 Marwadi University Marwadi Chandarana Group	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Cloud Computing(01CT1611)	Aim: Guided project (Dynamic web deployment)	
Experiment No: 13	Date:	Enrolment No: 92310133008

Project Overview:

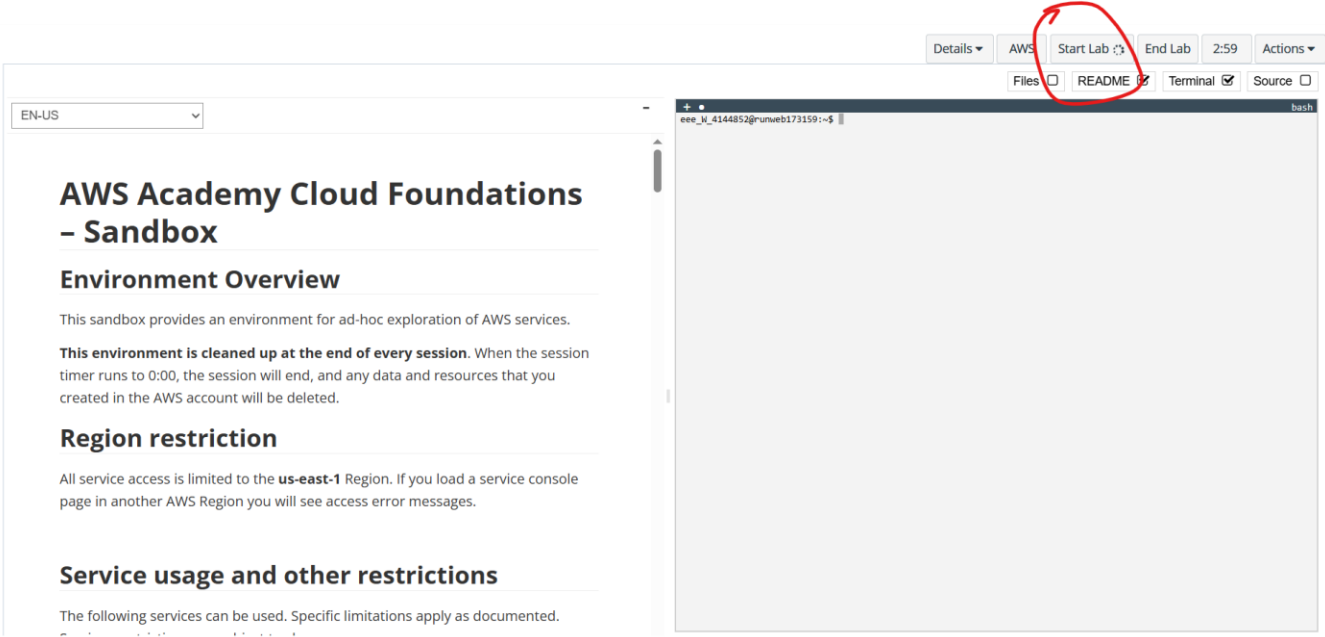
In this project, we will:

1. **Set Up AWS Infrastructure:** Create VPC, subnets, security groups, and EC2 instances.
2. **Deploy Web Application:** Host the application on EC2 and store static content on S3.
3. **Configure Networking:** Use Route 53 for domain mapping and Elastic IP for public access.
4. **Enable Scalability and Security:** Implement Load Balancer, Auto Scaling, and IAM roles.
5. **Access and Manage with PuTTY:** Use PuTTY for secure SSH access to the server.
6. **Optimize with CloudFront:** Distribute content globally for faster access.

Step 1: Setting Up AWS and EC2 Instance

1 ☐ Launch the AWS Academy Learner Lab:

- Go to **AWS Academy Learner Lab** → Click on **Start Lab** → Wait until the red dot turns green.
- Click on **AWS (green icon)** → This will take you to the **AWS Console**.



The screenshot displays the AWS Academy Cloud Foundations - Sandbox interface. The top navigation bar includes buttons for 'Details', 'AWS', 'Start Lab' (highlighted with a red circle), 'End Lab', '2:59', and 'Actions'. Below the navigation bar, the main content area is divided into two sections: 'EN-US' on the left and a terminal window on the right. The terminal window shows the command prompt 'eee_h_4144852@runweb173159:~\$' and a 'bash' prompt. The main content area contains the following text:

AWS Academy Cloud Foundations - Sandbox

Environment Overview

This sandbox provides an environment for ad-hoc exploration of AWS services.


This environment is cleaned up at the end of every session. When the session timer runs to 0:00, the session will end, and any data and resources that you created in the AWS account will be deleted.

Region restriction

All service access is limited to the **us-east-1** Region. If you load a service console page in another AWS Region you will see access error messages.

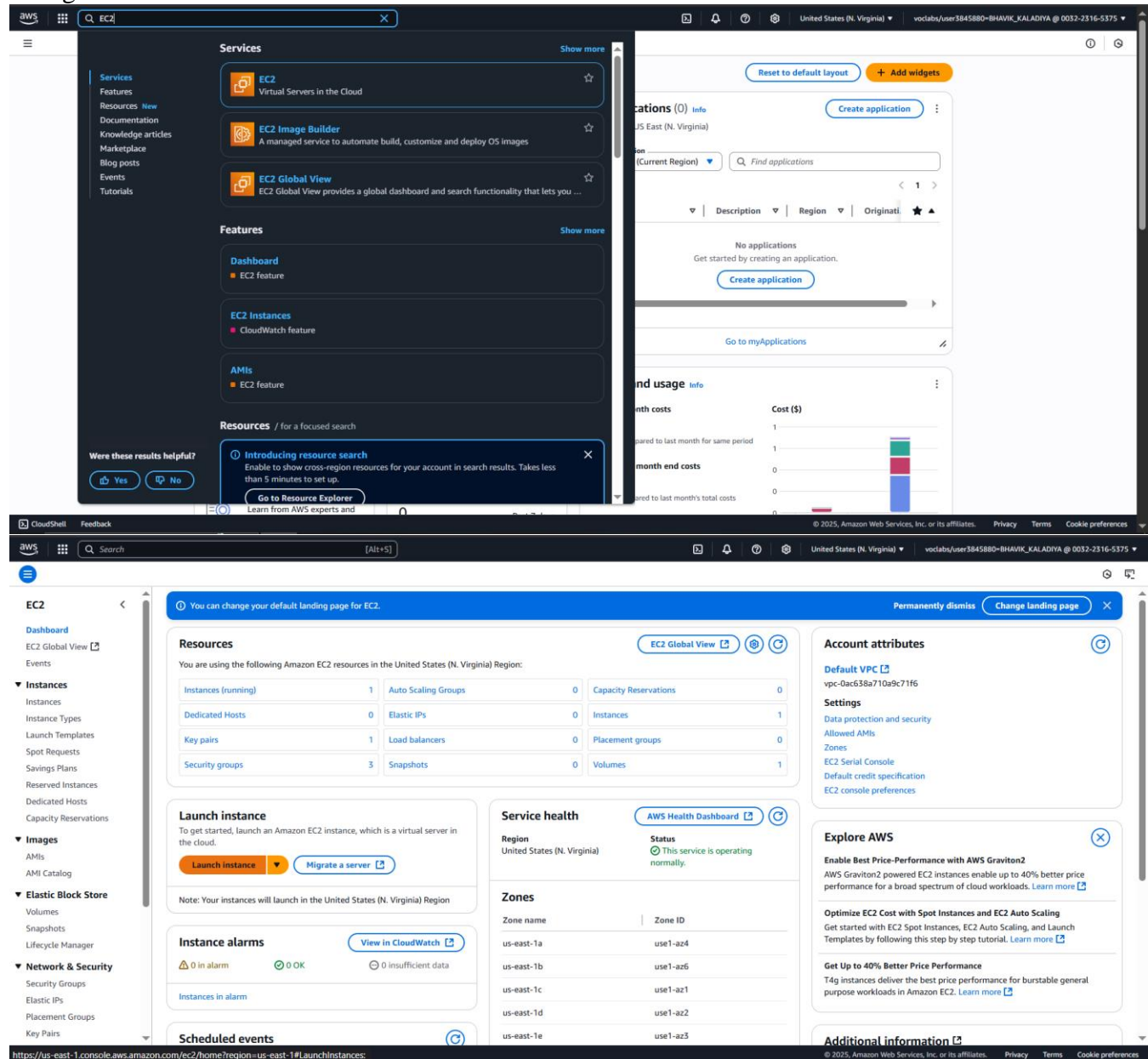
Service usage and other restrictions

The following services can be used. Specific limitations apply as documented.

