Assignment - 8

Team no.: 36
Team Members:
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Github Repo: https://github.com/JENILP910/STTAI-assignments/tree/main/LAB-8

Uploaded Docker Images -
Fastapi1 :- hub.docker.com/r/JENILp99/fastapi1
Fastapi2 :- hub.docker.com/r/JENILp99/fastapi2
Elasticsearch :- hub.docker.com/r/JENILp99/elasticsearch

Creating VMs

VM instances

	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect	
☐	○	backendelasticserver	asia-south1-c			10.160.0.3 (nic0)		SSH ▾	⋮
☐	○	frontendserver	asia-south1-c			10.160.0.2 (nic0)		SSH ▾	⋮

Installing docker on both VMs

```
g24210048@backendelasticserver:~$ curl -fsSL https://get.docker.com -o get-docker.sh
g24210048@backendelasticserver:~$ ls -l
total 24
-rw-rw-r-- 1 g24210048 g24210048 22592 Mar 25 18:25 get-docker.sh
g24210048@backendelasticserver:~$ sudo sh get-docker.sh
# Executing docker install script, commit: 4c94a56999e10efcf48c5b8e3f6afea464f9108e
+ sh -c apt-get -qq update >/dev/null
+ sh -c DEBIAN_FRONTEND=noninteractive apt-get -y -qq install ca-certificates curl >/dev/null
+ sh -c install -m 0755 -d /etc/apt/keyrings
+ sh -c curl -fsSL "https://download.docker.com/linux/ubuntu/gpg" -o /etc/apt/keyrings/docker.asc
+ sh -c chmod a+r /etc/apt/keyrings/docker.asc
+ sh -c echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com/linux/ubuntu oracular stable" > /etc/apt/sources.list.d/docker.list
+ sh -c apt-get -qq update >/dev/null
+ sh -c DEBIAN_FRONTEND=noninteractive apt-get -y -qq install docker-ce docker-ce-cli containerd.io docker-compose-plugin docker-ce-rootless-extras docker-buildx-plugin >/dev/null
sudo docker --version
debconf: delaying package configuration, since apt-utils is not installed
+ sh -c docker version
Client: Docker Engine - Community
 Version:           28.0.4
 API version:       1.48
 Go version:        go1.23.7
 Git commit:        b8034c0
 Built:             Tue Mar 25 15:07:16 2025
 OS/Arch:           linux/amd64
 Context:           default

Server: Docker Engine - Community
 Engine:
  Version:          28.0.4
  API version:      1.48 (minimum version 1.24)
  Go version:       go1.23.7
  Git commit:       6430e49
  Built:            Tue Mar 25 15:07:16 2025
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.7.26
  GitCommit:        753481ec61c7c8955a23d6ff7bc8e4daed455734
 runc:
  Version:          1.2.5
  GitCommit:        v1.2.5-0-g59923ef
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0
```

```
g24210048@frontendserver:~/frontend/frontend$ docker run -d -p 9567:9567 fastapi:1
64524a6f516fd395634241fc360e897bb997f06605bdffd076e7afe9c7b2fdfe
g24210048@frontendserver:~/frontend/frontend$ docker ps
CONTAINER ID   IMAGE       COMMAND                CREATED         STATUS         PORTS                                           NAMES
64524a6f516f   fastapi:1   "uvicorn frontend:ap…"  10 seconds ago  Up 9 seconds   0.0.0.0:9567->9567/tcp, [::]:9567->9567/tcp   optimistic_pasteur
g24210048@frontendserver:~/frontend/frontend$
```

```
g24210048@frontendserver:~/frontend/frontend$ nano Dockerfile
g24210048@frontendserver:~/frontend/frontend$ docker build -t fastapi:1 .
[+] Building 34.4s (10/10) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 300B
 => [internal] load metadata for docker.io/tiangolo/uvicorn-gunicorn-fastapi:python3.9
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [1/5] FROM docker.io/tiangolo/uvicorn-gunicorn-fastapi:python3.9@sha256:972d1598128462b1c5cb763c46fb7806e3d21203e0422380547845bc636366f2
 => resolve docker.io/tiangolo/uvicorn-gunicorn-fastapi:python3.9@sha256:972d1598128462b1c5cb763c46fb7806e3d21203e0422380547845bc636366f2
 => => sha256:0c816d3ba6354c5a224f563691f2df992685d5ce72f41ee5f18884ab0cea9016 3.90kB / 3.90kB
 => => sha256:155ad54a8b2812a0ec559ff82c0c6f0f0dddb337a226b11879f09e15f67b69fc 48.48MB / 48.48MB
 => => sha256:1d281e50d3e435595c266df06531a7e8c2ebb0c185622c8ab2eed8d760e6576b 64.39MB / 64.39MB
 => => sha256:5fe6fe90400c46f9a6fd9f32e4bb7bd099ee1570b85d8ba05179a4df4d238013 9.86kB / 9.86kB
