

Lab Exercise 1- Docker Fundamental

Commands

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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

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Admin> docker --version
Docker version 28.3.2, build 578ccf6
PS C:\Users\Admin>
```

2. Basic Docker Commands

Step 1: Verify Installation

docker --version

docker info

```
Windows PowerShell
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PS C:\Users\Admin> docker --version
Docker version 28.3.2, build 578ccf6
PS C:\Users\Admin> 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:      C:\Program Files\Docker\cli-plugins\docker-ai.exe
buildx: Docker Buildx (Docker Inc.)
   Version:   v0.25.0-desktop.1
   Path:      C:\Program Files\Docker\cli-plugins\docker-buildx.exe
cloud: Docker Cloud (Docker Inc.)
   Version:   v0.4.2
   Path:      C:\Program Files\Docker\cli-plugins\docker-cloud.exe
compose: Docker Compose (Docker Inc.)
   Version:   v2.38.2-desktop.1
   Path:      C:\Program Files\Docker\cli-plugins\docker-compose.exe
debug: Get a shell into any image or container (Docker Inc.)
   Version:   0.0.41
   Path:      C:\Program Files\Docker\cli-plugins\docker-debug.exe
desktop: Docker Desktop commands (Docker Inc.)
   Version:   v0.1.11
   Path:      C:\Program Files\Docker\cli-plugins\docker-desktop.exe
extension: Manages Docker extensions (Docker Inc.)
   Version:   v0.2.29
   Path:      C:\Program Files\Docker\cli-plugins\docker-extension.exe
init: Creates Docker-related starter files for your project (Docker Inc.)
   Version:   v1.4.0
   Path:      C:\Program Files\Docker\cli-plugins\docker-init.exe
mcp: Docker MCP Plugin (Docker Inc.)
   Version:   v0.9.9
   Path:      C:\Program Files\Docker\cli-plugins\docker-mcp.exe
model: Docker Model Runner (EXPERIMENTAL) (Docker Inc.)
```

Expected Output: Docker version and system details.

Step 2: Pull an Image from Docker Hub

```
docker pull ubuntu:latest
```

```
WARNING: DOCKER_INSECURE_NO_IPTABLES_RAW is set
PS C:\Users\Admin> docker pull ubuntu:latest
latest: Pulling from library/ubuntu
a3629ac5b9f4: Pull complete
Digest: sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f208028b2b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
PS C:\Users\Admin>
```

Explanation: Downloads the latest Ubuntu image from Docker Hub.

Check available images:

```
docker images
```

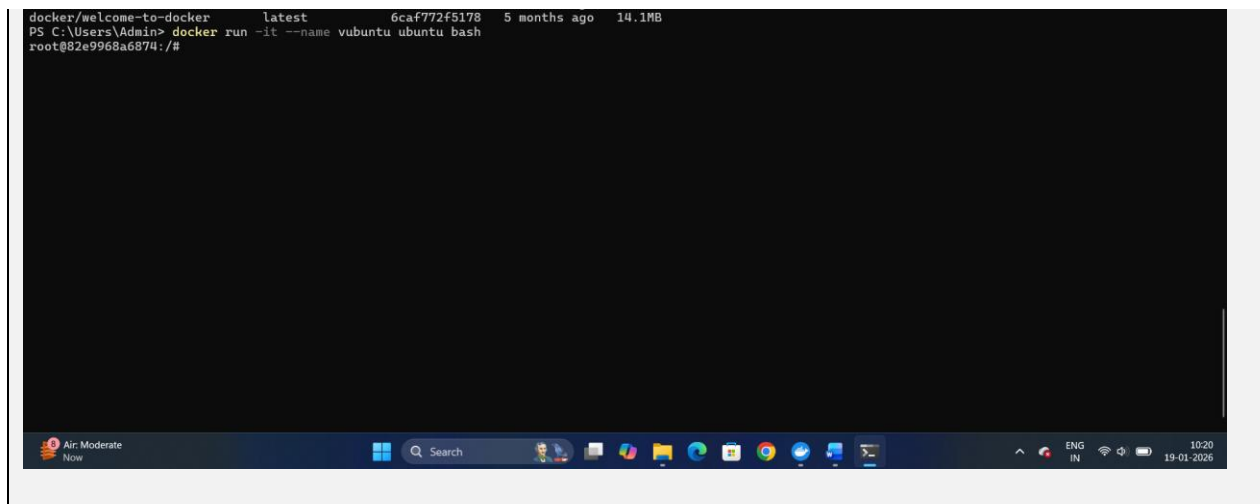
```
PS C:\Users\Admin> docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
ubuntu               latest              493218ed0f40       5 days ago         78.1MB
node                 lts-alpine3.23     aa855d560496       6 weeks ago        160MB
bash                 latest              ba58c520c2f5       6 weeks ago        15.6MB
docker               latest              ad869b62b5c0       6 weeks ago        369MB
maven                amazoncorretto     3c8a95d0238a       6 weeks ago        692MB
aquasec/trivy        latest              a234c1a46257       6 weeks ago        181MB
jenkins/jenkins      latest              858243a3d708       6 weeks ago        500MB
prom/prometheus      latest              d377f2544ff5       6 weeks ago        378MB
amazon/aws-cli       latest              cfe4d41alcdd       7 weeks ago        418MB
ollama/ollama        latest              0dc6f618ef68       2 months ago       3.75GB
hashicorp/terraform  latest              68b558536a08       2 months ago       129MB
postgres             latest              80c0891f5de9       2 months ago       456MB
memcached            latest              adfa206a4358       2 months ago       85MB
opensearchproject/opensearch latest              ba0ea55e925e       2 months ago       1.5GB
apache/airflow       latest              8fb4466b1339       2 months ago       2.12GB
sonarqube            latest              d6e7a271e8d1       2 months ago       1.22GB
owasp/dependency-check latest              e740ed7863e0       2 months ago       595MB
nginx/html-app       latest              d80f05632983       2 months ago       152MB
vanshbhattok/nginx-html-app latest              d80f05632983       2 months ago       152MB
ubuntu               <none>              c3a134f2ace4       3 months ago       78.1MB
docker/dockerfile    latest              6742480c08d7       3 months ago       27.4MB
hello-world          latest              1b44b5a3e06a       5 months ago       10.1kB
docker/welcome-to-docker latest              6caf772f5178       5 months ago       14.1MB
PS C:\Users\Admin> |
```

Step 3: Run a Container

Run Ubuntu interactively:

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