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2. Launch an EC2 Instance:

- Navigate to **EC2** → **Instances** → **Launch Instances**.




The screenshot displays the AWS Management Console for the EC2 service. The top navigation bar shows the AWS logo and the user's account information. The left sidebar contains the navigation menu, with 'Instances' selected. The main content area is divided into several sections:

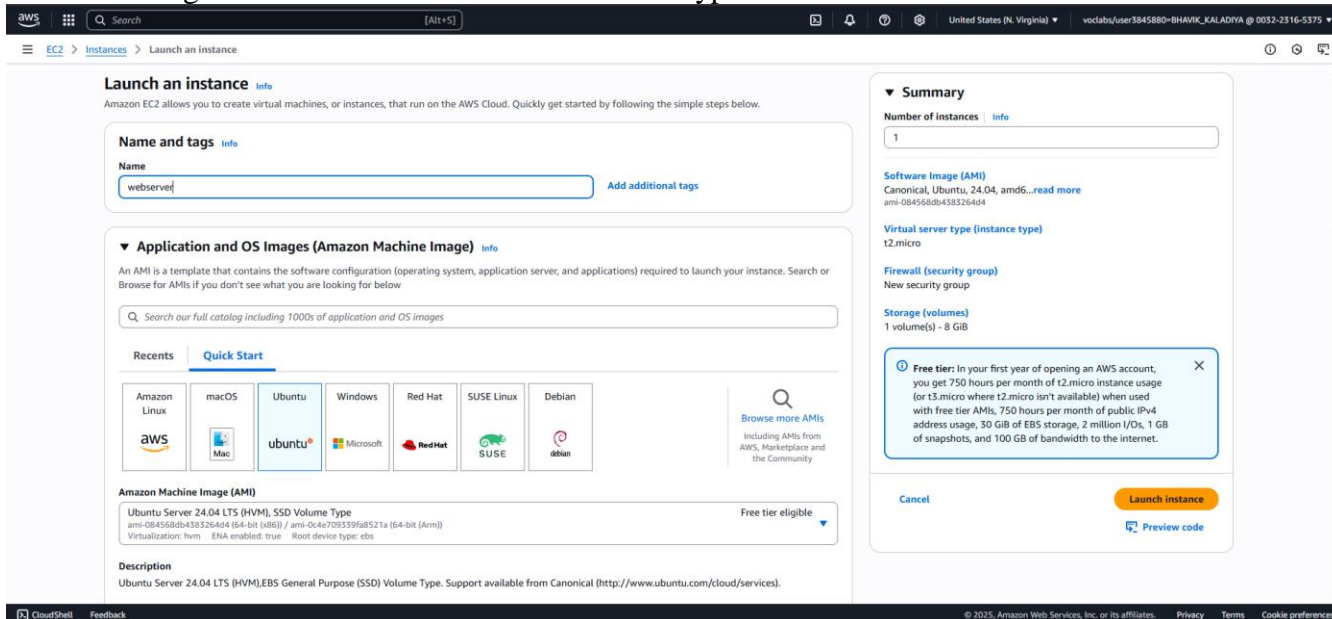
- Services:** A list of services related to EC2, including EC2 (Virtual Servers in the Cloud), EC2 Image Builder (A managed service to automate build, customize and deploy OS images), and EC2 Global View (EC2 Global View provides a global dashboard and search functionality that lets you ...).
- Features:** A list of features, including Dashboard (EC2 feature), EC2 Instances (CloudWatch feature), and AMIs (EC2 feature).
- Resources:** A section for searching resources, with a message: "Introducing resource search. Enable to show cross-region resources for your account in search results. Takes less than 5 minutes to set up. Go to Resource Explorer.".
- Applications (0):** A section for managing applications, with a message: "No applications. Get started by creating an application. Create application".
- Usage:** A section showing usage graphs for month costs and month end costs.
- Launch instance:** A section with a "Launch instance" button and a "Migrate a server" link.
- EC2 Global View:** A link to view EC2 resources across regions.
- Resources:** A table showing the resources used in the United States (N. Virginia) Region:

Resource	Count
Instances (running)	1
Dedicated Hosts	0
Key pairs	1
Security groups	3
Auto Scaling Groups	0
Elastic IPs	0
Load balancers	0
Snapshots	0
Capacity Reservations	0
Instances	1
Placement groups	0
Volumes	1
- Service health:** A section showing the status of the EC2 service, with a message: "Status: This service is operating normally".
- Zones:** A table showing the zones available in the region:

Zone name	Zone ID
us-east-1a	use1-az4
us-east-1b	use1-az6
us-east-1c	use1-az1
us-east-1d	use1-az2
us-east-1e	use1-az3
- Account attributes:** A section showing account attributes, including Default VPC (vpc-0ac638a710a9c71f6) and Settings (Data protection and security, Allowed AMIs, Zones, EC2 Serial Console, Default credit specification, EC2 console preferences).
- Explore AWS:** A section with links to "Enable Best Price-Performance with AWS Graviton2" and "Optimize EC2 Cost with Spot Instances and EC2 Auto Scaling".
- Get Up to 40% Better Price Performance:** A section with a link to "T4g instances deliver the best price performance for burstable general purpose workloads in Amazon EC2".
- Additional information:** A section with a link to "Additional information".

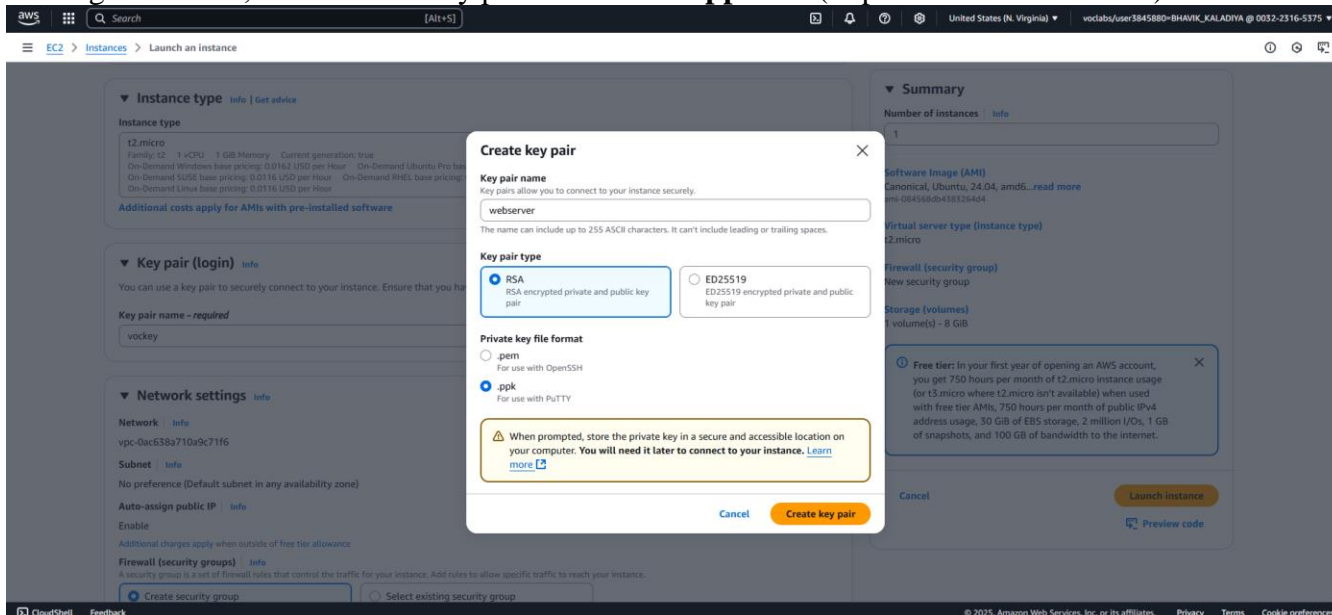
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- Enter a name for your instance (e.g., webserver).
- Choose **Ubuntu Server 22.04 LTS (HVM), SSD Volume Type (Free tier eligible)**.
- Confirm changes and select **t2.micro** as the instance type.



