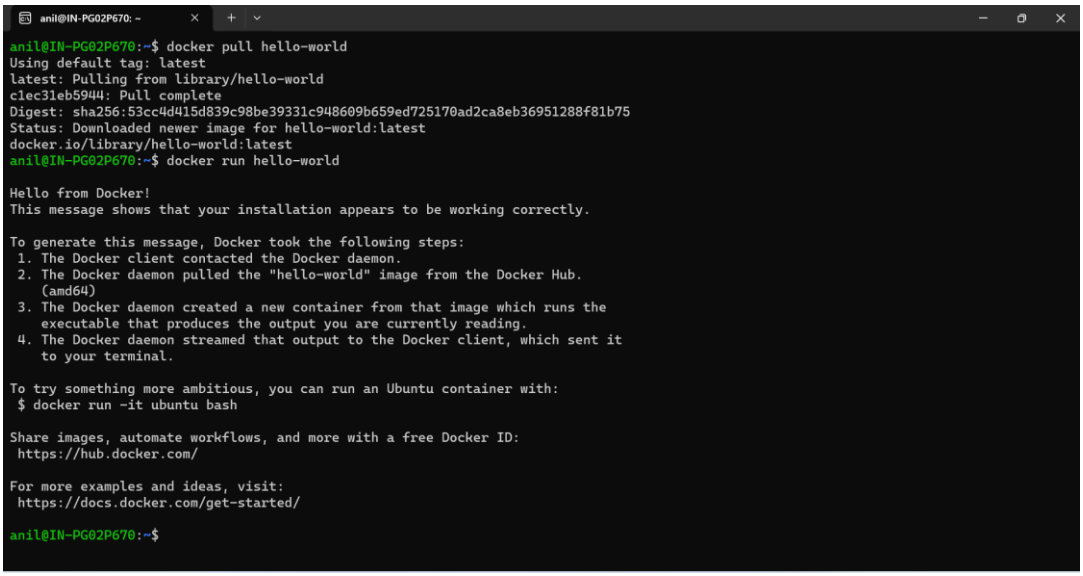
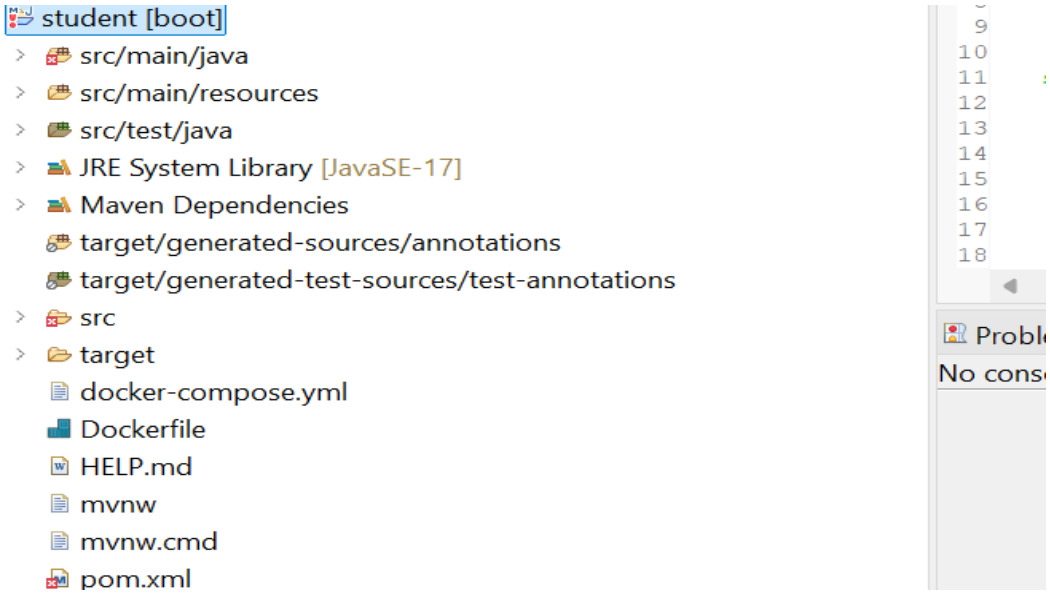
Docker Assignment:-1

Verify the installation by running a test container.



