

Task-1: Setting up an Apache Web Server

Step 1- Installing Apache: First, I updated the package repository and installed Apache2. To do this I used commands:

```
sudo apt update  
sudo apt install apache2
```

Step 2-Checking the Web Server Status: I verified that Apache was running properly. For this I used the command: `sudo systemctl status apache2`

The output showed that Apache was active and running successfully.

Step 3- Configuring Domain Name: To access the web server using a custom domain name, I edited the hosts file by: `sudo nano /etc/hosts`

And added the following entry: `127.0.0.1 webserverlab.com`

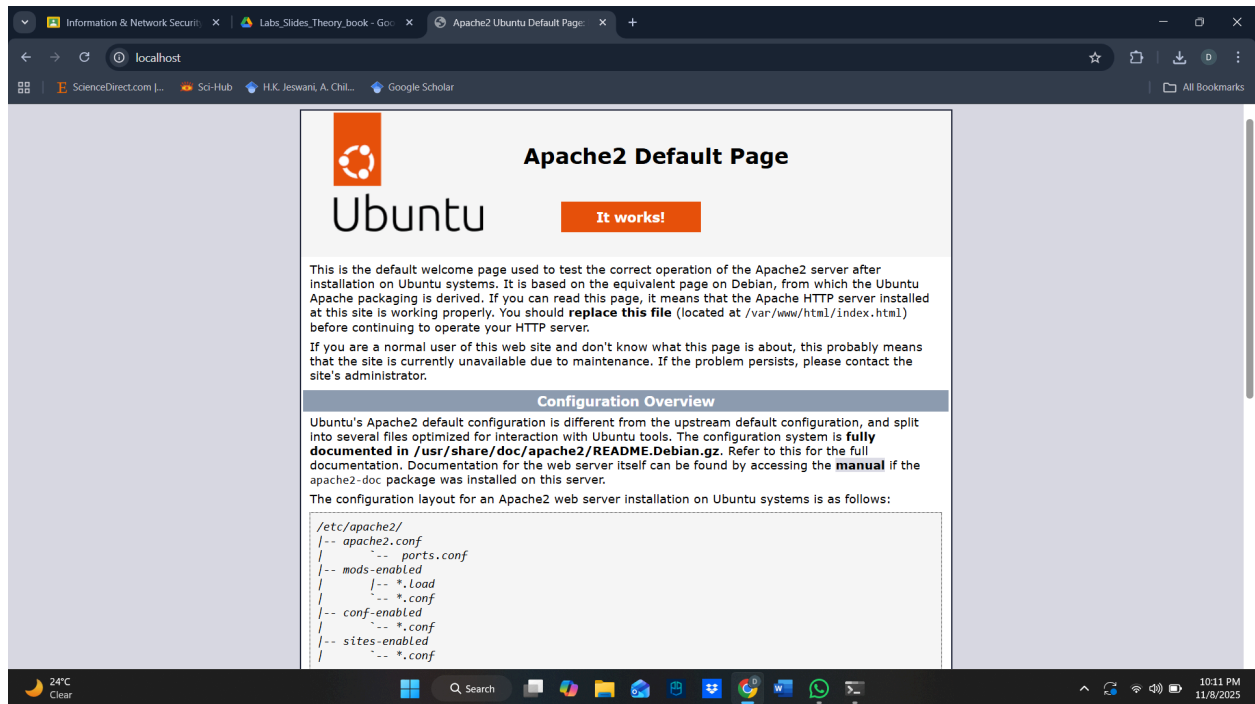
Step 4-Testing Apache Installation: I accessed the Apache default page through the browser using:

`http://localhost`

`http://127.0.0.1`

`http://webserverlab.com`

The Apache2 Ubuntu Default Page was displayed successfully, confirming the installation. **The screenshot is given on the next page.**



Task-2: Setting Up Virtual Hosts

Part 1- Managing Apache Process

I learned the basic Apache management commands:

```
sudo systemctl stop apache2    # Stop the server
sudo systemctl start apache2   # Start the server
sudo systemctl restart apache2 # Restart the server
sudo systemctl reload apache2  # Reload configuration
sudo systemctl status apache2  # Check status
```

Part 2-Setting Up First Virtual Host (example.com)

Step 1: Creating Directory Structure

```
sudo mkdir -p /var/www/example.com/html
sudo chown -R $USER:$USER /var/www/example.com/html
sudo chmod -R 755 /var/www/example.com
```

Step 2: Creating Index Page

Created an HTML file at `/var/www/example.com/html/index.html`:

```
<html>

<head>

<title>Welcome to Example.com!</title>

</head>

<body>

<h1>Success! The example.com server block is working!</h1>

</body>

</html>
```

