Competency Based Learning Material (CBLM)

Web Design

Level-3

Module: Setup Web Design Environment

Code: CBLM-ICT-WD-01-L3-EN-V1

National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh

Copyright

National Skills Development Authority
Prime Minister's Office
Level: 10-11, Biniyog Bhaban,
E-6 / B, Agargaon, Sher-E-Bangla Nagar Dhaka-1207, Bangladesh.
Email: ec@nsda.gov.bd
Website: www.nsda.gov.bd.
National Skills Portal: http:\\skillsportal.gov.bd

The CBLM on "Setup Web Design Environment" is developed based on NSDA approved Competency Standards and Competency Based Curriculum under Web Design, Level-3 Occupation. It contains the information required to implement the Web Design Level-3 standard.

This document has been prepared by NSDA with the help of relevant experts, trainers/professionals.

All Government-Private-NGO training institutes in the country accredited by NSDA can use this CBLM to implement skill-based training of Web Design level-3 course.

Approved by

---th Authority Meeting of NSDA

Held on -------------------

How to use this Competency Based Learning Material (CBLM)

The module, Setup Web Design Environment contains training materials and activities for you to complete. These activities may be completed as part of structured classroom activities or you may be required you to work at your own pace. These activities will ask you to complete associated learning and practice activities in order to gain knowledge and skills you need to achieve the learning outcomes.

1. Review the **Learning Activity** page to understand the sequence of learning activities you will undergo. This page will serve as your road map towards the achievement of competence.

2. Read the **Information Sheets.** This will give you an understanding of the jobs or tasks you are going to learn how to do. Once you have finished reading the **Information Sheets** complete the questions in the **Self-Check.**

3. **Self-**Checks are found after each **Information Sheet**. **Self-Checks** are designed to help you know how you are progressing. If you are unable to answer the questions in the **Self-Check** you will need to re-read the relevant **Information Sheet**. Once you have completed all the questions check your answers by reading the relevant **Answer Keys** found at the end of this module.

4. Next move on to the **Job Sheets. Job Sheets** provide detailed information about *how to do the job* you are being trained in. Some **Job Sheets** will also have a series of **Activity Sheets**. These sheets have been designed to introduce you to the job step by step. This is where you will apply the new knowledge you gained by reading the Information Sheets. This is your opportunity to practise the job. You may need to practise the job or activity several times before you become competent.

5. Specification **sheets**, specifying the details of the job to be performed will be provided where appropriate.

6. A review of competency is provided on the last page to help remind if all the required assessment criteria have been met. This record is for your own information and guidance and is not an official record of competency

When working though this Module always be aware of your safety and the safety of others in the training room. Should you require assistance or clarification please consult your trainer or facilitator.

When you have satisfactorily completed all the Jobs and/or Activities outlined in this module, an assessment event will be scheduled to assess if you have achieved competency in the specified learning outcomes. You will then be ready to move onto the next Unit of Competency or Module

Table of Contents

Module Content

Unit Title: Setup Web Design Environment
Unit Code: OU- ICT-WD-01-L3-V1
Module Title: Setup Web Design Environment
Module Description: This module encompasses the necessary knowledge, skills, and attitudes (KAS) for establishing a web design environment. It encompasses proficiencies such as configuring client servers, collaborating with browsers, acquiring web design software, explaining web servers, installing FTP clients, and clarifying data layers.

Nominal Duration: 12 Hours

Learning Outcomes:
Upon completion of this module the trainees must be able to:
1. Set up client server.
2. Work with Browsers.
3. Introduce web design software.
4. Interpret Web server.
5. Install FTP clients.
6. Interpret data layer.

Assessment Criteria:
1. Client-server architecture is identified.
2. Types of networks and their functionality is interpreted.
3. Types of websites are categorized.
4. A local Web server is installed.
5. The local web server is tested.
6. A web browser is identified.
7. Types of web browsers are introduced.
8. A web browser is installed and used.
9. Features/options of different web browsers are outlined.
10. Cross-browser compatibility of websites is interpreted.
11. The "Inspect element" tool is introduced.
12. Web design software is interpreted.
13. Web design platform is introduced.
14. Web design software is familiarized.
15. The web server is identified.
16. The local web server is defined.
17. The web server is interpreted.
18. FTP client is interpreted
19. FTP client is installed.
20. FTP client is used to upload or move files to web server.
21. Data layer is defined.
22. Data layer is interpreted.
23. Web API is introduced.

Learning Outcome 1: Setup Client Server

Assessment Criteria	1. Client-server architecture is identified. 2. Types of networks and their functionality is interpreted. 3. Types of websites are categorized. 4. Local Web server is installed. 5. Local web server is tested.
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1. client-server architecture and its components. 2. types of networks and understand their functionalities. 3. types of websites based on their purpose and features. 4. local web server 5. Testing procedures on the local web server to ensure its functionality and compatibility.
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning

Learning Experience 1: Setup Client Server

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about setup web design environment	1. Instructor will provide the learning materials setup client server.
2. Read the **Information sheet/s**	2. Information Sheet No:1 Setup client server
3. Complete the **Self-Checks & Answer key sheets.**	3. Self-Check No: 1- Setup client server Answer key No. 1- Setup client server
4. Read the **Job/ Task sheet** and **Specification Sheet**	4. Job/ task sheet and specification sheet Task Sheet No:1-1: Setup a Client-Server Network Infrastructure.
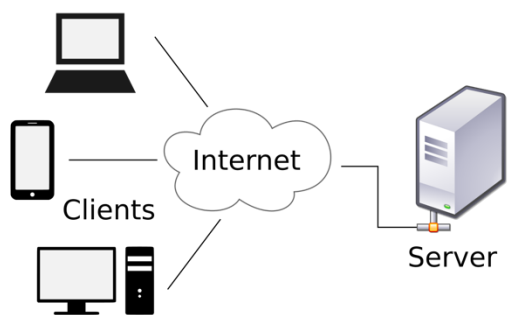
Information Sheet 1: Setup Client Server

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

1.1 Client-server architecture and its components.
1.2 Vrious types of networks and understand their functionalities.
1.3 Different types of websites based on their purpose and features.
1.4 Local web server and configure it properly.
1.5 Testing procedures on the local web server to ensure its functionality and compatibility.

1.1 Client-server architecture and its components

Client-server architecture and its components: Client-server architecture is a computing model in which clients and servers interact to fulfill computing tasks and services. Client-server architecture facilitates efficient communication, resource sharing, and data management on the Internet with TCP/IP protocol.	
<u>Clients:</u> Clients are devices or applications that request services or resources from servers. They can be personal computers, laptops, mobile devices, or software applications. Clients initiate communication by sending requests to servers and receiving responses in return.	
<u>Servers:</u> Servers are powerful computers or software applications that provide services or resources to clients. They respond to client requests by processing data, executing tasks, and delivering requested information. Servers are designed to handle multiple client connections simultaneously.	

<u>Benefits:</u>
  ▪ Scalability
  ▪ Centralized Data Management
  ▪ Improved Security
<u>Use Cases:</u>
  ▪ Web Servers
  ▪ Database Servers	

The communication between clients and servers follows a request-response model. Clients send requests to servers, specifying the desired service or resource, and servers respond by processing the request and delivering the requested information or performing the requested task.	
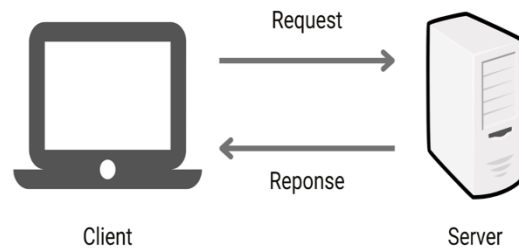
Watch a sample video lesson on client-server architecture.
(https://www.youtube.com/watch?v=Dg1U-jwVUrg)

1.2 Vrious types of networks and understand their functionalities

Types of Networks

- Intranet
- Extranet
- Internet

- **Intranet:**
  An intranet is a private network restricted to a specific organization, such as a company, school, or government agency. It enables internal communication and collaboration within the organization by providing access to shared resources, information, and applications. Intranets are typically protected by firewalls and require authentication for access.

- **Subdivision:**
  Local Area Network (LAN): A type of intranet that covers a small geographic area, such as an office building or campus. It allows for fast and efficient communication between devices within the network.

- **Extranet:**
  An extranet is an extension of an intranet that allows authorized external entities, such as partners, suppliers, or customers, to access certain parts of the internal network. It enables secure collaboration and information sharing with external stakeholders while maintaining control over access and permissions.

- **Subdivision**:
  Virtual Private Network (VPN): A secure connection established over a public network, such as the Internet, to connect remote users or external entities to the intranet or extranet. VPNs provide encryption and authentication to ensure secure communication.

- **Internet:**
  The Internet is a global network connecting millions of devices worldwide. It is a public network that enables communication, information sharing, and access to various services and resources. The internet operates on the TCP/IP protocol suite, allowing users to browse websites, send emails, access cloud services, and more.

Note: While there are no direct subdivisions of the Internet, it is worth mentioning that it comprises interconnected networks, including intranets, extranets, and various other types of networks owned by different organizations and service providers. These interconnected networks form the infrastructure that supports the functioning of the Internet as a whole.

1.3   Different types of websites based on their purpose and features.

Types of Websites
- Static
- Dynamic
- Interactive

- **Static Websites:**
  Static websites are the simplest websites that primarily display fixed content to the users. The content of these websites remains the same until a web developer manually updates or modifies it. Static websites are typically created using HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets). They are suitable for websites requiring minimal updates or needing more interactive elements. Examples of static websites include brochure websites, informational websites, and personal portfolios.

- **Dynamic Websites:**
  Unlike static websites, dynamic websites generate content on the fly, allowing for real-time updates and user interactions. They retrieve data from a database or external sources and deliver personalized content to the users based on their preferences or inputs. Dynamic websites use server-side technologies such as PHP, Python, Ruby, or ASP.NET to process user requests and generate dynamic content. Examples of dynamic websites include e-commerce sites, social media platforms, news portals, and content management systems (CMS).

- **Interactive Websites:**
  Interactive websites go beyond dynamic websites by providing users with a highly engaging and immersive experience. They often involve advanced user interfaces, multimedia elements, and interactive features encouraging user participation and input. Interactive websites leverage client-side technologies like JavaScript, AJAX and frameworks like AngularJS or ReactJS to enhance user interactivity. These websites enable users to perform actions, submit forms, play games, and manipulate content directly. Examples of interactive websites include web applications, online games, interactive educational platforms, and collaborative platforms like Google Docs.

1.4   Local web server and configure it properly

Local Web Server:

A local web server is software installed and run on a personal computer or a local network. It allows you to create a web design and development environment on your computer, enabling you to develop, test, and run websites or web applications locally before deploying them to a live server. A local web server simulates the functionality of a remote server, allowing you to interact with webpages and execute server-side scripts on your machine.

There are several ways to install a local web server. Some of the standard methods include:

- **Manual Installation:** Manual installation involves downloading and installing the necessary components to set up a web server. This includes downloading and installing the web server software (e.g., Apache, Nginx), database server (e.g., MySQL), and server-side scripting language (e.g., PHP). Each component must be configured separately, and the process requires a good understanding of the server setup and configuration.

- **XAMPP:** XAMPP is a popular cross-platform software package that includes Apache, MySQL, PHP, and Perl. It provides an all-in-one solution for setting up a local web server environment. XAMPP simplifies the installation process by bundling the necessary components and providing an intuitive control panel for managing the server. XAMPP is available for Windows, macOS, and Linux.

- **WAMP:** WAMP (Windows, Apache, MySQL, PHP) is similar to XAMPP but is specifically designed for Windows operating systems. It provides an easy-to-install package that includes Apache, MySQL, and PHP, allowing users to quickly set up a local web server on a Windows machine.

- **MAMP:** MAMP (Mac, Apache, MySQL, PHP) is a local web server solution for macOS users. It bundles Apache, MySQL, and PHP into a single package, providing an easy installation and configuration process for setting up a local development environment on a Mac.

- **LAMP:** LAMP (Linux, Apache, MySQL, PHP) refers to the combination of open-source software commonly used for hosting websites on Linux servers. It involves manually installing and configuring Apache, MySQL, and PHP on a Linux distribution, such as Ubuntu or CentOS.

These are just a few examples of local web server installation methods. Other options, such as WampServer, EasyPHP, and Bitnami, offer their features and benefits. The choice of installation method depends on the operating system, personal preference, and the specific requirements of the web development project. In this learning material we will see XAMPP installation.

How To Install Xampp on Windows

1. To install XAMPP on your PC, go to: **https://apachefriends.org** and click the **XAMPP for Windows** link. The download will start automatically.
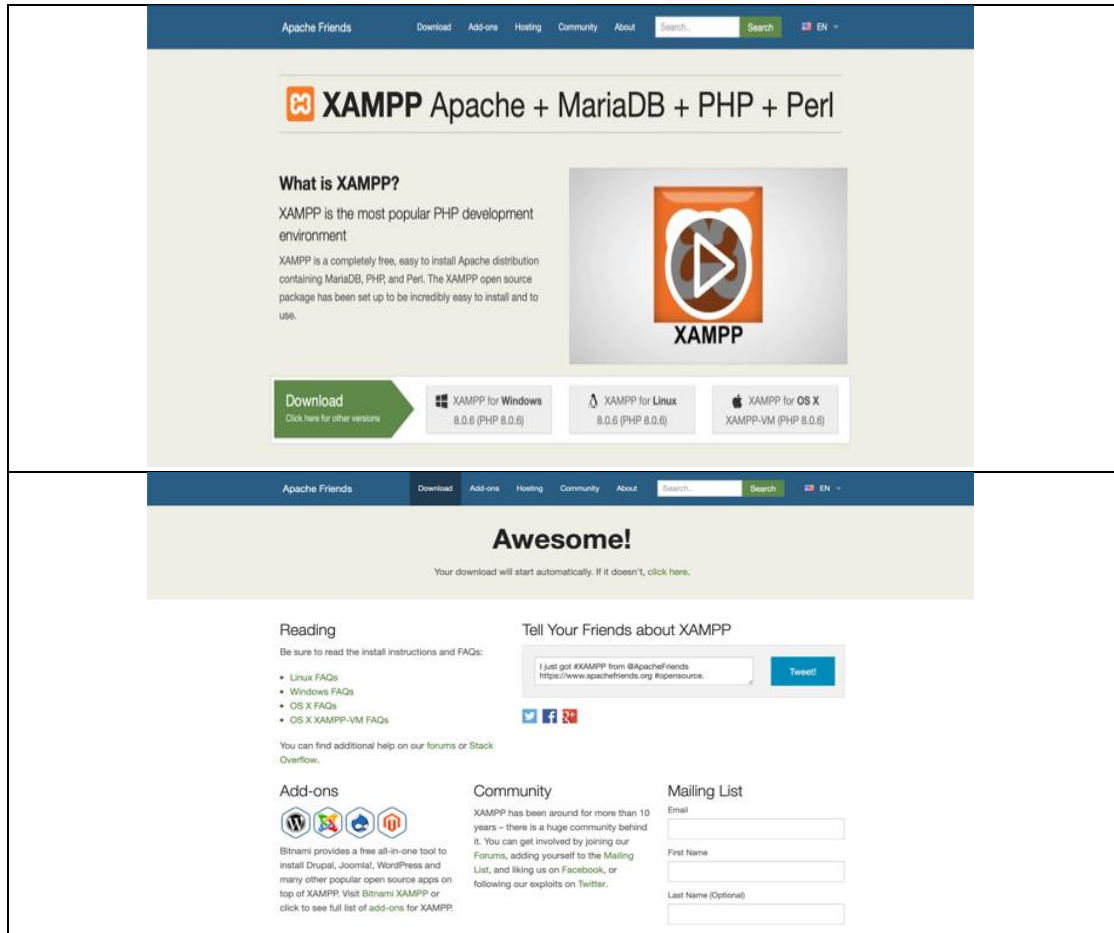
2. Once the download has completed, go to your Downloads folder and double-click on the installer to start the installation.
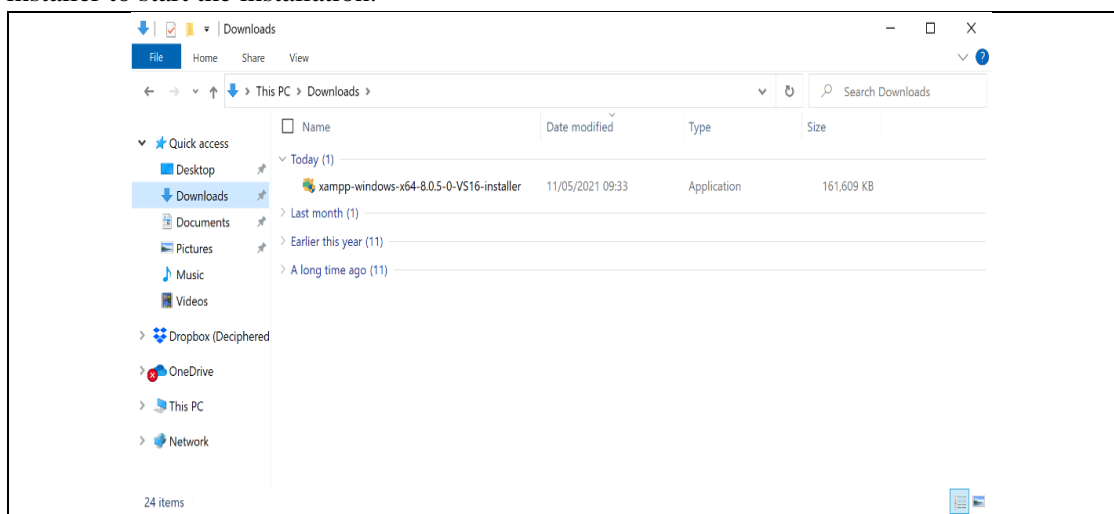
3. Follow the instructions to install XAMPP.
4. To start XAMPP, type **XAMPP** into the search bar. Then select the **XAMPP Control Panel** to start XAMPP.
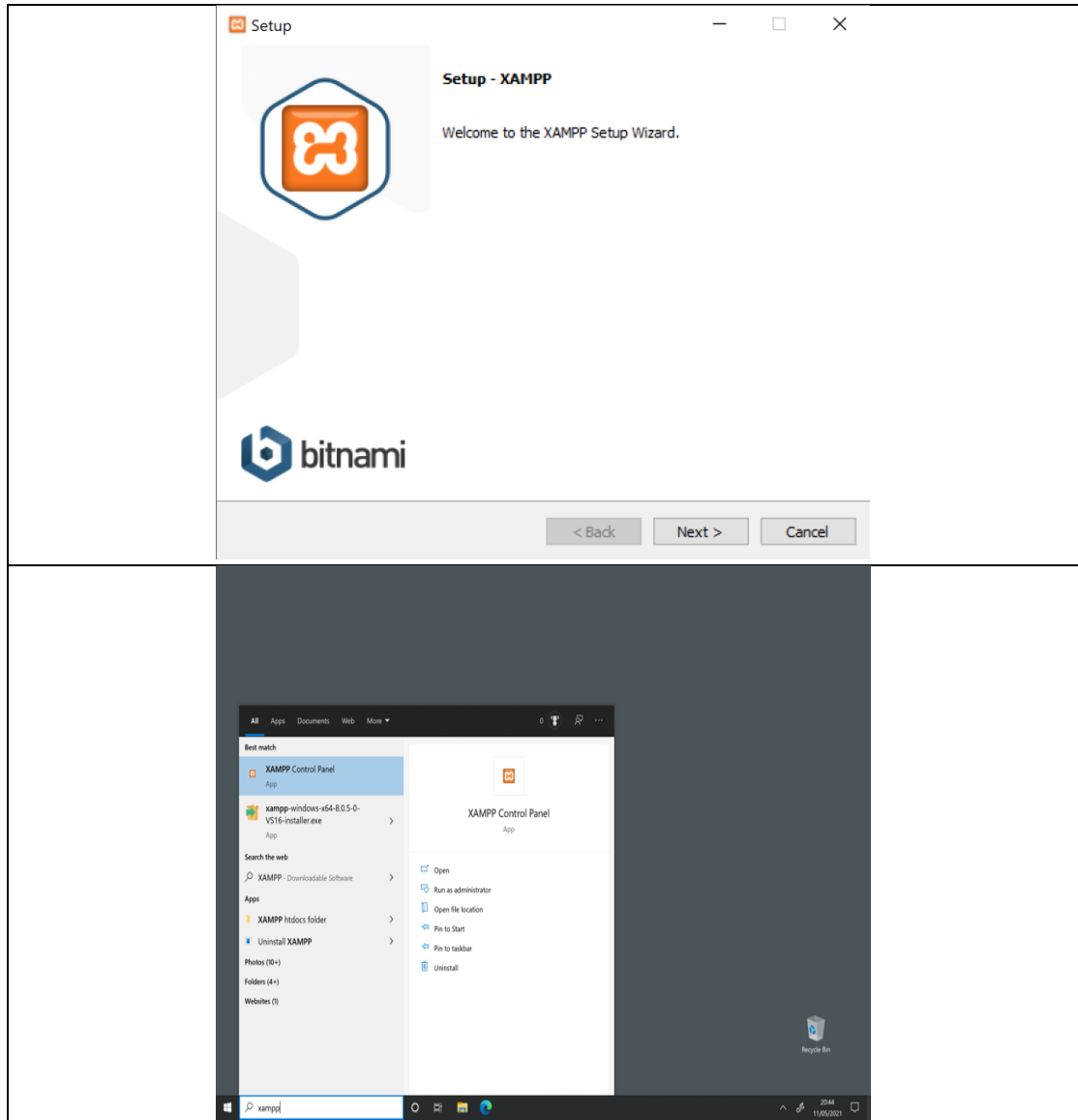
THE XAMPP INTERFACE