3. Key Pair Setup:

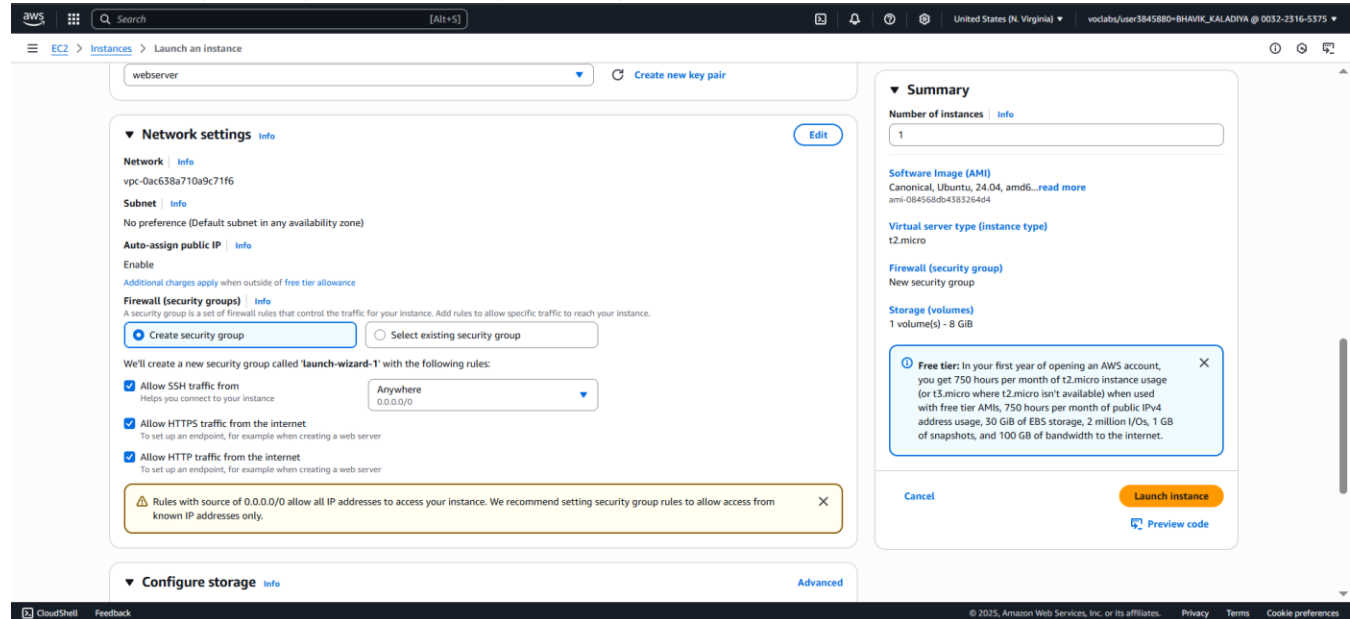
- If you are using **Method 2**, select **vockey**.
- If using **Method 1**, create a new key pair → Save the **.ppk file** (important for SSH access).



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4 □ Configure Security Groups:

- Allow **HTTP (Port 80)** and **HTTPS (Port 443)** traffic from the internet.



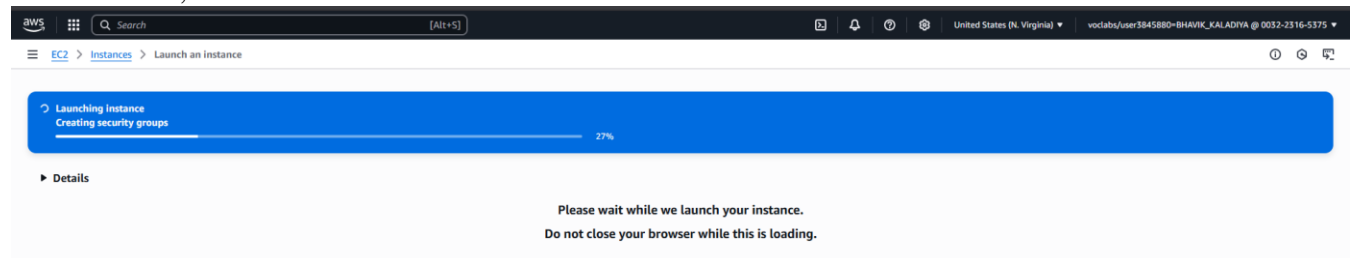
The screenshot shows the 'Launch an instance' wizard in the AWS Management Console, specifically the 'Network settings' step. The 'Network' dropdown is set to 'vpc-0ac638a710a9c71f6'. Under 'Firewall (security groups)', the 'Create security group' option is selected. The wizard suggests creating a new security group named 'launch-wizard-1' with the following rules:

- ☒ Allow SSH traffic from: Anywhere (0.0.0.0/0)
- ☒ Allow HTTPS traffic from the internet
- ☒ Allow HTTP traffic from the internet


A warning message states: 'Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' The 'Summary' panel on the right shows the instance configuration: 1 instance, Canonical Ubuntu 24.04 AMI, t2.micro instance type, and a new security group. A 'Free tier' notification is also visible.

5 □ Launch Instance:

- Click on **Launch Instance** → Wait for it to initialize.
- Once created, click on the **Instance ID** to see the details.

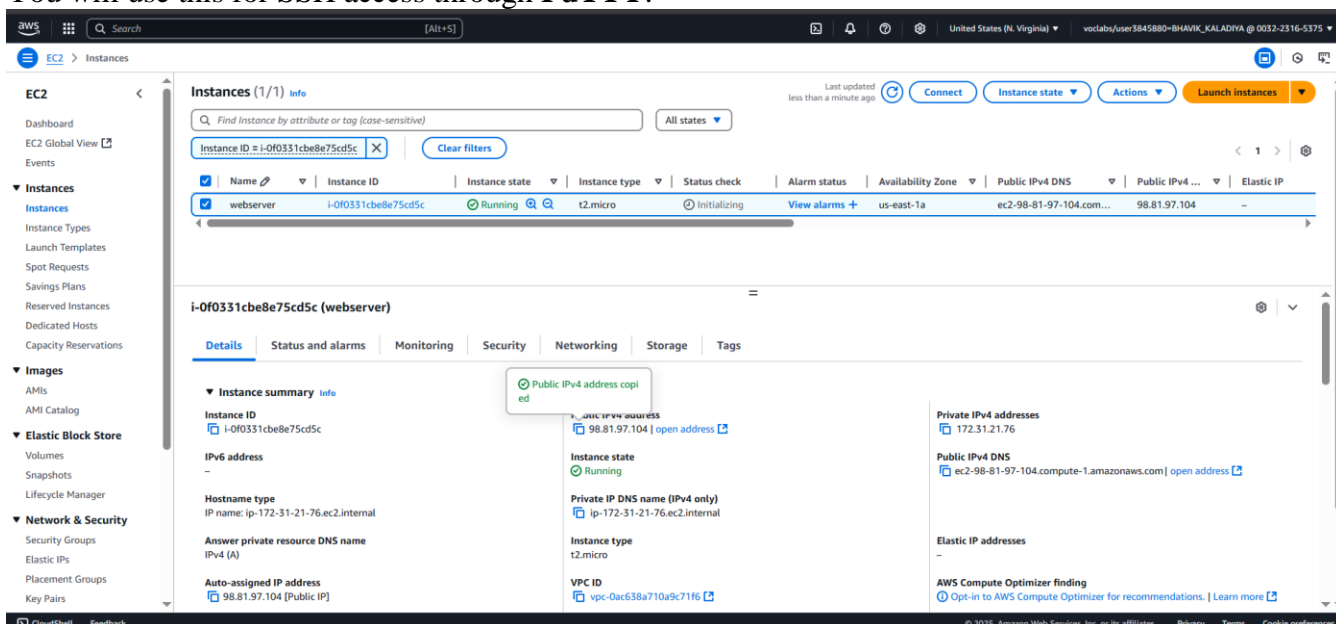


The screenshot shows the 'Launching instance' step of the AWS 'Launch an instance' wizard. A progress bar indicates that 'Creating security groups' is 27% complete. Below the progress bar, the text reads: 'Please wait while we launch your instance. Do not close your browser while this is loading.'