Step 3: Configuring Virtual Host

Created configuration file at /etc/apache2/sites-available/example.com.conf:

```
<VirtualHost *:80>

    ServerAdmin admin@example.com

    ServerName example.com

    ServerAlias www.example.com

    DocumentRoot /var/www/example.com/html

    ErrorLog ${APACHE_LOG_DIR}/error.log

    CustomLog ${APACHE_LOG_DIR}/access.log combined

</VirtualHost>
```

Step 4: Adding Domain to Hosts File

```
sudo nano /etc/hosts
```

Added 127.0.0.1 example.com

In the file.

Step 5: Enabling the Virtual Host

```
sudo a2ensite example.com.conf
```

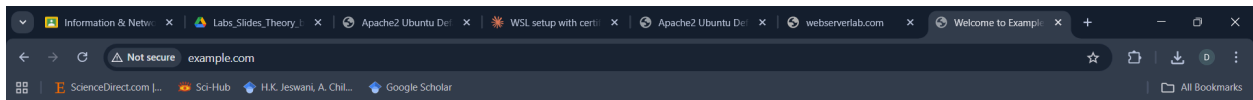
```
sudo a2dissite 000-default.conf
```

```
sudo apache2ctl configtest
```

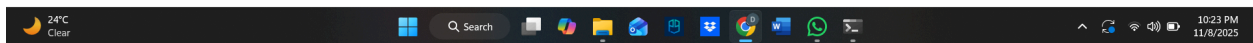
```
sudo systemctl restart apache2
```

Step 6: Testing

Accessed <http://example.com> in the browser, which displayed: "Success! The example.com server block is working!" Here is the screenshot:



Success! The example.com server block is working!



Checkpoint-3: Understanding Virtual Host Behavior

After disabling the default site (000-default.conf), I observed interesting behavior:

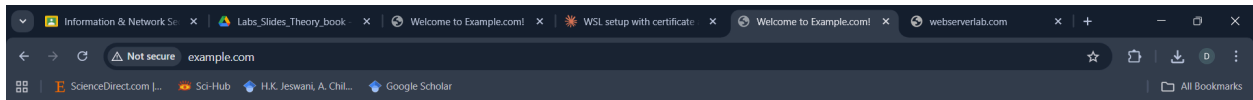
<http://localhost> showed the example.com content

<http://127.0.0.1> showed the example.com content

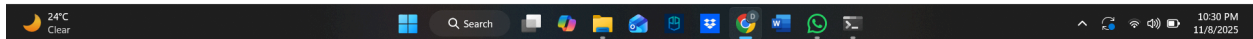
<http://webserverlab.com> showed the example.com content

Explanation: When the default site is disabled, Apache uses the first enabled virtual host as the fallback for any request that doesn't match a specific ServerName. Since example.com was the only enabled virtual host, all requests defaulted to it. This demonstrates Apache's default behavior in handling unmatched domain requests.

I verified the enabled sites using: `ls -la /etc/apache2/sites-enabled/`



Success! The example.com server block is working!



Which showed only example.com.conf was enabled.

Checkpoint- 4: Setting Up Second Virtual Host (anothervhost.com)

Step 1: Creating Directory Structure:

```
sudo mkdir -p /var/www/anothervhost.com/html
sudo chown -R $USER:$USER /var/www/anothervhost.com/html
sudo chmod -R 755 /var/www/anothervhost.com
```

Step 2: Creating Index Page

```
<html>
<head>
<title>Welcome to AnotherVhost.com!</title>
```

```
</head>
<body>
<h1>This is Another Virtual Host!</h1>
<p>You are viewing anothervhost.com</p>
</body>
</html>
```

Step 3: Creating Virtual Host Configuration

Created /etc/apache2/sites-available/anothervhost.com.conf:

```
<VirtualHost *:80>
    ServerAdmin admin@anothervhost.com
    ServerName anothervhost.com
    ServerAlias www.anothervhost.com
    DocumentRoot /var/www/anothervhost.com/html
    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined
</VirtualHost>
```

Step 4: Adding to Hosts File

127.0.0.1 anothervhost.com

Also added entries to Windows hosts file at

C:\Windows\System32\drivers\etc\hosts:

127.0.0.1 example.com

127.0.0.1 anothervhost.com

Step 5: Enabling and Testing

```
sudo a2ensite anothervhost.com.conf
```

```
sudo apache2ctl configtest
```

```
sudo systemctl restart apache2
```