- Here you can see the XAMPP interface.

- The **Start** button for Apache is used to start the Apache web server (and then stop it when it is started).

- The **Start** button for MySQL will start the MySQL database (and then stop it when it is started).

- The port numbers for Apache and MySQL are shown when the servers have started.

9

XAMPP Control Panel v3.3.0   [Compiled: Apr 6th 2021]

XAMPP Control Panel v3.3.0

Config

Modules Service	Module	PID(s)	Port(s)	Actions				
	Apache			Start	Admin	Config	Logs	
	MySQL			Start	Admin	Config	Logs	
	FileZilla			Start	Admin	Config	Logs	
	Mercury			Start	Admin	Config	Logs	
	Tomcat			Start	Admin	Config	Logs	

Netstat
Shell
Explorer
Services
Help
Quit

```
19:00:08  [main]     Checking for prerequisites
19:00:10  [main]     All prerequisites found
19:00:10  [main]     Initializing Modules
19:00:10  [main]     The FileZilla module is disabled
19:00:10  [main]     The Mercury module is disabled
19:00:10  [main]     The Tomcat module is disabled
19:00:10  [main]     Starting Check-Timer
19:00:10  [main]     Control Panel Ready
```

<div align="center">

Where To Save Files:

</div>

When learning to create a Local Web Server for website design, you should save your HTML pages in the **document root folder**. You should also put any other files the browser might request in this folder (such as images, CSS, and JavaScript files).

When using XAMPP, the default location of the document root folder is C:\XAMPP\htdocs\. And the default XAMPP URL is an address like this: http://localhost.

1.5   Testing procedures on the local web server to ensure its functionality and compatibility.

Testing XAMPP Installation:

In the control panel, click on the start action for the Apache module. This will instruct XAMPP to initiate the Apache webserver. Now open any web browser and type: http://localhost or 127.0.0.1, you should see the XAMPP screen. It means you have XAMPP appropriately installed on your system.

Follow these steps to check whether the XAMPP server is configured correctly or not, and we can create a PHP test page. This page can be stored under XAMPP's localhost and run on the browser.

Steps to create a PHP page:

- Open the XAMPP directory in C Drive and choose the htdocs folder (C:\xampp\htdocs for standard installations). This directory contains all the data required to run a web page.
- Please create a new folder **Test** for the test page in htdocs.
- Open Notepad, type the following code, and save the file in the Test folder.
- Make sure you have saved the file with .php extension. For example, test.php.

<div align="center">

<!doctype html>

<html>

<head>

<title> Test Page**</title>**

</head>

<body>

<p> XAMPP Server runs successfully**</p>**

</body>

</html>

</div>

- Open the XAMPP control panel and start the Apache module.
- Open your browser and type localhost/Test/test.php in the URL tab. If your browser prints 'XAMPP Server runs successfully,' it means XAMPP is installed and correctly configured.

<div align="center">

11

</div>

The output of localhost:
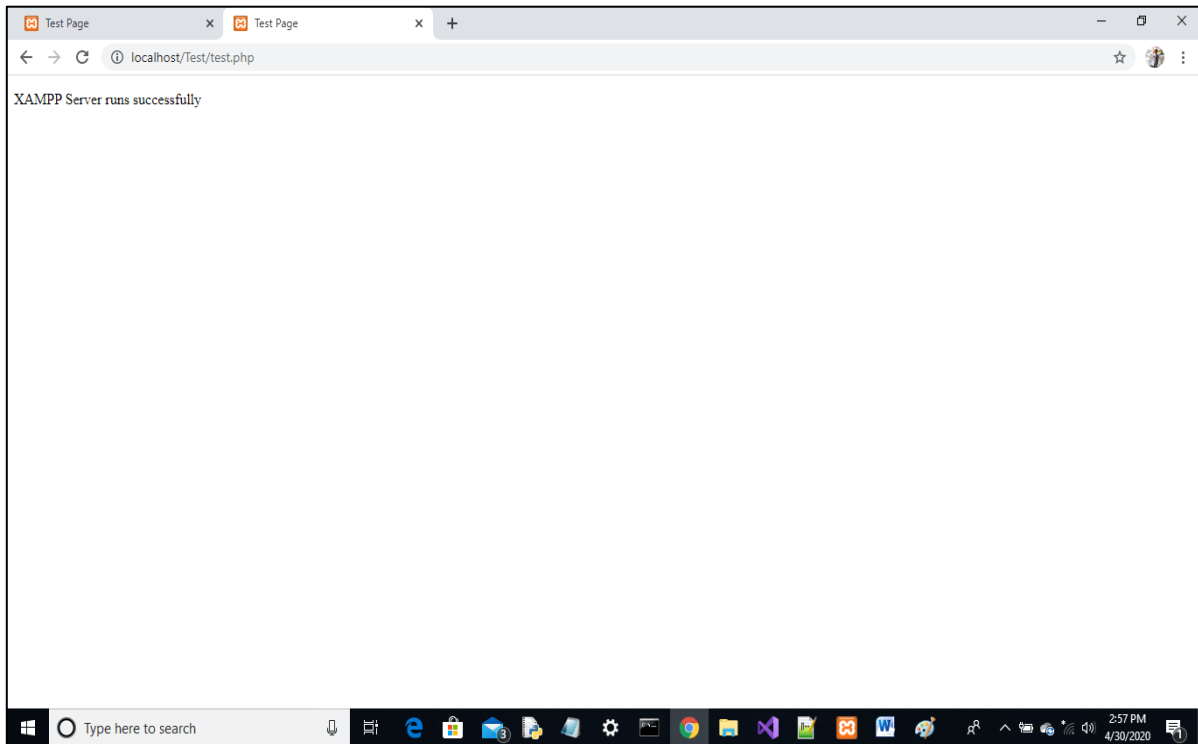
From the output screen, you can see that the XAMPP server is successfully installed. You can use it to create and test your Web Apps and learn how web servers work with OpenSSL, Tomcat, and others. We started only the Apache module for testing, but you can also begin other modules like MySQL, FileZilla, Mercury, and Tomcat to create web apps.

Self-Check Sheet 1: Setup Client Server

Questionnaire:

1. What is the purpose of setting up a Client-Server architecture?
   Answer:

2. What are the main components involved in a Client-Server setup?
   Answer:

3. What are the advantages of a Client-Server architecture?
   Answer:

4. What types of services can be provided in a Client-Server setup?
   Answer:

5. How does communication occur between clients and the server in a Client-Server architecture?
   Answer:

6. What factors should be considered when setting up a Client-Server architecture for a business?
   Answer:

Answer Key - 1: Setup Client Server

1. What is the purpose of setting up a Client-Server architecture?
   Answer: The purpose of setting up a Client-Server architecture is to establish a network model where multiple client devices (computers, smartphones, etc.) communicate with a central server to access resources, services, and data efficiently.

2. What are the main components involved in a Client-Server setup?
   Answer: The main components of a Client-Server setup include:
   1 Clients: Devices that request services or resources from the server.
   2 Server: A central system that manages and provides services, resources, or data to clients.
   3 Network: The communication medium that connects clients and the server.

3. What are the advantages of a Client-Server architecture?
   Answer: The advantages of a Client-Server architecture include centralized control, easier management and maintenance, improved security, scalability, and the ability to handle multiple client requests simultaneously.

4. What types of services can be provided in a Client-Server setup?
   Answer: In a Client-Server setup, various services can be provided, such as file sharing, email services, database management, web hosting, and application hosting.

5. How does communication occur between clients and the server in a Client-Server architecture?
   Answer: Communication between clients and the server takes place through network protocols. Clients send requests to the server, and the server responds by providing the requested services or data.

6. What factors should be considered when setting up a Client-Server architecture for a business?
   Answer: When setting up a Client-Server architecture for a business, factors to consider include the number of clients, the expected workload, hardware and software requirements for the server, network bandwidth, and security measures to protect data and resources.

Task Sheet-1.1: Setup a Client-Server Network Infrastruture

Objectives: The objective of this practical assessment is to set up a client-server network infrastructure. You will be required to demonstrate your ability to configure and establish communication between clients and servers using appropriate protocols and technologies.

Working Procedure:

Network Design and Planning:
1 Plan the network topology, including the physical layout and connection between clients and the server.
2 Decide on the type of client-server model (e.g., centralized, decentralized) based on the requirements.

Hardware and Software Procurement:
3 Identify the hardware components needed for the client computers and the server.
4 Procure the necessary networking equipment, such as routers, switches, and cables.
5 Select the appropriate operating system and server software for the server and client machines.

IP Addressing and Subnetting:
6 Assign IP addresses to each device in the network to ensure proper communication.
7 Implement subnetting to manage IP address allocation efficiently.

Server Setup:
8 Install the chosen operating system on the server machine.
9 Configure server roles and services as required, such as file sharing, web hosting, database management, etc.

Client Setup:
10 Install the chosen operating system on the client machines.
11 Ensure that client computers are connected to the network and can communicate with the server.

Network Configuration:
12 Configure the networking equipment, including routers and switches, to enable communication between clients and the server.
13 Set up DHCP (Dynamic Host Configuration Protocol) to automatically assign IP addresses to clients.

Security Implementation:
14 Implement security measures to protect the server and client devices from unauthorized access.
15 Set up user accounts with appropriate permissions and access controls.
16 Configure a firewall to control network traffic and protect against threats.

Data Backup and Recovery:
17 Implement a data backup and recovery strategy for critical data on the server.
18 Set up regular backups to an external storage device or cloud storage.

Learning Outcome 2: Work with Browsers

Assessment Criteria	1. Web browser is identified. 2. Types of web browsers are introduced. 3. Web browser is installed and used. 4. Features/options of different web browsers are outlined. 5. Cross-browser compatibility of websites is interpreted. 6. "Inspect element" tool is introduced.
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1 Web browser. 2 Types of Web browsers. 3 Install and use a Web browser. 4 Outline Features/options of different Web browsers. 5 Cross browser compatibility of websites. 6 "Inspect element" tool.
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning

Learning Experience 2: Work with Browsers

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about setup web design environment	1. Instructor will provide the learning materials work with browsers.
2. Read the **Information sheet/s**	2. Information Sheet No:2 Work with browsers.
3. Complete the **Self-Checks & Answer key sheets.**	3. Self-Check No: 2- Work with browsers. Answer key No. 2- Work with browsers.
4. Read the **Job/ Task sheet** and **Specification Sheet**	4. Job/ task sheet and specification sheet Job Sheet No:2-1: Install Google Chrome on Windows PC Specification Sheet: 2-1 Install Google Chrome on Windows PC

Information Sheet 2: Work with Browsers

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

2.1. Web browser.
2.2. Types of Web browsers and use Web browser.
2.3. Outline Features/options of different Web browsers.
2.4. Cross browser compatibility of websites.
2.5. "Inspect element" tool.

2.1.   Web browser

A web browser is a software application that allows users to access and view websites online. It acts as a user interface, enabling users to interact with web content, navigate web pages, and consume online information. Web browsers retrieve and display webpages by interpreting HTML, CSS, JavaScript, and other web technologies.	

2.2.   Different Types of Web Browsers and their uses:

❖ **Mozilla Firefox:**
- Mozilla Firefox is a popular open-source web browser developed by the Mozilla Foundation.
- It is known for its strong emphasis on privacy and security, with features like Enhanced Tracking Protection and support for various privacy-focused extensions.
- Firefox offers a customizable user interface and a wide range of add-ons and extensions to enhance the browsing experience.
- It is available for multiple platforms, including Windows, macOS, Linux, and mobile devices.

❖ **Google Chrome:**
- Google Chrome is a widely used web browser developed by Google.
- It is known for its fast performance, clean user interface, and integration with various Google services.
- Chrome supports many extensions and provides features like tab management, automatic updates, and built-in Google Translate.

- It is available for Windows, macOS, Linux, Android, and iOS.
❖ **Safari:**
  - Safari is the default web browser for Apple devices, including Mac computers, iPhones, and iPads.
  - It offers a clean and user-friendly interface focusing on performance and energy efficiency.
  - Safari integrates seamlessly with Apple's ecosystem, providing features like iCloud syncing, Handoff for seamless browsing across devices, and Apple Pay integration.
  - Safari is available exclusively for macOS and iOS.

❖ **Opera**:
  - Opera is a web browser known for its speed, security features, and unique functionalities.
  - It includes a built-in ad blocker, a free VPN (Virtual Private Network) for secure browsing, and a battery-saving mode.
  - Opera offers a customizable start page, sidebar extensions for quick access to bookmarks and messaging services, and a unique feature called Opera Turbo for faster browsing on slow internet connections.
  - It is available for Windows, macOS, Linux, Android, and iOS.

❖ **Microsoft Edge**:
  - Microsoft Edge is a web browser developed by Microsoft and is the default browser for Windows 10 and later versions.
  - It offers a clean and modern interface, integration with Microsoft services like Cortana and Office, and features like reading mode, PDF annotation, and collections for organizing web content.
  - Microsoft Edge is built on the Chromium open-source project, which provides better compatibility with web standards and a wide range of extensions.
  - It is available for Windows, macOS, Android, and iOS.

❖ **Brave**:
  - Brave is a privacy-focused web browser built on Chromium, the same open-source project that powers Google Chrome.
  - It strongly emphasizes blocking ads and trackers by default, providing a faster and more secure browsing experience.
  - Brave offers feature such as built-in ad and tracker blocking, HTTPS Everywhere for secure connections, and Brave Rewards. This system allows users to earn cryptocurrency for opting into privacy-respecting ads.
  - Brave is available for Windows, macOS, Linux, Android, and iOS.

❖ **Tor Browser**:
  - Tor Browser is a web browser that focuses on privacy and anonymity.
  - It is based on the Tor network, a volunteer-operated servers that encrypt and route internet traffic through multiple layers, making it difficult to trace back

to the user.
- ▪ Tor Browser prevents websites from tracking browsing habits and obscures your IP address, enhancing online privacy.
- ▪ It also allows access to websites blocked or censored in certain regions by bypassing restrictions.
- ▪ Tor Browser is available for Windows, macOS, Linux, and Android.

