

A) Push a base image to Docker Hub (Pull → Tag → Login → Push)

1) Pull any base image on host

Cmd= docker pull alpine:latest

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\harik> docker pull alpine:latest
latest: Pulling from library/alpine
589002ba0eae: Pull complete
9e595aac14e0: Download complete
caa817ad3aea: Download complete
Digest: sha256:25109184c71bdad752c8312a8623239686a9a2071e8825f20acb8f2198c3f659
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest
PS C:\Users\harik> 
```

B). Tag that image with your Docker Hub username and login

Cmd= docker tag alpine:latest harikrishna777/ap1:v1.1

Docker login

```
PS C:\Users\harik> docker tag alpine:latest harikrishna777/ap1:v1.1
PS C:\Users\harik> docker login
Authenticating with existing credentials... [Username: harikrishna777]

Info → To login with a different account, run 'docker logout' followed by 'docker login'

Login Succeeded
PS C:\Users\harik> 
```

4) Push to Docker Hub

Cmd= docker push harikrishna777/ap1:v1.1

```
PS C:\Users\harik> docker push harikrishna777/ap1:v1.1
The push refers to repository [docker.io/harikrishna777/ap1]
589002ba0eae: Mounted from library/alpine
v1.1: digest: sha256:59855d3dceb3ae53991193bd03301e082b2a7faa56a514b03527ae0ec2ce3a95 size: 1022

Info → Not all multiplatform-content is present and only the available single-platform image was pushed
sha256:25109184c71bdad752c8312a8623239686a9a2071e8825f20acb8f2198c3f659 -> sha256:59855d3dceb3ae53991193bd03301e082b2a7faa56a514b03527ae0ec2ce3a95
PS C:\Users\harik> 
```

B) Update image by making changes inside a container, then push (Run → Change → Commit → Tag → Push)

1) Run container from base/tagged image and interact

Cmd= docker run -it --name a1 harikrishna777/ap1:v1.1 sh

/ # apk update

v3.23.3-129-g1486cfebe03 [https://dl-cdn.alpinelinux.org/alpine/v3.23/main]

v3.23.3-131-g88c6aa978ea [<https://dl-cdn.alpinelinux.org/alpine/v3.23/community>]

OK: 27572 distinct packages available

/ # apk add php

(1/9) Installing php84-common (8.4.17-r0)

(2/9) Installing argon2-libs (20190702-r5)

(3/9) Installing ncurses-terminfo-base (6.5_p20251123-r0)

(4/9) Installing libncursesw (6.5_p20251123-r0)

(5/9) Installing libedit (20251016.3.1-r0)

(6/9) Installing pcre2 (10.47-r0)

(7/9) Installing xz-libs (5.8.2-r0)

(8/9) Installing libxml2 (2.13.9-r0)

(9/9) Installing php84 (8.4.17-r0)

Executing busybox-1.37.0-r30.trigger

OK: 18.7 MiB in 25 packages

/ # php -v

PHP 8.4.17 (cli) (built: Jan 20 2026 19:04:32) (NTS)

Copyright (c) The PHP Group

Built by Alpine Linux aports

Zend Engine v4.4.17, Copyright (c) Zend Technologies

/ # exit

```
PS C:\Users\harik> docker run -it --name a1 harikrishna777/ap1:v1.1 sh
/ # apk update
v3.23.3-129-g1486cfebe03 [https://dl-cdn.alpinelinux.org/alpine/v3.23/main]
v3.23.3-131-g88c6aa978ea [https://dl-cdn.alpinelinux.org/alpine/v3.23/community]
OK: 27572 distinct packages available
/ # apk add php
(1/9) Installing php84-common (8.4.17-r0)
(2/9) Installing argon2-libs (20190702-r5)
(3/9) Installing ncurses-terminfo-base (6.5_p20251123-r0)
(4/9) Installing libncursesw (6.5_p20251123-r0)
(5/9) Installing libedit (20251016.3.1-r0)
(6/9) Installing pcre2 (10.47-r0)
(7/9) Installing xz-libs (5.8.2-r0)
(8/9) Installing libxml2 (2.13.9-r0)
(9/9) Installing php84 (8.4.17-r0)
Executing busybox-1.37.0-r30.trigger
OK: 18.7 MiB in 25 packages
/ # php -v
PHP 8.4.17 (cli) (built: Jan 20 2026 19:04:32) (NTS)
Copyright (c) The PHP Group
Built by Alpine Linux aports
Zend Engine v4.4.17, Copyright (c) Zend Technologies
/ # exit
```

2) Commit container changes into a new image

Cmd= docker commit a1 harikrishna777/ap1:v1.2