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6□ Connect to the Instance:

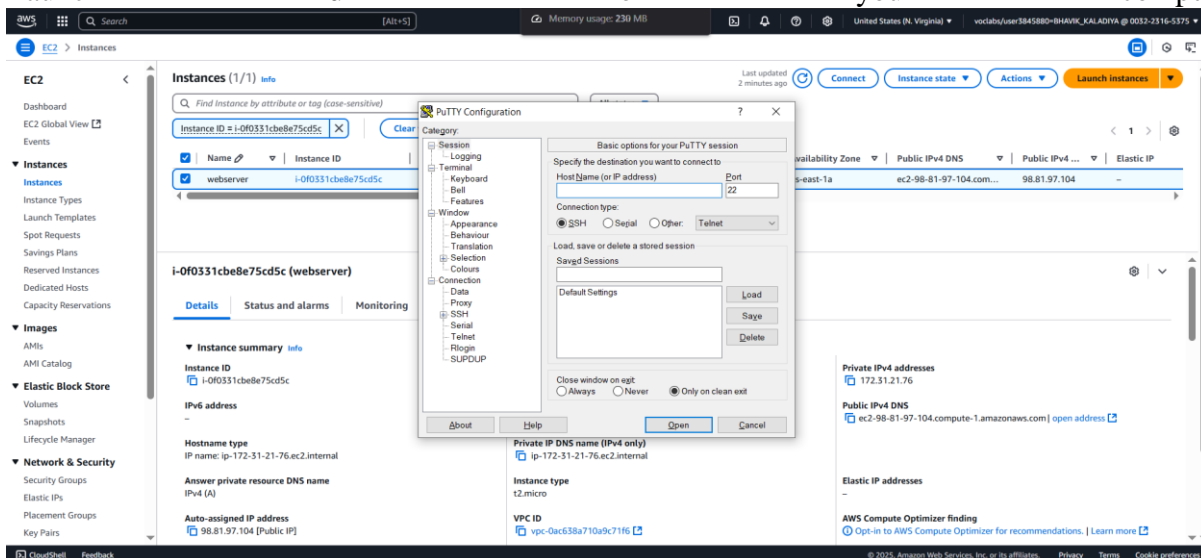
- Click on **Connect** → Note the **Public IPv4 address**.
- You will use this for SSH access through **PuTTY**.




Step 2: Configuring PuTTY for SSH Access

1□ Open PuTTY:

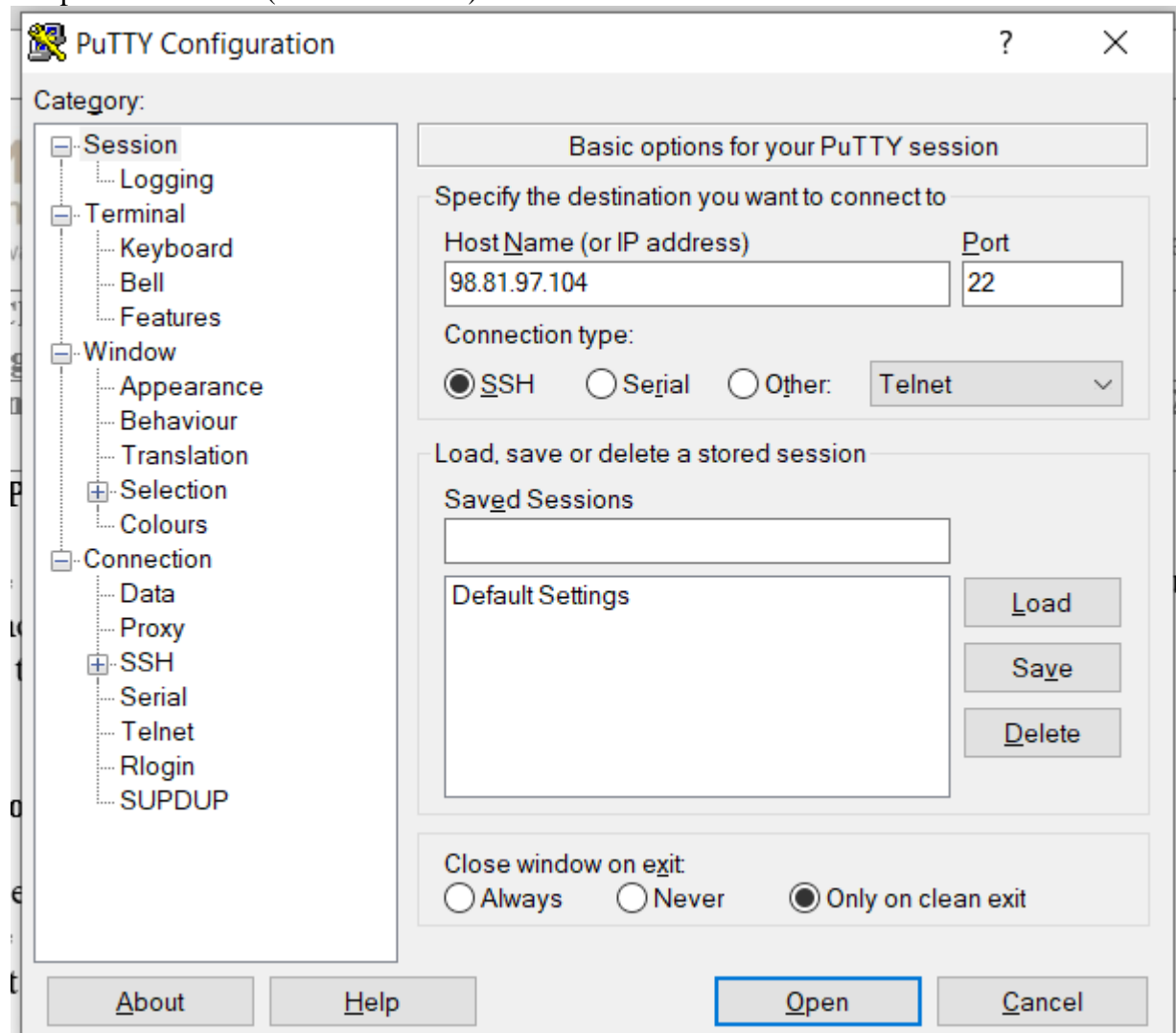
- Launch **PuTTY** on your computer.



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2 ☐ Enter the Public IPv4 Address:

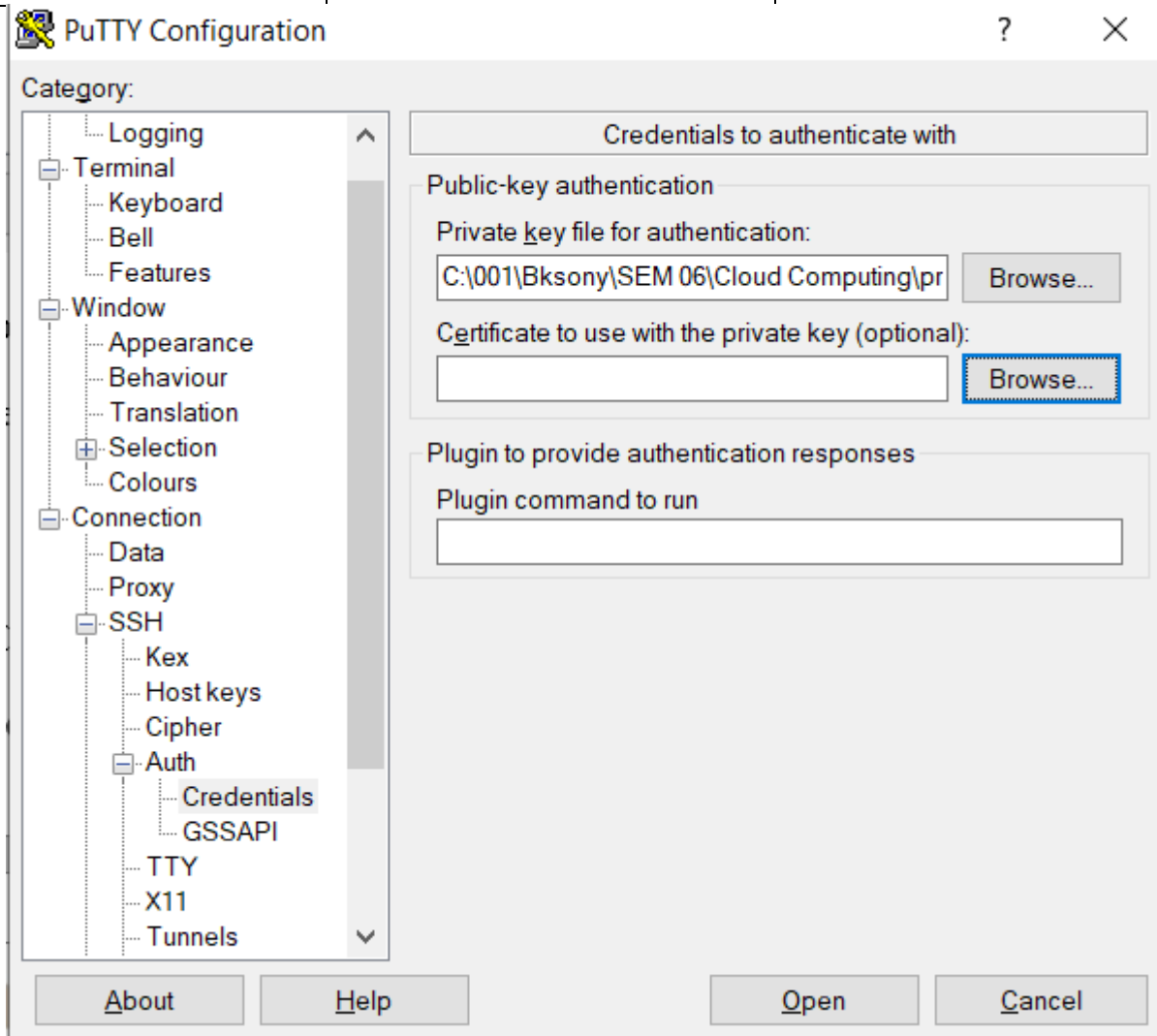
- In the **Host Name (or IP address)** field, paste the **Public IPv4 address** from your AWS instance.
- Keep the **Port** as **22** (default for SSH).