 => => sha256:8031108f3cda87bb32f090262d0109c8a0db99168050967becefad502e9a681b 24.06MB / 24.06MB
 => => sha256:972d1598128462b1c5cb763c46fb7806e3d21203e0422380547845bc636366f2 1.61kB / 1.61kB
 => => extracting sha256:155ad54a8b2812a0ec559ff82c0c6f0f0dddb337a226b11879f09e15f67b69fc
 => => sha256:447713e77b4fc3658cfba0c1e816b70ff6d9bf06563dc8cfcb0459406aed33b4 211.34MB / 211.34MB
 => => sha256:93bee3686f319cf7bd4fcc659256d85121430628478ba3d026b5a96967b35cbe 6.16MB / 6.16MB
 => => sha256:521cad6ddc5302ec0b1d426cdf6df64316fd18ddf3cb0924d24daee81b661501 250B / 250B
 => => sha256:95b7226c62e1a4719940920ae7fffd1ea4915befd3139d7020b84da24182ffd9 19.85MB / 19.85MB
 => => sha256:c6dbfcf462cfb135442e57c6056cf2a54f4739d444f67862696043896a79dbbf 180B / 180B
 => => sha256:09e495b2582a928eccc03809850eb420ebd21c85c97c747e233aee8baf7a0a78 7.13MB / 7.13MB
 => => sha256:7243ea44642baebf2770db162205f2490e0411b520ea112d34b81ea5e3430df4 834B / 834B
 => => sha256:64d6ee42e56b9998a2f53068f0e69d7e7b2a22a7ba9ba075d3017dbbfe2ff96e 541B / 541B
 => => sha256:da40f1d9a2f06c5646615fc7d08973da04caf90d3c8aaa3ee4bbadb9ddd87ca1 541B / 541B
```

```
g24210048@frontendserver:~/frontend/frontend$ sudo usermod -aG docker $USER
g24210048@frontendserver:~/frontend/frontend$ newgrp docker
g24210048@frontendserver:~/frontend/frontend$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
e6590344b1a5: Pull complete
Digest: sha256:7e1a4e2d11e2ac7a8c3f768d4166c2defeb09d2a750b010412b6ea13de1efb19
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/
```

```
g24210048@frontendserver:~$ sudo docker --version
Docker version 28.0.4, build b8034c0
g24210048@frontendserver:~$ sudo systemctl start docker && sudo systemctl enable docker
Synchronizing state of docker.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable docker
g24210048@frontendserver:~$ sudo docker --version
Docker version 28.0.4, build b8034c0
g24210048@frontendserver:~$ []
```

```
g24210048@frontendserver:~$ curl -fsSL https://get.docker.com -o get-docker.sh
g24210048@frontendserver:~$ ls -l
total 24
-rw-rw-r-- 1 g24210048 g24210048 22592 Mar 25 18:29 get-docker.sh
g24210048@frontendserver:~$ sudo sh get-docker.sh
# Executing docker install script, commit: 4c94a56999e10efcf48c5b8e3f6afea464f9108e
+ sh -c apt-get -qq update >/dev/null
+ sh -c DEBIAN_FRONTEND=noninteractive apt-get -y -qq install ca-certificates curl >/dev/null
+ sh -c install -m 0755 -d /etc/apt/keyrings
+ sh -c curl -fsSL "https://download.docker.com/linux/ubuntu/gpg" -o /etc/apt/keyrings/docker.asc
+ sh -c chmod a+r /etc/apt/keyrings/docker.asc
+ sh -c echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com/linux/ubuntu oracular stable" > /etc/apt/sources.list.d/docker.list
+ sh -c apt-get -qq update >/dev/null
+ sh -c DEBIAN_FRONTEND=noninteractive apt-get -y -qq install docker-ce docker-ce-cli containerd.io docker-compose-plugin docker-ce-rootless-extras docker-buildx-plugin >/dev/null
debconf: delaying package configuration, since apt-utils is not installed
+ sh -c docker version
Client: Docker Engine - Community
 Version:           28.0.4
 API version:       1.48
 Go version:        go1.23.7
 Git commit:        b8034c0
 Built:             Tue Mar 25 15:07:16 2025
 OS/Arch:           linux/amd64
 Context:           default

Server: Docker Engine - Community
 Engine:
  Version:          28.0.4
  API version:      1.48 (minimum version 1.24)
  Go version:       go1.23.7
  Git commit:       6430e49
  Built:            Tue Mar 25 15:07:16 2025
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.7.26
  GitCommit:        753481ec61c7c8955a23d6ff7bc8e4daed455734
 runc:
  Version:          1.2.5
  GitCommit:        v1.2.5-0-g59923ef
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0
```

```
g24210048@backendelasticserver:~$ sudo systemctl start docker
sudo systemctl enable docker
Synchronizing state of docker.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable docker
g24210048@backendelasticserver:~$ sudo docker --version
Docker version 28.0.4, build b8034c0
g24210048@backendelasticserver:~$ 
```

