

Lab 1 - Screenshots by Athika Fatima(101502209)

1.0 Running your first container

1) \$ docker run hello-world

```
Last login: Sat Jan 13 07:42:49 on ttys000
You have new mail.
/Users/athikafatima/.zshrc:5: command not found: ng
[athikafatima@Athikas-MBP ~ % docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:4bd78111b6914a99dbc560e6a20eab57ff6655aea4a80c50b0c5491968cbc2e6
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
athikafatima@Athikas-MBP ~ %
```

2) \$ docker pull alpine

```
[athikafatima@Athikas-MBP ~ % docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
661ff4d9561e: Pull complete
Digest: sha256:51b67269f354137895d43f3b3d810bfacd3945438e94dc5ac55fdac340352f48
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest

What's Next?
View a summary of image vulnerabilities and recommendations → docker scout quickview alpine
athikafatima@Athikas-MBP ~ %
```

3) \$ docker images

```
[athikafatima@Athikas-MBP ~ % docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
alpine          latest        f8c20f8bbcb6   5 weeks ago   7.38MB
hello-world     latest        d2c94e258dcf   8 months ago  13.3kB
athikafatima@Athikas-MBP ~ %
```

```
4) $ docker run alpine ls -l
```

```
[athikafatima@Athikas-MBP ~ % docker run alpine ls -l
total 56
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 bin
drwxr-xr-x  5 root      root          340 Jan 13 12:48 dev
drwxr-xr-x  1 root      root          4096 Jan 13 12:48 etc
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 home
drwxr-xr-x  7 root      root          4096 Dec  7 09:43 lib
drwxr-xr-x  5 root      root          4096 Dec  7 09:43 media
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 mnt
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 opt
dr-xr-xr-x 262 root      root          0 Jan 13 12:48 proc
drwx----- 2 root      root          4096 Dec  7 09:43 root
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 run
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 sbin
drwxr-xr-x  2 root      root          4096 Dec  7 09:43 srv
dr-xr-xr-x 12 root      root          0 Jan 13 12:48 sys
drwxrwxrwt  2 root      root          4096 Dec  7 09:43 tmp
drwxr-xr-x  7 root      root          4096 Dec  7 09:43 usr
drwxr-xr-x 12 root      root          4096 Dec  7 09:43 var
athikafatima@Athikas-MBP ~ %
```

```
5) $ docker run alpine echo "hello from alpine"
```

```
[athikafatima@Athikas-MBP ~ % docker run alpine echo "hello from alpine"
hello from alpine
athikafatima@Athikas-MBP ~ %
```

```
6) $ docker run alpine /bin/sh
```

- a) \$ docker run -it alpine /bin/sh
- b) ls -l
- c) uname -a
- d) Exit

```
[athikafatima@Athikas-MBP ~ % docker run alpine /bin/sh
[athikafatima@Athikas-MBP ~ % docker run -it alpine /bin/sh
[/ # ls -l
total 56
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 bin
drwxr-xr-x  5 root  root      360 Jan 13 12:49 dev
drwxr-xr-x  1 root  root      4096 Jan 13 12:49 etc
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 home
drwxr-xr-x  7 root  root      4096 Dec  7 09:43 lib
drwxr-xr-x  5 root  root      4096 Dec  7 09:43 media
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 mnt
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 opt
dr-xr-xr-x  261 root  root      0 Jan 13 12:49 proc
drwx----- 1 root  root      4096 Jan 13 12:49 root
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 run
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 sbin
drwxr-xr-x  2 root  root      4096 Dec  7 09:43 srv
dr-xr-xr-x  12 root  root      0 Jan 13 12:49 sys
drwxrwxrwt  2 root  root      4096 Dec  7 09:43 tmp
drwxr-xr-x  7 root  root      4096 Dec  7 09:43 usr
drwxr-xr-x  12 root  root      4096 Dec  7 09:43 var
[/ # uname -a
Linux 907d23cb7654 6.4.16-linuxkit #1 SMP PREEMPT_DYNAMIC Sat Sep 23 13:39:52 UTC 2023 x86_64 Linux
[/ # exit
athikafatima@Athikas-MBP ~ %
```