3 ☐ Navigate to Authentication Settings:


- On the left panel, go to **Connection** → **SSH** → **Auth** → **Credentials**.
- In the **Private key file for authentication** section, click **Browse**.
- Select the **.ppk file** that you downloaded earlier for key-based authentication.

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4□ Open the Connection:

- Click **Open** → A terminal window will pop up.
- You will be prompted to enter the **login as:** — type **ubuntu** and press Enter.

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```

ubuntu@ip-172-31-21-76: ~
login as: ubuntu
Authenticating with public key "webserver"
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1024-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Mon May 12 10:40:01 UTC 2025

System load:  0.08               Processes:            103
Usage of /:   25.0% of 6.71GB    Users logged in:     0
Memory usage: 20%               IPv4 address for enX0: 172.31.21.76
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

• The list of available updates is more than a week old.

```

5 Switch to Root User:


- Type the command:

```

bash
CopyEdit
sudo su

```

- This command gives you root (admin) access.

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```

root@ip-172-31-21-76: /home/ubuntu
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-21-76:~$ sudo su
root@ip-172-31-21-76:/home/ubuntu#

```

Step 3: Update and Install Apache Web Server

1□ Update the System Packages:

- Run the following command to update the package lists:


```
apt update
```

2□ Install Apache2 Web Server:

- Execute the command to install Apache:

```
apt install apache2
```

- When prompted, type **y** and press **Enter** to confirm the installation.

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3▣ Start the Apache Service:

- Start the Apache service with the following command:

```
service apache2 start
```

4▣ Verify Apache Service Status:

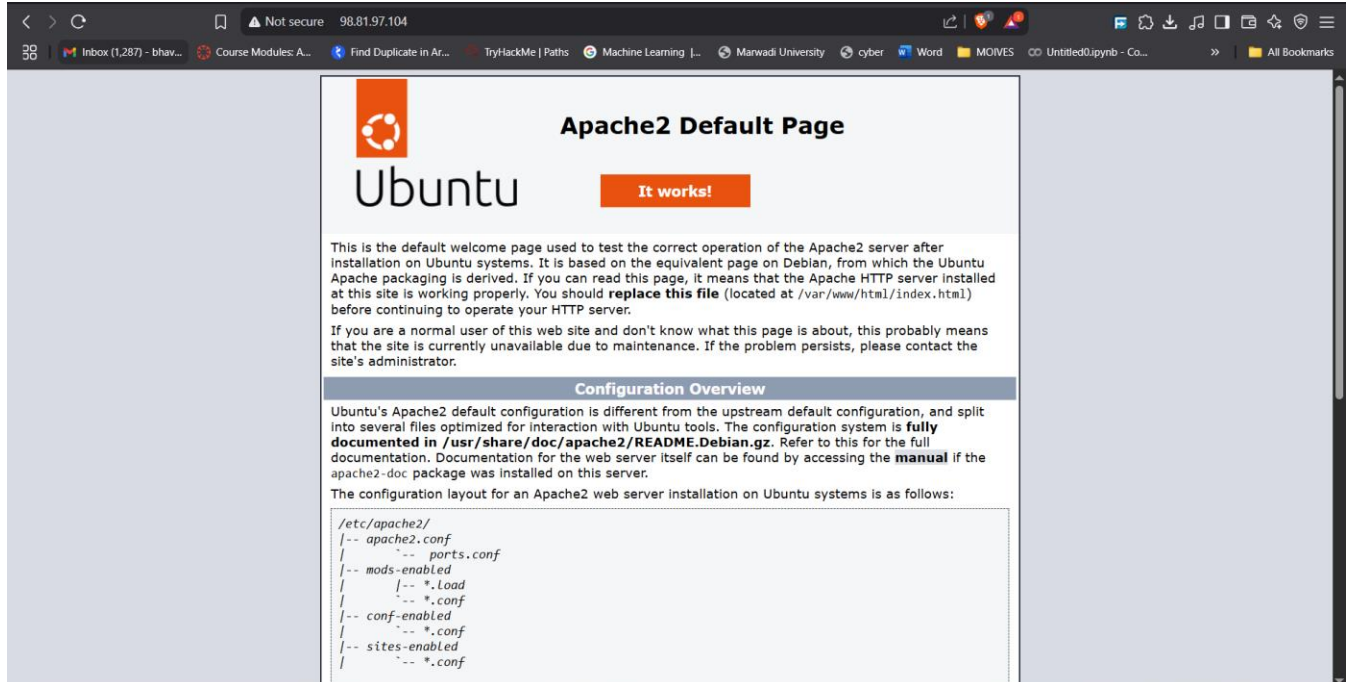
- Check if Apache is running correctly:

```
service apache2 status
```

- If it is active and running, you are good to go. Press **q** or **Ctrl + C** to exit the status screen.

5▣ Test in Web Browser:


- Open your browser and enter your **Public IPv4 address** from AWS.
- You should see the **Apache2 Ubuntu Default Page**, confirming that Apache is correctly set up.



Step 4: Clean Up Default Apache Page and Prepare for PHP

1. Go to the Apache HTML Directory:

```
cd /var/www/html/
```

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2. List the Files:

```
ls
```

You should see `index.html`.

3. Remove the Default File:

```
bash
CopyEdit
rm index.html
```

Confirm it's deleted:

```
bash
CopyEdit
ls
```

Step 5: Install PHP and MySQL

1. Install PHP:

```
apt install php
```

2. Install MySQL Server:

```
apt install mysql-server
```

3. Install PHP-MySQL Module:

```
sudo apt install php-mysqli
```

Step 6: Upload PHP Project via FileZilla

1. Open FileZilla > File > Site Manager

2. Create New Site and configure:

- **Protocol:** SFTP - SSH File Transfer Protocol
- **Host:** *Your EC2 Public IPv4*
- **Port:** 22
- **Logon Type:** Key File
- **User:** ubuntu
- **Key File:** Browse to your `.ppk` file

