

# Lab Exercise 1- Docker Fundamental

## Commands

### Objective

Learn and practice the fundamental Docker CLI commands to:

- Manage images and containers
  - Understand container lifecycle
  - Build and run applications using Docker
- 

### 1. Setup

#### Prerequisites

- Docker installed on your system  
(Check using: `docker --version`)
  - Internet access to pull images
- 

### 2. Basic Docker Commands

#### Step 1: Verify Installation

```
docker --version
```

```
docker info
```

---

```
[mohdanas@Mohds-MacBook-Air ~ % docker info
Client:
Version:      28.3.2
Context:      desktop-linux
Debug Mode:   false
Plugins:
ai: Docker AI Agent - Ask Gordon (Docker Inc.)
  Version:    v1.6.0
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-ai
buildx: Docker Buildx (Docker Inc.)
  Version:    v0.25.0-desktop.1
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-buildx
cloud: Docker Cloud (Docker Inc.)
  Version:    v0.4.2
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-cloud
compose: Docker Compose (Docker Inc.)
  Version:    v2.38.2-desktop.1
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-compose
debug: Get a shell into any image or container (Docker Inc.)
  Version:    0.0.41
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-debug
desktop: Docker Desktop commands (Docker Inc.)
  Version:    v0.1.11
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-desktop
extension: Manages Docker extensions (Docker Inc.)
  Version:    v0.2.29
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-extension
init: Creates Docker-related starter files for your project (Docker Inc.)
  Version:    v1.4.0
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-init
mcp: Docker MCP Plugin (Docker Inc.)
  Version:    v0.9.9
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-mcp
model: Docker Model Runner (EXPERIMENTAL) (Docker Inc.)
  Version:    v0.1.33
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-model
sbom: View the packaged-based Software Bill Of Materials (SBOM) for an image (Anchore Inc.)
  Version:    0.6.0
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-sbom
scout: Docker Scout (Docker Inc.)
  Version:    v1.18.1
  Path:       /Users/mohdanas/.docker/cli-plugins/docker-scout
```

## Step 2: Pull an Image from Docker Hub

```
docker pull ubuntu:latest
```

*Explanation:* Downloads the latest Ubuntu image from Docker Hub.

```
[mohdanas@Mohds-MacBook-Air ~ % docker pull ubuntu:latest
latest: Pulling from library/ubuntu
36bf709aa36d: Pull complete
Digest: sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
```

Check available images:

```
docker images
```

```
[mohdanas@Mohds-MacBook-Air ~ % docker images
REPOSITORY          TAG          IMAGE ID      CREATED        SIZE
ubuntu              latest       cd1dba651b30  5 days ago    139MB
nginx-html-app      latest       174b9ceb80b6  2 months ago  244MB
```

### Step 3: Run a Container

Run Ubuntu interactively:

```
docker run -it --name myubuntu ubuntu bash
```

```
[mohdanas@Mohds-MacBook-Air ~ % docker run -it --name myubuntu ubuntu bash
```

```
[root@5d9a89598e1c:/# ls
```

```
bin    dev    home   media  opt    root   sbin   sys    usr  
boot   etc    lib    mnt    proc   run    srv    tmp    var
```

```
[root@5d9a89598e1c:/# mkdir Hello
```

```
[root@5d9a89598e1c:/# ls
```

```
Hello  boot   etc    lib    mnt    proc   run    srv    tmp    var  
bin    dev    home   media  opt    root   sbin   sys    usr
```

Now you're inside a running container (prompt will change).

Exit:

```
exit
```

```
[root@5d9a89598e1c:/Hello# exit
```

```
exit
```

```
mohdanas@Mohds-MacBook-Air ~ %
```

---

### Step 4: List Containers

- Show running containers:

```
docker ps
```

- Show all containers (including stopped):

```
docker ps -a
```

```
[mohdanas@Mohds-MacBook-Air ~ % docker ps ]  
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS    NAMES  
[mohdanas@Mohds-MacBook-Air ~ % docker ps -a ]  
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS    NAMES  
S  
5d9a89598e1c   ubuntu   "bash"    5 minutes ago   Exited (127) About a minute ago  
myubuntu  
mohdanas@Mohds-MacBook-Air ~ %
```

---

## Step 5: Start / Stop / Remove Containers

```
# Start a stopped container

docker start <container_id>

# Stop a running container

docker stop <container_id>

# Remove a container

docker rm <container_id>
```

*Tip:* Use `docker ps -a` to get container IDs.

```
[mohdanas@Mohds-MacBook-Air ~ % docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
]
[mohdanas@Mohds-MacBook-Air ~ % docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
5d9a89598e1c   ubuntu   "bash"    5 minutes ago  Exited (127) About a minute ago  myubuntu
]
[mohdanas@Mohds-MacBook-Air ~ % docker start 5d9a89598e1c
5d9a89598e1c
]
[mohdanas@Mohds-MacBook-Air ~ % docker stop 5d9a89598e1c
5d9a89598e1c
]
[mohdanas@Mohds-MacBook-Air ~ % docker rm 5d9a89598e1c
5d9a89598e1c
]
[mohdanas@Mohds-MacBook-Air ~ % docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
]
```

---

## Step 6: Remove Images

```
docker rmi ubuntu:latest
```

*Note:* You must stop and remove all containers using that image first.

```
[mohdanas@Mohds-MacBook-Air ~ % docker rmi ubuntu:latest

Untagged: ubuntu:latest
Deleted: sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
```