It's important to note that while Tor Browser provides enhanced privacy and anonymity, it may result in slower browsing speeds due to the nature of routing internet traffic through multiple servers. Additionally, it's crucial to use Tor Browser responsibly and be aware of the legal and ethical considerations associated with accessing certain types of content.
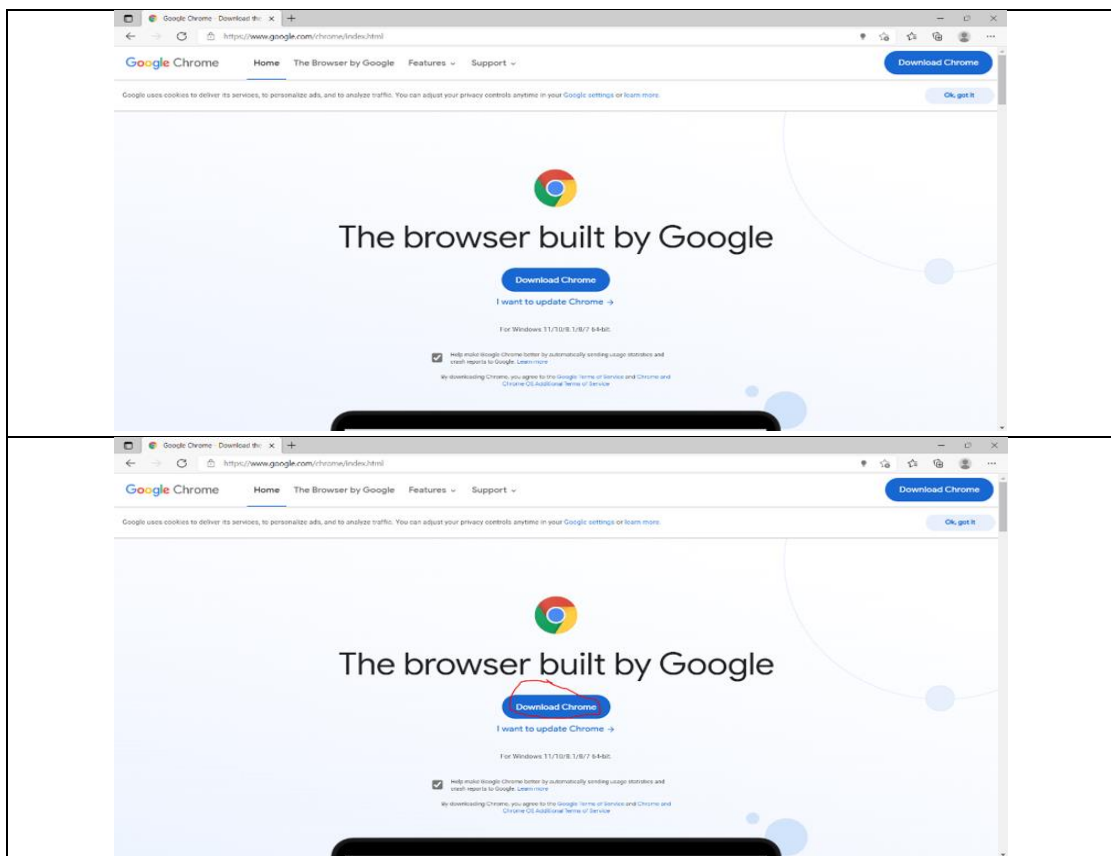
2.3.   Outline Features/options of different Web browsers

Open a web browser:
- ▪ Launch any web browser installed on your computer, such as Internet Explorer, Firefox, or Safari.

Visit the official Google Chrome website:
- ▪ Type "Chrome" or "Google Chrome" in the search bar of your current web browser.
- ▪ Click on the official link that directs you to the Google Chrome website.

Download the Chrome installer:

- On the Google Chrome website, you will find a prominent download button.
- Click on the download button to initiate the download of the Chrome installer.

Choose the installer version:

- Depending on your operating system, you may have different download options.
- Select the appropriate installer version for your operating system (Windows, macOS, or Linux).

Accept the terms and conditions:

- Before proceeding with the download, you may be required to accept the terms and conditions of using Google Chrome.
- Read the terms and conditions and click the "Accept and Install" button to continue.
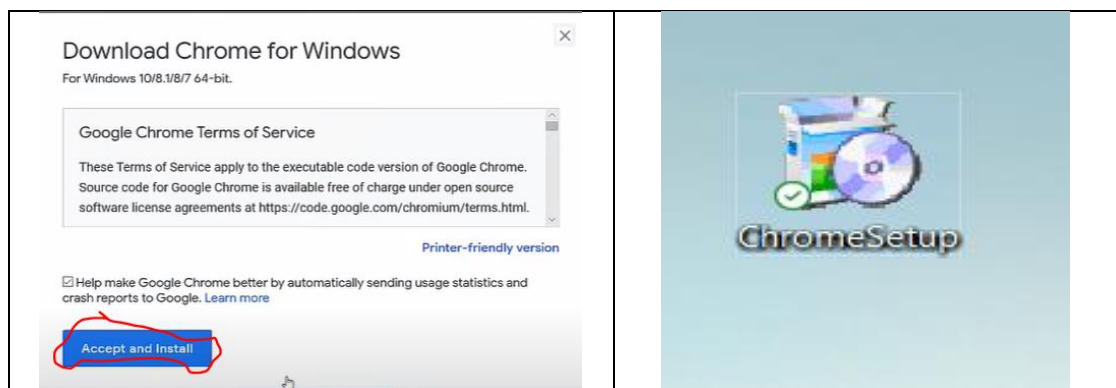
Save the Installer file:

- You will be prompted to choose a location on your computer where you want to save the installer file.
- Select a location and click "Save" to start the download.

Run the installer:

- Once the download is complete, locate the downloaded installer file on your computer.
- Double-click on the installer file to run it.

User Account Control (UAC) prompt (for Windows):

- If you are using Windows, the User Account Control (UAC) prompt may appear to ask for your permission to proceed.
- Click "Yes" or enter your administrator password if prompted.
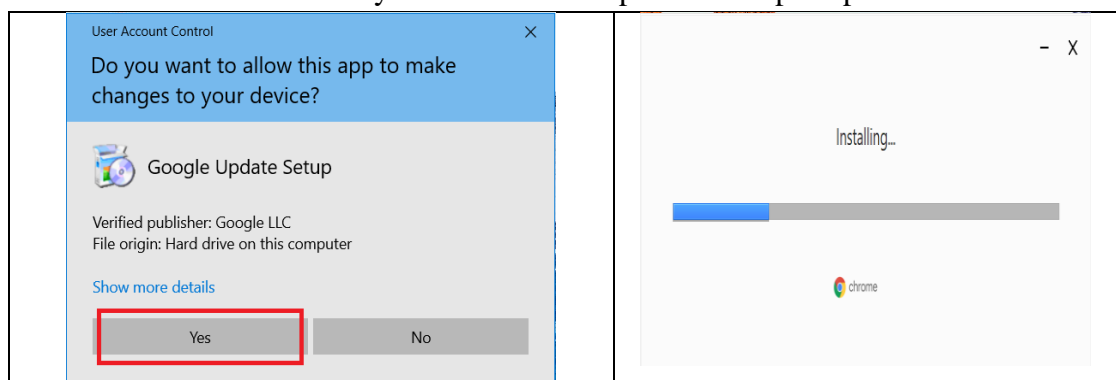
Follow the installation prompts:

- The Chrome installer will guide you through the installation process with several prompts.
- You may be asked to choose installation options, such as the installation location or whether to make Chrome your default browser.
- Follow the prompts and make any desired selections.

Wait for the installation to complete:

- The installation process may take a few minutes.
- Wait for the installer to complete the installation of Google Chrome on your computer.

Launch Google Chrome:

- Once the installation is finished, you can launch Google Chrome by locating its icon on your desktop or in the Start menu.
- Double-click on the icon to open Google Chrome.

Set up Chrome (optional):

- You may be prompted to sign in with your Google Account upon launching Chrome for the first time.
- You can sign in or skip this step if you prefer to keep your data private.
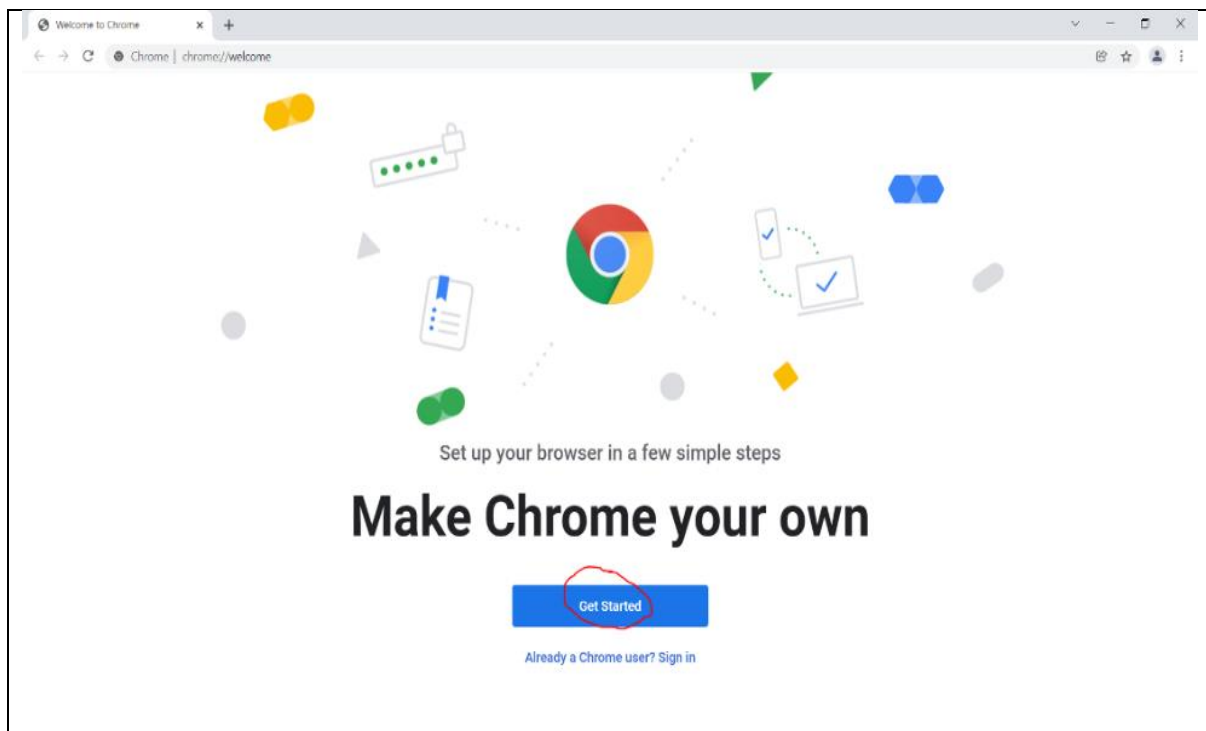
2.4. Cross browser compatibility of websites

Cross-browser compatibility refers to the ability of a website, web application, or any web-based content to function consistently and correctly across different web browsers. Web browsers are developed by different companies, each with its rendering engines,

scripting capabilities, and interpretation of web standards. As a result, web content can sometimes appear or function differently depending on the browser being used.

2.5. "Inspect element" tool

The Inspect Element tool, also known as Developer Tools or DevTools, is a feature available in most modern web browsers that allow developers and designers to inspect and manipulate a web page's HTML, CSS, and JavaScript code. It is a powerful tool for web development, debugging, and understanding how websites are built.
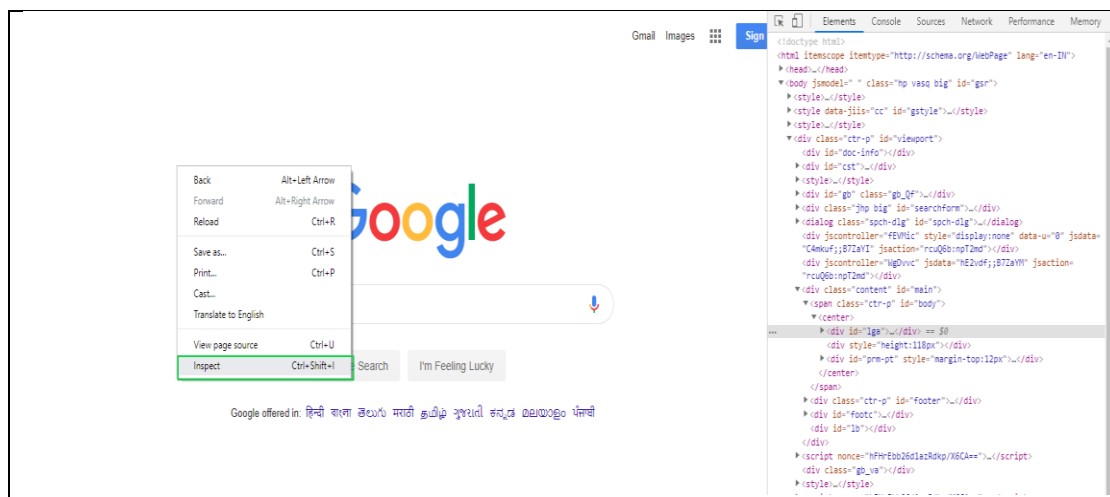
Here are some key features and functions of the Inspect Element tool:

❖ **Element Inspection:**

- The tool's primary function is to inspect individual elements on a web page. By right-clicking on an element and selecting "Inspect" or using a keyboard shortcut, the tool opens a panel that displays the HTML code and associated CSS styles for that element.
- Developers can see the element's attributes, classes, IDs, box model properties, computed styles, and more.

❖ **DOM Manipulation:**

- The Inspect Element tool allows for live editing of a web page's Document Object Model (DOM). This means developers can add, modify, or remove elements and see the changes immediately without affecting the website.

❖ **CSS Inspection and Editing:**

- Developers can examine and modify the CSS properties applied to specific elements. This includes adjusting styles, experimenting with different values, and even disabling or overriding existing styles to test the visual effects.

23

❖ **JavaScript Debugging:**

- The tool provides a console that allows developers to execute JavaScript code, log messages, and debug JavaScript errors and issues.
- Developers can set breakpoints, step through code, inspect variables, and track the flow of execution.

❖ **Network Monitoring:**

- The Inspect Element tool includes a network panel that displays network requests made by the web page, including HTTP requests, response headers, and timing information.
- It enables developers to analyze network performance, monitor API calls, and identify potential bottlenecks or errors.

❖ **Mobile Device Emulation:**

- Many modern browsers have a responsive design mode within the Inspect Element tool, allowing developers to simulate the appearance and behavior of a web page on different devices and screen sizes.
- This helps in designing and testing responsive websites.

❖ **Performance Analysis:**

- The tool provides performance profiling capabilities to analyze and optimize a web page's loading and rendering speed.
- It can identify performance bottlenecks, memory leaks, and excessive CPU usage.

Self-Check Sheet 2: Work with Browsers

Questionnaire:

True/False Questions:

1. True or False: Web browsers interpret HTML, CSS, and JavaScript to display webpages.
2. True or False: Opera offers a built-in ad blocker and free VPN.
3. True or False: Cross-browser compatibility refers to the ability of a website to function consistently across different web browsers.
4. True or False: CSS resets or normalization techniques eliminate inconsistencies in default browser styles.
5. True or False: The Inspect Element tool allows live editing of the Document Object Model (DOM).
6. True or False: The Inspect Element tool provides a network panel to monitor network requests made by a web page.
7. True or False: The Inspect Element tool is primarily used by website visitors to view the source code of a webpage.

Short Questions:

1. What is a web browser?
   Answer:

2. Which web browser is developed by the Mozilla Foundation?
   Answer:

3. Which web browser is the default browser for Apple devices?
   Answer:

4. Which web browser is based on the Chromium project and is the default browser for Windows 10?
   Answer:

5. What is the purpose of feature detection in achieving cross-browser compatibility?
   Answer:

6. What can developers do with the console in the Inspect Element tool?
   Answer:

7. What is the significance of adhering to web standards in achieving cross-browser compatibility?
   Answer:

Answer Key - 2: Work with Browsers

1. **True:** Web browsers interpret HTML, CSS, and JavaScript to display webpages.
2. **True**: Opera offers a built-in ad blocker and free VPN.
3. **True**: Cross-browser compatibility refers to the ability of a website to function consistently across different web browsers.
4. **True**: CSS resets or normalization techniques eliminate inconsistencies in default browser styles.
5. **True**: The Inspect Element tool allows live editing of the Document Object Model (DOM).
6. **True**: The Inspect Element tool provides a network panel to monitor network requests made by a web page.
7. **False**: The Inspect Element tool is primarily used by website visitors to view the source code of a webpage.

Short Questions:

1. What is a web browser?
   Answer: A web browser is a software application that allows users to access and view websites online.

2. Which web browser is developed by the Mozilla Foundation?
   Answer: Mozilla Firefox.

3. Which web browser is the default browser for Apple devices?
   Answer: Safari.

4. Which web browser is based on the Chromium project and is the default browser for Windows 10?
   Answer: Microsoft Edge

5. What is the purpose of feature detection in achieving cross-browser compatibility?
   Answer: Feature detection helps identify browser capabilities before executing specific code or applying certain styles

6. What can developers do with the console in the Inspect Element tool?
   Answer: Developers can execute JavaScript code, log messages, and debug JavaScript errors and issues with the console in the Inspect Element tool

7. What is the significance of adhering to web standards in achieving cross-browser compatibility?
   Answer: Adhering to web standards ensures that websites are developed using standardized practices, improving compatibility across browsers and devices

Job Sheet-2.1: Install Google Chrome on Windows PC

Working Procedure:

1. Go to the official Google Chrome website (https://www.google.com/chrome).
2. Click on the "Download Chrome" button.
3. Review the Terms of Service and click the "Accept and Install" button.
4. Save the installation file to your computer.
5. Once the download is complete, locate the file (e.g., "ChromeSetup.exe").
6. Double-click on the installation file to run it.
7. If prompted by User Account Control, click "Yes" to allow the installation.
8. The installer will start and display the "Welcome to Google Chrome" screen.
9. Review the installation options and click "Install" to proceed with the default settings.
10. Google Chrome will now be installed on your Windows PC.
11. After the installation, you can launch Google Chrome by double-clicking the desktop shortcut or finding it in the Start menu.

