Deploying a Web Application on AWS EC2 Using Apache Web Server

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Project Objective

The goal of this project is to gain **hands-on experience with Amazon Web Services (AWS)** by:

- Launching an EC2 instance
- Configuring SSH and HTTP access using Security Groups
- Installing and managing the Apache2 web server
- Deploying a sample web application accessible through a browser

By completing this project, students will understand:

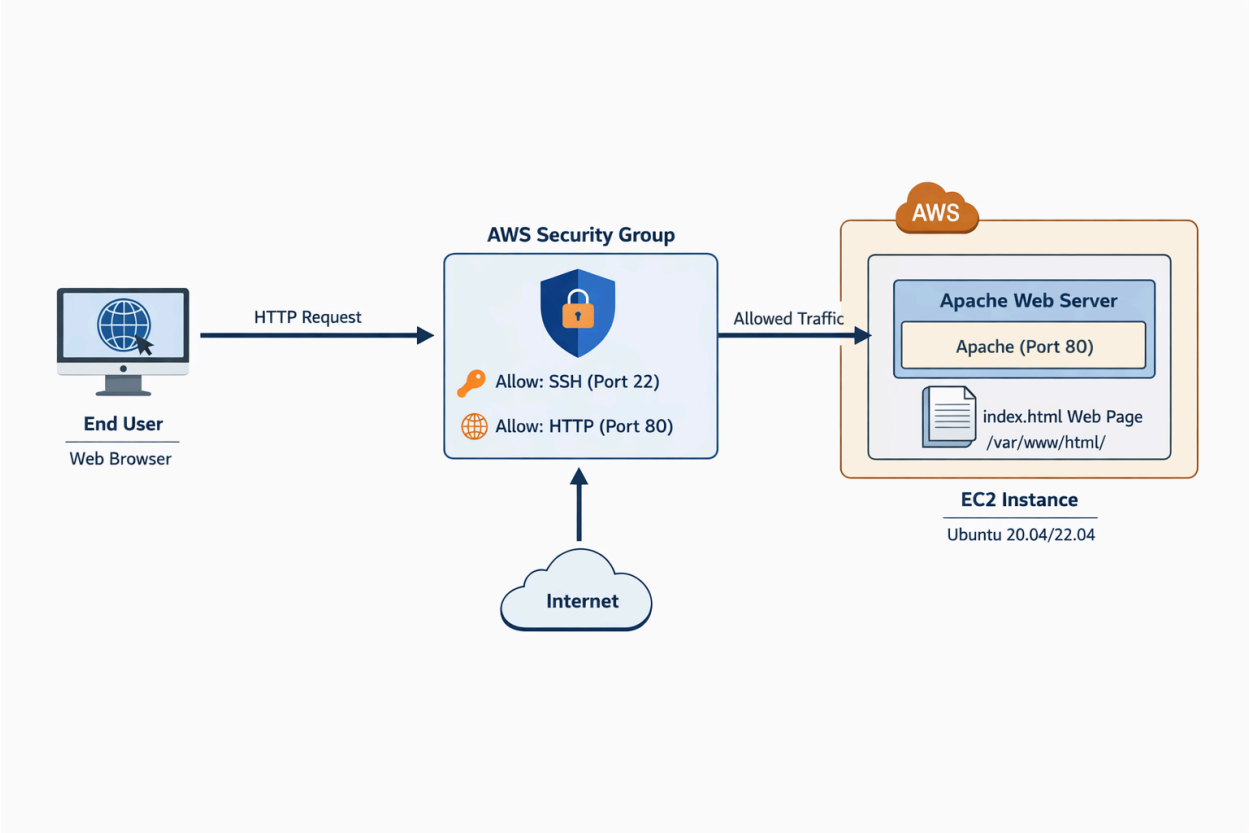
- Basic cloud infrastructure setup
- Linux server management
- Web application deployment on AWS

Prerequisites

- Basic knowledge of Linux commands
- An active AWS account
- Basic understanding of networking concepts (ports, security groups)
- SSH client:
    - Terminal (Linux/macOS)
    - PuTTY (Windows)