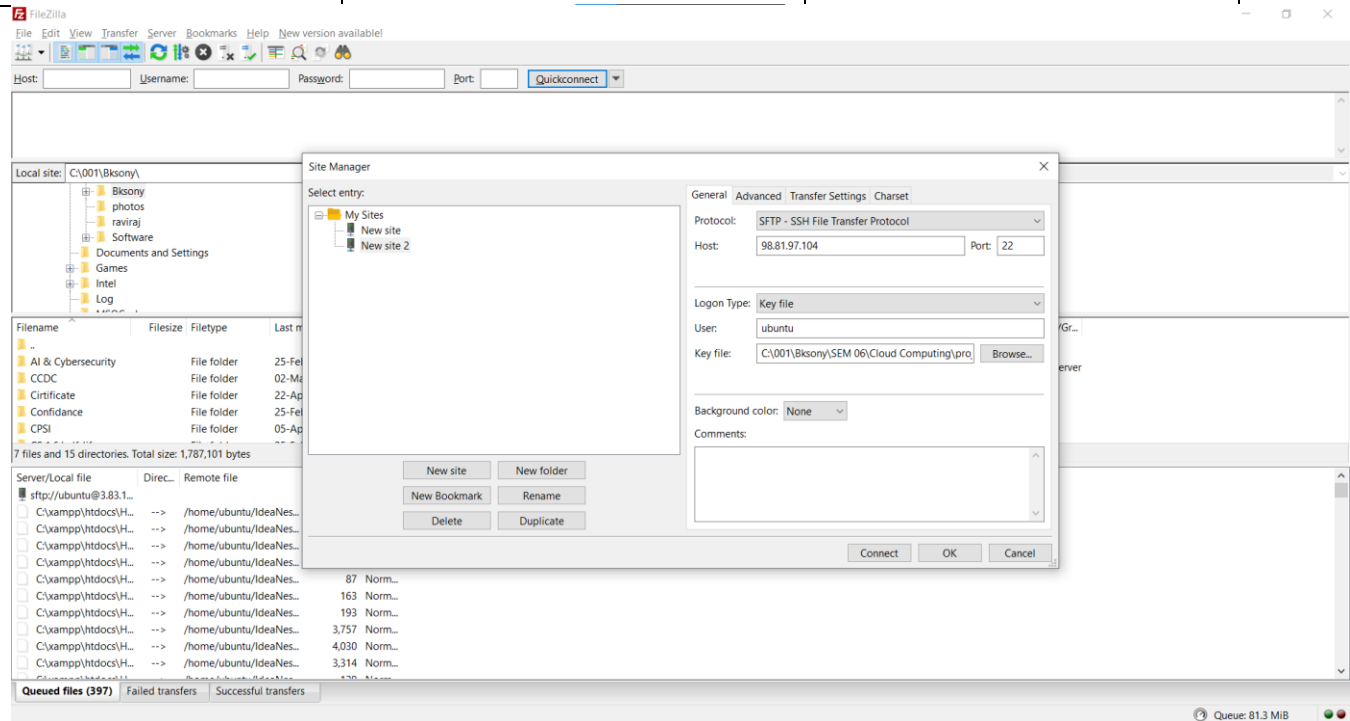
Subject: Cloud Computing(01CT1611)

Aim: Guided project (Dynamic web deployment)

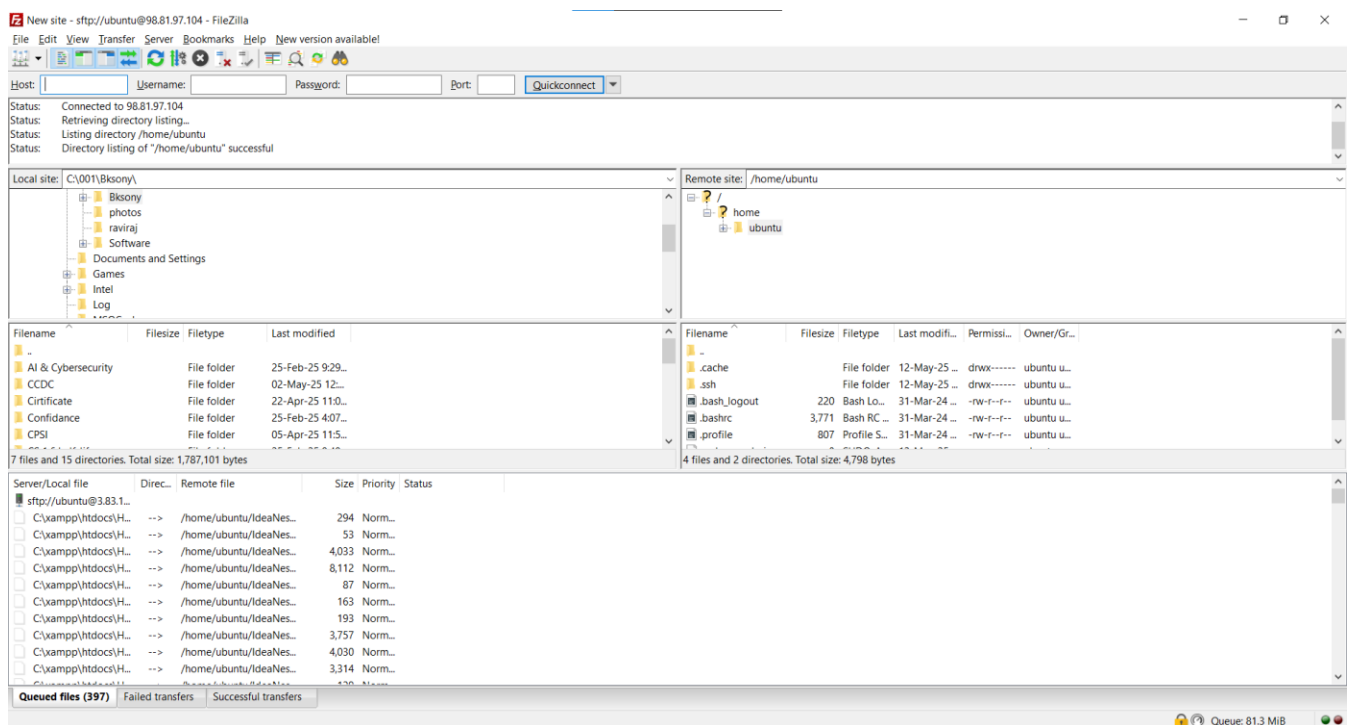
Experiment No: 13


Date:

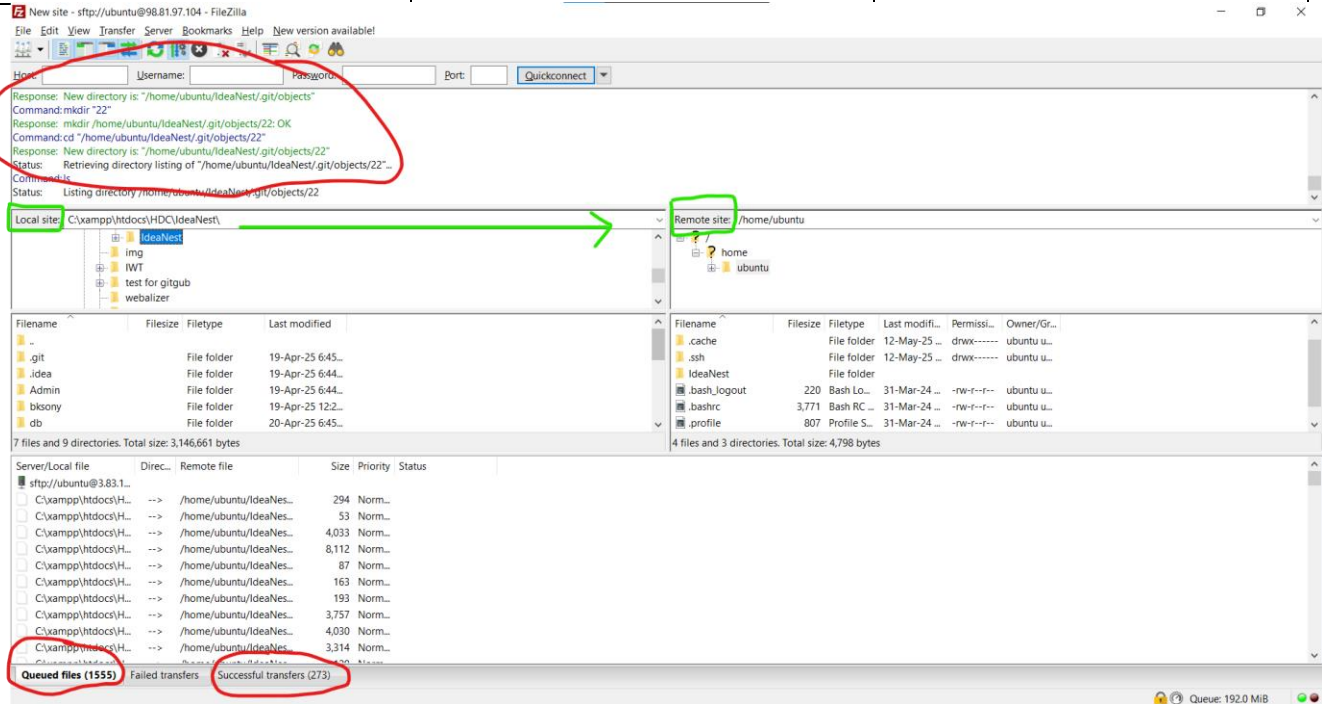
Enrolment No: 92310133008



3. Connect and drag your PHP project folder from the left (Local Site) to right (Remote Site) /var/www/html/




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Step 7: Move Project Folder

If your uploaded folder is `sample`, move it to the web root:

```
cd /home/ubuntu/
mv IdeaNest /var/www/html/
```

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```

root@ip-172-31-21-76: /home/ubuntu
Usage of /: 36.7% of 6.71GB  Users logged in: 1
Memory usage: 60%          IPv4 address for enX0: 172.31.21.76
Swap usage: 0%

* Ubuntu Pro delivers the most comprehensive open source security and
  compliance features.

  https://ubuntu.com/aws/pro

Expanded Security Maintenance for Applications is not enabled.