7) \$ docker ps

a) \$ docker ps -a

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
907d23cb7654	alpine	"/bin/sh"	About a minute ago	Exited (0) 36 seconds ago		quirky_ritchie
c19390f441fa	alpine	"/bin/sh"	About a minute ago	Exited (0) About a minute ago		ecstatic_darwin
00946a5881ea	alpine	"echo 'hello from al..."	About a minute ago	Exited (0) About a minute ago		admiring_keller
7c04b2db76e5	alpine	"ls -l"	2 minutes ago	Exited (0) 2 minutes ago		dreamy_ishizaka
26da057e128d	hello-world	"/hello"	4 minutes ago	Exited (0) 4 minutes ago		stupefied_chebyshev

8) \$ docker run -it alpine /bin/sh

a) ls -l

b) uname -a

c) Exit

```
[athikafatima@Athikas-MBP ~ % docker run -it alpine /bin/sh
[/ # ls
bin  dev  etc  home  lib  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
[/ # uname -a
Linux bb6c4c70d162 6.4.16-linuxkit #1 SMP PREEMPT_DYNAMIC Sat Sep 23 13:39:52 UTC 2023 x86_64 Linux
[/ # exit
athikafatima@Athikas-MBP ~ %
```

9) \$ docker inspect alpine

```
[athikafatima@Athikas-MBP ~ % docker inspect alpine
[{"Id": "sha256:f8c20f8bbcb684055b4fea470fdd169c86e87786940b3262335b12ec3adef418",
 "RepoTags": [
     "alpine:latest"
 ],
 "RepoDigests": [
     "alpine@sha256:51b67269f354137895d43f3b3d810bfacd3945438e94dc5ac55fdac340352f48"
 ],
 "Parent": "",
 "Comment": "",
 "Created": "2023-12-08T01:20:49.650406179Z",
 "Container": "f2f93a8109b6034cb27137e7cb0a77417b4d7529cde89524d455964455c0d23a",
 "ContainerConfig": {
     "Hostname": "f2f93a8109b6",
     "Domainname": "",
     "User": "",
     "AttachStdin": false,
     "AttachStdout": false,
     "AttachStderr": false,
     "Tty": false,
     "OpenStdin": false,
     "StdinOnce": false,
     "Env": [
         "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
     ],
     "Cmd": [
         "/bin/sh",
         "-c",
         "#(nop) ",
         "CMD [\"/bin/sh\"]"
     ],
     "Image": "sha256:c068232ea3eea78e6800063b9b599c95911729d5c8dd2a2b737684998eefb10a",
     "Volumes": null,
     "WorkingDir": "",
     "Entrypoint": null,
     "OnBuild": null,
     "Labels": {}
 },
 "DockerVersion": "20.10.23",
 "Author": "",
 "Config": {
     "Hostname": "",
     "Domainname": "",
     "User": "",
     "AttachStdin": false,
     "AttachStdout": false,
     "AttachStderr": false,
     "Tty": false,
     "OpenStdin": false,
     "StdinOnce": false,
     "Env": [
         "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
     ],
     "Cmd": [
         "/bin/sh"
     ],
     "Image": "sha256:c068232ea3eea78e6800063b9b599c95911729d5c8dd2a2b737684998eefb10a",
     "Volumes": null,
     "WorkingDir": "",
     "Entrypoint": null,
     "OnBuild": null,
 }
```

```

],
"Cmd": [
    "/bin/sh",
    "-c",
    "#$(nop) ",
    "CMD [\"/bin/sh\"]"
],
"Image": "sha256:c068232ea3eea78e6800063b9b599c95911729d5c8dd2a2b737684998eebf10a",
"Volumes": null,
"WorkingDir": "",
"Entrypoint": null,
"OnBuild": null,
"Labels": {}
},
"DockerVersion": "20.10.23",
"Author": "",
"Config": {
    "Hostname": "",
    "Domainname": "",
    "User": "",
    "AttachStdin": false,
    "AttachStdout": false,
    "AttachStderr": false,
    "Tty": false,
    "OpenStdin": false,
    "StdinOnce": false,
    "Env": [
        "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
    ],
    "Cmd": [
        "/bin/sh"
    ],
    "Image": "sha256:c068232ea3eea78e6800063b9b599c95911729d5c8dd2a2b737684998eebf10a",
    "Volumes": null,
    "WorkingDir": "",
    "Entrypoint": null,
    "OnBuild": null,
    "Labels": null
},
"Architecture": "amd64",
"Os": "linux",
"Size": 7377066,
"VirtualSize": 7377066,
"GraphDriver": {
    "Data": {
        "MergedDir": "/var/lib/docker/overlay2/2523f26a64e64050fa9f35bc8f68b8c3d76d74b4e0167f431185fbad77a7683/merged",
        "UpperDir": "/var/lib/docker/overlay2/2523f26a64e64050fa9f35bc8f68b8c3d76d74b4e0167f431185fbad77a7683/diff",
        "WorkDir": "/var/lib/docker/overlay2/2523f26a64e64050fa9f35bc8f68b8c3d76d74b4e0167f431185fbad77a7683/work"
    },
    "Name": "overlay2"
},
"RootFS": {
    "Type": "layers",
    "Layers": [
        "sha256:5af4f8f59b764c64c6def53f52ada809fe38d528441d08d01c206dfb3fc3b691"
    ]
},
"Metadata": {
    "LastTagTime": "0001-01-01T00:00:00Z"
}
}
]
athikafatima@Athikas-MBP ~ %

