Bahria University, Lahore Campus Department of Computer Sciences Lab Journal 2
(Fall 2025)

Course:	**Introduction to Big Data**	Date:
Course Code:	CR 7B	Max Marks: 10
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GITHUB LINK:
https://github.com/AbdulRehaman942004/Big-Data-Analytics-Lab/tree/main/lab2

Lab Objective

This lab is designed to give you a practical start with Docker Compose and multi-database setups. You will prepare your system, configure services, and validate connections. Each task builds on the previous one, ensuring you understand both the setup and verification process.

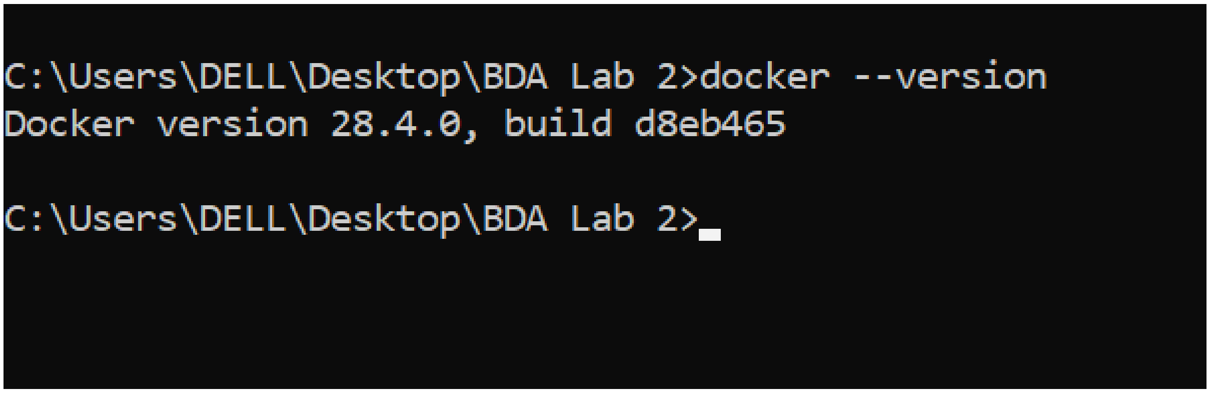
Task 1: Install Docker Compose on Your Computer

- Download and install Docker and Docker Compose for your operating system.

  - Verify the installation by running `docker --version` and `docker compose version`.

  - Ensure Docker Desktop (Windows/macOS) or the Docker engine (Linux) is running properly.

Solution:



```
C:\Users\DELL\Desktop\BDA Lab 2>docker --version
Docker version 28.4.0, build d8eb465

C:\Users\DELL\Desktop\BDA Lab 2>
```

Task 2: Configure Services with `docker-compose.yml` and `.env`

- Create a `docker-compose.yml` file defining services for **Elasticsearch**, **MongoDB**, and a database accessible via **SQLAlchemy** (e.g., PostgreSQL/MySQL).

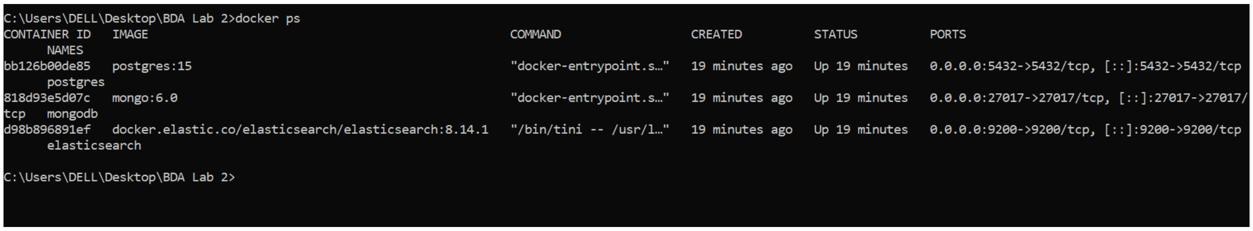
- Use a `.env` file to store variables such as ports, usernames, and passwords securely.

- Reference these environment variables in the `docker-compose.yml` file to keep configuration clean and reusable.