Creating all required Docker Files and Running the containers:

```
g24210048@backendelasticserver:~$ cd ./backend/
g24210048@backendelasticserver:~/backend$ ls -l
total 0
g24210048@backendelasticserver:~/backend$ nano Dockerfile
g24210048@backendelasticserver:~/backend$ nano backend.py
g24210048@backendelasticserver:~/backend$ cd ..
g24210048@backendelasticserver:~$ ls -l
total 28
drwxrwxr-x 2 g24210048 docker      4096 Mar 25 20:14 backend
-rw-rw-r-- 1 g24210048 g24210048 22592 Mar 25 18:25 get-docker.sh
g24210048@backendelasticserver:~$ nano docker-compose.yml
g24210048@backendelasticserver:~$ ls -l
total 32
drwxrwxr-x 2 g24210048 docker      4096 Mar 25 20:14 backend
-rw-rw-r-- 1 g24210048 g24210048   824 Mar 25 20:15 docker-compose.yml
-rw-rw-r-- 1 g24210048 g24210048 22592 Mar 25 18:25 get-docker.sh
```

```
g24210048@backendelasticserver:~$ docker ps
CONTAINER ID   IMAGE                                                 COMMAND                  CREATED         STATUS         PORTS
                                                       NAMES
968bfa24cdef   fastapi:2                                             "uvicorn backend:app…"   6 seconds ago   Up 5 seconds   0.0.0.0:95
67->9567/tcp, [::]:9567->9567/tcp              fastapi-backend
e881c62bd6e6   docker.elastic.co/elasticsearch/elasticsearch:8.6.0   "/bin/tini -- /usr/l…"   6 seconds ago   Up 5 seconds   0.0.0.0:92
00->9200/tcp, [::]:9200->9200/tcp, 9300/tcp    elasticsearch
```

```
g24210048@backendelasticserver:~$ docker-compose up -d
[+] Running 10/10
 ✓ elasticsearch Pulled
   ✓ 36a9c60c46d0 Pull complete
   ✓ d22663168337 Pull complete
   ✓ 47f973eb47ad Pull complete
   ✓ 5b345eb4fdd6 Pull complete
   ✓ 8b5c3573d266 Pull complete
   ✓ 323f6dbbcf4d Pull complete
   ✓ 25ac60e263ed Pull complete
   ✓ db482dcb21ce Pull complete
   ✓ e696351a49b5 Pull complete
[+] Running 3/3
 ✓ Network g24210048_backend-network   Created
 ✓ Container elasticsearch             Started
 ✓ Container fastapi-backend           Started
```

```
g24210048@backendelasticserver:~$ ls -l
total 32
drwxrwxr-x 2 g24210048 docker     4096 Mar 25 20:28 backend
-rw-rw-r-- 1 g24210048 g24210048   824 Mar 25 20:15 docker-compose.yml
-rw-rw-r-- 1 g24210048 g24210048 22592 Mar 25 18:25 get-docker.sh
g24210048@backendelasticserver:~$ docker-compose build
Compose can now delegate builds to bake for better performance.
 To do so, set COMPOSE_BAKE=true.
[+] Building 35.5s (12/12) FINISHED                                                          docker:default
 => [backend internal] load build definition from Dockerfile                                          0.0s
 => => transferring dockerfile: 276B                                                                  0.0s
 => [backend internal] load metadata for docker.io/library/python:3.9                                 0.8s
 => [backend internal] load .dockerignore                                                             0.0s
 => => transferring context: 2B                                                                       0.0s
 => [backend 1/6] FROM docker.io/library/python:3.9@sha256:bc2e05bca883473050fc3b7c134c28ab822be73126ba1c  21.1s
 => => resolve docker.io/library/python:3.9@sha256:bc2e05bca883473050fc3b7c134c28ab822be73126ba1ce29517d9e  0.0s
 => => sha256:3db46eeb095dbddf83794896233f9ed627746b394587600bf4e8e4c68303a915 2.32kB / 2.32kB       0.0s
 => => sha256:091eb8249475f42de217265c501e0186f0a3ea7490ef7f51458c30db91fb3cac 24.01MB / 24.01MB     0.9s
 => => sha256:255774e0027b72d2327719e78dbad5ad8c9cf446d055e45be7fc149418470bae 64.40MB / 64.40MB     1.5s
 => => sha256:bc2e05bca883473050fc3b7c134c28ab822be73126ba1ce29517d9e8b7f3703b 10.35kB / 10.35kB     0.0s
 => => sha256:859d4a0f1fd8b03e685b4f3b6f0abfeeb84cca3047f9b87d0a8c8f3c90764365 6.17kB / 6.17kB       0.0s
 => => sha256:7cd785773db44407e20a679ce5439222e505475eed5b99f1910eb2cda51729ab 48.47MB / 48.47MB     0.9s
```
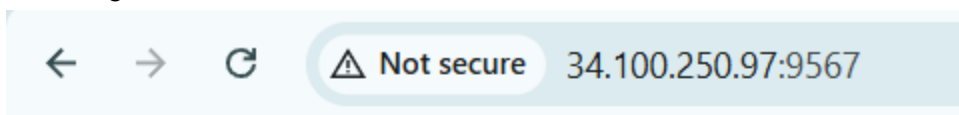
Checking Access from the browser