```
PS C:\Users\harik> docker commit a1 harikrishna777/ap1:v1.2
sha256:5148f16df1a162f04dda57bc2a814e3e73f5d74f25a03f4a51773de8165f78c5
PS C:\Users\harik>
```

```
PS C:\Users\harik> docker commit a1 harikrishna777/ap1:v1.2
sha256:5148f16df1a162f04dda57bc2a814e3e73f5d74f25a03f4a51773de8165f78c5
```

```
PS C:\Users\harik> docker push harikrishna777/ap1:v1.2
```

The push refers to repository [docker.io/harikrishna777/ap1]

6d6297d1ade0: Pushed

589002ba0eae: Layer already exists

```
PS C:\Users\harik> docker run -it --name a2 harikrishna777/ap1:v1.2 sh
```

>>

/ # php -v

PHP 8.4.17 (cli) (built: Jan 20 2026 19:04:32) (NTS)

Copyright (c) The PHP Group

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Zend Engine v4.4.17, Copyright (c) Zend Technologies

/ # exit

```
PS C:\Users\harik>
```

```
PS C:\Users\harik> docker images harikrishna777/ap1
```

i Info →

U In Use

IMAGE	ID	DISK USAGE	CONTENT SIZE	EXTRA
-------	----	------------	--------------	-------

```

harikrishna777/ap1:v1.1 25109184c71b 13.1MB 3.95MB U
harikrishna777/ap1:v1.2 5148f16df1a1 33.6MB 10.1MB U
PS C:\Users\harik>

```

```

/ # exit
PS C:\Users\harik> docker images harikrishna777/ap1

IMAGE                ID                DISK USAGE    CONTENT SIZE  EXTRA
harikrishna777/ap1:v1.1 25109184c71b    13.1MB        3.95MB        U
harikrishna777/ap1:v1.2 5148f16df1a1    33.6MB        10.1MB        U

```

Ex#2(Practice Question):

1.Update the ubuntu container, install apache and php, then push updated on to docker hub.

```

Cmd= PS C:\Users\harik> docker run -it --name u1 ubuntu:latest bash
root@a66a28628c8a:/# apt update
apt install -y apache2 php
apache2 -v
php -v
docker commit u1 harikrishna777/ubuntu-apache-php:v1.0
docker login
docker push harikrishna777/ubuntu-apache-php:v1.0

```

exit

```

ubuntu:latest c010ba051030 115MB 31.7MB
PS C:\Users\harik> docker run -it --name u1 ubuntu:latest bash
root@a66a28628c8a:/# apt update
apt install -y apache2 php
apache2 -v
php -v
exit
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble InRelease [256 kB]
Get:3 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1843 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble/universe amd64 Packages [19.3 MB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [1205 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [34.8 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [3157 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [331 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble/main amd64 Packages [1808 kB]
Get:12 http://archive.ubuntu.com/ubuntu noble/restricted amd64 Packages [117 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [2223 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [2015 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [38.1 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [3330 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [34.6 kB]
Get:18 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Packages [49.5 kB]
Fetched 35.1 MB in 38s (9220 kB/s)

```

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\harik> docker run -it --name u1 ubuntu:latest bash
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
info: Switch to mpm prefork for package libapache2-mod-php8.3
Module mpm_event disabled.
Enabling module mpm_prefork.
info: Executing deferred 'a2enmod php8.3' for package libapache2-mod-php8.3
Enabling module php8.3.
invoke-rc.d: could not determine current runlevel
invoke-rc.d: policy-rc.d denied execution of start.
Setting up php8.3 (8.3.6-0ubuntu0.24.04.6) ...
Setting up php (2:8.3+93ubuntu2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Processing triggers for ca-certificates (20240203) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
Processing triggers for php8.3-cli (8.3.6-0ubuntu0.24.04.6) ...
Processing triggers for libapache2-mod-php8.3 (8.3.6-0ubuntu0.24.04.6) ...
invoke-rc.d: could not determine current runlevel
invoke-rc.d: policy-rc.d denied execution of restart.
Server version: Apache/2.4.58 (Ubuntu)
Server built: 2025-12-09T15:50:28
PHP 8.3.6 (cli) (built: Jan 7 2026 08:40:32) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.3.6, Copyright (c) Zend Technologies
with Zend OPcache v8.3.6, Copyright (c), by Zend Technologies

PS C:\Users\harik> docker run -it --name u3 harikrishna777/ubuntu-apache-php:v1.0 bash
root@67badb65422e:/# apache2 -v
Server version: Apache/2.4.58 (Ubuntu)
Server built: 2025-12-09T15:50:28
root@67badb65422e:/# php -v
PHP 8.3.6 (cli) (built: Jan 7 2026 08:40:32) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.3.6, Copyright (c) Zend Technologies
with Zend OPcache v8.3.6, Copyright (c), by Zend Technologies
root@67badb65422e:/# exit
exit
PS C:\Users\harik> 
```