- **Create a simple web application (e.g., a Python Flask, DotNet, Java or Node application).**



- **Write a Dockerfile to containerize the application.**

```
# Use OpenJDK image to run the application
FROM openjdk:17
WORKDIR /app
COPY --from=build /app/target/*.jar app.jar
ENTRYPOINT ["java", "-jar", "app.jar"]

```

- **Write a docker-compose.yml file to define a multi-container application.**

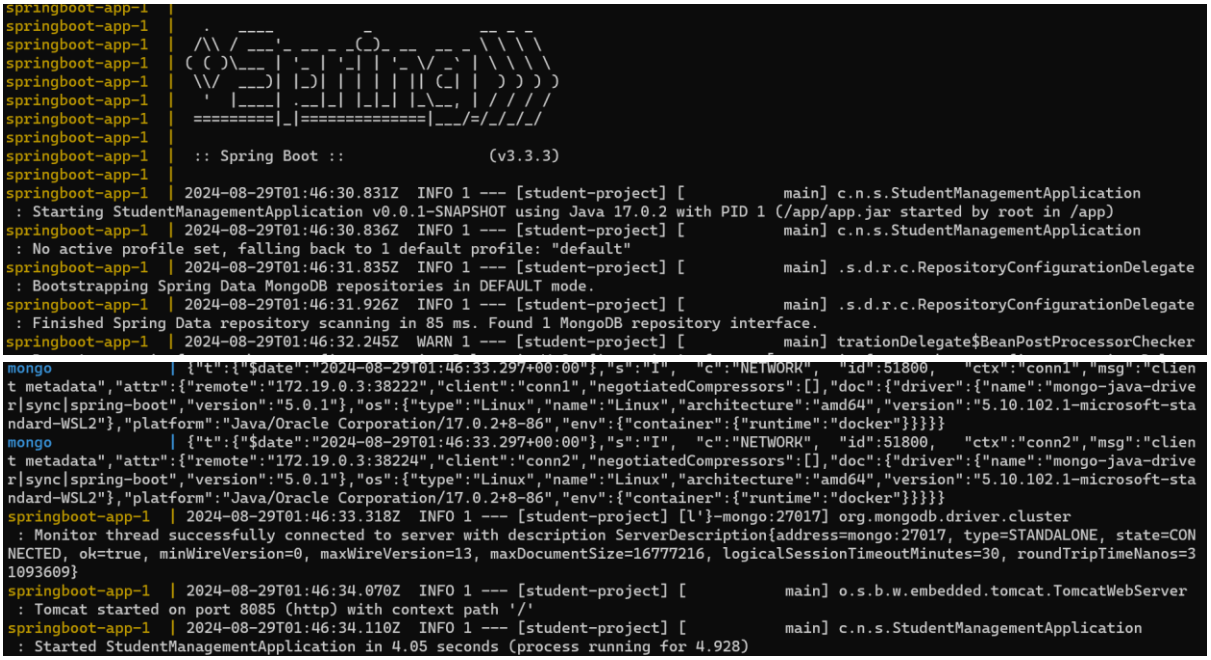
```yaml
version: '3'
services:
   mongo:
    image: mongo:5.0
    container_name: mongo
    ports:
    - 27017:27017
    volumes:
    - mongo-data:/data/db

   springboot-app:
    build: .
    ports:
    - 8085:8085

    depends_on:
    - mysql
    environment:
      SPRING_DATA_MONGODB_URI: mongodb://mongo:27017/student-management



volumes:
  mongo-data:
```

- **Use Docker commands to list, start, stop, and remove containers.**

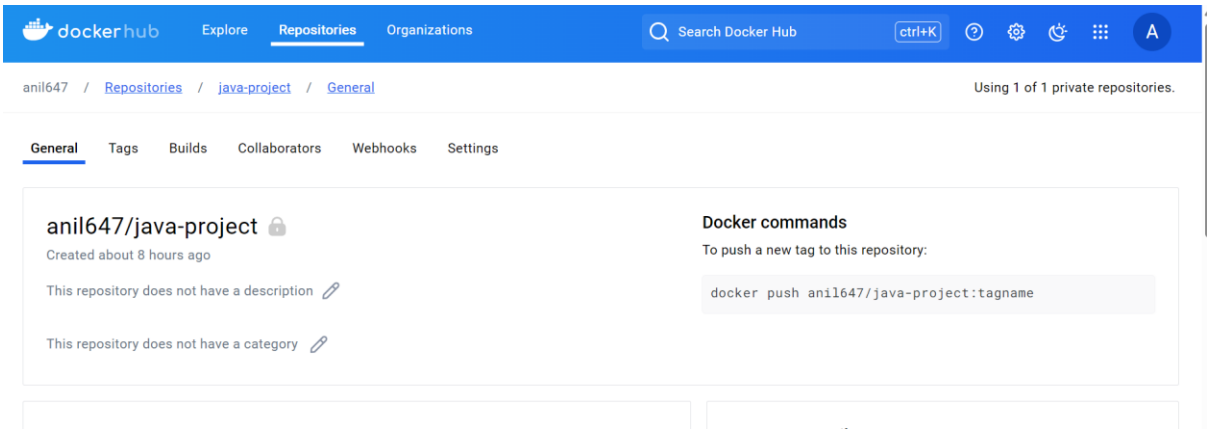
```
CONTAINER ID   IMAGE                          COMMAND              CREATED         STATUS         PORTS
        NAMES
226d62ae8ed9   anil647/java-project:latest   "java -jar app.jar"   5 minutes ago   Up 5 minutes   0.0.0.0:8085->8085/tcp, :::8085->80
85/tcp   springboot-container
anil@IN-PG02P670:~/ld/java-project/student$  docker rm 226d62ae8ed9
Error response from daemon: cannot remove container "/springboot-container": container is running: stop the container before removing
 or force remove
anil@IN-PG02P670:~/ld/java-project/student$ docker stop 226d62ae8ed9
226d62ae8ed9
anil@IN-PG02P670:~/ld/java-project/student$ docker rm 226d62ae8ed9
226d62ae8ed9
anil@IN-PG02P670:~/ld/java-project/student$ docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
```