Specification Sheet-2.1: Install Google Chrome on Windows PC

Necessary Personal Protective Equipment (PPE)

Sl. No	Name of PPE	Unit	Quantity
1	Apron	Pair	01
2	Mask	Pair	01

Necessary tools and equipment

Sl. No	Name of Tools & Equipment	Specification	Unit	Quantity
1	Computer	Processor: Intel Pentium 4 or higher RAM: 2 GB Disk Space: 200 MB	Set	01
2	Software (Google Chrome)	Latest Version	No.	01
3	Internet connections		Set	01

Learning Outcome 3: Introduce Web Design Software

Assessment Criteria	1. Web design software is interpreted. 2. Web design platform is introduced. 3. Web design software is familiarized.
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker
Contents	1. Web design software. 2. Web design platform. 3. Familiarize with Web design software
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning

Learning Experience 3: Introduce Web Design Software

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about setup web design environment	1. Instructor will provide the learning materials introduce web design software.
2. Read the **Information sheet/s**	2. Information Sheet No:3 Introduce web design software.
3. Complete the **Self-Checks & Answer key sheets.**	3. Self-Check No: 3- Introduce web design software. Answer key No. 3- Introduce web design software.
4. Read the **Job/ Task sheet** and **Specification Sheet**	4. Job/ task sheet and specification sheet Task Sheet No:3-1: Introduce functionality of web design software

Information Sheet 3: Introduce Web Design Software

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

4.1   Web Design Software
4.2   Web Design Platform

4.1   Web Design Software

Web design software refers to computer applications or tools designed to assist web designers in creating, editing, and managing websites. These software applications provide a range of features and functionalities to facilitate the design and development process, enabling designers to create visually appealing and functional websites.

Different Types of Web Design Software:

- **Web Editors**: Web editors are software programs that allow designers to create and edit web pages using HTML, CSS, and other programming languages. These editors provide a user-friendly interface, syntax highlighting, code completion, and other productivity features. Examples of web editors include Notepad++, Sublime Text, Atom, and Visual Studio Code.

- **Content Management Systems (CMS):** Content Management Systems are software platforms that simplify website creation and management. They offer pre-designed templates, drag-and-drop functionality, and built-in tools for content organization, publishing, and updates. Examples of popular CMSs include WordPress, Joomla, and Drupal.

- **Graphic Design Tools:** Graphic design software creates visually appealing website elements, such as logos, icons, banners, and graphics. These tools provide features for image editing, vector graphics creation, and digital illustration. Examples of graphic design software commonly used in web design include Adobe Photoshop, Adobe Illustrator, and CorelDRAW.

- **Prototyping and Wireframing Tools:** Prototyping and wireframing tools create interactive prototypes and wireframes representing a website's layout, structure, and functionality. These tools help designers visualize and test the user experience before development. Examples of popular prototyping tools include Adobe XD, Sketch, and InVision.

- **Integrated Development Environments (IDEs):** IDEs are comprehensive software applications providing an integrated web development environment. They typically include features like code editing, debugging, version control, and project management tools. Examples of IDEs used for web design include JetBrains PhpStorm, Microsoft Visual Studio, and Eclipse.

- **Audio/Video Players:** Audio and video players are tools to embed multimedia content into webpages, such as audio and video files. These players provide controls for playback, volume adjustment, and display customization. Examples of famous web-based audio/video players include HTML5 and JavaScript libraries like Plyr and Video.js.

4.2 Web Design Platform

Web design platforms, also known as website builders or web development platforms, are online software tools that provide comprehensive features and functionalities for creating and managing websites. These platforms offer a user-friendly interface, pre-designed templates, drag-and-drop functionality, and various customization options, enabling individuals and businesses to build professional-looking websites without requiring extensive coding knowledge or technical expertise.

Here are some key aspects of web design platforms:

- **Ease of Use:** Web design platforms are designed to be user-friendly, allowing individuals with little to no coding experience to create and manage websites. They typically offer intuitive interfaces, drag-and-drop functionality, and WYSIWYG (What You See Is What You Get) editors, enabling users to build and customize their websites visually.

- **Templates and Themes**: Web design platforms provide a wide range of professionally designed templates and themes that serve as a starting point for website creation. These templates cover various industries and design styles, providing users with a selection of visually appealing designs.

- **Customization Options:** Web design platforms allow users to customize the appearance and layout of their websites. Users can easily modify colors, fonts, images, and other visual elements to align with their branding and design preferences. Some platforms offer advanced customization options, such as CSS editing and HTML access, for more granular control over the website's design.

- **Responsive Design:** In today's mobile-centric world, responsive design is essential. Web design platforms ensure that the websites created are mobile-friendly and responsive, meaning they adapt and display correctly on various devices, including smartphones, tablets, and desktops.

- **Content Management:** Many web design platforms include built-in content management systems (CMS) that allow users to create, edit, and manage website content easily. These CMSs provide tools for adding and organizing pages, creating blog posts, managing media files, and integrating with external services like e-commerce or customer relationship management (CRM) systems.

- **E-commerce Functionality**: Some web design platforms offer built-in e-commerce functionality, allowing users to create online stores and sell products or services directly from their websites. These platforms provide features such as product catalog management, shopping carts, secure payment gateways, and order management.

- **Hosting and Domain Services**: Web design platforms often include hosting services, providing the infrastructure to host websites on their servers. They may also offer domain registration or integration services, allowing users to obtain and connect their custom domain names to their websites.

Popular web design platforms include:

- **WordPress:** An open-source CMS that powers millions of websites globally and offers extensive customization options and a vast plugin ecosystem.
- **Wix:** A user-friendly platform is known for its drag-and-drop editor, a wide range of templates, and integrated e-commerce functionality.
- **Squarespace:** A platform that emphasizes stylish and modern designs, catering to creatives and small businesses.
- **Shopify:** A platform focused on e-commerce, providing comprehensive tools for creating and managing online stores.
- **Weebly:** A beginner-friendly platform with drag-and-drop functionality, suitable for small businesses and personal websites.

Web design platforms simplify website creation, enabling individuals and businesses to establish an online presence quickly and efficiently. They offer a convenient solution for those needing more extensive technical skills who want to create attractive and functional websites.

Familiarize with different web design Software:

Familiarizing yourself with different web editors can enhance your web development workflow and enable you to work efficiently. Here are a few popular web editors:

Notepad++: Notepad++ is a free and open-source web editor for Windows. It offers a user-friendly interface with syntax highlighting for various programming languages, search and replace functionality, and support for multiple tabs. Notepad++ also supports plugins, allowing users to extend its functionality according to their needs.	
Sublime Text: Sublime Text is a popular cross-platform web editor known for its speed, flexibility, and powerful features. It offers a clean and minimalistic interface, customizable preferences, and a wide range of plugins and packages that enhance productivity. Sublime Text supports multiple cursors, project management, and advanced search and replace options.	
Visual Studio Code (VS Code): Visual Studio Code, developed by Microsoft, is a free and highly extensible web editor available for Windows, macOS, and Linux. It provides a modern and feature-rich environment for web development, with built-in support for Git, debugging tools, intelligent code completion, and an extensive marketplace for extensions.	
Atom: Atom is an open-source web editor created by GitHub. It offers a customizable and flexible interface and is known for its hackability. Atom provides features like a built-in package manager, smart autocompletion, multiple panes, and a wide range of community-created packages to enhance functionality.	

Brackets: Brackets is an open-source web editor designed specifically for web designers and front-end developers. It offers a lightweight and intuitive interface, live preview capabilities, and visual tools for working with CSS, such as inline editing and quick editing of gradients and colors. Brackets also support preprocessors like LESS and SCSS.	
Adobe Dreamweaver: Dreamweaver is a popular web editor with a visual design interface and code editing capabilities. It offers features like WYSIWYG editing, drag-and-drop functionality, and built-in support for CSS preprocessors and JavaScript frameworks. Dreamweaver also integrates with Adobe's Creative Cloud suite, enabling seamless collaboration and asset management.	

Each web editor has its features, interface, and customization options. Exploring and familiarizing yourself with different web editors allows you to find the one that best fits your preferences and workflow, making your web development process more efficient and enjoyable.
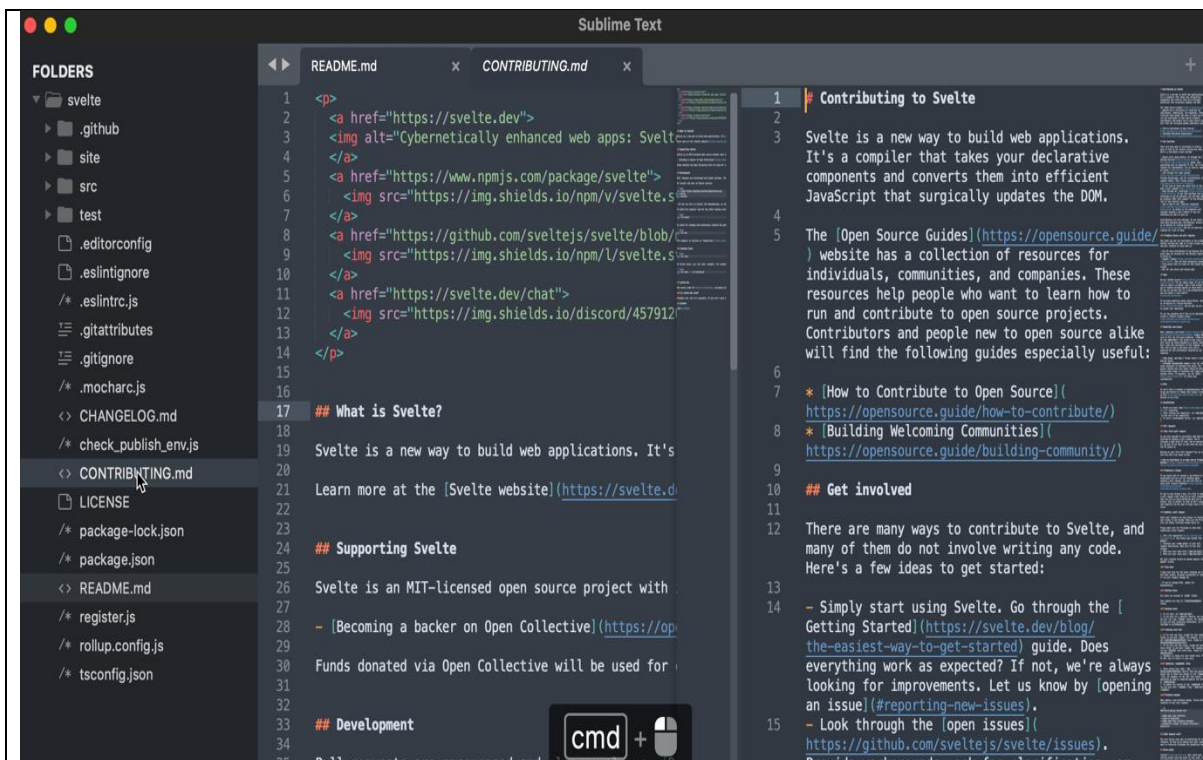
Self-Check Sheet 3: Introduce Web Design Software

Questionnaire:

1. Which web design software is known for its speed, flexibility, and powerful features?
   - a) Notepad++
   - b) Sublime Text
   - c) Visual Studio Code
   - d) Atom

2. Which web design software type is used to create visually appealing website elements?
   - a) Web editors
   - b) Content Management Systems
   - c) Graphic design tools
   - d) Prototyping and wireframing tools

3. Which web design platform is known for its drag-and-drop functionality and integrated e-commerce features?
   - a) WordPress
   - b) Wix
   - c) Squarespace
   - d) Shopify

4. Which web editor is designed specifically for web designers and offers visual tools for working with CSS?
   - a) Notepad++
   - b) Sublime Text
   - c) Brackets
   - d) Atom

5. Which web design software provides a visual design interface along with code editing capabilities?
   - a) Adobe Dreamweaver
   - b) Visual Studio Code
   - c) Sublime Text
   - d) Brackets

Answer Key - 3: Introduce Web Design Software

1. Which web design software is known for its speed, flexibility, and powerful features?
   b) Sublime Text

2. Which web design software type is used to create visually appealing website elements?
   c) Graphic design tools

3. Which web design platform is known for its drag-and-drop functionality and integrated e-commerce features?
   b) Wix

4. Which web editor is designed specifically for web designers and offers visual tools for working with CSS?
   c) Brackets

5. Which web design software provides a visual design interface along with code editing capabilities?
   a) Adobe Dreamweaver

Task Sheet-3.1: Introduce Functionality of Web Design Software

Objectives: The objective of this task sheet is to introduce and demonstrate the functionality of web design software. You will be required to explore and showcase the key features and capabilities of the chosen web design software, enabling participants to create visually appealing and functional websites.

Working Procedure:

Software Selection:
1   Choose a popular web design software that is widely used in the industry.
2   Justify the selection based on its user-friendliness, functionality, and relevance for web design.

User Interface and Navigation:
3   Introduce the user interface (UI) of the web design software.
4   Explain the layout, navigation, and organization of tools and features.

Website Project Setup:
5   Demonstrate how to set up a new web design project within the software.
6   Guide participants through the steps to choose templates or create custom designs.

Design Elements and Assets:
7   Showcase the various design elements available in the software, such as images, fonts, icons, and color palettes.
8   Explain how to upload custom assets and integrate them into the design.

Layout and Structure:
9   Demonstrate how to create responsive layouts and structures for different devices (desktop, tablet, mobile).
10   Show how to arrange and align elements on the web page.

Editing and Customization:
11   Guide participants on how to edit text, images, and other design elements.
12   Demonstrate customization options, such as changing colors, fonts, and styles.

Interactivity and Animation:
13   Showcase the software's capabilities for adding interactivity and animations to web pages.
14   Explain how to create buttons, links, and other interactive elements.

Preview and Testing:
15   Show how to preview the web design in different browsers and devices.
16   Demonstrate testing features to ensure the website's responsiveness and functionality.

Publishing and Exporting:
17   Guide participants on how to publish the website to a hosting server or export the design files for deployment.

Troubleshooting and Support:
18   Provide tips on troubleshooting common issues and errors that may arise during the design process.
19   Share resources and support channels for participants to seek help if needed.

Learning Outcome 4: Interpret Web Servers

Assessment Criteria	1. Web server is identified. 2. Local web server is defined. 3. Web server is interpreted.
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker
Contents	1. Web server. 2. Local web server. 3. Interpret Web server
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning

Learning Experience 4: Interpret Web Servers

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about setup web design environment	1. Instructor will provide the learning materials interpret web servers.
2. Read the **Information sheet/s**	2. Information Sheet No:4 Interpret web servers
3. Complete the **Self-Checks & Answer key sheets.**	3. Self-Check No: 4- Interpret web servers. Answer key No. 4- Interpret web servers.
4. Read the **Job/ Task sheet** and **Specification Sheet**	4. Job/ task sheet and specification sheet Task Sheet No:4-1: Interpret functionality and configuration of web servers.

Information Sheet 4: Interpret Web Servers

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

4.1   Web Server
4.2   Local web Server

4.1   Web Server

A web server is a computer program or software that serves and delivers web pages and other web content to clients upon request. It is the backbone of the World Wide Web, allowing users to access websites and web-based applications through their web browsers. Web servers receive requests from clients, process those requests, and send back the requested files or data to be displayed on the user's device.

Web servers use the Hypertext Transfer Protocol (HTTP) to communicate with web browsers and other client applications. When a user enters a website's URL or clicks on a hyperlink, the web browser sends a request to the appropriate web server, specifying the desired resource. The web server then retrieves the requested resource, such as HTML files, images, CSS stylesheets, or JavaScript files, and sends them back to the client for display in the browser.

Web servers are typically located in data centers and are designed to handle a large volume of concurrent requests. They have high-performance hardware and software configurations to ensure fast and reliable web content delivery. Examples of popular web server software include Apache HTTP Server, Nginx, Microsoft IIS (Internet Information Services), and LiteSpeed.

4.2   Local web Server

A local web server, or a development server or localhost, is a web server installed and run on an individual's local computer or a local network. Unlike a public web server, which is accessible over the internet, a local web server is used to develop, test, and host websites or web applications locally before being deployed to a live server.

Setting up a local web server allows web developers to work on their projects without needing an internet connection. It provides an isolated environment where they can test and debug their websites or web applications before making them available to the public. Additionally, local web servers offer flexibility in terms of customization and configuration, allowing developers to simulate various server environments.

Several software packages are available for installing and running a local web server, such as XAMPP, WAMP, MAMP, and LAMP. These packages include the necessary

XAMPP vs WAMP vs MAMP vs LAMP

components for running a web server, including the web server software itself (e.g., Apache), a database server (e.g., MySQL), and scripting languages (e.g., PHP). Once installed, developers can create and host websites locally, access them through their web browsers, and perform development tasks such as coding, testing, and debugging.

Define Xamp
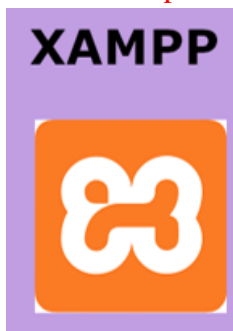
Define Wanp

Define

Define

Real-Life Examples for Local Web Servers:

Local WordPress Development: Web developers often use a local web server to set up and run a local installation of WordPress for development purposes. They can create and customize WordPress themes or plugins locally before deploying them to a live website.
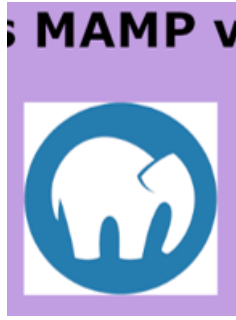
Web Application Testing: Software developers and quality assurance teams utilize local web servers to test web applications. They can replicate production environments, simulate user interactions, and verify the functionality and performance of web applications before releasing them.

Learning Web Development: Local web servers provide an ideal environment for beginners learning web development. Students and enthusiasts can practice coding HTML, CSS, JavaScript, and other web technologies, experiment with different frameworks and libraries, and see the results in their browsers without hosting or internet connectivity.

Intranet Development: Local web servers can be used to develop and test internal websites or intranets within organizations. They allow developers to create and share

internal web-based tools, databases, and resources for employees to access securely within the local network.

In summary, a web server is software that serves web content to clients. In contrast, a local web server is installed on a local computer or network for development and testing. Local web servers offer convenience, flexibility, and isolation for web developers and other users to build, test, and experiment with websites and web applications before making them publicly accessible.