```

2.1 Run a static website in a container

1) \$ docker run -d dockersamples/static-site

```
[athikafatima@Athikas-MBP ~ % docker run -d dockersamples/static-site
Unable to find image 'dockersamples/static-site:latest' locally
latest: Pulling from dockersamples/static-site
fdd5d7827f33: Pull complete
a3ed95caeb02: Pull complete
716f7a5f3082: Pull complete
7b10f03a0309: Pull complete
aff3ab7e9c39: Pull complete
Digest: sha256:daa686c61d7d239b7977e72157997489db49f316b9b9af3909d9f10fd28b2dec
Status: Downloaded newer image for dockersamples/static-site:latest
401d05c3259d3090e0361e5e394f086e394180c215f0258ffd8c1397cc27a72
athikafatima@Athikas-MBP ~ %
```

- 2) \$ docker ps
- a) \$ docker stop 401d05c3259d
- b) \$ docker rm 401d05c3259d

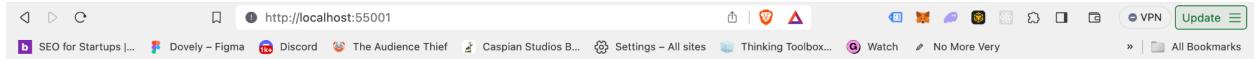
```
[athikafatima@Athikas-MBP ~ % docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
401d05c3259d dockersamples/static-site "/bin/sh -c 'cd /usr..." About a minute ago Up About a minute 80/tcp, 443/tcp flamboyant_morse
[athikafatima@Athikas-MBP ~ % docker stop 401d05c3259d
401d05c3259d
[athikafatima@Athikas-MBP ~ % docker rm 401d05c3259d
401d05c3259d
athikafatima@Athikas-MBP ~ %
```

- 3) \$ docker run --name static-site -e AUTHOR="athika" -d -P dockersamples/static-site

```
[athikafatima@Athikas-MBP ~ % docker run --name static-site -e AUTHOR="athika" -d -P dockersamples/static-site
57db6c4711c29fefb8a1b056f405c8d085b6b9a3083f50ee3cbfaef94e238127
athikafatima@Athikas-MBP ~ %
```

- 4) \$ docker port static-site

```
[athikafatima@Athikas-MBP ~ % docker port static-site
80/tcp -> 0.0.0.0:55001
443/tcp -> 0.0.0.0:55000
athikafatima@Athikas-MBP ~ %
```

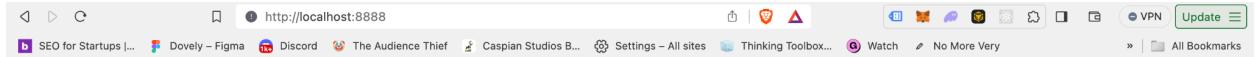


Hello athika!

This is being served from a **docker** container running Nginx.

```
5) $ docker run --name static-site-2 -e AUTHOR="Athika Fatima"  
-d -p 8888:80 dockersamples/static-site
```

```
[athikafatima@Athikas-MBP ~ % docker run --name static-site-2 -e AUTHOR="Athika Fatima" -d -p 8888:80 dockersamples/static-site  
5fe813655b380e75d71979dc8b1acd94b1bfbabfd90de025496d3c14a13f8beb  
athikafatima@Athikas-MBP ~ %
```



Hello Athika Fatima!

This is being served from a `docker` container running Nginx.