82 updates can be applied immediately.
44 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Mon May 12 10:40:03 2025 from 152.59.20.123
ubuntu@ip-172-31-21-76:~$ sudo su
root@ip-172-31-21-76:/home/ubuntu# ls
IdeaNest
root@ip-172-31-21-76:/home/ubuntu#

```

Step 8: Update Apache to Use Your Project Folder (Optional but Recommended)

This step makes your IdeaNest project load **directly** when you visit your IP address, instead of needing /IdeaNest in the URL.

1. Navigate to Apache's config directory:

```
cd /etc/apache2/sites-available/
```

2. Open the default site configuration file:


```
nano 000-default.conf
```

3. Locate the line that says:

```
DocumentRoot /var/www/html
```

4. Change it to:

```
DocumentRoot /var/www/html/IdeaNest
```


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```

root@ip-172-31-21-76: /etc/apache2/sites-available
GNU nano 7.2                                000-default.conf *
<VirtualHost *:80>
    # The ServerName directive sets the request scheme, hostname and port that
    # the server uses to identify itself. This is used when creating
    # redirection URLs. In the context of virtual hosts, the ServerName
    # specifies what hostname must appear in the request's Host: header to
    # match this virtual host. For the default virtual host (this file) this
    # value is not decisive as it is used as a last resort host regardless.
    # However, you must set it for any further virtual host explicitly.
    #ServerName www.example.com

    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/html/IdeaNest

    # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
    # error, crit, alert, emerg.
    # It is also possible to configure the loglevel for particular
    # modules, e.g.
    #LogLevel info ssl:warn

    ErrorLog ${APACHE_LOG_DIR}/error.log

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^/ Go To Line

```

5. Save and exit:
 - o Press Ctrl + X, then Y, then Enter
6. Restart Apache to apply the change:

```

bash
CopyEdit
service apache2 restart

```

Step 10: Import Your Database into MySQL


1. Log in to MySQL as root:

```
mysql -h localhost -u root
```

If prompted for a password and you haven't set one yet, just press Enter.

2. Create a New User and Database

In the MySQL prompt:

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```
CREATE USER 'ideanest_user'@'localhost' IDENTIFIED BY 'secure_password';
GRANT ALL PRIVILEGES ON *.* TO 'ideanest_user'@'localhost' WITH GRANT OPTION;
FLUSH PRIVILEGES;
CREATE DATABASE ideanest_db;
EXIT;
```

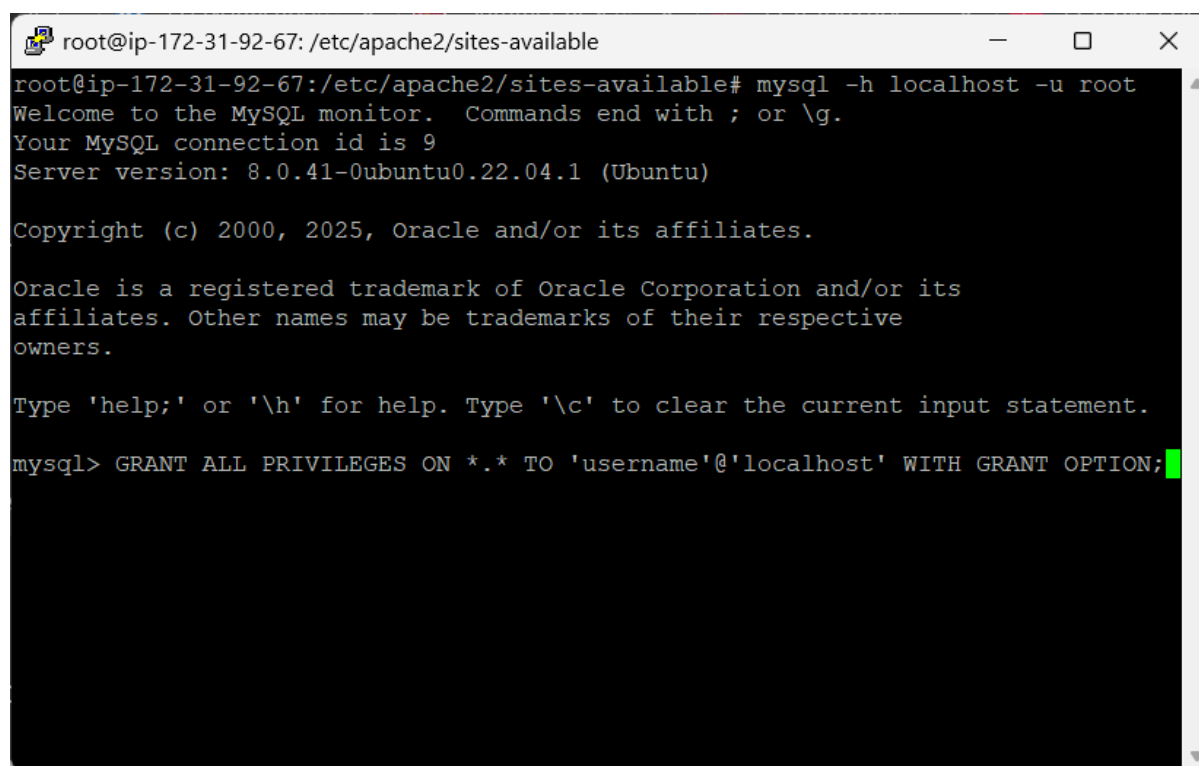
◆ 3. Import Your SQL File into the Database

Back in the terminal (outside MySQL), run:

```
mysql -h localhost -u ideanest_user -p ideanest_db < "/var/www/html/IdeaNest/db/ideanest (6).sql"
```

You'll be prompted to enter the password: `secure_password`

This command will import your database.



```
root@ip-172-31-92-67: /etc/apache2/sites-available
root@ip-172-31-92-67:/etc/apache2/sites-available# mysql -h localhost -u root
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 9
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)


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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> GRANT ALL PRIVILEGES ON *.* TO 'username'@'localhost' WITH GRANT OPTION;
```

Write command : **FLUSH PRIVILEGES;**

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```

root@ip-172-31-92-67: /etc/apache2/sites-available
root@ip-172-31-92-67:/etc/apache2/sites-available# mysql -h localhost -u root
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 9
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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owners.


Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> GRANT ALL PRIVILEGES ON *.* TO 'username'@'localhost' WITH GRANT OPTION;
Query OK, 0 rows affected (0.00 sec)

mysql> FLUSH PRIVILEGES;

```

Write command : **EXIT;**

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```

root@ip-172-31-92-67: /etc/apache2/sites-available
root@ip-172-31-92-67:/etc/apache2/sites-available# mysql -h localhost -u root
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 9
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> GRANT ALL PRIVILEGES ON *.* TO 'username'@'localhost' WITH GRANT OPTION;
Query OK, 0 rows affected (0.00 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)

mysql> EXIT;

```


Write command : **mysql -h localhost -u username -p**

```

root@ip-172-31-92-67: /etc/apache2/sites-available
root@ip-172-31-92-67:/etc/apache2/sites-available# mysql -h localhost -u username -p

```

you have to enter the password

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password

```

root@ip-172-31-92-67: /etc/apache2/sites-available
root@ip-172-31-92-67:/etc/apache2/sites-available# mysql -h localhost -u username -p
Enter password: 

```

Write Command : show databases;