Self-Check Sheet 4: Interpret Web Servers

Questionnaire:

1. What is a web server?
   - a) A software that delivers web content to clients
   - b) A hardware device used for browsing the internet
   - c) A web browser used to access websites
   - d) A programming language for web development

2. Which protocol is commonly used by web servers to communicate with web browsers?
   - a) HTTP
   - b) FTP
   - c) SMTP
   - d) TCP/IP

3. Where are web servers typically located?
   - a) Data centers
   - b) Home computers
   - c) Mobile devices
   - d) Cloud servers

4. Which of the following is a popular web server software?
   - a) Apache HTTP Server
   - b) Photoshop
   - c) Microsoft Word
   - d) Excel

5. When a user enters a website's URL, what happens next?
   - a) The web server sends a request to the client.
   - b) The web browser sends a request to the web server.
   - c) The web server sends a request to the DNS server.
   - d) The web browser displays the website without any communication.

6. What is a local web server?
   - a) A server located in a different country
   - b) A server used for web development and testing on a local computer
   - c) A server accessible over the internet
   - d) A server that can only host static websites

Answer Key - 4: Interpret Web Servers

1. What is a web server?

   a) A software that delivers web content to clients

2. Which protocol is commonly used by web servers to communicate with web browsers?

   a) HTTP

3. Where are web servers typically located?

   a) Data centers

4. Which of the following is a popular web server software?

   a) Apache HTTP Server

5. When a user enters a website's URL, what happens next?

   b) The web browser sends a request to the web server.

6. What is a local web server?

   b) A server used for web development and testing on a local computer

Task Sheet-4.1: Interpret Functionality and Configuration of Web Servers.

Objectives: The objective of this task sheet is to interpret and analyze the functionality and configuration of web servers. You will be required to explore and explain the key components and settings of a web server, as well as demonstrate how to deploy and manage a basic web application.

Working Procedure:

Web Server Selection:
1. Choose a popular web server software (e.g., Apache, Nginx) that is widely used in the industry.
2. Justify the selection based on its popularity, performance, and flexibility.

Web Server Components:
3. Introduce the core components of the selected web server software.
4. Explain the roles of components such as HTTP server, virtual hosts, modules, etc.

Installation and Setup:
5. Demonstrate the installation process of the web server software on a server or local environment.
6. Guide participants through the initial setup, including necessary configurations.

Virtual Hosting:
7. Show how to set up virtual hosts to host multiple websites on a single server.
8. Explain the concept of server blocks (Nginx) or virtual hosts (Apache).

Security Configuration:
9. Demonstrate how to implement basic security configurations for the web server.
10. Showcase techniques such as SSL/TLS certificate installation and firewall setup.

URL Rewriting and Redirection:
11. Explain how to set up URL rewriting and redirection for better user experience and SEO optimization.

Performance Optimization:
12. Showcase techniques for optimizing the web server's performance, such as caching and compression.
13. Explain how these optimizations improve website loading speed.

Web Application Deployment:
14. Demonstrate how to deploy a basic web application on the web server.
15. Guide participants through the steps to configure the server to run the application.

Server Logs and Monitoring:
16. Explain the importance of server logs for troubleshooting and performance monitoring.
17. Showcase how to access and interpret server logs.

Learning Outcome 5: Install FTP Clients

Assessment Criteria	1. FTP client is interpreted 2. FTP client is installed. 3. FTP client is used to upload or move files to web server
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker
Contents	1. FTP clients. 2. Installing an FTP client. 3. Move files to a web server using FTP client.
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning

Learning Experience 5: Install FTP Clients

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about setup web design environment	1. Instructor will provide the learning materials Install FTP clients.
2. Read the **Information sheet/s**	2. Information Sheet No:5 Install FTP clients.
3. Complete the **Self-Checks & Answer key sheets.**	3. Self-Check No: 5- Install FTP clients. Answer key No. 5- Install FTP clients.
4. Read the **Job/ Task sheet** and **Specification Sheet**	4. Job/ task sheet and specification sheet Job Sheet No:5-1: Install FileZilla FTP Client in Wondows Specification Sheet: 5-1: Install FileZilla FTP Client in Wondows

Information Sheet 5: Install FTP Clients

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

5.1   FTP clients.
5.2   Install an FTP client.
5.3   Move files to a web server using FTP client.

5.1   FTP clients

FTP (File Transfer Protocol) clients are software applications that allow users to connect to FTP servers and transfer files between their local computers and the remote server. FTP is a standard network protocol used for file transfer over the Internet.

FTP clients provide an intuitive user interface and a range of features to facilitate file transfer and management. Here are some critical aspects of FTP clients:

- **Connection Management:** FTP clients enable users to connect with remote FTP servers. Users can enter the server's hostname, IP address, username, and password to authenticate and establish a secure connection.
- **File Transfer:** FTP clients allow users to upload files from their local computer to the remote server or download files from the server to their local computer. Files can be transferred individually or in bulk, and the client provides progress indicators to track the transfer process.
- **Directory Navigation:** FTP clients provide a graphical interface that allows users to navigate the directory structure of the remote server. Users can browse folders, create new directories, rename or delete files, and organize their files on the server.
- **File Management**: FTP clients offer various file management functionalities, such as copying, moving, and deleting files on the remote server. Users can also set permissions and modify file attributes directly from the client interface.
- **Synchronization:** Some FTP clients offer synchronization capabilities, allowing users to compare the files on their local computer with those on the remote server. This feature helps ensure that the files on both sides are up-to-date and consistent.
- **Queue Management:** FTP clients often include a queue management feature that allows users to queue multiple file transfers for sequential execution. Users can prioritize transfers, pause or resume transfers, and view the status of each transfer in the queue.
- **Bookmarking:** FTP clients enable users to save and manage bookmarks or favorites for frequently accessed FTP servers. This feature allows quick and easy access to frequently used servers without re-entering connection details.

- **Security:** FTP clients support various security measures, such as Secure FTP (SFTP) or FTP over SSL/TLS (FTPS), to encrypt the file transfer process and ensure data confidentiality. Users can choose the appropriate security protocol based on their server's configuration.
- **Proxy and Firewall Support:** FTP clients often provide options to configure proxy settings, allowing users to connect to FTP servers through proxy servers. They also support firewall traversal to ensure successful connections even in network environments with strict security policies.
- **Logging and Reporting:** FTP clients may offer logging and reporting features to record the details of file transfers, including timestamps, transfer status, and any errors encountered. This information can be helpful for troubleshooting or auditing purposes.

Examples of popular FTP clients include FileZilla, Cyberduck, WinSCP, and Transmit. These clients are available for various operating systems, including Windows, macOS, and Linux, and provide a user-friendly interface for efficient and secure file transfer between local computers and remote FTP servers.

FileZilla

FileZilla is a popular and widely used FTP client software with a user-friendly interface for transferring files between a local computer and remote FTP servers. It is available for Windows, macOS, and Linux operating systems, making it accessible to many users.
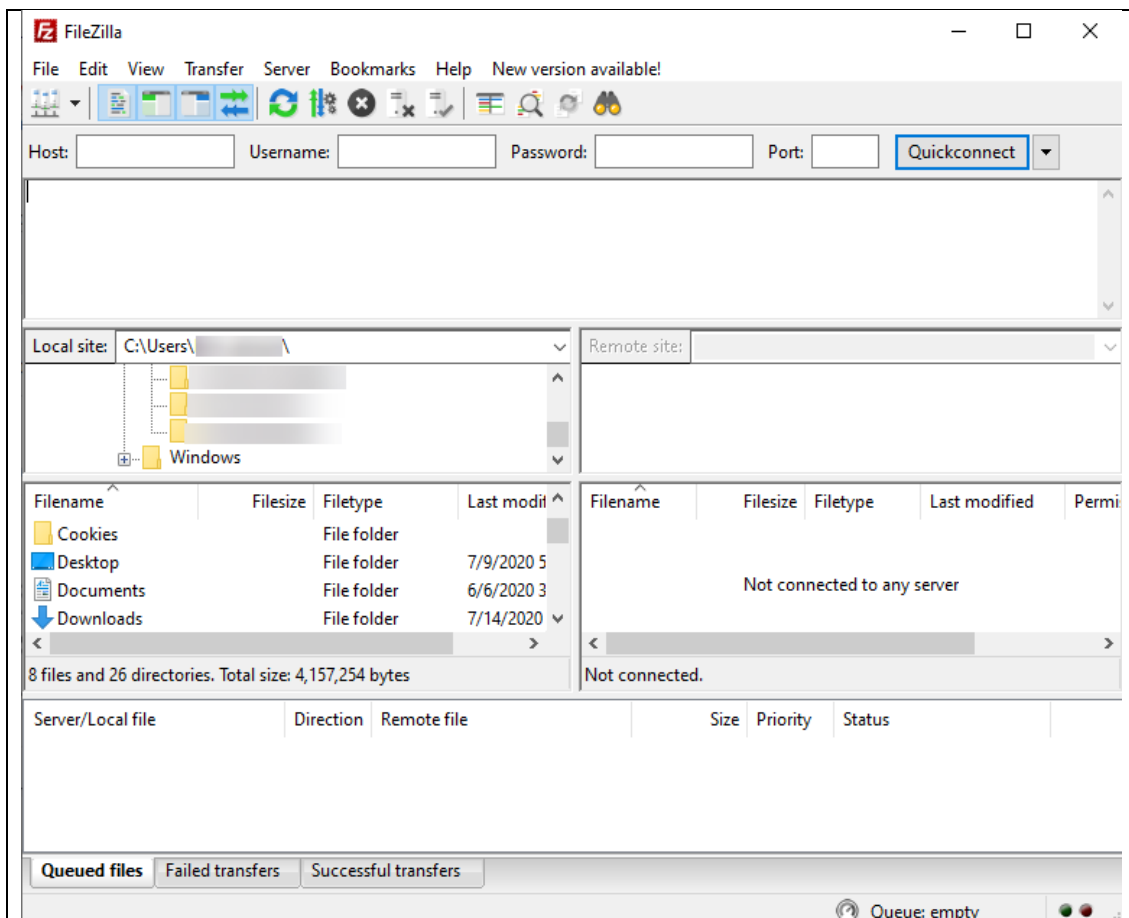
Key Features of FileZilla:

- **User-friendly Interface:** FileZilla offers an intuitive interface with a dual-pane layout that displays both the local and remote directory structures. Users can easily navigate through folders, drag and drop files, and manage their file transfers efficiently.

- **Cross-platform Support:** FileZilla is available for multiple operating systems, allowing users to transfer files between different platforms seamlessly. It provides a consistent experience across Windows, macOS, and Linux systems.

- **File Transfer Management**: FileZilla supports various file transfer protocols, including FTP, FTPS (FTP over SSL/TLS), and SFTP (SSH File Transfer Protocol). It offers robust file transfer capabilities, including support for resuming interrupted transfers, queuing multiple files for transfer, and setting transfer speed limits.

- **Site Manager**: FileZilla includes a Site Manager that allows users to save and manage connection details for multiple FTP servers. Users can store server credentials, configure server-specific settings, and quickly connect to their favorite servers with just a few clicks.

- **Bookmarks:** FileZilla offers a bookmarking feature, enabling users to save frequently accessed directories on both the local and remote sides. This feature makes it convenient to navigate to specific folders and saves time when working with frequently used directories.

- **File Editing**: FileZilla provides basic file editing capabilities, allowing users to edit remote files directly within the application. Users can make changes to HTML, PHP, or text files and save them back to the server without downloading and re-uploading the entire file.

Cyberduck:

Cyberduck is a free and open-source FTP client that supports multiple protocols, including FTP, SFTP, WebDAV, and Amazon S3. It is available for macOS and Windows operating systems and offers a user-friendly interface with powerful features.

Cyberduck Quick Reference Guide

By Andrew Fogo & Becca Schmidt

Location Guide

File Edit View Go Bookmark Window Help

2 Open Connection | **3** Quick Connect | **4** Action | **5** Get Info | **6** Refresh | **7** Edit | **8** Upload | **9** Transfers | **10** Disconnect

11 | **12** Search...

1 docs.google.com – Google Docs
docs.google.com
https://anonymous@docs.google.com/

mirror.switch.ch – FTP
mirror.switch.ch
ftp://anonymous@mirror.switch.ch/mirror

Amazon S3 (HTTPS)
s3.amazonaws.com
https://anonymous@s3.amazonaws.com/

4 Bookmarks

1 **Bookmarks -** Save and have easy access to designated servers

2 **Open Connection -** Start a new server connection

3 **Quick Connect -** List of all servers for one click connections

4 **Actions -** List of actions available for files including Download, Delete, Upload, Synchronize, Etc.

5 **Get Info -** Show general information about selected file including Permissions and Metadata

6 **Refresh -** Reconnects to the server, showing any updates that have been made

7 **Edit -** Locally edit files stored on the server, updating them on save

8 **Upload -** Easily upload files stored locally to the server

9 **Transfers -** Show files being uploaded or downloaded

10 **Disconnect -** Disconnect from currently selected server

11 **Tab Buttons -** Convenient way to switch between Browser, Bookmarks, History, and Bonjour.

12 **Search Bar -** Easily search for files or servers

Key Features of Cyberduck:

- **Easy Connection Setup**: Cyberduck simplifies connecting to remote servers by providing a straightforward connection setup wizard. Users can enter their server details, including hostname, username, and password, and quickly establish a secure connection.

- **Broad Protocol Support**: Cyberduck supports various file transfer protocols, including FTP, FTPS, SFTP, WebDAV, and cloud storage services like Amazon S3 and Microsoft Azure. This flexibility allows users to connect to various servers and storage platforms.

- **Integration with Cloud Services**: Cyberduck integrates with popular cloud storage services such as Dropbox, Google Drive, OneDrive, and Box. Users can access and manage their cloud storage files directly within the Cyberduck interface.

53

- **File Encryption**: Cyberduck supports encryption for secure file transfer. It utilizes protocols like FTPS and SFTP, which provide encryption during file transmission, ensuring data confidentiality and protection against unauthorized access.

- **Synchronization and Mirroring**: Cyberduck includes synchronization and mirroring features, enabling users to sync local and remote directories. Users can automatically update files and directories between their local computer and the remote server, ensuring consistency.

- **Advanced Options**: Cyberduck offers advanced options for power users, allowing them to customize various settings and behaviors. Users can specify transfer mode, choose between active or passive FTP connections, configure proxy settings, and set up SSH key authentication.

cPanel File Manager:

cPanel File Manager is a web-based file management tool provided by cPanel, a popular web hosting control panel. It allows website owners and administrators to manage their files and folders directly from their web browser, without the need for third-party FTP clients.
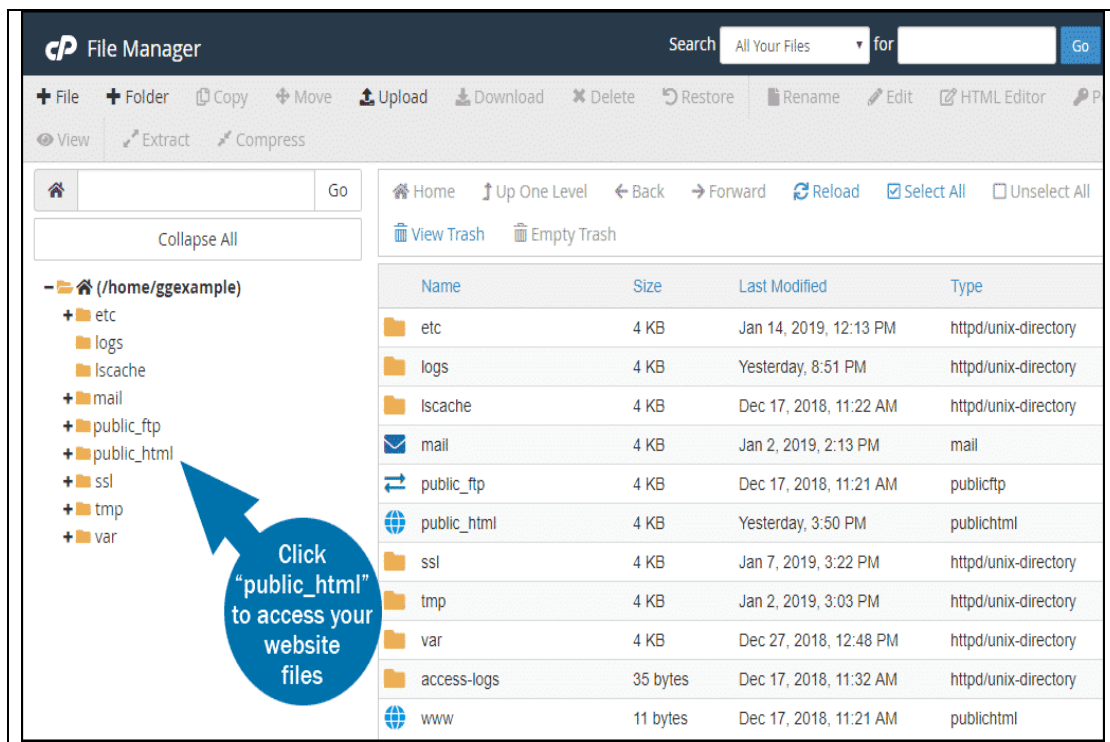
Key Features of cPanel File Manager:

- **Browser-based File Management**: cPanel File Manager provides a browser-based interface that allows users to perform file management tasks directly from their web browser. Users can easily create, upload, edit, move, and delete files and folders.

54

- **Drag-and-drop Functionality**: cPanel File Manager supports drag-and-drop functionality, making uploading files and organizing directories convenient. Users can drag files from their local computer and drop them into the desired location in the file manager.

- **File Editing:** cPanel File Manager includes a built-in text editor that allows users to edit files directly within the interface. Users can make quick changes to HTML, CSS, PHP, and other text-based files without downloading them, editing offline, and re-uploading them.

- **File Compression and Extraction:** cPanel File Manager enables users to compress files and directories into ZIP archives or extract files from existing archives. This feature simplifies managing multiple files and reduces the size of file transfers.

- **File Permissions:** cPanel File Manager allows users to modify file permissions, granting or restricting access to files and directories. Users can set permissions for owner, group, and public, ensuring proper security configurations for website files.