- **Use Docker Compose to bring up the application and ensure all services are running correctly.**

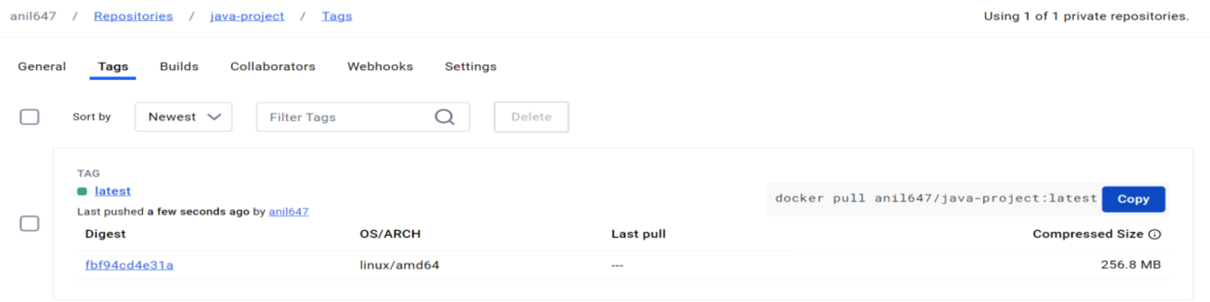
```
anil@IN-PG02P670:~/ld$ dir
Java8  java-project  student
anil@IN-PG02P670:~/ld$ cd java-project
anil@IN-PG02P670:~/ld/java-project$ cd student
anil@IN-PG02P670:~/ld/java-project/student$ docker compose up --build
WARN[0000] /home/anil/ld/java-project/student/docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please rem
ove it to avoid potential confusion
[+] Building 0.3s (9/9) FINISHED                                                                                    docker:default
 => [springboot-app internal] load build definition from Dockerfile                                                          0.0s
 => => transferring dockerfile: 213B                                                                                         0.0s
 => [springboot-app internal] load metadata for docker.io/library/openjdk:17                                                 0.0s
 => [springboot-app internal] load .dockerignore                                                                             0.0s
 => => transferring context: 2B                                                                                              0.0s
 => [springboot-app internal] load build context                                                                             0.0s
 => => transferring context: 94B                                                                                             0.0s
 => [springboot-app 1/3] FROM docker.io/library/openjdk:17                                                                   0.0s
 => CACHED [springboot-app 2/3] WORKDIR /app                                                                                 0.0s
 => CACHED [springboot-app 3/3] COPY target/student-management-0.0.1-SNAPSHOT.jar app.jar                                    0.0s
 => [springboot-app] exporting to image                                                                                      0.0s
 => => exporting layers                                                                                                      0.0s
 => => writing image sha256:c7cf59cee2001e35919c647ce82d4fb5abe11cc7c790719edf3a3c074665dad2                                 0.0s
 => => naming to docker.io/library/student-springboot-app                                                                    0.0s
 => [springboot-app] resolving provenance for metadata file                                                                  0.0s
[+] Running 2/2
 ✔ Container mongo                    Recreated                                                                              0.1s
 ✔ Container student_springboot-app_1  Recreated                                                                             0.1s
Attaching to mongo, springboot-app-1
mongo            | {"t":{"$date":"2024-08-29T01:46:29.168+00:00"},"s":"I",  "c":"NETWORK",  "id":4915701, "ctx":"-","msg":"Initializ
ed wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":13},"incomingInternalClient":{"m
inWireVersion":0,"maxWireVersion":13},"outgoing":{"minWireVersion":0,"maxWireVersion":13},"isInternalClient":true}}}
mongo            | {"t":{"$date":"2024-08-29T01:46:29.177+00:00"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"-","msg":"Automatic
```