Project Architecture Overview

User Browser → EC2 Public IP → Apache2 Web Server → HTML Web Application



Project Tasks & Step-by-Step Implementation

Task 1: Create an EC2 Instance

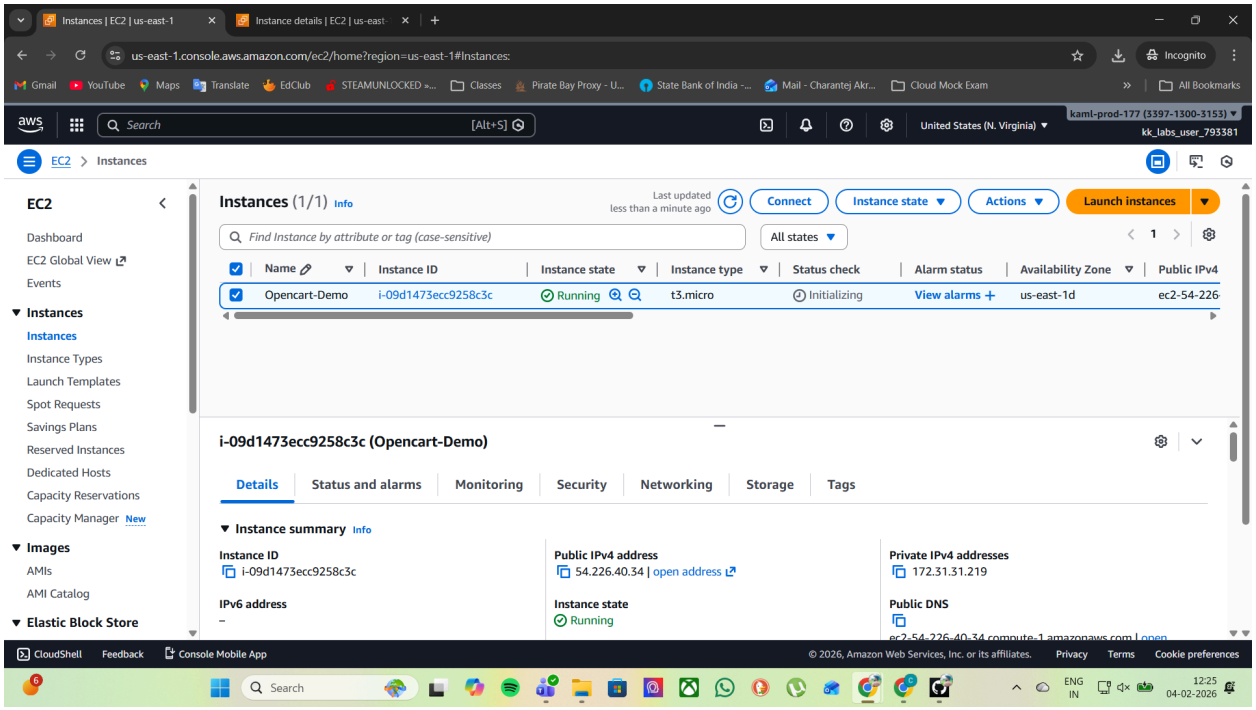
Steps

1. Log in to the **AWS Management Console**
2. Navigate to **EC2 → Launch Instance**
3. Choose an Amazon Machine Image (AMI):
    - Ubuntu Server **20.04 LTS** or **22.04 LTS**
4. Select instance type:
    - t2.micro (Free Tier eligible)

5. Create or select an existing **key pair** for SSH access
6. Launch the EC2 instance

Deliverable

- EC2 instance in **Running** state



Task 2: Configure Security Groups (Firewall Rules)