- **Search and Filter:** cPanel File Manager provides search and filter options, allowing users to quickly locate specific files or folders within their website's directory. This feature saves time and simplifies file management, especially in extensive directory listings.

cPanel File Manager is commonly used by website owners and administrators with access to cPanel-based web hosting accounts. It offers a convenient and user-friendly interface for managing files and directories, making it easy to upload, edit, organize, and secure website files without needing external FTP clients.

5.2 Install an FTP client

Install FileZilla FTP Client

It is _strongly_ recommended that you only download FileZilla from the official source to avoid viruses and spyware. There have been unofficial versions of FileZilla that contain viruses and spyware on many websites on the Internet, so don't use them! Also, I recommend always getting the latest version of FileZilla.

There are three different FileZilla versions you can download.

Installer version

As a new user, the installer version is a safe and easy choice. With this version, you only need to download and run the file, and the program will be installed. If you need to know

which version to get, this is probably the one you want. However, the zip version is the way to go if you need more rights to install programs on your computer (e.g. at work or school).

Note: The installer version is not available for Linux or Mac.

Zip version

If you have special needs, don't have sufficient rights to install programs, or don't like installers, the zip version is there for you. A zip file is a file that contains files inside of it. They are packed into one file, and you need to unpack (unzip) them to use them. To do this, you need a zip program (or if you are running Windows, there's a simple unzipper in the operating system).

Source code version

This is for the advanced user who wants to look at or modify the source code of FileZilla. You must check out the forum (https://forum.filezilla-project.org/) to get more information.

With installer version
Ensure that the user account used for the installation has administrative rights that allow the installation of software. Depending on OS settings and version, one or both of the following confirmation prompts may appear:
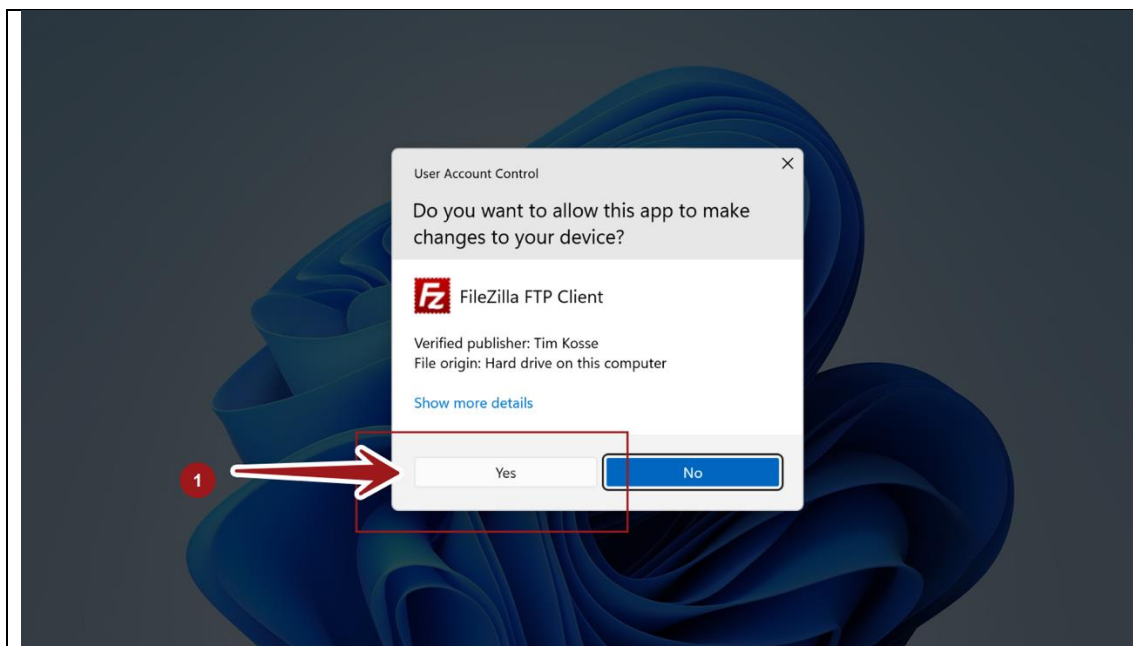

Downloading FileZilla: Official Link: https://filezilla-project.org/

License agreement

Hopefully, you should now see the following window where you must accept the license agreement terms to continue. Read through it and click "I Agree" if you do.
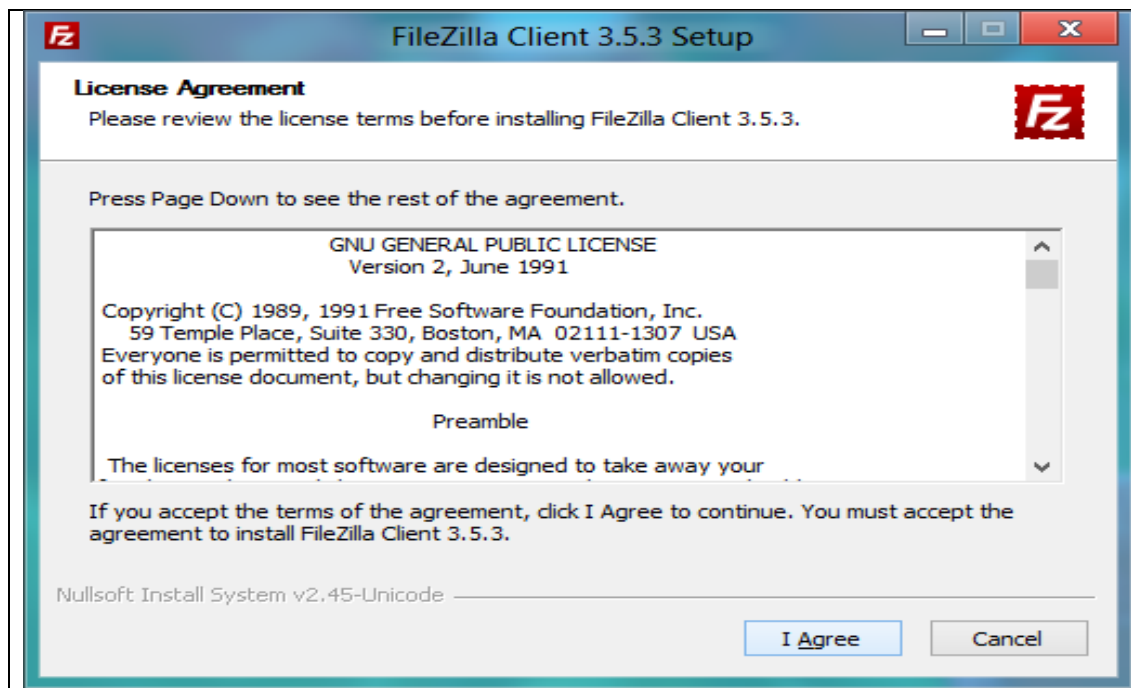

You will now have to decide if you want to install only for your user account or if FileZilla should be accessible by every user on the machine. This mainly affects where the Start Menu icons are placed. Installing for all users needs administrative privileges, and every user will have his/her settings.
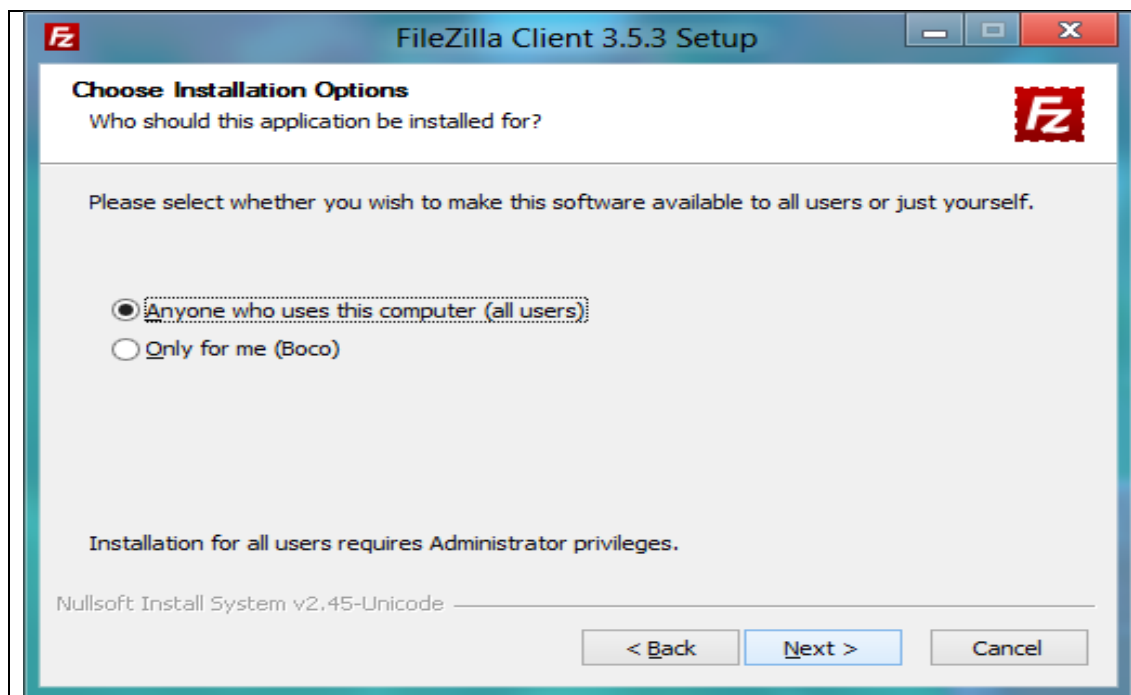
Next, choose which parts of the FileZilla client you want to install. If you hover your mouse over a choice, FileZilla will show you a description of the item. Here is the window:

Go through all of them and check/uncheck the stuff you want. Select additional languages if you want FileZilla in another language than English. Icon sets let you choose different looks for FileZilla's icons (they are partly user-contributed). The shell extension integrates FileZilla into Windows Explorer. Most users will go with what's selected by default here. When you're all finished, click Next.
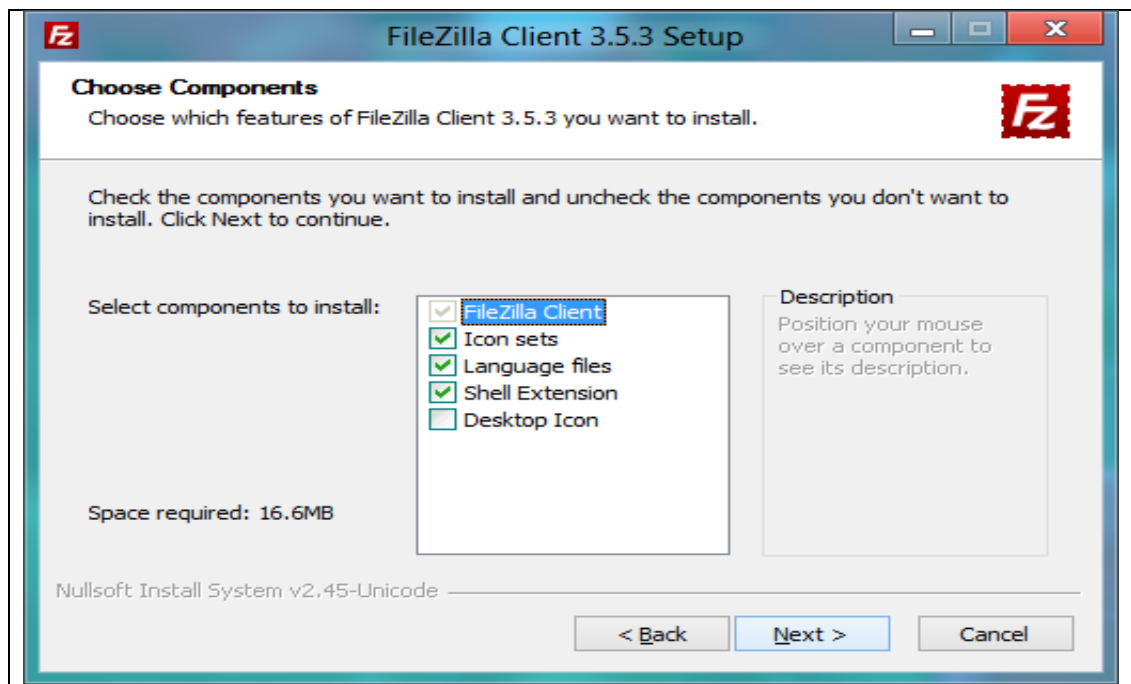

The following window will ask you where to install the program. If you don't have any special needs, click Next.


58
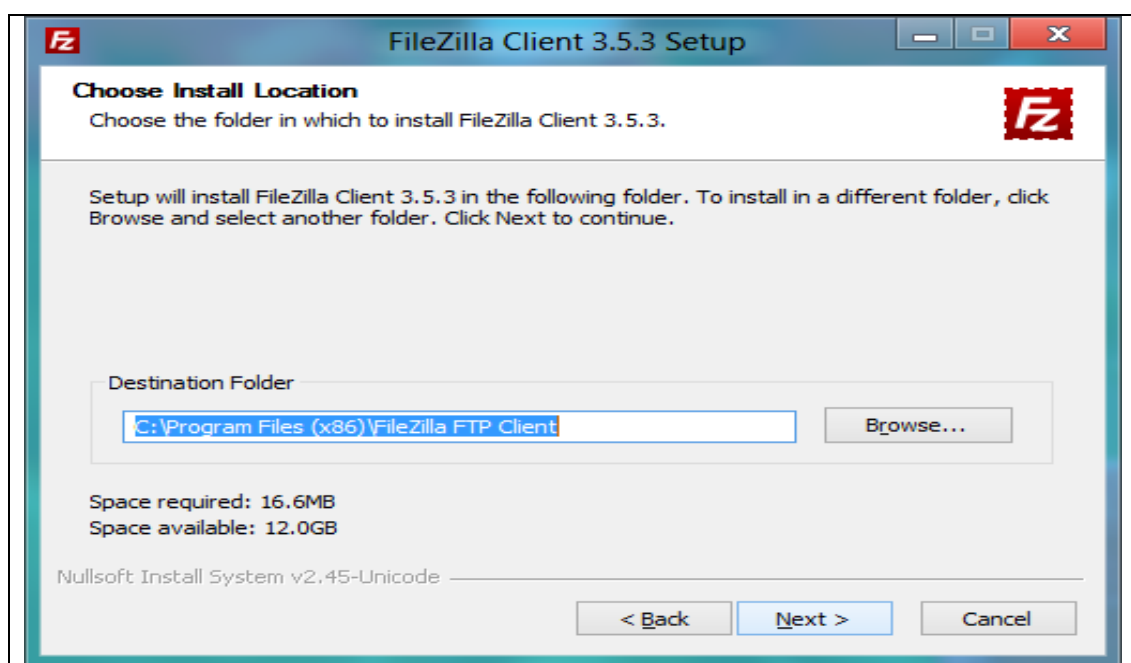
The default path is to install into your "Program Files" directory on 32-bit Windows and into "Program Files (x86)" on 64-bit Windows. Next, you will be asked what you want to name the folder with the shortcuts to FileZilla inside. The default name, "FileZilla FTP Client," should be good for most people. You can also choose not to install these shortcuts.
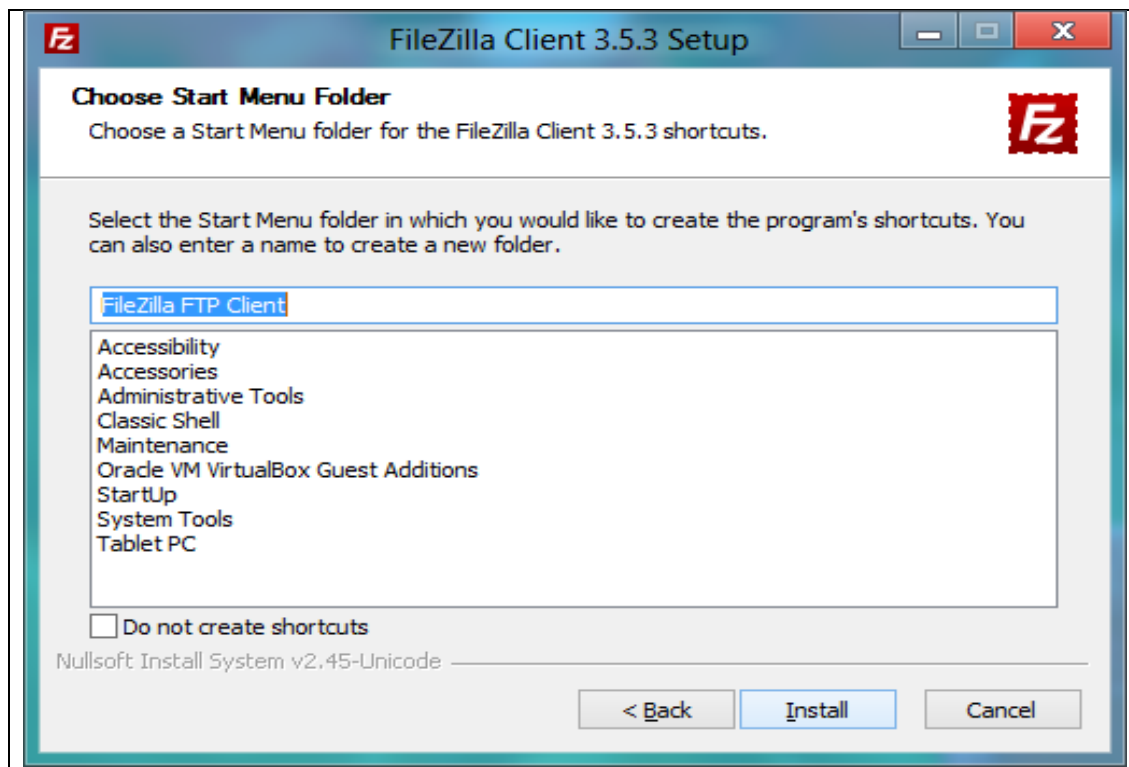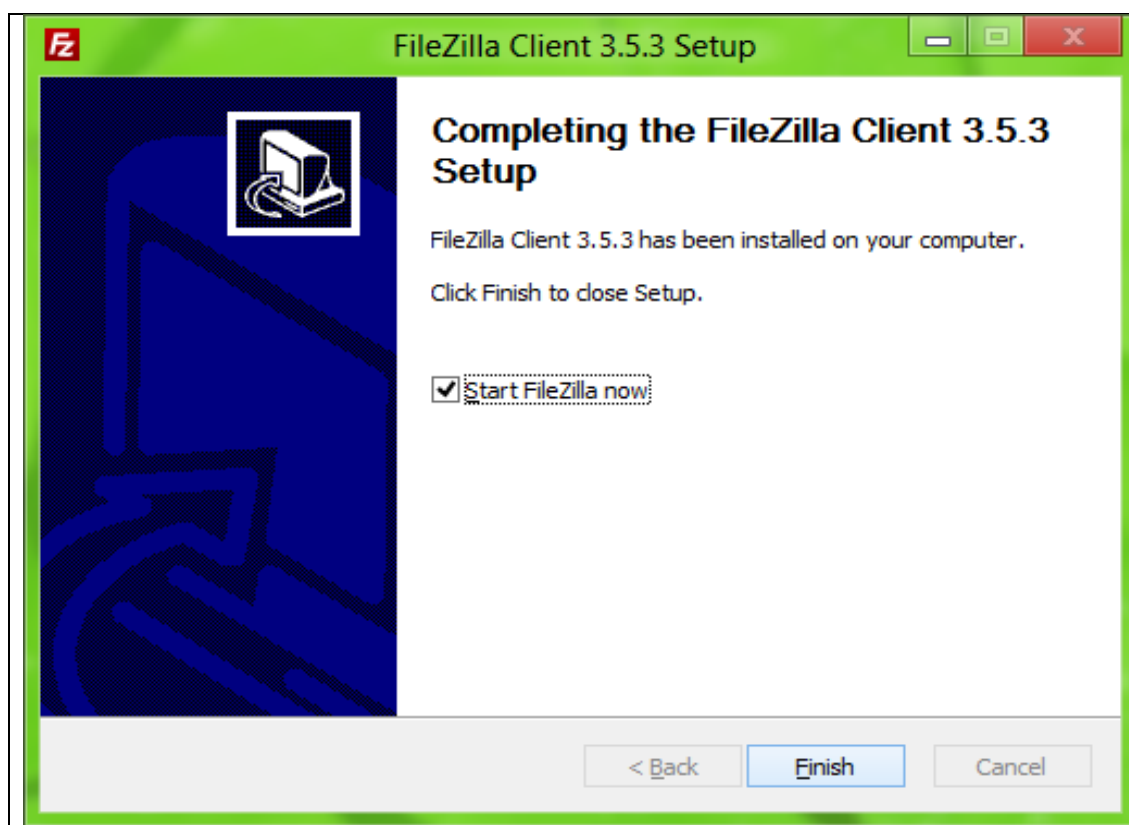