- 6) \$ `docker stop static-site`
 - a) \$ `docker rm static-site`
 - b) \$ `docker rm -f static-site-2`
 - c) \$ `docker ps`

```
[athikafatima@Athikas-MBP ~ % docker stop static-site
static-site
[athikafatima@Athikas-MBP ~ % docker rm static-site
static-site
[athikafatima@Athikas-MBP ~ % docker rm -f static-site-2
static-site-2
[athikafatima@Athikas-MBP ~ % docker ps
CONTAINER ID   IMAGE      COMMAND   CREATED   STATUS    PORTS      NAMES
athikafatima@Athikas-MBP ~ %
```

2.2 Docker Images

- 1) \$ `docker images`

```
[athikafatima@Athikas-MBP ~ % docker images
REPOSITORY          TAG      IMAGE ID      CREATED     SIZE
alpine              latest   f8c20f8bbcb6  5 weeks ago  7.38MB
hello-world         latest   d2c94e258dcb  8 months ago  13.3kB
dockersamples/static-site  latest   f589ccde7957  7 years ago  191MB
athikafatima@Athikas-MBP ~ %
```

2) \$ docker pull ubuntu:12.04

a) \$ docker pull ubuntu

```
[athikafatima@Athikas-MBP ~ % docker pull ubuntu:12.04
12.04: Pulling from library/ubuntu
d8868e50ac4c: Pull complete
83251ac64627: Pull complete
589bba2f1b36: Pull complete
d62ecaceda39: Pull complete
6d93b41cf6b: Pull complete
Digest: sha256:18305429afa14ea462f810146ba44d4363ae76e4c8dfc38288cf73aa07485005
Status: Downloaded newer image for ubuntu:12.04
docker.io/library/ubuntu:12.04

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview ubuntu:12.04
[athikafatima@Athikas-MBP ~ % docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
a48641193673: Pull complete
Digest: sha256:6042500cf4b44023ea1894effe7890666b0c5c7871ed83a97c36c76ae560bb9b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview ubuntu
athikafatima@Athikas-MBP ~ %
```

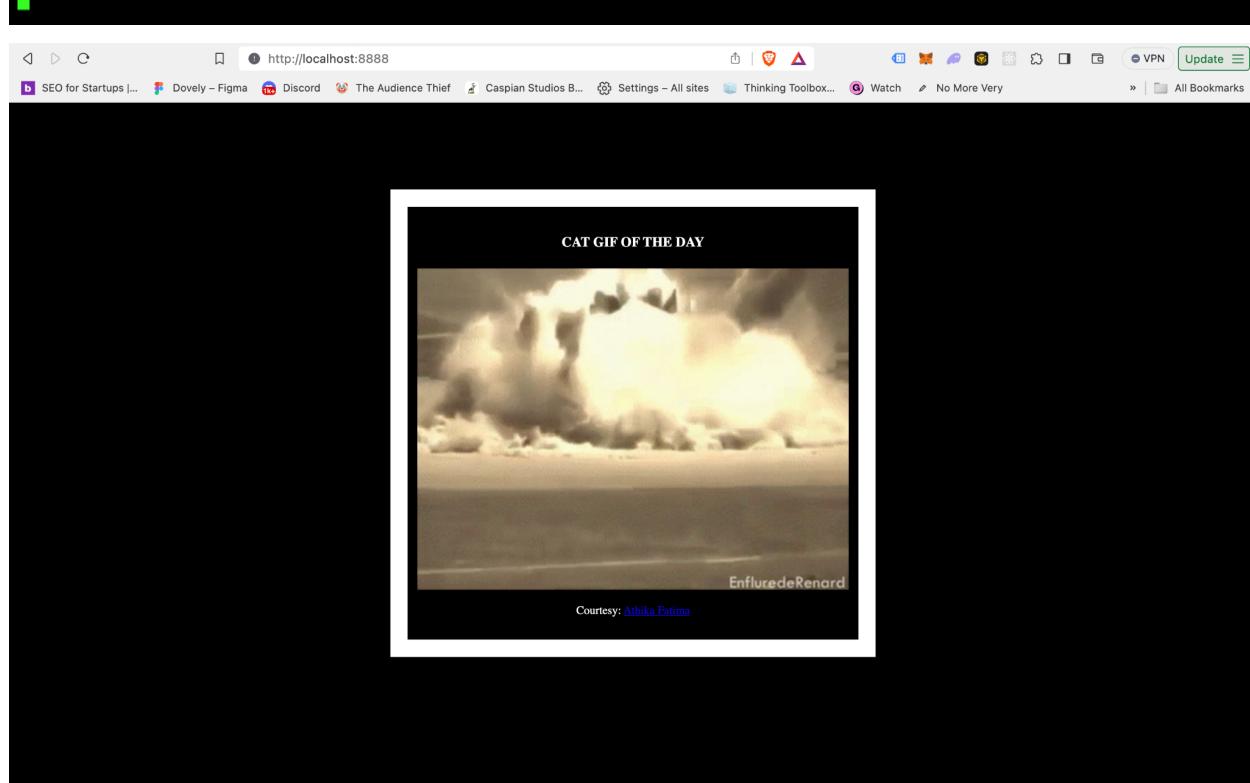
3) Create a Python Flask app that displays random cat pix

```
[athikafatima@Athikas-MBP ~ % cd Desktop
[athikafatima@Athikas-MBP Desktop % mkdir flask-app
[athikafatima@Athikas-MBP Desktop % cd flask-app
[athikafatima@Athikas-MBP flask-app % touch app.py requirements.txt templates/index.html
touch: templates/index.html: No such file or directory
[athikafatima@Athikas-MBP flask-app % touch app.py requirements.txt
[athikafatima@Athikas-MBP flask-app % mkdir templates
[athikafatima@Athikas-MBP flask-app % touch templates/index.html
[athikafatima@Athikas-MBP flask-app % ls
app.py           requirements.txt      templates
athikafatima@Athikas-MBP flask-app %
```

