Exercise 1: Running containers

In this exercise, we'll learn the basics of pulling images, starting, stopping, and removing containers.

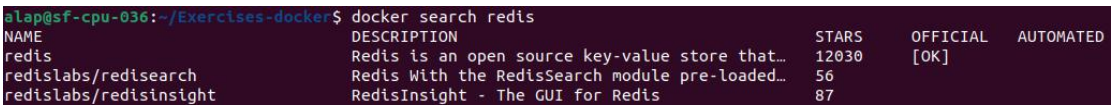
Pulling an image

To run containers, we'll first need to pull some images.

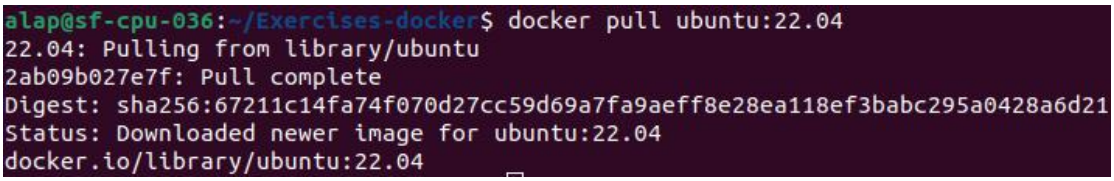
1. Let's see what images we have currently on our machine, by running docker images:

2. On a fresh Docker installation, we should have no images. Let's pull one from Dockerhub.

   We can search for images using docker search <keyword>

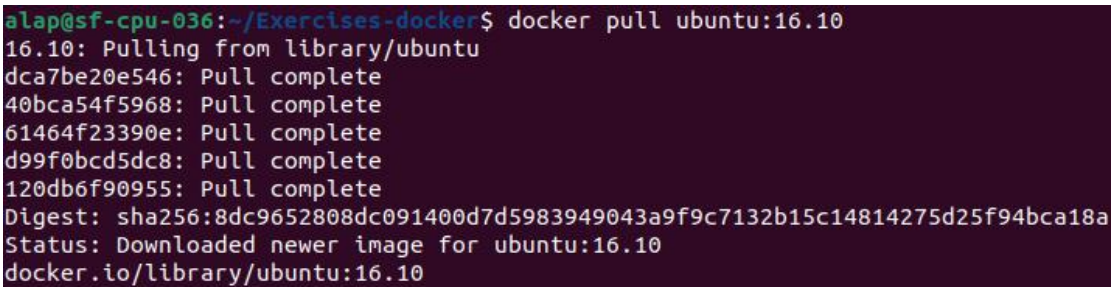


   Run docker pull ubuntu:22.04 to pull an image of Ubuntu 22.04 from DockerHub.



3. We can also pull different versions on the same image.

   Run docker pull ubuntu:16.10 to pull an image of Ubuntu 16.10.



Then when we run `docker images again, we should get:

```
alap@sf-cpu-036:~/Exercises-docker$ docker images
REPOSITORY   TAG       IMAGE ID       CREATED        SIZE
ubuntu       22.04     08d22c0ceb15   6 weeks ago    77.8MB
ubuntu       16.10     7d3f705d307c   5 years ago    107MB
```

4. Over time, your machine can collect a lot of images, so it's nice to remove unwanted images.

   Run docker rmi <IMAGE ID> to remove the Ubuntu 16.10 image we won't be using.

```
alap@sf-cpu-036:~/Exercises-docker$ docker rmi 7d3f705d307c
Untagged: ubuntu:16.10
Untagged: ubuntu@sha256:8dc9652808dc091400d7d5983949043a9f9c7132b15c14814275d25f94bca18a
Deleted: sha256:7d3f705d307c7c225398e04d4c4f8512f64eb8a65959a1fb4514dfde18a047e7
Deleted: sha256:d9db289b9342d9617596cd6ee3bba988629e24d9afa5db4e4b0e4e491c65007d
Deleted: sha256:a87725e8597b97f2399bc3aa50b0e2eec903b8ce19055668d3befb012918205c
Deleted: sha256:38cf10a2801529348366953e9b933d3524360dedc91d3e4d5d7f941da0c973c9
Deleted: sha256:61172966249d43026dbd017eec3a9575e37bddf8a269a9f09ecb559d7bfe7fef
Deleted: sha256:57145c01eb80040fdd0a24cde20af4788605b49593188d4f7efab099af89a08e
```

   Alternatively, you can delete images by tag or by a partial image ID. In the previous example, the following would have been equivalent:

   1. docker rmi 7d
   2. docker rmi ubuntu:16.10

   Running docker images should reflect the deleted image.

```
alap@sf-cpu-036:~/Exercises-docker$ docker images
REPOSITORY   TAG       IMAGE ID       CREATED        SIZE
ubuntu       22.04     08d22c0ceb15   6 weeks ago    77.8MB
```

   A nice shortcut for removing all images from your system is docker rmi $(docker images -a -q)

Running our container

Using the Ubuntu 22.04 image we downloaded, we can run a our first container. Unlike a traditional virtualization framework like VirtualBox or VMWare, we can't just start a virtual machine running this image without anything else: we have to give it a command to run.

The command can be anything you want, as long as it exists on the image. In the case of the Ubuntu image, it's a Linux kernel with many of the typical applications you'd find in a basic Linux environment.

2. Let's do a very simple example. Run `docker run ubuntu:22.04 /bin/echo 'Hello world!'`

```
alap@sf-cpu-036:~/Exercises-docker$ docker run ubuntu:22.04 /bin/echo 'Hello World'
Hello World
```

   The `/bin/echo` command is a really simple application that just prints whatever you give it to the terminal. We passed it 'Hello world!', so it prints `Hello world!` to the terminal.

   When you run the whole `docker run` command, it creates a new container from the image specified, then runs the command inside the container. From the previous example, the Docker container started, then ran the `/bin/echo` command in the container.

3. Let's check what containers we have after running this. Run `docker ps`

```
alap@sf-cpu-036:~/Exercises-docker$ docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
```

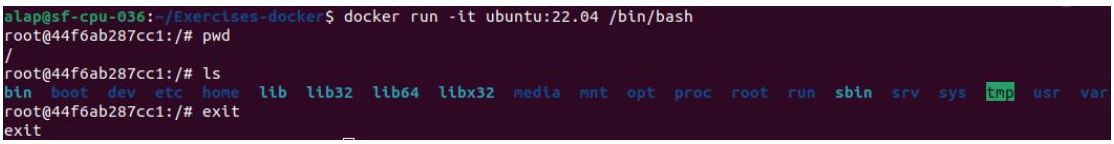
   That's strange: no containers right? The `ps` command doesn't show stopped containers by default, add the `-a` flag.

```
alap@sf-cpu-036:~/Exercises-docker$ docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED         STATUS                     PORTS     NAMES
581d38f8e2fe   ubuntu:22.04   "echo 'Hello World'"     6 minutes ago   Exited (0) 6 minutes ago             objective_buck
ab685adebf93   ubuntu:22.04   "/bin/echo 'Hello Wo…"   6 minutes ago   Exited (0) 6 minutes ago             bold_spence
```

   Okay, there's our container. But why is the status "Exited"?

   Docker containers only run as long as the command it starts with is running. In our example, it ran `/bin/echo` successfully, printed some output, then exited with status code 0 (which means no errors.) When Docker saw this command exit, the container stopped.

4. Let's do something a bit more interactive. Run docker run ubuntu:22.04 /bin/bash



Removing containers

We can remove the containers using docker rm <container_id>/<container_name>