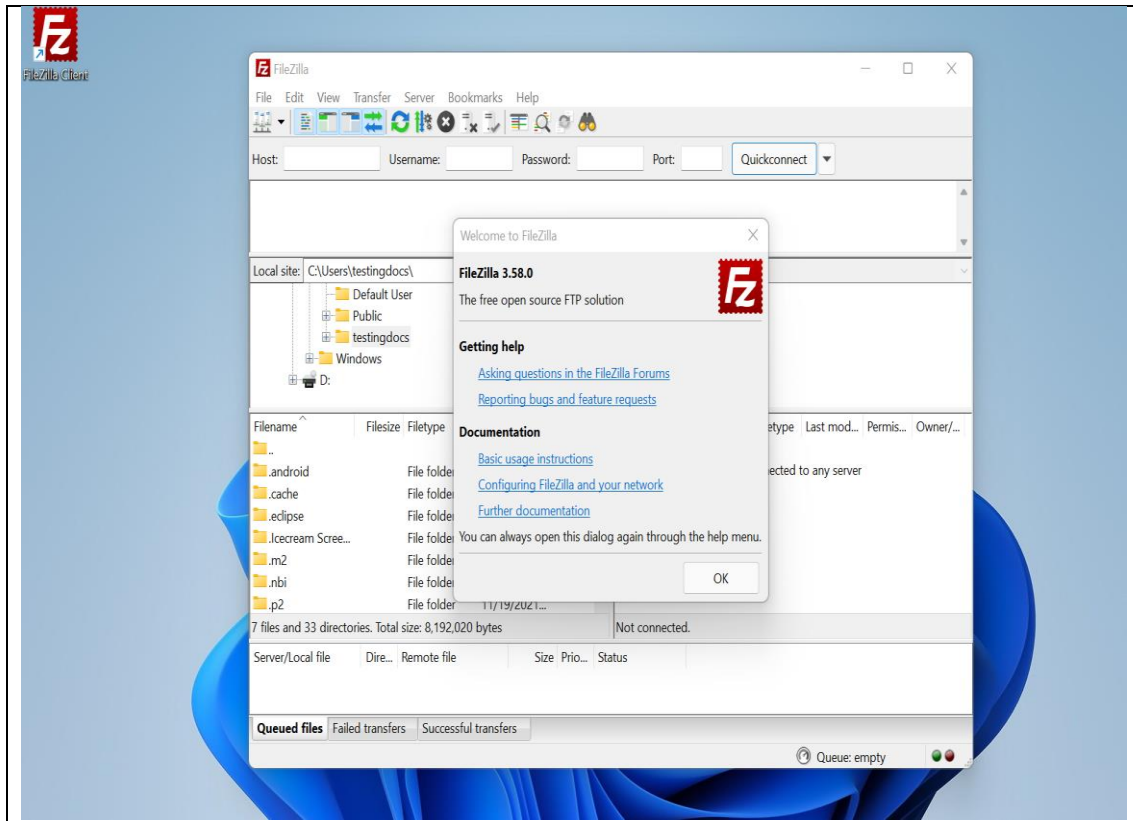When you click Install, FileZilla will get installed.
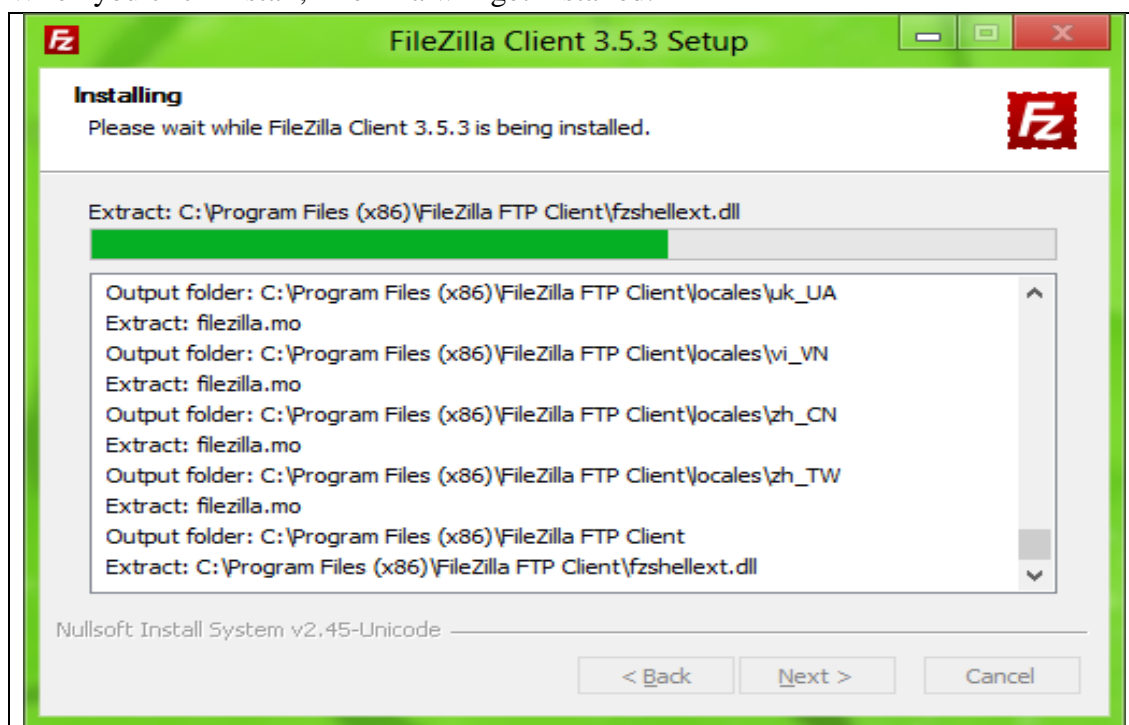
If no errors occur, it should complete in some seconds.
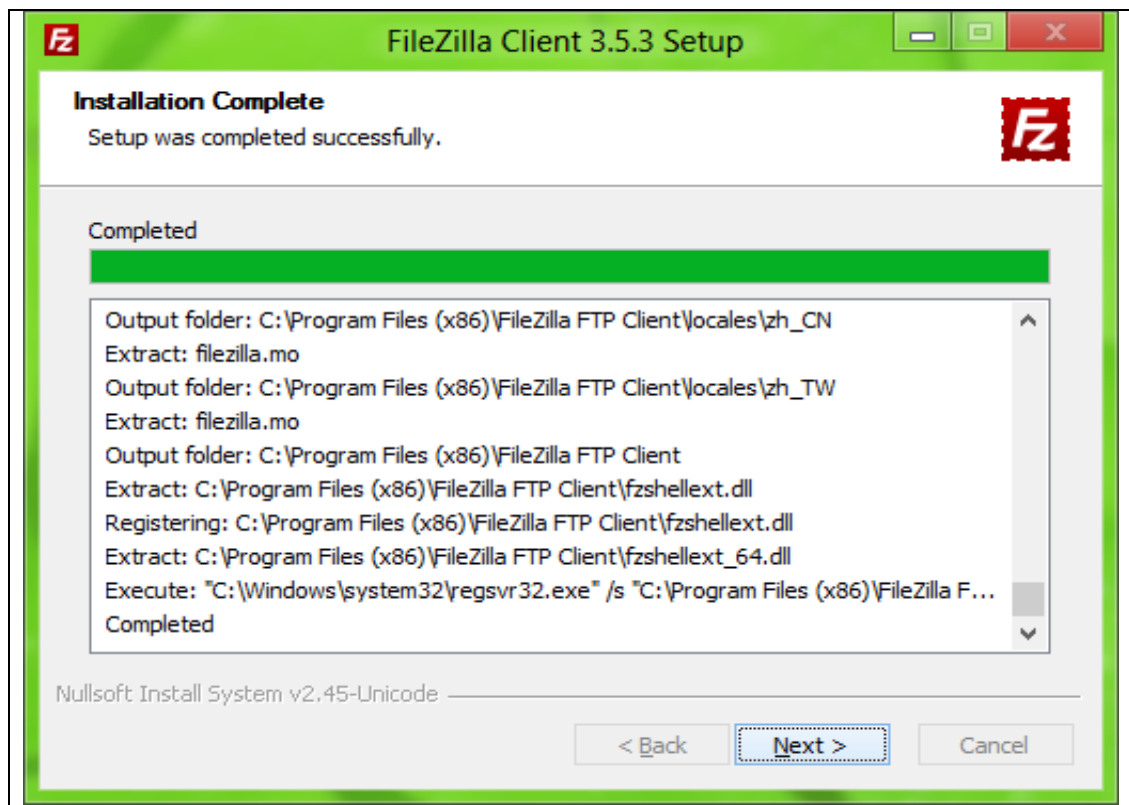
When it's done, click Next to finish the installation.

Congratulations, you've now successfully installed the FileZilla Client and can now move on to running!


With zip version

Installation with the zip version is very simple as long as you know how to work with zip files and manage general files and directory handling in Windows. You extract (unzip) the downloaded file to a folder on your disk, e.g. "C:\Program Files\FileZilla FTP Client\" and then start FileZilla with the filezilla.exe file afterward. Please note that this action requires Elevation on Windows. It might be a good idea to make a shortcut to this file on your desktop/start menu/quick launch to access it easily.

To create a portable installation of FileZilla on a USB stick or any other portable storage, you must first extract the ZIP file contents to that location. Then, you must create a file named "fzdefaults.xml" in the same directory as the FileZilla executable. You can use an example file in the "./docs" subdirectory as a template. Follow the instructions in the example file to set the config location to a relative path on your portable device.

Installing on Mac OS X

Please note that the official binaries for FileZilla require OS X 10.9 or greater. To install FileZilla, download the appropriate file to your computer.

It will be automatically extracted if you have downloaded the FileZilla package using Safari. You might have to extract the archive using a different browser manually. To start FileZilla, double-click the extracted application bundle. Nothing extra requires!
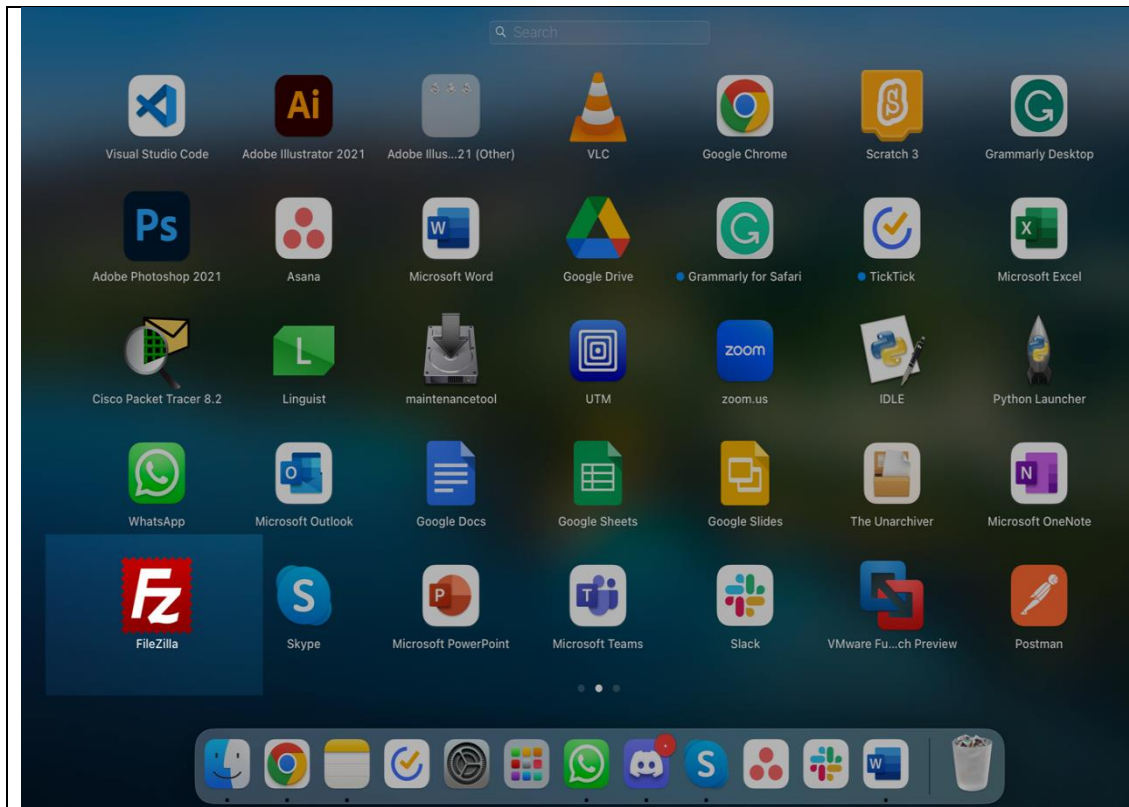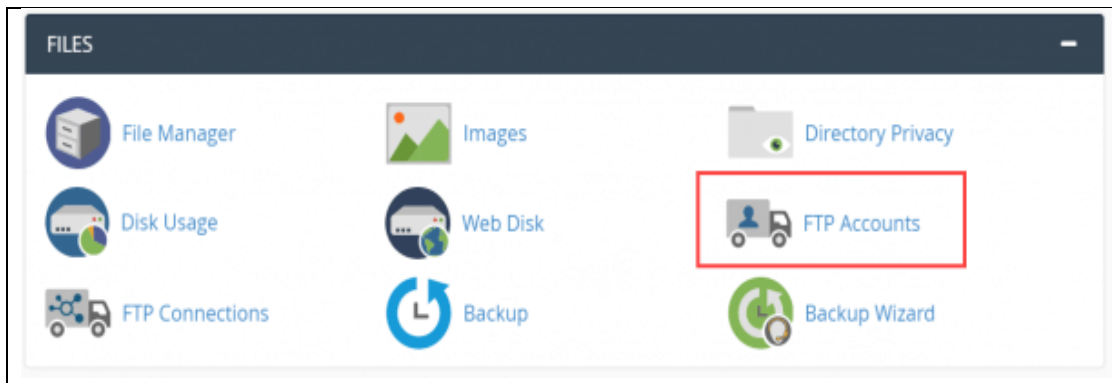

5.3   Move files to a web server using FTP client

Locate your FTP access credentials:
FTP access to your server requires a username and password. Your FTP client must be configured with credentials before you can access the server.

- In a cPanel-based Web Server, click the FTP Accounts icon after logging in to the cPanel Under Files.

- Scroll down to the **FTP Accounts** section. You'll notice that one or more FTP accounts may have been pre-configured for you when your account was created. You can use these accounts to access your server or scroll up the page to create a new FTP account.
- Click **Configure FTP Client** to display your FTP account credentials.

Log in to your server using Filezilla

Open Filezilla and select **File > Site Manager** to enter your FTP account details.