Introduction to Web Engineering

Solution:

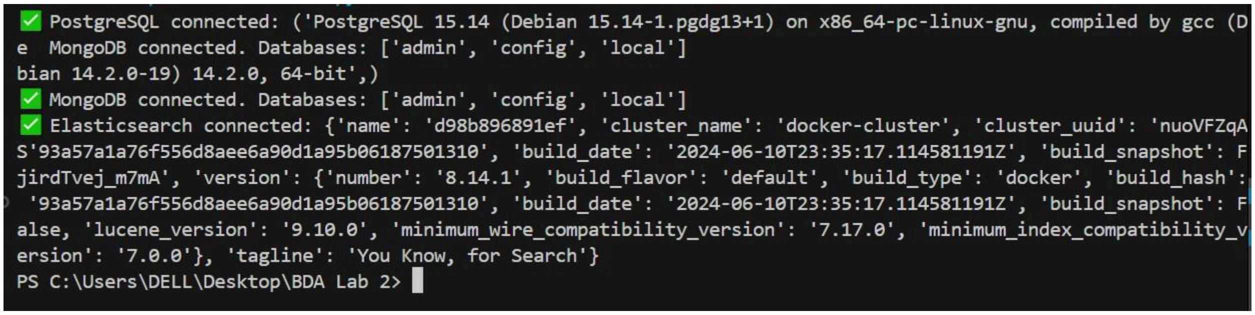
CMD:



```
C:\Users\DELL\Desktop\BDA Lab 2>docker ps
CONTAINER ID   IMAGE                                                 COMMAND                  CREATED          STATUS          PORTS
      NAMES
bb126b00de85   postgres:15                                           "docker-entrypoint.s…"   19 minutes ago   Up 19 minutes   0.0.0.0:5432->5432/tcp, [::]:5432->5432/tcp
      postgres
818d93e5d07c   mongo:6.0                                             "docker-entrypoint.s…"   19 minutes ago   Up 19 minutes   0.0.0.0:27017->27017/tcp, [::]:27017->27017/
tcp   mongodb
d98b896891ef   docker.elastic.co/elasticsearch/elasticsearch:8.14.1   "/bin/tini -- /usr/l…"   19 minutes ago   Up 19 minutes   0.0.0.0:9200->9200/tcp, [::]:9200->9200/tcp
      elasticsearch

C:\Users\DELL\Desktop\BDA Lab 2>
```

IDE terminal:



```
✅ PostgreSQL connected: ('PostgreSQL 15.14 (Debian 15.14-1.pgdg13+1) on x86_64-pc-linux-gnu, compiled by gcc (D
e  MongoDB connected. Databases: ['admin', 'config', 'local']
bian 14.2.0-19) 14.2.0, 64-bit',)
✅ MongoDB connected. Databases: ['admin', 'config', 'local']
✅ Elasticsearch connected: {'name': 'd98b896891ef', 'cluster_name': 'docker-cluster', 'cluster_uuid': 'nuoVFZqA
S'93a57a1a76f556d8aee6a90d1a95b06187501310', 'build_date': '2024-06-10T23:35:17.114581191Z', 'build_snapshot': F
jirdTvej_m7mA', 'version': {'number': '8.14.1', 'build_flavor': 'default', 'build_type': 'docker', 'build_hash':
 '93a57a1a76f556d8aee6a90d1a95b06187501310', 'build_date': '2024-06-10T23:35:17.114581191Z', 'build_snapshot': F
alse, 'lucene_version': '9.10.0', 'minimum_wire_compatibility_version': '7.17.0', 'minimum_index_compatibility_v
ersion': '7.0.0'}, 'tagline': 'You Know, for Search'}
PS C:\Users\DELL\Desktop\BDA Lab 2> █
```

Task 3: Start and Verify Service Connections

- Run `docker-compose up -d` to start all services in the background.

  - Verify Elasticsearch by opening its endpoint (e.g., `http://localhost:9200`) in a browser or using `curl`.