2) Compare size of base image vs updated image (after commit)

Show base Ubuntu size

Cmd= docker images ubuntu

docker images harikrishna777/ubuntu-apache-php

docker images | findstr "ubuntu harikrishna777/ubuntu-apache-php"

```
PS C:\Users\harik> docker images ubuntu
>>
IMAGE          ID                DISK USAGE  CONTENT SIZE  EXTRA
ubuntu:latest  cd1dba651b30     119MB       31.7MB       U
PS C:\Users\harik> docker images harikrishna777/ubuntu-apache-php
>>
IMAGE          ID                DISK USAGE  CONTENT SIZE  EXTRA
harikrishna777/ubuntu-apache-php:v1.0  4561a557e6fe     412MB       115MB        U
PS C:\Users\harik> docker images | findstr "ubuntu harikrishna777/ubuntu-apache-php"
>>
WARNING: This output is designed for human readability. For machine-readable output, please use --format.
harikrishna777/ubuntu-apache-php:v1.0  4561a557e6fe     412MB       115MB        U
ubuntu:latest  cd1dba651b30     119MB       31.7MB       U
PS C:\Users\harik> docker rm -f u1 u2
>>
u1
u2
PS C:\Users\harik>
```

To Create Docker Image by Docker file

```
PS C:\Users\harik> mkdir ubuntu-docker
```

Directory: C:\Users\harik

Mode	LastWriteTime	Length	Name
d----	18-02-2026 00:25		ubuntu-docker

```
PS C:\Users\harik> cd ubuntu-docker
```

```
PS C:\Users\harik\ubuntu-docker> New-Item Dockerfile
```

Directory: C:\Users\harik\ubuntu-docker

Mode	LastWriteTime	Length	Name
-a---	18-02-2026 00:26	0	Dockerfile

```
PS C:\Users\harik\ubuntu-docker> docker build -t harikrishna777/ubuntu-php:v1.0 .
```

[+] Building 0.4s (1/1) FINISHED

docker:desktop-linux

=> [internal] load build definition from Dockerfile

0.2s

=> => transferring dockerfile: 31B

0.0s

ERROR: failed to build: failed to solve: the Dockerfile cannot be empty

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/sf788bpqf56uhso1bqi7w0l0o

PS C:\Users\harik\ubuntu-docker> code Dockerfile

PS C:\Users\harik\ubuntu-docker> code Dockerfile

PS C:\Users\harik\ubuntu-docker> FROM ubuntu:latest

>>

>> LABEL maintainer="harikrishna777"

>>

>> RUN apt update && \

>> apt install -y php && \

>> apt clean

>>

>> CMD ["echo", "Hello Students"]

>>

ParserError:

Line |

1 | FROM ubuntu:latest

| ~~~~

| The 'from' keyword is not supported in this version of the language.

