -di helloalpine
49a150b6924d70578db336df377a64bae46f571ea22b7c45ca8ee38822a12c9a
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
49a150b6924d helloalpine "python3 app.py" 15 seconds ago Up 14 seconds 0.0.0.0:8000->5000/tcp, [::]:8000->5000/tcp helloa
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker exec -it helloa /bin/bash
OCI runtime exec failed: exec failed: unable to start container process: exec: "/bin/bash": stat /bin/bash: no such file or directory: unknown
emmanart@course-vm:~/cs430-src/04_container_dockerhub$
```

Maybe what happened was we thought this Alpine image was a bash kind of linux.


- Take a screenshot of the output of each

```
Gemini CLI is available in Cloud Shell terminal! Type gemini to try it. Learn more

[notice] A new release of pip is available: 25.2 -> 25.3
[notice] To update, run: pip install --upgrade pip
--> Removed intermediate container fb60d3d41df0
--> 00f021cf6f72
Step 6/7 : ENTRYPOINT ["python3"]
--> Running in bd7f66296602
--> Removed intermediate container bd7f66296602
--> cfdc0dfbe8a
Step 7/7 : CMD ["app.py"]
--> Running in c9a3af5ca6ae
--> Removed intermediate container c9a3af5ca6ae
--> 9ecb7203850a
Successfully built 9ecb7203850a
Successfully tagged helloalpine:latest
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
helloalpine latest 9ecb7203850a 49 seconds ago 60.7MB
python alpine 24ef78ff5ffe 2 weeks ago 47MB
ubuntu 20.04 b7bab04fd9aa 6 months ago 72.8MB
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker run -p 8000:5000 --name helloa -di helloalpine
49a150b6924d70578db336df377a64bae46f571ea22b7c45ca8ee38822a12c9a
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
49a150b6924d helloalpine "python3 app.py" 15 seconds ago Up 14 seconds 0.0.0.0:8000->5000/tcp, [::]:8000->5000/tcp helloa
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker exec -it helloa /bin/bash
OCI runtime exec failed: exec failed: unable to start container process: exec: "/bin/bash": stat /bin/bash: no such file or directory: unknown
emmanart@course-vm:~/cs430-src/04_container_dockerhub$ docker exec -it helloa /bin/sh
/app # cat /etc/alpine-release
3.22.2
/app # ps -ef
PID USER TIME COMMAND
1 root 0:00 python3 app.py
7 root 0:00 /usr/local/bin/python3 -c from multiprocessing.resource_tracker import main;main(5)
8 root 0:01 /usr/local/bin/python3 app.py
9 root 0:00 /usr/local/bin/python3 -c from multiprocessing.resource_tracker import main;main(6)
18 root 0:00 /bin/sh
25 root 0:00 ps -ef
/app #
```

- Take a screenshot of the container image and its size.

repositories / emmanart / tags / latest



emmanart/helloalpine:latest

MANIFEST DIGEST sha256:856f07789d62b37425ee32733651251277213627ba14d89b74215e7da923ee63

OS/ARCH linux/amd64	COMPRESSED SIZE 21.62 MB	LAST PUSHED 3 minutes by emmanart	TYPE Image	MANIFEST DIGEST sha256:856f0778...
------------------------	-----------------------------	--	---------------	---------------------------------------

[Delete Tag](#)

Image Layers Vulnerabilities

Image Layers

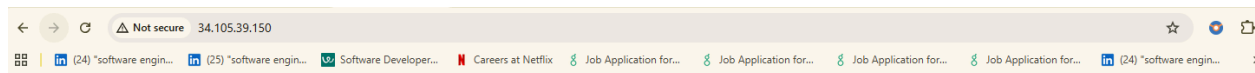
1 ADD alpine-minirootfs-3.22.2-x86_64.tar.gz / # buildkit	3.63 MB
2 CMD ["/bin/sh"]	0 B
3 ENV PATH=/usr/local/bin:/usr/local/sbin:/usr/sbin:/usr/bin:/sbin...	0 B
4 RUN /bin/sh -c set -eux;	446.21 KB
5 ENV PYTHON_VERSION=3.14.0	0 B
6 ENV PYTHON_SHA256=2299dae542d395ce3883aca08d3c910307cd68e0b2f7336098c8e7b7eee9f...	0 B
7 RUN /bin/sh -c set -eux;	12.61 MB
8 RUN /bin/sh -c set -eux;	250 B
9 CMD ["python3"]	0 B
10 LABEL maintainer=emmanart@pdx.edu	0 B

Command

ADD alpine-minirootfs-3.22.2-x86_64.tar.gz / # buildkit

Odin ID: emmanart

- Take a screenshot of the entry that includes the VM's external IP address for your lab notebook



Guestbook

[Sign here](#)

Entries

Emmanuel Arthur <emmanart@pdx.edu>
signed on 2025-10-26
Hello Compute Engine + Docker