← → C ⚠ Not secure 34.100.250.97:9567

FastAPI Elasticsearch Frontend

Enter text to insert [Insert]

Enter search query [Search]

Inserting and Querying the 4 documents

FastAPI Elasticsearch Frontend

[India, officially the Republic] [Insert]

[Enter search query] [Search]

✅ Stored successfully!

ID: 7

Text: India, officially the Republic of India,[j][21] is a country in South Asia. It is the seventh-largest country by area; the most populous country from June 2023 onwards;[22][23] and since its independence in 1947, the world's most populous democracy.[24][25][26] Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west;[k] China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east. In the Indian Ocean, India is near Sri Lanka and the Maldives; its Andaman and Nicobar Islands share a maritime border with Thailand, Myanmar, and Indonesia.

FastAPI Elasticsearch Frontend

[Modern humans arrived on] [Insert]

[Enter search query] [Search]

✅ Stored successfully!

ID: 8

Text: Modern humans arrived on the Indian subcontinent from Africa no later than 55,000 years ago.[28][29][30] Their long occupation, predominantly in isolation as hunter-gatherers, has made the region highly diverse, second only to Africa in human genetic diversity.[31] Settled life emerged on the subcontinent in the western margins of the Indus river basin 9,000 years ago, evolving gradually into the Indus Valley Civilisation of the third millennium BCE.[32] By 1200 BCE, an archaic form of Sanskrit, an Indo-European language, had diffused into India from the northwest.[33][34] Its hymns recorded the dawning of Hinduism in India.[35] India's pre-existing Dravidian languages were supplanted in the northern regions.[36] By 400 BCE, caste had emerged within Hinduism,[37] and Buddhism and Jainism had arisen, proclaiming social orders unlinked to heredity.[38] Early political consolidations gave rise to the loose-knit

FastAPI Elasticsearch Frontend

[In the early mediaeval era,] [Insert]

[Enter search query] [Search]

✅ Stored successfully!

ID: 9

Text: In the early mediaeval era, Christianity, Islam, Judaism, and Zoroastrianism became established on India's southern and western coasts.[44] Muslim armies from Central Asia intermittently overran India's northern plains.[45] The resulting Delhi Sultanate drew northern India into the cosmopolitan networks of mediaeval Islam.[46] In south India, the Vijayanagara Empire created a long-lasting composite Hindu culture.[47] In the Punjab, Sikhism emerged, rejecting institutionalised religion.[48] The Mughal Empire, in 1526, ushered in two centuries of relative peace,[49] leaving a legacy of luminous architecture.[m][50] Gradually expanding rule of the British East India Company turned India into a colonial economy but consolidated its sovereignty.[51] British Crown rule began in 1858. The rights promised to Indians were granted slowly,[52][53] but technological changes were introduced, and modern ideas of

FastAPI Elasticsearch Frontend

[India has been a federal rep] [Insert]

[Enter search query] [Search]

✅ Stored successfully!