PS C:\Users\harik\ubuntu-docker> rm Dockerfile

PS C:\Users\harik\ubuntu-docker> notepad dockerfile

PS C:\Users\harik\ubuntu-docker> ren dockerfile.txt dockerfile

PS C:\Users\harik\ubuntu-docker> docker build -t harikrishna777/ubuntu-php:v1.0 .

```
▼ TERMINAL
● PS C:\Users\harik> mkdir ubuntu-docker

Directory: C:\Users\harik

Mode                LastWriteTime         Length Name
----                -
d---             18-02-2026     00:25         ubuntu-docker

● PS C:\Users\harik> cd ubuntu-docker
● PS C:\Users\harik\ubuntu-docker> New-Item Dockerfile

Directory: C:\Users\harik\ubuntu-docker

Mode                LastWriteTime         Length Name
----                -
-a---             18-02-2026     00:26             0 Dockerfile

● PS C:\Users\harik\ubuntu-docker> docker build -t harikrishna777/ubuntu-php:v1.0 .
[+] Building 0.4s (1/1) FINISHED                                docker:desktop-1
ux
=> [internal] load build definition from Dockerfile
2s
=> => transferring dockerfile: 31B
0s
ERROR: failed to build: failed to solve: the Dockerfile cannot be empty

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/sf788bpgf56uhso1bqi7w010o
● PS C:\Users\harik\ubuntu-docker> code Dockerfile
● PS C:\Users\harik\ubuntu-docker> code Dockerfile
PS C:\Users\harik\ubuntu-docker> FROM ubuntu:latest
>>
>> LABEL maintainer="harikrishna777"
>>
PS C:\Users\harik\ubuntu-docker> docker build -t harikrishna777/ubuntu-php:v1.0 .
=> [internal] load .dockerignore                                0.0s
1s
=> => transferring context: 2B                                  0.0s
[+] Building 153.9s (5/6)                                       docker:desktop-linux/library/ubuntu:latest@sha256:
cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
=> [internal] load build definition from dockerfile            0.0s
@sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
=> => transferring dockerfile: 197B                             0.0s
0s apt install -y php && apt clean                             0.0s
=> [internal] load metadata for docker.io/library/ubuntu:latest 0.0s
=> [internal] load .dockerignore                                0.0s
1s
=> => transferring context: 2B                                  0.0s
FINISHED                                                       docker:desktop-linux
=> [internal] load build definition from dockerfile            0.0s
=> => transferring dockerfile: 197B                             0.0s
=> [internal] load metadata for docker.io/library/ubuntu:latest 0.2s
=> [internal] load .dockerignore                                0.1s
=> => transferring context: 2B                                  0.0s
=> [1/2] FROM docker.io/library/ubuntu:latest@sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b 0.2s
=> resolve docker.io/library/ubuntu:latest@sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b 0.1s
=> [2/2] RUN apt update && apt install -y php && apt clean    130.6s
=> exporting to image                                         27.4s
=> => exporting layers                                         21.6s
=> => exporting manifest sha256:9f114fc27abaedf5611dfb6fe19cdca9185d347423164871da95d06406245b2e 0.1s
=> => exporting config sha256:f9758c26b797cd24fc34b612544c9c3904111a656f8810c9db2b7ea17e46f720 0.0s
=> => exporting attestation manifest sha256:e447993ee811736af5b7c6b733478ae847e3d37db1d071156f8e95661bda1935 0.1s
=> => exporting manifest list sha256:d125dfb50a679bf814092060b283a40b897db158905b45b58b86bab0d0b05e55 0.0s
=> naming to docker.io/harikrishna777/ubuntu-php:v1.0        0.0s
=> => unpacking to docker.io/harikrishna777/ubuntu-php:v1.0  5.4s

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/d4344b085b6f64eb3a310a2
```

Docker file#3 for Python application

Cmd= mkdir dockerfile_python

cd dockerfile_python

notepad dockerfile

ren dockerfile.txt dockerfile

dir

notepad requirments.txt

notepad app.py

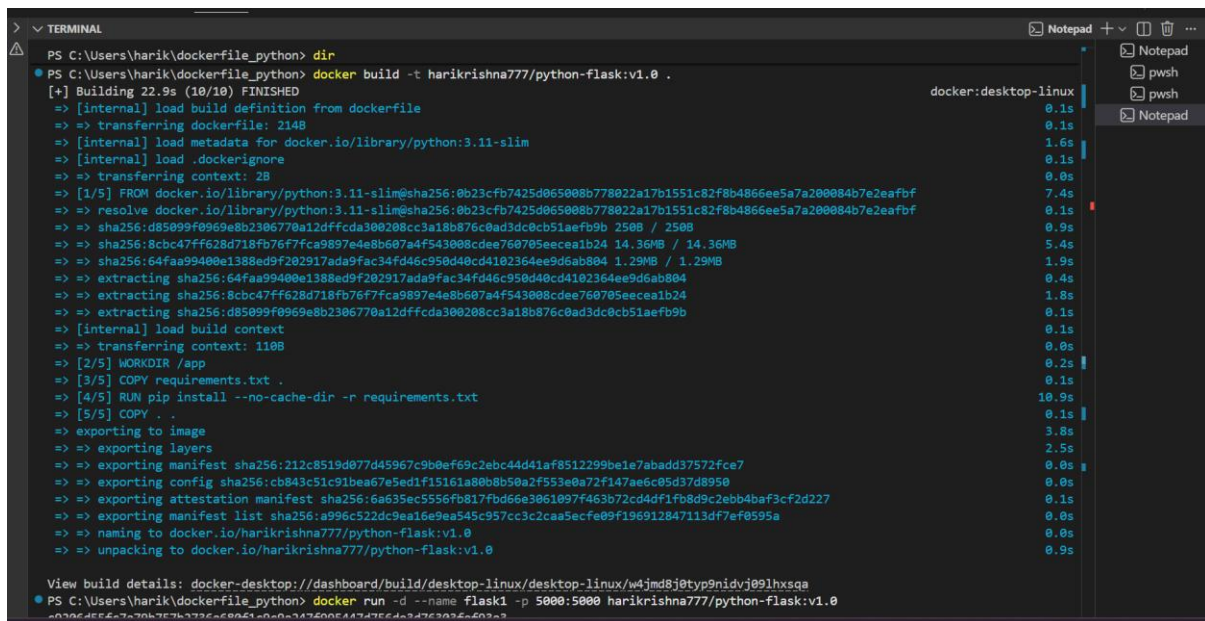
dir

docker build -t harikrishna777/python-flask:v1.0 .