```
docker/welcome-to-docker    latest        6caf772f5178    5 months ago    14.1MB
PS C:\Users\Admin> docker run -it --name vubuntu ubuntu bash
root@82e9968a6874:/#
```

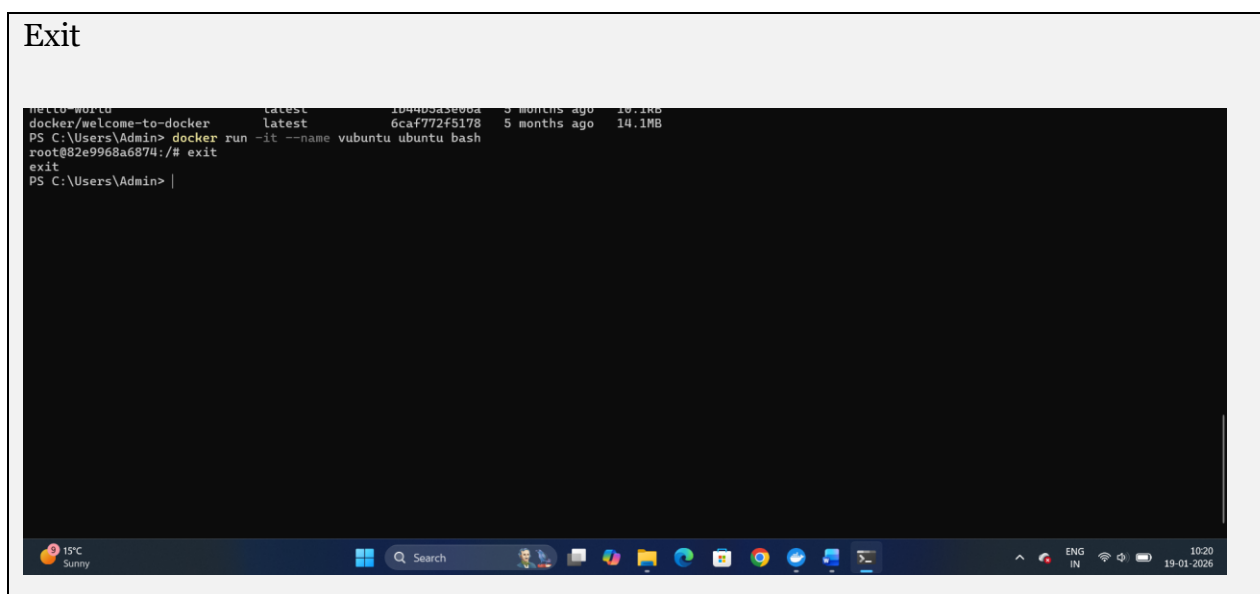


Now you're inside a running container (prompt will change).

Exit:

Exit