4) \$ docker build -t athikaf/myfirstapp .

```
5) $ docker run -p 8888:5000 --name myfirstapp  
athikaf/myfirstapp
```

```
[athikafatima@Athikas-MBP flask-app % docker run -p 8888:5000 --name myfirstapp athikaf/myfirstapp
 * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
192.168.65.1 - - [14/Jan/2024 06:29:58] "GET / HTTP/1.1" 200 -
192.168.65.1 - - [14/Jan/2024 06:30:47] "GET / HTTP/1.1" 200 -
192.168.65.1 - - [14/Jan/2024 06:31:11] "GET / HTTP/1.1" 200 -
```



6) \$ docker login

```
athikafatima@Athikas-MBP flask-app % docker login
Log in with your Docker ID or email address to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com/ to create one.
You can log in with your password or a Personal Access Token (PAT). Using a limited-scope PAT grants better security and is required for organizations using SSO. Learn more at https://docs.docker.com/go-access-tokens/
Username: athikaf
Password:
Login Succeeded
athikafatima@Athikas-MBP flask-app %
```

```
7) $ docker push athikaf/myfirstapp
```

```
[athikafatima@Athikas-MBP flask-app % docker push athikaf/myfirstapp
Using default tag: latest
The push refers to repository [docker.io/athikaf/myfirstapp]
ec6dbad4c9a9: Pushed
a0ae050de220: Pushed
03b7ed27f63b: Pushed
fc75d35738ab: Pushed
f1547ed539aa: Pushed
f566c57e6f2d: Mounted from library/alpine
latest: digest: sha256:f87030c56d3cc526ede2315fa90ded75ea12ae42c5b3ea977877139f1a22e8d2 size: 1571
athikafatima@Athikas-MBP flask-app % ]
```

```
8) $ docker rm -f myfirstapp
```

```
[athikafatima@Athikas-MBP flask-app % docker rm -f myfirstapp
myfirstapp
athikafatima@Athikas-MBP flask-app %
```