Step 6: Verification

Both virtual hosts were verified using curl commands:

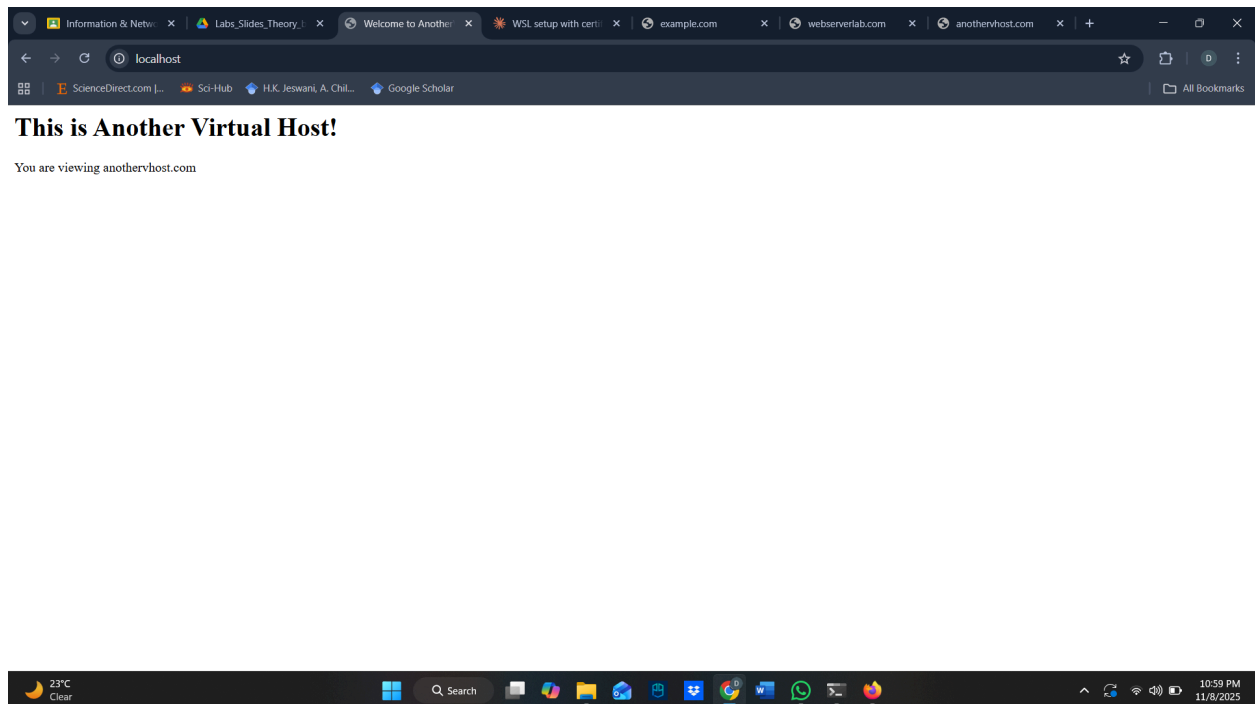
```
curl http://example.com
```

```
curl http://anothervhost.com
```

```
curl -H "Host: example.com" http://localhost
```

```
curl -H "Host: anothervhost.com" http://localhost
```

All commands returned the correct HTML content for their respective virtual hosts, confirming proper configuration. Given screenshot:



Task 3: Hosting Dynamic Websites using HTML and JavaScript

I created two dynamic websites with interactive forms that process user input using JavaScript.

Dynamic Website 1: Simple Calculator

Features :

1. Accepts two numerical inputs
2. Provides four operations: Addition, Subtraction, Multiplication, Division
3. Input validation to ensure valid numbers are entered
4. Error handling for division by zero
5. Real-time calculation and result display
6. Responsive design with purple gradient background