Steps

1. Open the EC2 instance details
2. Navigate to the **Security** tab
3. Edit inbound rules for the security group

Inbound Rules Configuration

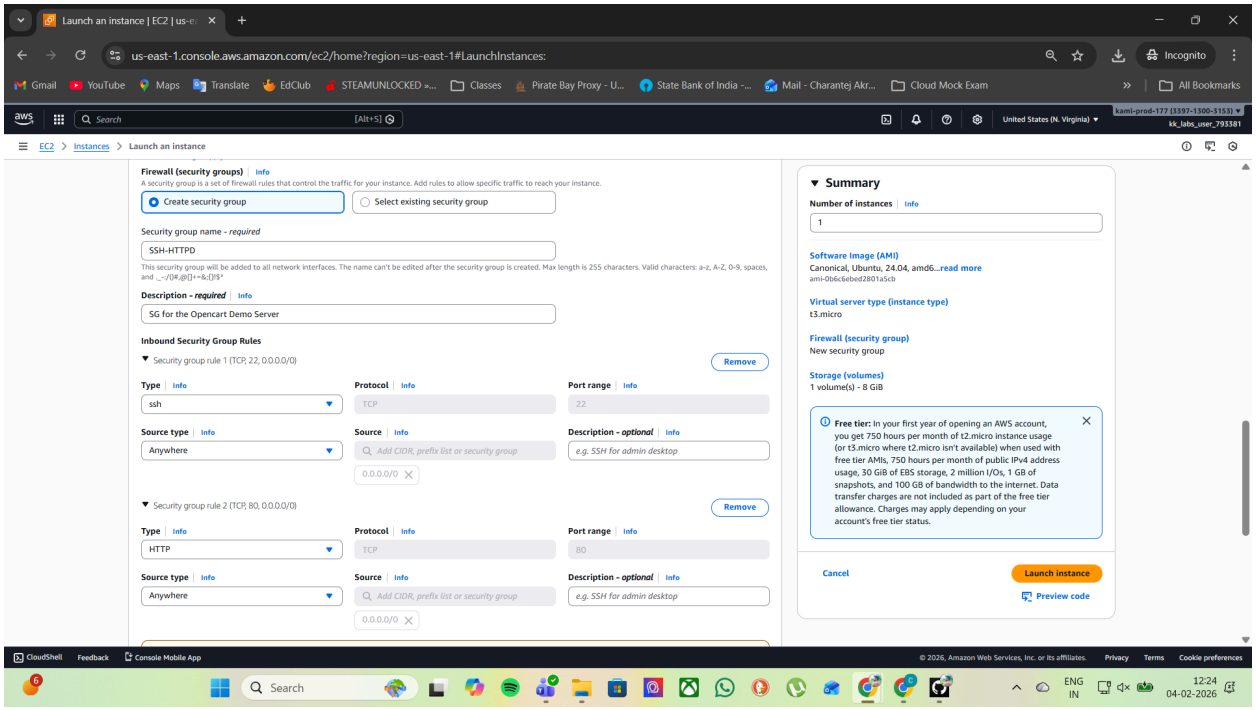
Protocol	Port	Source
SSH	22	Your IP

HTTP	80	Anywhere (0.0.0.0/0)

📌 SSH access is restricted to your IP for security best practices.

Deliverable

- Properly configured inbound rules



Task 3: Connect to EC2 Using SSH

Steps

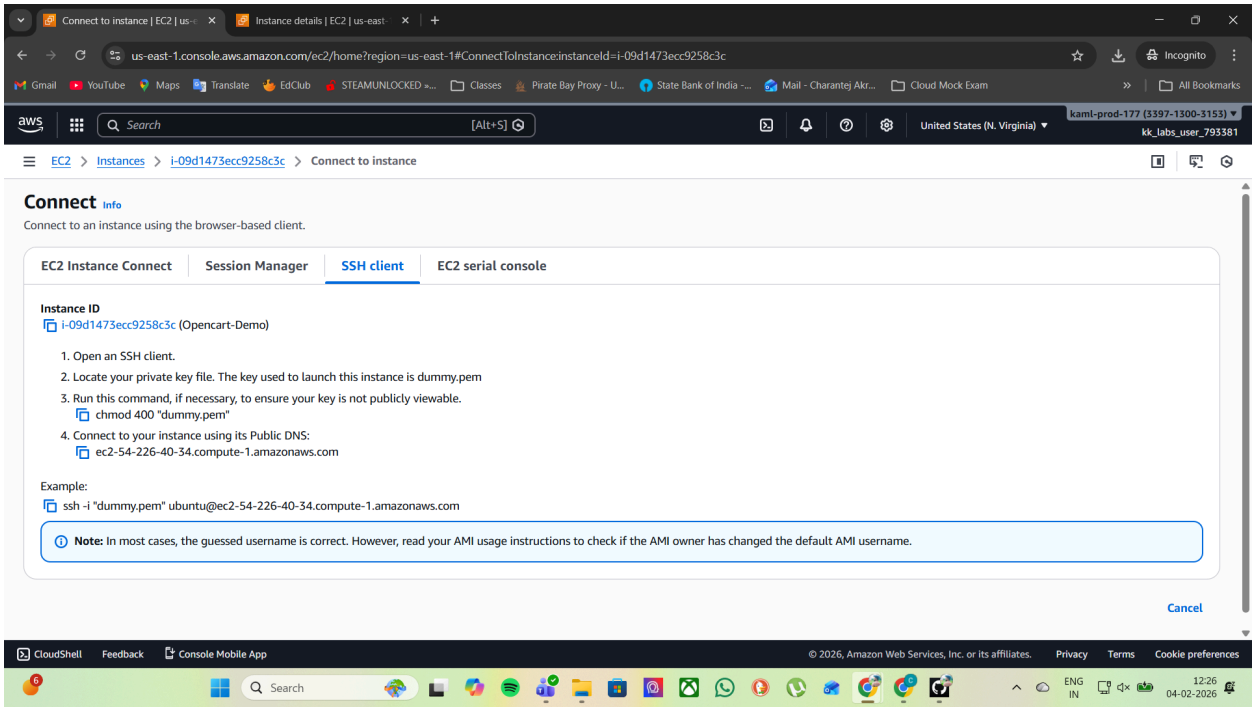
1. Copy the **Public IPv4 Address** of the EC2 instance
2. Open terminal and connect using SSH:

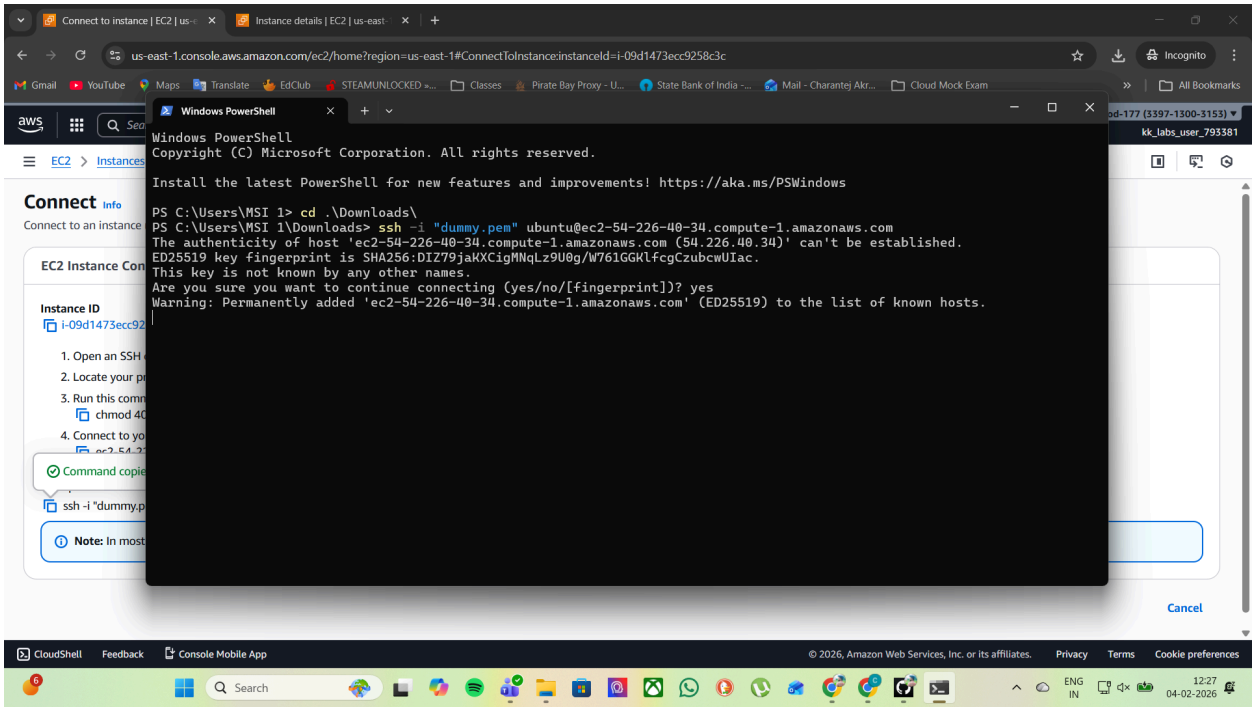
ssh -i your-key.pem ubuntu@<public-ip>

3. Verify successful login to the EC2 instance

Deliverable

- Successful SSH connection





Task 4: Install and Start Apache2 Web Server

Steps

Update the package list:

sudo apt update

```
ubuntu@ip-172-31-31-219:~$ sudo apt -y update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
```