3.0 Deploying an app to a Swarm

```
1) git clone https://github.com/docker/example-voting-app.git
```

```
a) cd example-voting-app
```

```
[athikafatima@Athikas-MBP Desktop % git clone https://github.com/docker/example-voting-app.git
Cloning into 'example-voting-app'...
remote: Enumerating objects: 1132, done.
remote: Total 1132 (delta 0), reused 0 (delta 0), pack-reused 1132
Receiving objects: 100% (1132/1132), 1.17 MiB | 5.70 MiB/s, done.
Resolving deltas: 100% (432/432), done.
[athikafatima@Athikas-MBP Desktop % cd example-voting-app
athikafatima@Athikas-MBP example-voting-app % ]
```

```
2) docker swarm init
```

```
[athikafatima@Athikas-MBP example-voting-app % docker swarm init
Swarm initialized: current node (726c5tlzty2qnjoh32ryro691) is now a manager.

To add a worker to this swarm, run the following command:

  docker swarm join --token SWMTKN-1-4ru6b7dh2ujm30b1o3iss652pr3iy12y7it1bxkyf01v4ir0b-1dky1t6f4j290u5vnjr0ustqr 192.168.65.3:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.

athikafatima@Athikas-MBP example-voting-app % ]
```

```
3) docker stack deploy --compose-file docker-stack.yml vote
```

```
[athikafatima@Athikas-MBP example-voting-app % docker stack deploy --compose-file docker-stack.yml vote
Creating network vote_frontend
Creating network vote_backend
Creating network vote_default
Creating service vote_result
Creating service vote_worker
Creating service vote_visualizer
Creating service vote_redis
Creating service vote_db
Creating service vote_vote
athikafatima@Athikas-MBP example-voting-app % ]
```

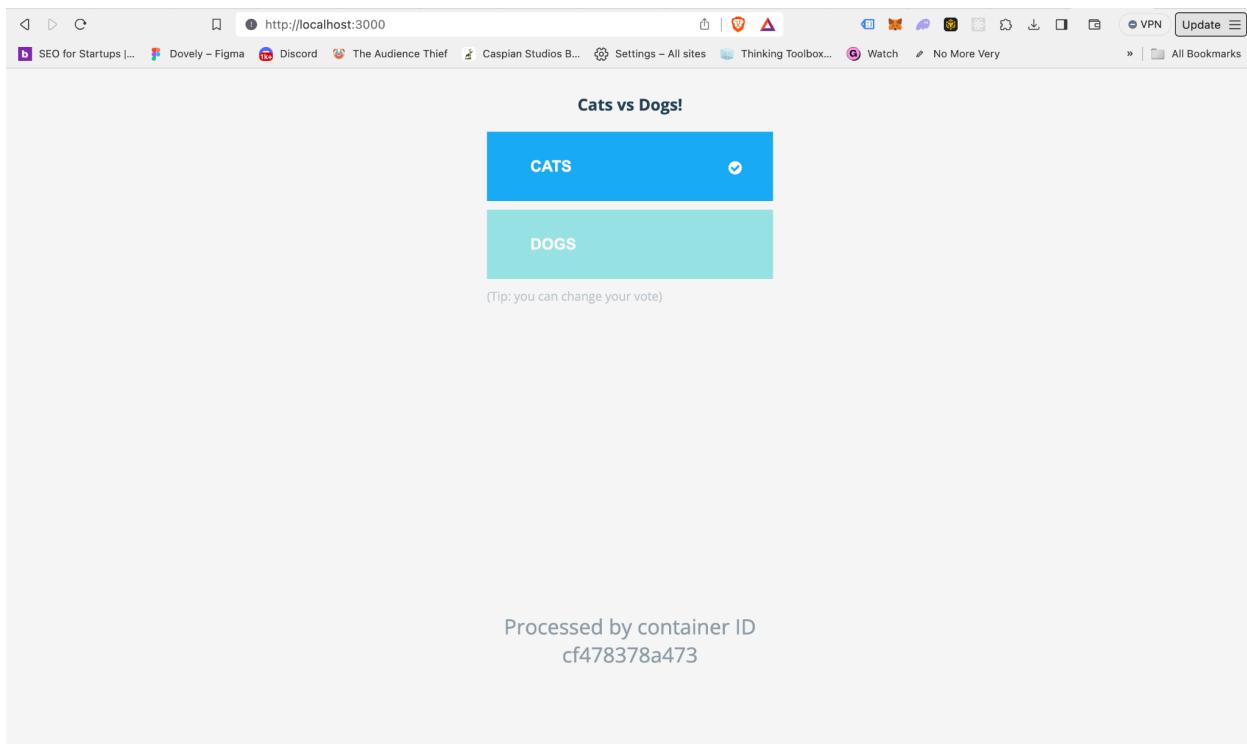
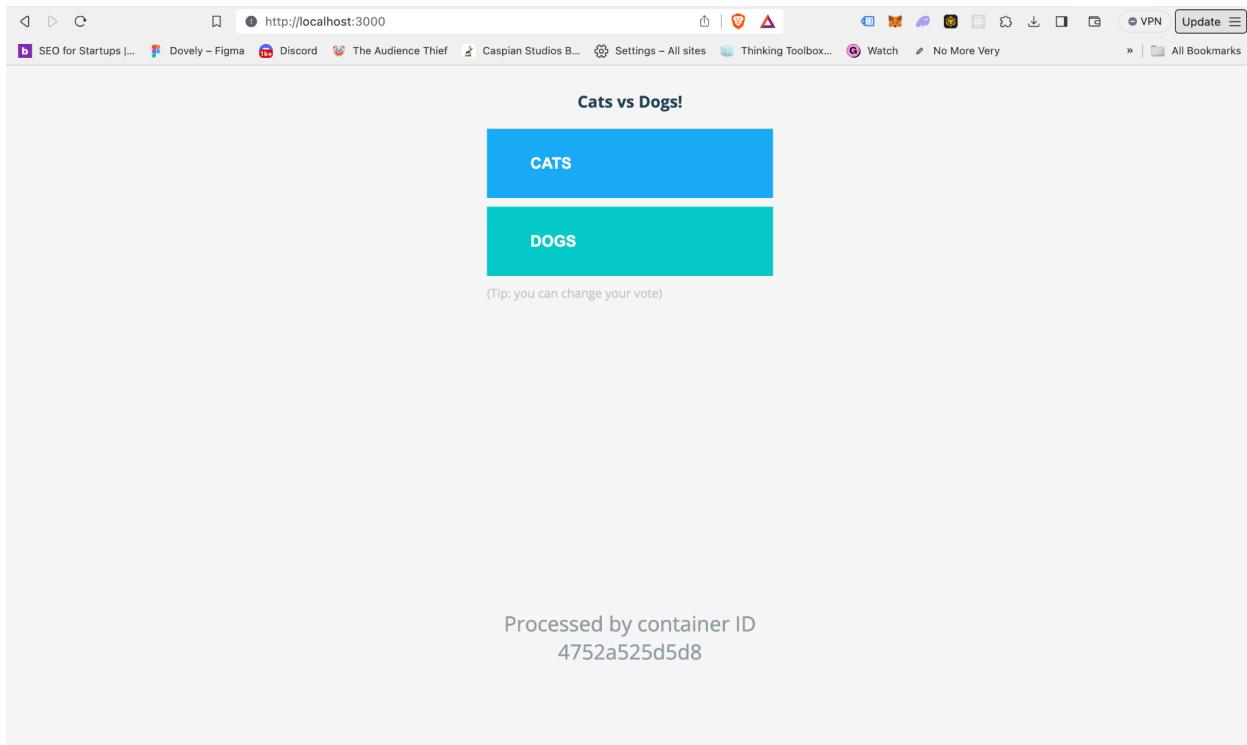
4) docker stack services vote