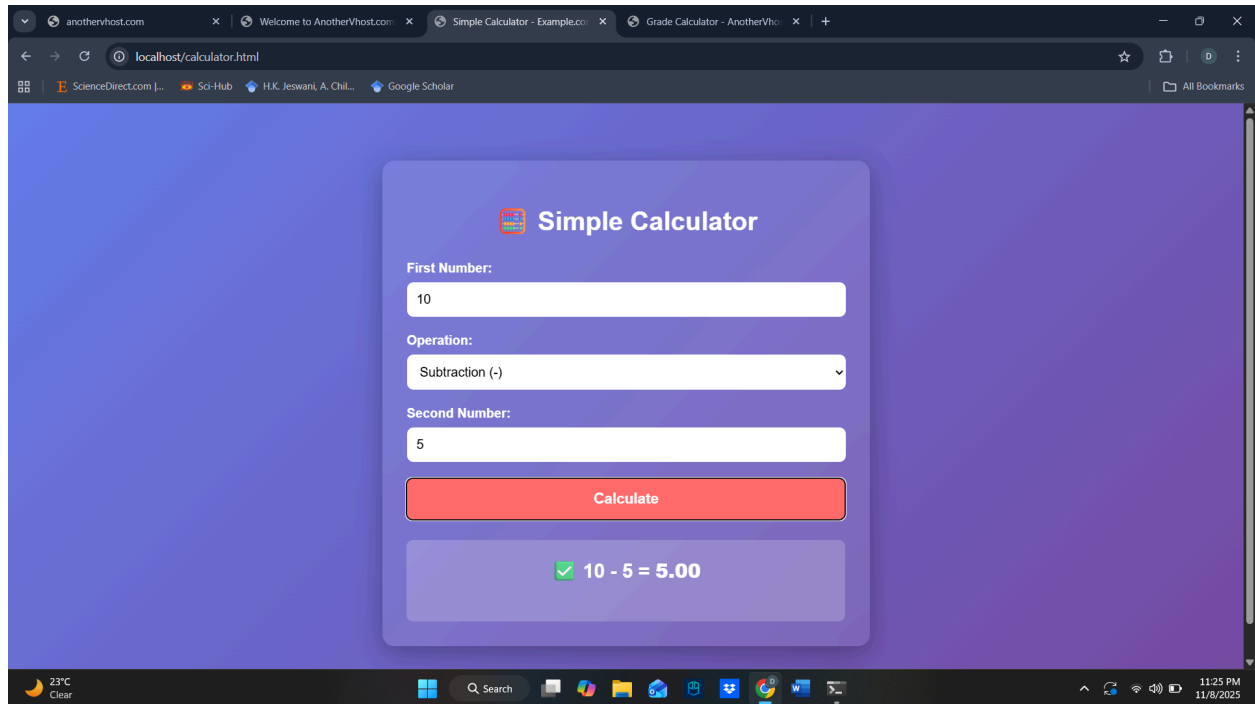
Here is the screenshot:

Key JavaScript Functions:

calculate(): Performs arithmetic operations based on user selection

Input validation using parseFloat() and isNaN()

Event listeners for form submission and Enter key



Dynamic Website 2: Grade Calculator

Features:

1. Accepts three subject marks (0-100)
2. Calculates average percentage
3. Assigns letter grade (A, B, C, D, F)
4. Input validation for mark ranges
5. Responsive design with colorful background

Key JavaScript Functions:

calculateGrade(): Computes average and determines grade, range validation (0-100 for each subject), dynamic result display with color-coded grades.

Here is the screenshot:

The screenshot shows a web browser window with the URL `localhost/grades.html`. The page title is "Student Grade Calculator". Below the title, there is a subtitle "Enter your marks to calculate average and grade". The form contains three input fields for subject marks: "Subject 1 Marks (0-100):" with the value 80, "Subject 2 Marks (0-100):" with the value 75, and "Subject 3 Marks (0-100):" with the value 70. A green button labeled "Calculate Grade" is positioned below the input fields. Below the button, the results are displayed: "Subject 1: 80", "Subject 2: 75", "Subject 3: 70", and "Average: 75.00%". The browser's taskbar at the bottom shows the system time as 11:21 PM on 11/8/2025.

Student Grade Calculator

Enter your marks to calculate average and grade

Subject 1 Marks (0-100):
80

Subject 2 Marks (0-100):
75

Subject 3 Marks (0-100):
70

Calculate Grade

Subject 1: 80
Subject 2: 75
Subject 3: 70

Average: 75.00%

This screenshot shows the same web application as the first, but with the calculated grade displayed. The input fields and the "Calculate Grade" button remain the same. Below the results section, the text "Grade: C" is displayed in a large, bold, orange font. The browser's taskbar at the bottom shows the system time as 11:21 PM on 11/8/2025.

Subject 1 Marks (0-100):
80

Subject 2 Marks (0-100):
75

Subject 3 Marks (0-100):
70

Calculate Grade

Subject 1: 80
Subject 2: 75
Subject 3: 70

Average: 75.00%

Grade: C

Deployment and Access: Due to WSL DNS resolution issues, I implemented a practical solution: `sudo cp /var/www/example.com/html/calculator.html /var/www/anotherhost.com/html/`

This allowed both dynamic websites to be accessed via localhost:

<http://localhost/calculator.html> - Calculator application

<http://localhost/grades.html> - Grade calculator application