```

root@ip-172-31-92-67: /etc/apache2/sites-available
root@ip-172-31-92-67:/etc/apache2/sites-available# mysql -h localhost -u username -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;

```

you can see the database

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Experiment No: 13	Date:	Enrolment No: 92310133008

```

root@ip-172-31-92-67: /etc/apache2/sites-available
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database                |
+-----+
| information_schema      |
| mysql                   |
| performance_schema      |
| sys                     |
+-----+
4 rows in set (0.00 sec)

mysql>

```

Write Command : **create database shopping**

```

root@ip-172-31-92-67: /etc/apache2/sites-available
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database                |
+-----+
| information_schema      |
| mysql                   |
| performance_schema      |
| sys                     |
+-----+
4 rows in set (0.00 sec)

mysql> create database shopping;

```

Write command : show databases;
 you can see the new row has been added

 Marwadi University Marwadi Chandarana Group	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
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Experiment No: 13	Date:	Enrolment No: 92310133008

```

root@ip-172-31-92-67: /etc/apache2/sites-available
+-----+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+-----+
4 rows in set (0.00 sec)

mysql> create database shopping;
Query OK, 1 row affected (0.01 sec)

mysql> show databases;
+-----+
| Database          |
+-----+
| information_schema |
| mysql              |
| performance_schema |
| shopping           |
| sys                |
+-----+
5 rows in set (0.00 sec)

mysql>

```

Write command : **exit;**

```


root@ip-172-31-92-67: /etc/apache2/sites-available
+-----+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+-----+
4 rows in set (0.00 sec)

mysql> create database shopping;
Query OK, 1 row affected (0.01 sec)

mysql> show databases;
+-----+
| Database          |
+-----+
| information_schema |
| mysql              |
| performance_schema |
| shopping           |
| sys                |
+-----+
5 rows in set (0.00 sec)

mysql> exit;

```

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command: cd /var/www/html


Write _____ command _____ : _____ **cd** _____ **sample**
 you will go inside the sample directory

```

root@ip-172-31-92-67: /var/www/html
root@ip-172-31-92-67:/etc/apache2/sites-available# cd /var/www/html/
root@ip-172-31-92-67:/var/www/html# cd sample

```

Write Command : **mysql -h localhost -u username -p shopping < shopping.sql**

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```

root@ip-172-31-92-67: /var/www/html/sample
root@ip-172-31-92-67:/etc/apache2/sites-available# cd /var/www/html/
root@ip-172-31-92-67:/var/www/html# cd sample
root@ip-172-31-92-67:/var/www/html/sample# ls
config.php  index.php  login.php  logout.php  register.php  shopping.sql
root@ip-172-31-92-67:/var/www/html/sample# mysql -h localhost -u username -p shopping < shopping.sql

```

it will ask for password : **password**

```

root@ip-172-31-92-67:/var/www/html/sample# mysql -h localhost -u username -p shopping < shopping.sql
Enter password:
root@ip-172-31-92-67:/var/www/html/sample#


```

write command : **mysql -h localhost -u username -p**

```

root@ip-172-31-92-67: /var/www/html/sample
root@ip-172-31-92-67:/var/www/html/sample# mysql -h localhost -u username -p

```

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Experiment No: 13	Date:	Enrolment No: 92310133008

Write command : show databases;
you can see your database

```

root@ip-172-31-92-67: /var/www/html/sample
Your MySQL connection id is 14
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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owners.


Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| shopping |
| sys |
+-----+
5 rows in set (0.00 sec)

mysql>

```

Write Command : use shopping;

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Experiment No: 13	Date:	Enrolment No: 92310133008

```

root@ip-172-31-92-67: /var/www/html/sample
Your MySQL connection id is 14
Server version: 8.0.41-0ubuntu0.22.04.1 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| shopping |
| sys |
+-----+
5 rows in set (0.00 sec)

mysql> use shopping;

```

Write command : show tables;
it will show you the all table in database

```

root@ip-172-31-92-67: /var/www/html/sample


| sys |
+-----+
5 rows in set (0.00 sec)

mysql> use shopping;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----+
| Tables_in_shopping |
+-----+
| orders |
| product |
| transactions |
| user |
| user_demand |
| usercart |
| vendor |
+-----+
7 rows in set (0.01 sec)

mysql>

```

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Experiment No: 13	Date:	Enrolment No: 92310133008

Write command : **exit;**


```

root@ip-172-31-92-67: /var/www/html/sample
| sys |
+-----+
5 rows in set (0.00 sec)

mysql> use shopping;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----+
| Tables_in_shopping |
+-----+
| orders              |
| product             |
| transactions        |
| user                |
| user_demand         |
| usercart            |
| vendor              |
+-----+
7 rows in set (0.01 sec)

mysql> exit;
```

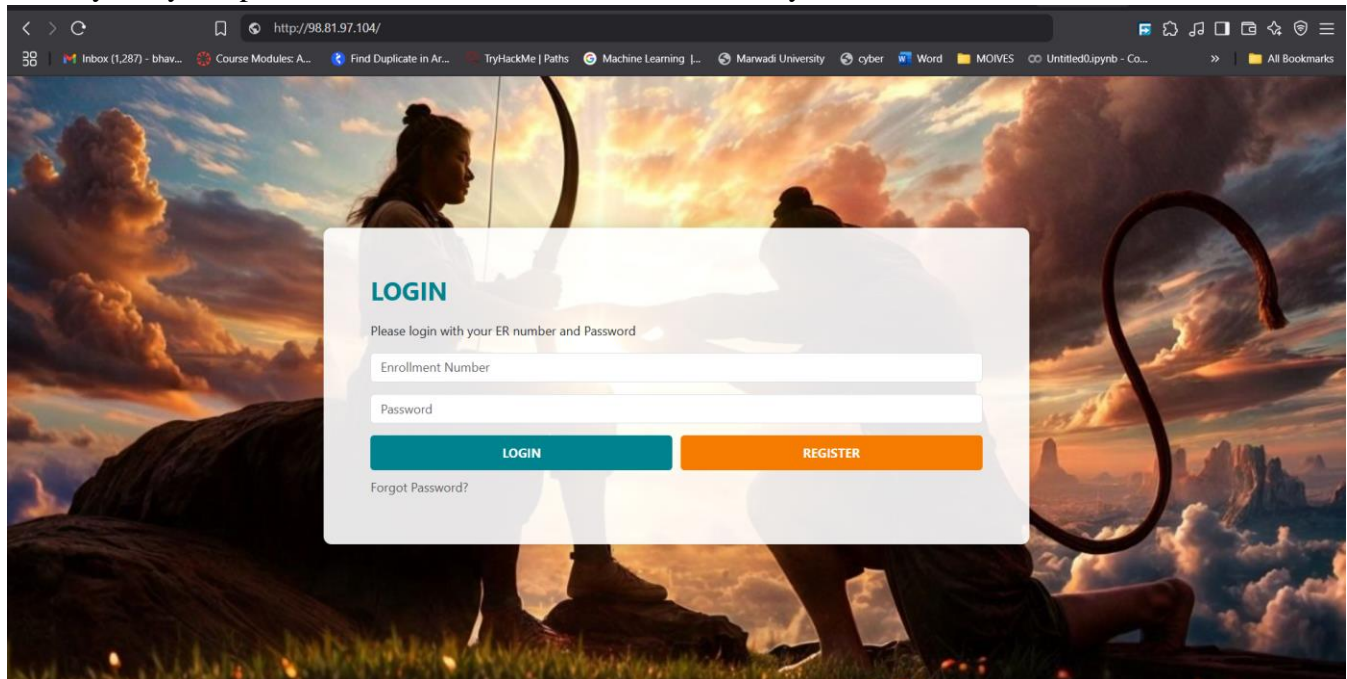

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Experiment No: 13	Date:	Enrolment No: 92310133008

```

root@ip-172-31-92-67: /var/www/html/sample
root@ip-172-31-92-67:/var/www/html/sample# service apache2 restart

```

When you try to open that same IP address it will connect to your sever and database



Conclusion :

In this project we learn that how to lunch EC2 instance and why we choose our Amazon machine image, we also learn about the use Putty for private key authentication , which we use for server and we also deployed our local webpage of other project, we also learn how we can use server and configure it , we also learn about FileZilla which is use to upload the file to your remote server.