ID: 10

Text: India has been a federal republic since 1950, governed through a democratic parliamentary system. It is a pluralistic, multilingual and multi-ethnic society. India's population grew from 361 million in 1951 to over 1.4 billion in 2023.[62] During this time, its nominal per capita income increased from US$64 annually to US$2,601, and its literacy rate from 16.6% to 74%. A comparatively destitute country in 1951,[63] India has become a fast-growing major economy and hub for information technology services; it has an expanding middle class.[64] Indian movies and music increasingly influence global culture.[65] India has reduced its poverty rate, though at the cost of increasing economic inequality.[66] It is a nuclear-weapon state that ranks high in military expenditure. It has disputes over Kashmir with its neighbours, Pakistan and China, unresolved since the mid-20th century.[67] Among the socio-economic

FastAPI Elasticsearch Frontend

[India has been a federal rep] [Insert]

[India] [Search]

✅ Best Document Found:

ID: 3

Text: India, officially the Republic of India,[j][21] is a country in South Asia. It is the seventh-largest country by area; the most populous country from June 2023 onwards;[22][23] and since its independence in 1947, the world's most populous democracy.[24][25][26] Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west;[k] China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east. In the Indian Ocean, India is near Sri Lanka and the Maldives; its Andaman and Nicobar Islands share a maritime border with Thailand, Myanmar, and Indonesia.

Pushing the images:

```
(Python39) C:\Users\JENIL\Desktop\LABS SEM-2\Software Tools & Techniques for AI\LAB-8>push_docker_containers.sh

(Python39) C:\Users\JENIL\Desktop\LABS SEM-2\Software Tools & Techniques for AI\LAB-8>docker login
Authenticating with existing credentials... [Username: jenilp99]

Info → To login with a different account, run 'docker logout' followed by 'docker login'


Login Succeeded

(Python39) C:\Users\JENIL\Desktop\LABS SEM-2\Software Tools & Techniques for AI\LAB-8>docker tag fastapi:1 JENILp99/fastapi:1

(Python39) C:\Users\JENIL\Desktop\LABS SEM-2\Software Tools & Techniques for AI\LAB-8>docker tag fastapi:1 JENILp99/fastapi:2

(Python39) C:\Users\JENIL\Desktop\LABS SEM-2\Software Tools & Techniques for AI\LAB-8>docker tag fastapi:1 JENILp99/elasticsearch
```

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3.64 GB / 4.77 GB in use   14 images   Last refresh: 20 hours ago

		Name	Tag	Image ID	Created	Size	Actions
☐	●	JENILp99/elasticsearch	latest	02c1c9937ed2	2 days ago	1.53 GB	▷ ⋮ 🗑
☐	●	JENILp99/fastapi	1	02c1c9937ed2	2 days ago	1.53 GB	▷ ⋮ 🗑
☐	●	JENILp99/fastapi	2	02c1c9937ed2	2 days ago	1.53 GB	▷ ⋮ 🗑

Netstat on GCP

```
g24210048@backendelasticserver:~$ netstat -antp | grep LISTEN
(No info could be read for "-p": geteuid()=1001 but you should be root.)
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:9567            0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:20202           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.54:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:9200            0.0.0.0:*               LISTEN      -
tcp6       0      0 :::9567                 :::*                    LISTEN      -
tcp6       0      0 :::20201                :::*                    LISTEN      -
tcp6       0      0 :::22                   :::*                    LISTEN      -
tcp6       0      0 :::9200                 :::*                    LISTEN      -
```

```
g24210048@frontendserver:~/frontend$ netstat -antp | grep LISTEN
(No info could be read for "-p": geteuid()=1001 but you should be root.)
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.54:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:9657            0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:20202           0.0.0.0:*               LISTEN      -
tcp6       0      0 :::22                   :::*                    LISTEN      -
tcp6       0      0 :::9657                 :::*                    LISTEN      -
tcp6       0      0 :::20201                :::*                    LISTEN      -
```