```
hello world
docker/welcome-to-docker    latest        6caf772f5178    5 months ago    14.1MB
PS C:\Users\Admin> docker run -it --name vubuntu ubuntu bash
root@82e9968a6874:/# exit
exit
PS C:\Users\Admin> |
```



Step 4: List Containers

- Show running containers:

```
docker ps
```

```
exit
PS C:\Users\Admin> docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED         STATUS         PORTS          NAMES
```

- Show all containers (including stopped):

docker ps -a

```
PS C:\Users\Admin> docker ps -a
CONTAINER ID   IMAGE      COMMAND                  CREATED         STATUS         PORTS          NAMES
82e9968a6874   ubuntu    "bash"                  About a minute ago   Exited (0) 39 seconds ago           vubuntu
0671aa52a7de   hello-world "/hello"                2 months ago       Exited (0) 2 months ago           gallant_edison
3fce5d5fb3cd   nginx-html-app "/docker-entrypoint..." 2 months ago       Exited (255) 2 months ago   0.0.0.0:8006->80/tcp   flamboyant_khayyam
PS C:\Users\Admin>
```

Step 5: Start / Stop / Remove Containers

Start a stopped container

docker start <container_id>

```
0.0.0:8006->80/tcp   flamboyant_khayyam
PS C:\Users\Admin> docker start 82e9968a6874
82e9968a6874
PS C:\Users\Admin> |
```

Stop a running container

docker stop <container_id>

```
PS C:\Users\Admin> docker stop 82e9968a6874
82e9968a6874
PS C:\Users\Admin> |
```

Remove a container

`docker rm <container_id>`

```
PS C:\Users\Admin> docker rm 82e9968a6874
82e9968a6874
```

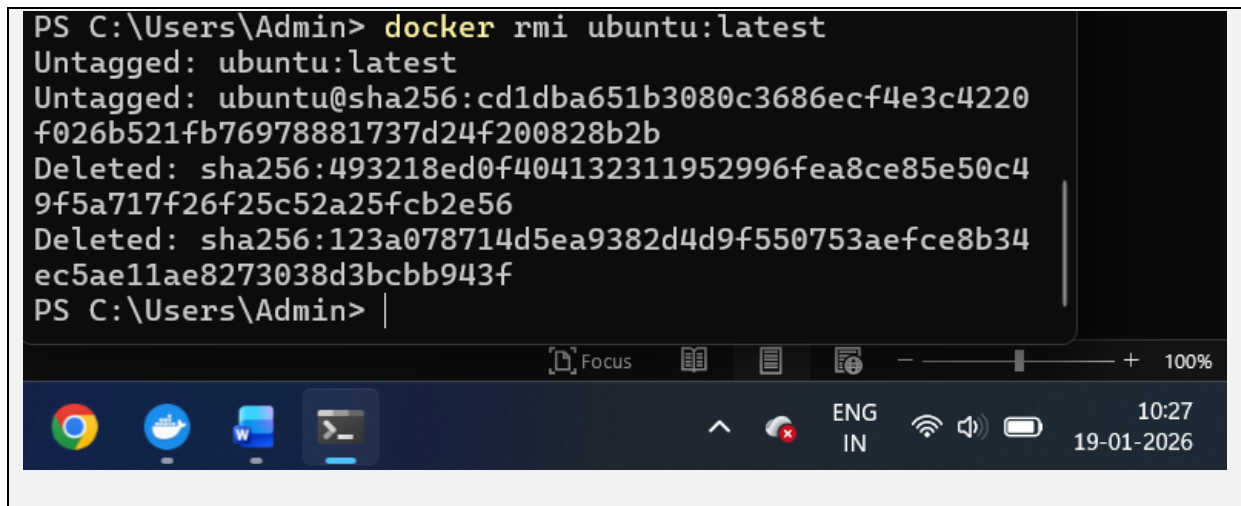
Tip: Use `docker ps -a` to get container IDs.

```
PS C:\Users\Admin> docker ps -aq
0671aa52a7de
3fce5d5fb3c4
PS C:\Users\Admin> |
```

Step 6: Remove Images

```
docker rmi ubuntu:latest
```

```
PS C:\Users\Admin> docker rmi ubuntu:latest
Untagged: ubuntu:latest
Untagged: ubuntu@sha256:cd1dba651b3080c3686ecf4e3c4220
f026b521fb76978881737d24f200828b2b
Deleted: sha256:493218ed0f404132311952996fea8ce85e50c4
9f5a717f26f25c52a25fcb2e56
Deleted: sha256:123a078714d5ea9382d4d9f550753aefce8b34
ec5ae11ae8273038d3bcbb943f
PS C:\Users\Admin> |
```



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

Thank You