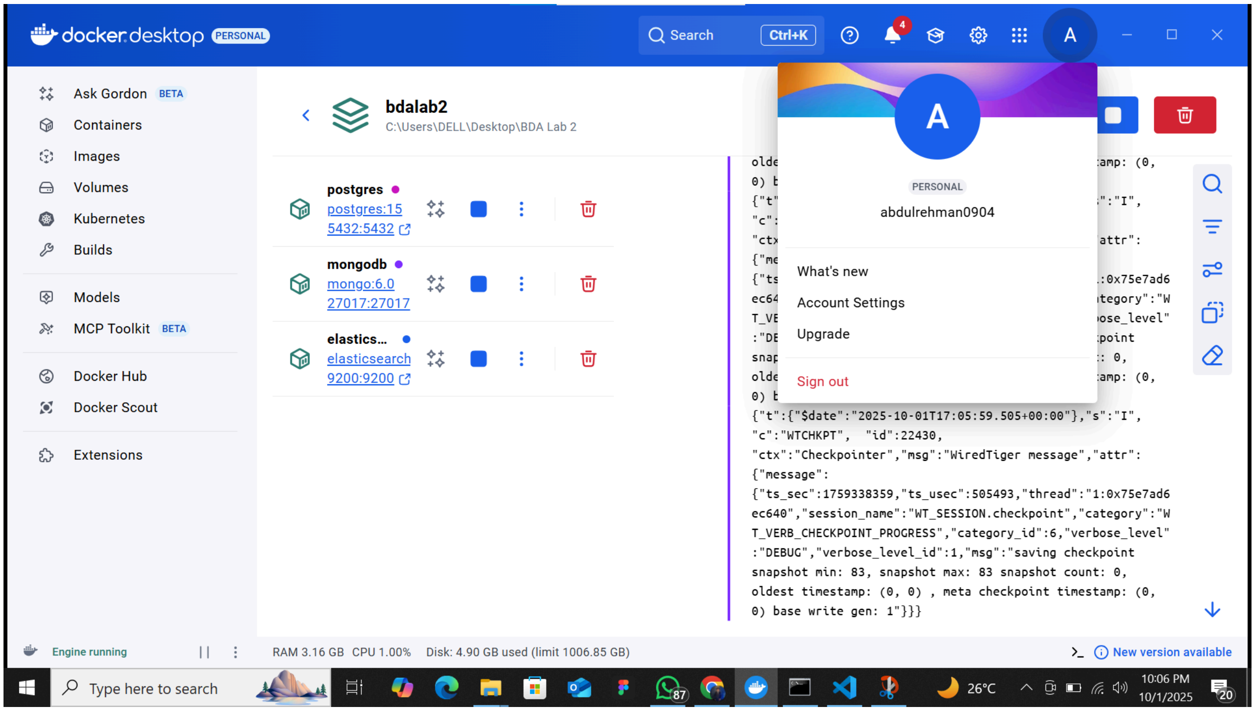
- Connect to MongoDB using a client or CLI (`mongo` or `mongosh`).

- Test SQLAlchemy connection in Python by creating an engine string using `.env`

  credentials and confirming the connection.

  Solution:

Docker Desktop Screenshot:



bdalab2
C:\Users\DELL\Desktop\BDA Lab 2

postgres	postgres:15 5432:5432
mongodb	mongo:6.0 27017:27017
elastics...	elasticsearch 9200:9200

```
olde                                             amp: (0,
0) b
{"t"                                             ":"I",
"c":
"ctx                                             attr":
{"me
{"ts                                             :0x75e7ad6
ec64                                             tegory":"W
T_VE                                             ose_level"
:"DE                                             point
snap                                             : 0,
olde                                             amp: (0,
0) b
{"t":{"$date":"2025-10-01T17:05:59.505+00:00"},"s":"I",
"c":"WTCHKPT",  "id":22430,
"ctx":"Checkpointer","msg":"WiredTiger message","attr":
{"message":
{"ts_sec":1759338359,"ts_usec":505493,"thread":"1:0x75e7ad6
ec640","session_name":"WT_SESSION.checkpoint","category":"W
T_VERB_CHECKPOINT_PROGRESS","category_id":6,"verbose_level"
:"DEBUG","verbose_level_id":1,"msg":"saving checkpoint
snapshot min: 83, snapshot max: 83 snapshot count: 0,
oldest timestamp: (0, 0) , meta checkpoint timestamp: (0,
0) base write gen: 1"}}}
```

RAM 3.16 GB CPU 1.00% Disk: 4.90 GB used (limit 1006.85 GB)

10:06 PM
10/1/2025