Install Apache2:

sudo apt install apache2 -y

```
ubuntu@ip-172-31-31-219:~$ sudo apt install apache2 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

Start and enable Apache service:

sudo systemctl start apache2

sudo systemctl enable apache2

```
ubuntu@ip-172-31-31-219:~$ sudo systemctl start apache2
ubuntu@ip-172-31-31-219:~$ sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
ubuntu@ip-172-31-31-219:~$
```

Verify Apache status:

sudo systemctl status apache2

Deliverable

- Apache service running successfully

```
ubuntu@ip-172-31-31-219:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Wed 2026-02-04 07:01:04 UTC; 23s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 2266 (apache2)
      Tasks: 55 (limit: 1008)
     Memory: 5.7M (peak: 6.4M)
        CPU: 38ms
     CGroup: /system.slice/apache2.service
             ├─2266 /usr/sbin/apache2 -k start
             ├─2268 /usr/sbin/apache2 -k start
             └─2269 /usr/sbin/apache2 -k start

Feb 04 07:01:04 ip-172-31-31-219 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 04 07:01:04 ip-172-31-31-219 systemd[1]: Started apache2.service - The Apache HTTP Server.
```

Task 5: Test HTTP Access

Steps

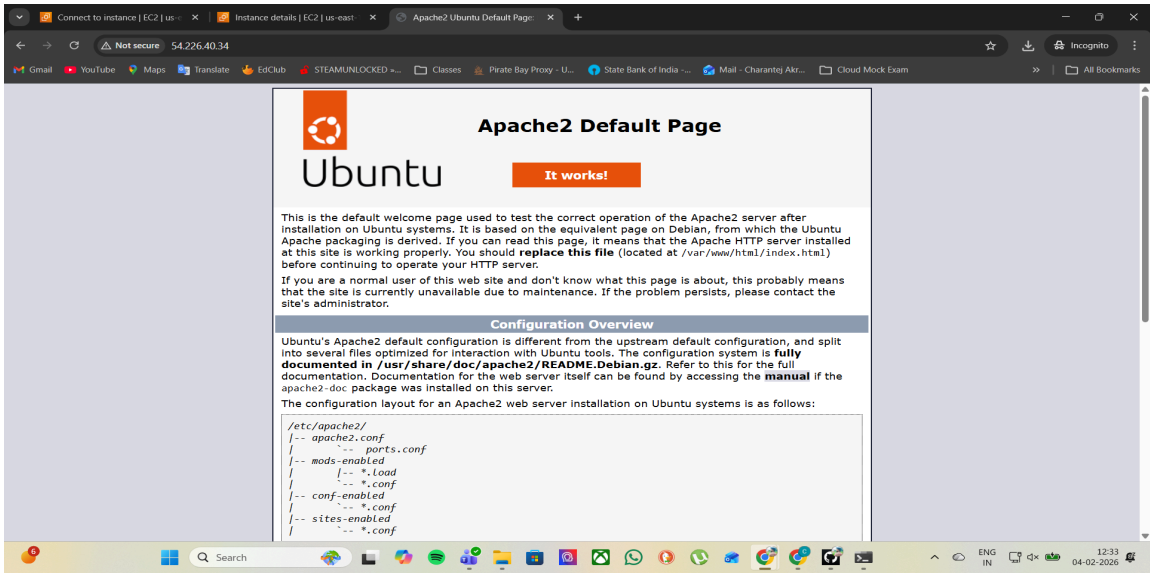
1. Open a web browser
2. Enter the EC2 **Public IP Address**:

http://<public-ip>

3. Confirm the **Apache2 default page** is displayed

Deliverable

- Apache default web page visible in browser



Task 6: Deploy a Sample Web Application

Steps

Navigate to Apache web root:

cd /var/www/html

```
ubuntu@ip-172-31-31-219:~$ cd /var/www/html
ubuntu@ip-172-31-31-219:/var/www/html$ ls
index.html
ubuntu@ip-172-31-31-219:/var/www/html$
```

Delete the default HTML file:

sudo rm index.html