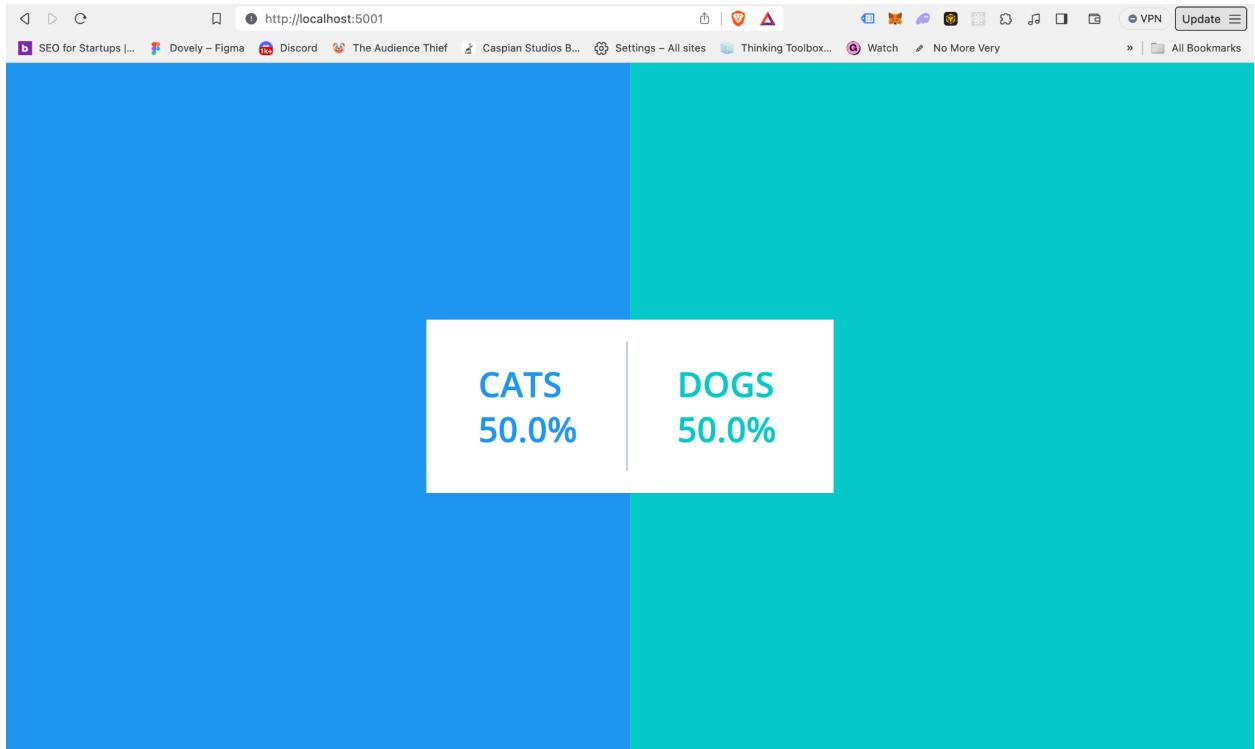
(Note:I ran this command and checked localhost:5000 but it was throwing an error. So I changed the port to 3000, redeployed it and it worked)

```
[athikafatima@Athikas-MBP example-voting-app % docker stack services vote
ID          NAME      MODE      REPLICAS  IMAGE
fyxft10xl1ul  vote_db   replicated  0/1      postgres:9.4
gdmmp5g5exndj  vote_redis  replicated  2/2      redis:alpine
s8jm0qjbs8ce   vote_result  replicated  1/1      dockersamples/examplevotingapp_result:before
otx3lqivdzwa   vote_visualizer  replicated  0/1      dockersamples/visualizer:latest
z7k3564u6xx1   vote_vote   replicated  2/2      dockersamples/examplevotingapp_vote:before
yk08w60avamn   vote_worker  replicated  1/1      dockersamples/examplevotingapp_worker:latest
athikafatima@Athikas-MBP example-voting-app % ]
```