docker run -d --name flask1 -p 5000:5000 harikrishna777/python-flask:v1.0

docker login

docker push harikrishna777/python-flask:v1.0



```
PS C:\Users\harik\dockerfile_python> dir
PS C:\Users\harik\dockerfile_python> docker build -t harikrishna777/python-flask:v1.0 .
[+] Building 22.9s (10/10) FINISHED
=> [internal] load build definition from dockerfile
=> => transferring dockerfile: 214B
=> [internal] load metadata for docker.io/library/python:3.11-slim
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/5] FROM docker.io/library/python:3.11-slim@sha256:0b23cfb7425d065008b778022a17b1551c82f8b4866ee5a7a200884b7e2eafb
=> => resolve docker.io/library/python:3.11-slim@sha256:0b23cfb7425d065008b778022a17b1551c82f8b4866ee5a7a200884b7e2eafb
=> => sha256:d85099f0969e8b2306770a12dffda300208cc3a18b876c0ad3dc0cb51aefb9b 250B / 250B
=> => sha256:8cbc47ff628d718fb76f7fca9897e4e8b607a4f543008cdee760705eece1b24 14.36MB / 14.36MB
=> => sha256:64faa99400e1388ed9f202917ada9fac34fd46c950d40cd4102364ee9d6ab804 1.29MB / 1.29MB
=> => extracting sha256:8cbc47ff628d718fb76f7fca9897e4e8b607a4f543008cdee760705eece1b24
=> => extracting sha256:d85099f0969e8b2306770a12dffda300208cc3a18b876c0ad3dc0cb51aefb9b
=> [internal] load build context
=> => transferring context: 118B
=> [2/5] WORKDIR /app
=> [3/5] COPY requirements.txt .
=> [4/5] RUN pip install --no-cache-dir -r requirements.txt
=> [5/5] COPY . .
=> exporting to image
=> => exporting layers
=> => exporting manifest sha256:212c8519d077d45967c9b0ef69c2ebc44d41af8512299be1e7abadd37572fce7
=> => exporting config sha256:cb843c51c91bea67e5ed1f15161a80b8b50a2f553e0a72f147ae6c05d37d8950
=> => exporting attestation manifest sha256:6a635ec5556fb817fbd66e3061097f463b72cd4d4f1fb8d9c2ebb4baf3cf2d227
=> => exporting manifest list sha256:a996c522dc9ea16e9ea545c957cc3c2caa5ecfe09f196912847113df7ef0595a
=> => naming to docker.io/harikrishna777/python-flask:v1.0
=> => unpacking to docker.io/harikrishna777/python-flask:v1.0

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/w4jmd8j0typ9nidvj09lhxsqa
PS C:\Users\harik\dockerfile_python> docker run -d --name flask1 -p 5000:5000 harikrishna777/python-flask:v1.0
```

docker push harikrishna777/python-flask:v1.0

The push refers to repository [docker.io/harikrishna777/python-flask]

64faa99400e1: Pushed

d85099f0969e: Pushed

8cbc47ff628d: Pushed

cfea4e4a12ea: Pushed

ed12dcb6ddad: Pushed

6cc5a6ea135c: Pushed

8260c0595952: Pushed

0c8d55a45c0d: Mounted from library/httpd

08e4a24d769d: Pushed

v1.0: digest:

sha256:a996c522dc9ea16e9ea545c957cc3c2caa5ecfe09f196912847113df7ef0595a

size: 856

PS C:\Users\harik\dockerfile_python>

```
PS C:\Users\harik\dockerfile_python> docker push harikrishna777/python-flask:v1.0
The push refers to repository [docker.io/harikrishna777/python-flask]
64faa99400e1: Pushed
d85099f0969e: Pushed
8cbc47ff628d: Pushed
cfea4e4a12ea: Pushed
ed12dcb6ddad: Pushed
6cc5a6ea135c: Pushed
8260c0595952: Pushed
0c8d55a45c0d: Mounted from library/httpd
08e4a24d769d: Pushed
v1.0: digest: sha256:a996c522dc9ea16e9ea545c957cc3c2caa5ecfe09f196912847113df7ef0595a size: 856
```