```
ubuntu@ip-172-31-31-219:/var/www/html$ sudo rm index.html
ubuntu@ip-172-31-31-219:/var/www/html$ ls
ubuntu@ip-172-31-31-219:/var/www/html$
```

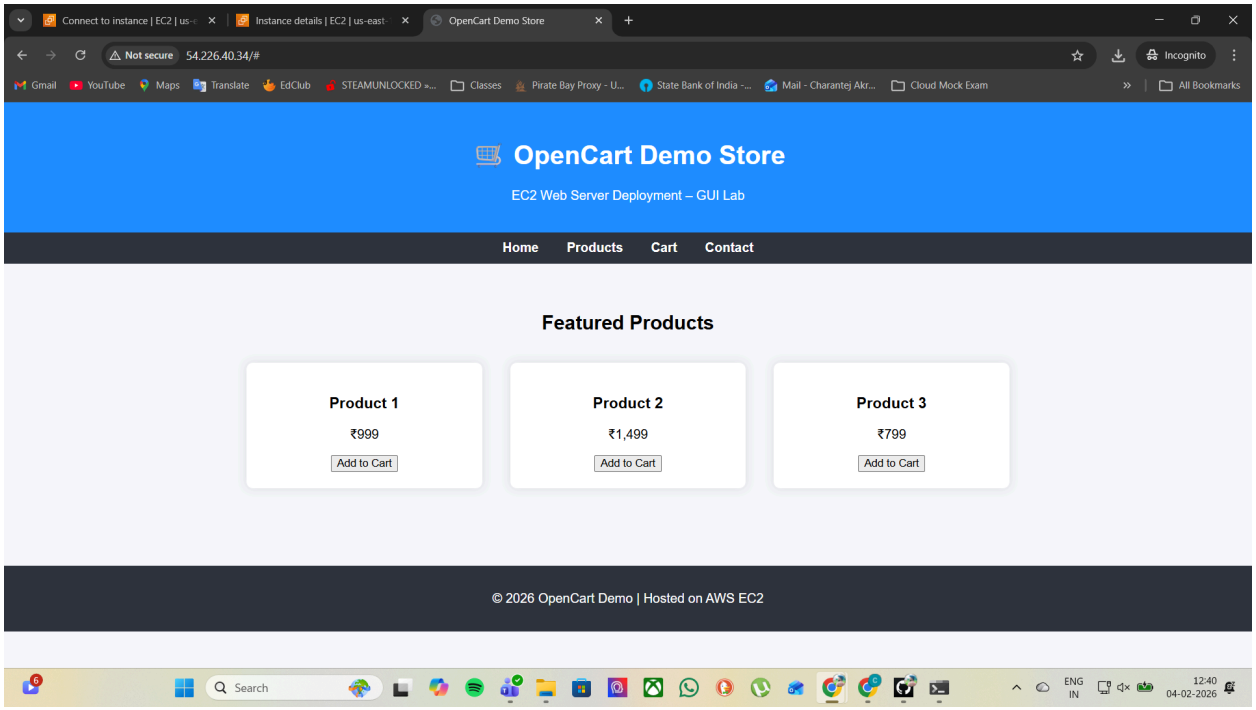
Add the following content or any content you want. I am using code from my repo.

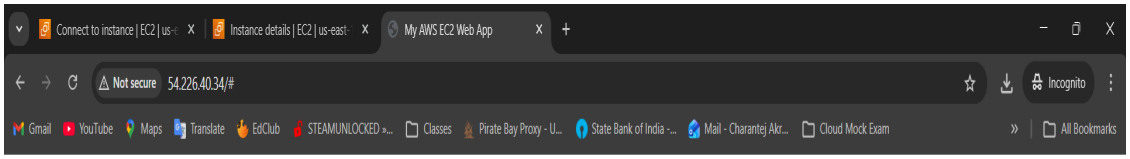
```
<!DOCTYPE html>
<html>
<head>
  <title>My AWS EC2 Web App</title>
</head>
<body>
  <h1>Welcome to My EC2 Web Server</h1>
  <p>Apache2 is running successfully on AWS!</p>
</body>
</html>
```

Save and exit the file, then refresh the browser.

Deliverable

- Custom web application page displayed





Notes

- This project uses **AWS Management Console (GUI)** for infrastructure setup
- Suitable for:
    - Beginners in AWS
    - Students learning cloud fundamentals
    - Entry-level DevOps and Cloud roles