**Redeployed

```
[athikafatima@Athikas-MBP example-voting-app % docker stack services vote
ID          NAME      MODE      REPLICAS  IMAGE
v126ro6cnfvk  vote_db   replicated  0/1      postgres:9.4
se0jk8grxwrs  vote_redis  replicated  2/2      redis:alpine
b6cx6sepd3gr   vote_result  replicated  2/2      dockersamples/examplevotingapp_result:after
b8yxhimt4396   vote_visualizer  replicated  0/1      dockersamples/visualizer:latest
noey5euvlnc   vote_vote   replicated  2/2      dockersamples/examplevotingapp_vote:after
hlirf9tlpvpu   vote_worker  replicated  1/1      dockersamples/examplevotingapp_worker:latest
athikafatima@Athikas-MBP example-voting-app % ]
```





5) `docker stack deploy --compose-file docker-stack.yml vote`

```
[athikafatima@Athikas-MBP example-voting-app % docker stack deploy --compose-file docker-stack.yml vote
Updating service vote_result (id: 0jwbb3ve5dm3jd4s4rx7712jl)
Updating service vote_worker (id: o7xzxttd5adljinlxg5h4ovgl)
Updating service vote_visualizer (id: p9saq9nu4luj4e86k4iyujfb2)
Updating service vote_redis (id: fs5zm3b18wk9n19jnurwb00db)
Updating service vote_db (id: 723a1i7mp85yl2ck5fojcwjib)
Updating service vote_vote (id: zvmyt8bro8nbs2dmv76k3dtz57)
athikafatima@Athikas-MBP example-voting-app %
```

6) `docker stack rm vote`

```
[athikafatima@Athikas-MBP example-voting-app % docker stack rm vote
Removing service vote_db
Removing service vote_redis
Removing service vote_result
Removing service vote_visualizer
Removing service vote_vote
Removing service vote_worker
Removing network vote_frontend
Removing network vote_default
Removing network vote_backend
athikafatima@Athikas-MBP example-voting-app %
```