- **Create a private Docker registry or use Docker Hub.**



- **Push your Docker images to the registry.**




```
anil@IN-PG02P670:~/ld/java-project/student$ docker build -t anil647/java-project .
[+] Building 0.2s (8/8) FINISHED                                                       docker:default
 => [internal] load build definition from Dockerfile                                             0.0s
 => => transferring dockerfile: 213B                                                             0.0s
 => [internal] load metadata for docker.io/library/openjdk:17                                    0.0s
 => [internal] load .dockerignore                                                                0.0s
 => => transferring context: 2B                                                                  0.0s
 => [1/3] FROM docker.io/library/openjdk:17                                                      0.0s
 => [internal] load build context                                                                0.0s
 => => transferring context: 94B                                                                 0.0s
 => CACHED [2/3] WORKDIR /app                                                                    0.0s
 => CACHED [3/3] COPY target/student-management-0.0.1-SNAPSHOT.jar app.jar                       0.0s
 => exporting to image                                                                           0.0s
 => => exporting layers                                                                          0.0s
 => => writing image sha256:ed52a1df40feef0ba55927f588d05ca82455ba53c593cf33d8f65749c8bcd9c8      0.0s
 => => naming to docker.io/anil647/java-project                                                  0.0s
anil@IN-PG02P670:~/ld/java-project/student$ docker login
Authenticating with existing credentials...
WARNING! Your password will be stored unencrypted in /home/anil/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credential-stores

Login Succeeded
anil@IN-PG02P670:~/ld/java-project/student$ docker push anil647/java-project
Using default tag: latest
The push refers to repository [docker.io/anil647/java-project]
74fc293ad3ac: Pushed
06c118e9322d: Layer already exists
dc9fa3d8b576: Layer already exists
27ee19dc88f2: Layer already exists
c8dd97366670: Layer already exists
latest: digest: sha256:fbf94cd4e31af2b0a6ee65fb2bb8015380427ad46d0f478535260902f29145f4 size: 1373
```

- **Pull the images from the registry and run them locally.**

```
anil@IN-PG02P670:~/ld/java-project/student$ docker pull anil647/java-project:latest
latest: Pulling from anil647/java-project
Digest: sha256:fbf94cd4e31af2b0a6ee65fb2bb8015380427ad46d0f478535260902f29145f4
Status: Image is up to date for anil647/java-project:latest
docker.io/anil647/java-project:latest
anil@IN-PG02P670:~/ld/java-project/student$ docker images
REPOSITORY               TAG       IMAGE ID       CREATED          SIZE
student-springboot-app   latest    c7cf59cee200   8 hours ago      501MB
anil647/java-project     latest    ed52a1df40fe   8 hours ago      501MB
student_springboot-app   latest    70849db8a4a2   10 hours ago     501MB
mysql                    latest    a82a8f162e18   5 weeks ago      586MB
mongo                    5.0       642d31cc2d52   6 weeks ago      724MB
hello-world              latest    d2c94e258dcb   16 months ago    13.3kB
openjdk                  17        5e28ba2b4cdb   2 years ago      471MB
anil@IN-PG02P670:~/ld/java-project/student$  docker build --it  ed52a1df40fe
unknown flag: --it
See 'docker buildx build --help'.
anil@IN-PG02P670:~/ld/java-project/student$ docker build  ed52a1df40fe
[+] Building 0.0s (0/0)                                                                 docker:default
ERROR: unable to prepare context: path "ed52a1df40fe" not found
anil@IN-PG02P670:~/ld/java-project/student$ docker run -d --name springboot-container -p 8085:8085 anil647/java-project:latest
226d62ae8ed9a942d7dc173773d8a55596ca40cbcb4a3874f32e02ed979b1f64
anil@IN-PG02P670:~/ld/java-project/student$ docker ps
CONTAINER ID   IMAGE                         COMMAND                  CREATED          STATUS          PORTS
          NAMES
226d62ae8ed9   anil647/java-project:latest   "java -jar app.jar"      34 seconds ago   Up 33 seconds   0.0.0.0:8085->8085/tcp, :::8085->
8085/tcp   springboot-container
```

Bonus Question

- **Extend the multi-container application to include a database service and configure the web application to interact with the database.**

```yaml
version: '3'
services:
   mongo:
    image: mongo:5.0
    container_name: mongo
    ports:
    - 27017:27017
    volumes:
    - mongo-data:/data/db

   springboot-app:
    build: .
    ports:
    - 8085:8085

    depends_on:
    - mysql
    environment:
      SPRING_DATA_MONGODB_URI: mongodb://mongo:27017/student-management



volumes:
  mongo-data:
```