- **Hostname/Server Name**: This is your domain name with an FTP prefix (for example, mydomain.com).
- **Port**: The port number used for FTP connections to the server, typically port **21**.
- **Logon Type**: If requested, set this to **Normal**, not **Anonymous**.
- **User**: Enter your FTP user account name.
- **Password**: Enter your FTP account password.
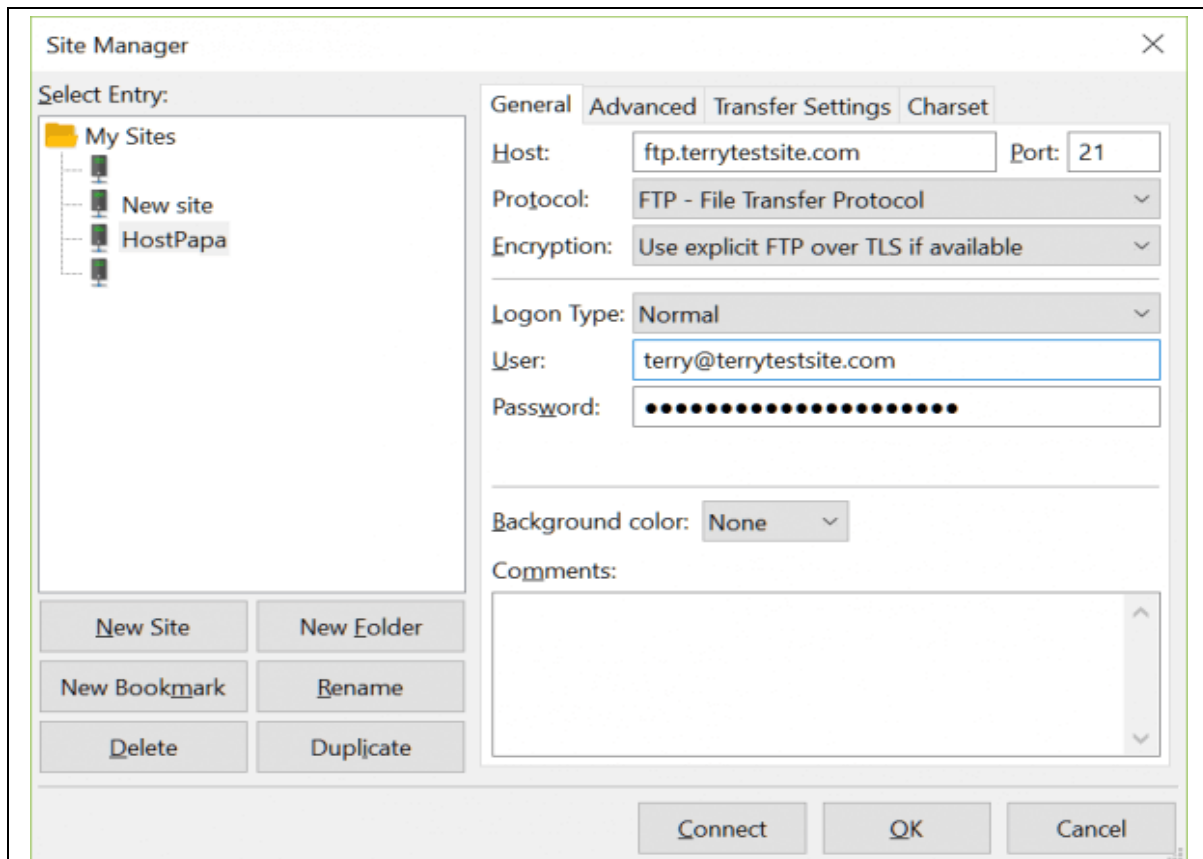
Upload files using Filezilla

Once logged in to the FTP server, you'll notice two panes on the screen. The left pane displays the files and folders stored on your local computer, while the right pane displays the contents of the remote computer.
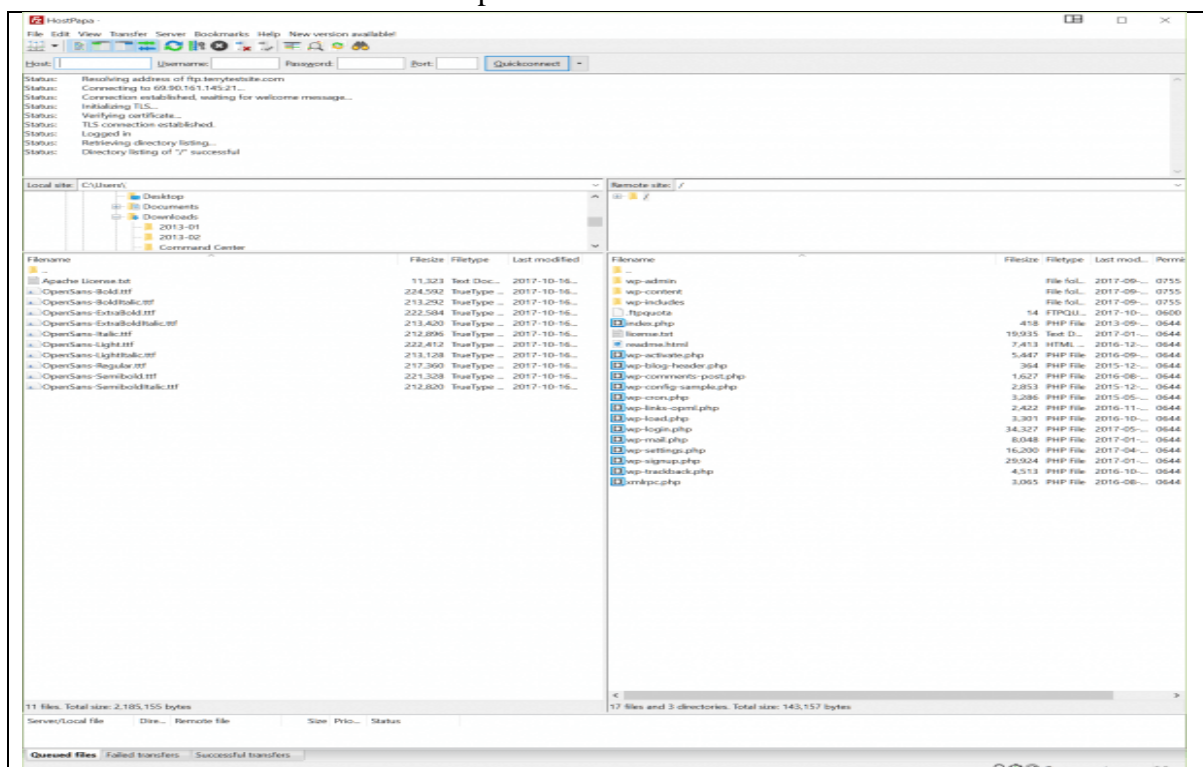
- In the left pane, navigate and select the files and folders you wish to upload to the server. Most FTP clients allow you to drag and drop files from one pane to the other to initiate an upload.
- Alternatively, highlight the files, right-click, and select **Upload**.
- Your files will now be queued to be uploaded to the server.

Download files using Filezilla

Downloading files from your remote server to your local computer works similarly.

- Navigate to the file or folder you wish to download in the right pane.
- Highlight the file or folder, right-click, and select Download.

Self-Check Sheet 5: Install FTP Clients

Questionnaire:

1   What is the purpose of installing FTP clients?
   Answer:

2   What is an FTP client?
   Answer:

3   How does an FTP client work?
   Answer:

4   What are some popular FTP client software available?
   Answer:

5   How do I install an FTP client on my computer?
   Answer:

6   What are the benefits of using FTP clients for file transfers?
   Answer:

Answer Key - 5: Install FTP Clients

1   What is the purpose of installing FTP clients?
    Answer: The purpose of installing FTP clients is to enable users to connect to and transfer files between their local computer and a remote FTP (File Transfer Protocol) server.

2   What is an FTP client?
    Answer: An FTP client is a software application that allows users to access and interact with FTP servers. It provides a user-friendly interface to perform file uploads, downloads, deletions, and other file management tasks.

3   How does an FTP client work?
    Answer: An FTP client establishes a connection to the FTP server using the FTP protocol. It prompts the user to enter the FTP server's address, username, and password for authentication. Once connected, users can navigate the server's directory structure and transfer files between the local machine and the server.

4   What are some popular FTP client software available?
    Answer: Some popular FTP client software include FileZilla, Cyberduck, WinSCP, Core FTP, and Transmit (for macOS). These tools are available for different operating systems and are commonly used for FTP file transfers.

5   How do I install an FTP client on my computer?
    Answer: To install an FTP client, you can visit the official website of the chosen FTP client software and download the installer compatible with your operating system. Once downloaded, run the installer and follow the on-screen instructions to complete the installation.

6   What are the benefits of using FTP clients for file transfers?
    Answer: Using FTP clients for file transfers offers several benefits, including ease of use, a graphical user interface (GUI) for seamless file management, support for various file transfer protocols (FTP, SFTP, FTPS), and the ability to resume interrupted file transfers.

Job Sheet-5.1: Install FileZilla FTP Client in Windows

Objective: Install FileZilla FTP Client on the Windows computer to facilitate file transfer via FTP protocol.

Working Procedure:

1. Prepare for Installation:
   - Verify that the computer meets the minimum system requirements for FileZilla FTP Client. Ensure that the user has administrative access to the computer.
2. Download FileZilla:
   - Visit the official FileZilla website (https://filezilla-project.org/) using a web browser.
   - Download the FileZilla FTP Client installer for Windows.
3. Run the Installer:
4. Select Installation Options:
   - Read and accept the License Agreement.
   - Choose the installation type.
5. Choose Installation Location:
   - Specify the destination folder where FileZilla will be installed.
6. Configure Additional Settings:
   - Choose the desired language for the FileZilla interface.
7. Start Installation:
   - Click on the "Install" button to begin the installation process.
8. Complete Installation:
   - Once the installation is finished, click on the "Finish" button.
   - Launch FileZilla FTP Client to verify successful installation.
9. Job Completion:
   - Confirm with the instructor that FileZilla FTP Client is installed and functioning correctly.
   - Ask if the instructor has any additional questions or concerns.

Specification Sheet-5.1: Install FileZilla FTP Client in Windows

Necessary Personal Protective Equipment (PPE)

Sl. No	Name of PPE	Unit	Quantity
1	Apron	Pair	01
2	Mask	Pair	01

Necessary tools and equipment

Sl. No	Name of Tools & Equipment	Specification	Unit	Quantity
1	Computer	Latest configuration	Set	01
2	FileZilla_Installer.exe	Stadnard	Set	01

Learning Outcome 6: Interpret Data Layers

Assessment Criteria	1. Data layer is defined. 2. Data layer is interpreted. 3. Web API is introduced.
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker
Contents	1. Data layer. 2. Interpreting Data layer 3. Introducing Web API
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning

Learning Experience 6: Interpret Data Layers

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

| Learning Steps	Resources specific instructions
1. Student will ask the instructor about setup web design environment	1. Instructor will provide the learning materials Interpret Data Layers
2. Read the **Information sheet/s**	2. Information Sheet No:6 Interpret Data Layers.
3. Complete the **Self-Checks & Answer key sheets.**	3. Self-Check No: 6- Interpret Data Layers. Answer key No. 6- Interpret Data Layers.
4. Read the **Job/ Task sheet** and **Specification Sheet**	4. Job/ task sheet and specification sheet Task Sheet No:6-1: Interpret Data Layers within the Context of Data Management

Information Sheet 6: Interpret Data Layers

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

6.1   Data Layer
6.2   Web API

6.1   Data Layer

The data layer, or the data tier or access layer, is an architectural component in software systems responsible for managing data storage, retrieval, and manipulation. It is an intermediary between the application layer (the user interface or business logic) and the physical data storage. The primary purpose of the data layer is to provide a structured and organized approach to accessing and managing data. It abstracts the underlying data storage technology and provides a consistent interface for the application layer to interact with the data, regardless of the specific database or data source.
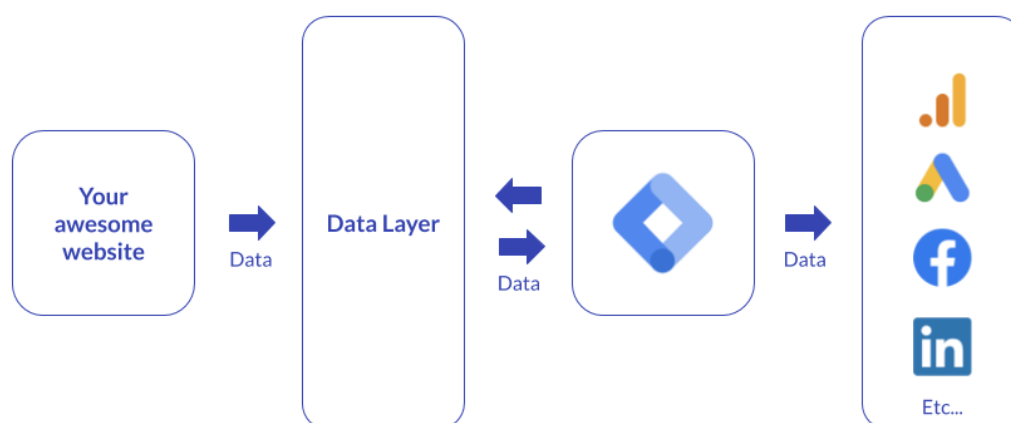
Key characteristics and functions of the data layer include:

- **Data Storage:** The layer manages structured data stored in databases or other data repositories. It ensures that the data is stored securely and efficiently.

- **Data Retrieval:** The data layer provides mechanisms to retrieve data from the storage system based on specific criteria or queries. It facilitates the retrieval of relevant data to fulfill application requirements.

- **Data Manipulation**: The data layer enables the creation, update, and deletion of data records. It provides methods and APIs for modifying the data in a controlled and consistent manner.

- **Data Access:** The data layer abstracts the underlying data storage technology, allowing the application layer to interact with the data without knowing the implementation details. This abstraction promotes modularity and facilitates changes in the data storage system without impacting the application layer.

- **Data Validation and Transformation**: The data layer often includes functionalities to validate and transform data to ensure its integrity and adherence to predefined rules or constraints.

- **Data Security:** The data layer implements security measures to protect sensitive data, including authentication, authorization, and data encryption.

- **Data Caching**: In some cases, the data layer may incorporate caching mechanisms to improve performance by storing frequently accessed data in memory, reducing the need for repeated database queries.

Overall, the data layer plays a critical role in separating the concerns of data storage and access from the application logic. It promotes data integrity, security, and scalability, allowing applications to interact with and manipulate data efficiently.

Some commonly used components, tools, or technologies in data layers are described below:

Web API (AWS, Azure, etc.)

- Web APIs (Application Programming Interfaces) offered by cloud platforms like AWS (Amazon Web Services) and Azure provide a way to interact with various services and access data stored in the cloud.
- These APIs allow developers to retrieve, update, and manage data through HTTP-based requests.
- Developers can utilize APIs provided by AWS, such as Amazon S3 API for object storage, Amazon DynamoDB API for NoSQL database operations, or AWS Lambda API for serverless computing.
- Similarly, Azure offers APIs like Azure Blob Storage API, Azure SQL Database API, and Azure Functions API for specific functionalities.
- Cloud platform web APIs enable seamless integration with cloud-based services and data storage.

Static Files (Excel, CSV, PDF)

- Static files refer to files that are not dynamically generated but are stored and accessed directly.
- Excel, CSV (Comma-Separated Values), and PDF (Portable Document Format) are standard file formats that store and share structured data.
- Excel files (.xlsx) are widely used for spreadsheets and tabular data.
- CSV files are plain text files with values separated by commas, commonly used for data interchange between applications.
- PDF files are widely used for sharing documents in a platform-independent format.
- These static file formats are often used for storing and distributing data that needs to be accessed and processed by different applications or systems.

Google Sheets
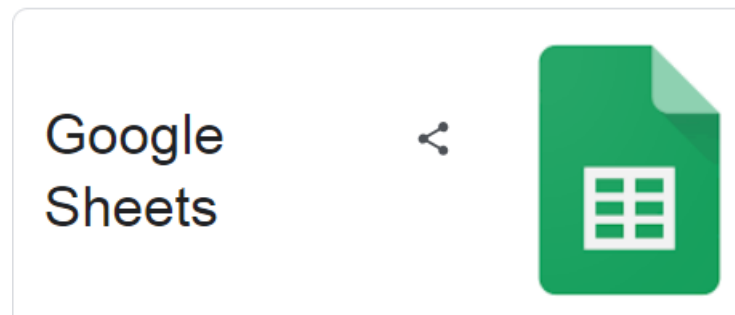
- Google Sheets is a web-based spreadsheet application offered by Google as part of Google Workspace.
- It allows multiple users to collaborate on a spreadsheet simultaneously, making it suitable for real-time data sharing and collaboration.
- Google Sheets provides features for creating, editing, and organizing data in tabular format, similar to traditional spreadsheet software.
- Users can import data from various sources, perform calculations, apply formulas, and visualize data using charts and graphs.
- Google Sheets can be accessed through a web browser or via APIs, allowing developers to interact with the data stored in Google Sheets programmatically.

PHPMyAdmin

- PHPMyAdmin is a free and open-source web-based application used for managing MySQL databases.

- It provides a graphical interface for performing everyday database management tasks such as creating databases, tables, and querying data.
- PHPMyAdmin allows users to interact with MySQL databases through a user-friendly interface, eliminating the need to write SQL queries manually.
- It offers features like importing and exporting data, managing user permissions, and executing SQL queries.
- Developers and database administrators widely use PHPMyAdmin for managing MySQL databases efficiently.

MySQL

- MySQL is an open-source relational database management system (RDBMS) widely used for storing and managing structured data.
- It is known for its scalability, reliability, and performance.
- MySQL uses a client-server architecture, where the database server handles data storage and processing, and clients interact with the server to perform database operations.
- It supports SQL (Structured Query Language) for querying and manipulating data.
- MySQL is compatible with various programming languages and platforms, making it a popular choice for web applications and other data-driven software.

NoSQL Databases

NoSQL (Not only SQL) databases, such as MongoDB, Cassandra, or Redis, are used to handle unstructured, semi-structured, or rapidly changing data. They offer flexibility and scalability, making them suitable for handling large amounts of data in distributed environments.

6.2   Web API

A Web API, or Application Programming Interface, is a set of rules and protocols that enables different software applications to communicate and interact with each other over the internet. It allows developers to access and use the functionalities and data of a particular software system or service in a standardized and controlled manner. Web APIs

are intermediaries, facilitating seamless integration and interoperability between applications and platforms.

Types of Web APIs:

- RESTful APIs: Representational State Transfer (REST) APIs are the most common type of Web API. They follow the principles of the REST architectural style and use HTTP methods (GET, POST, PUT, DELETE) to perform operations on resources. RESTful APIs use uniform resource identifiers (URIs) to identify and access resources, and they typically return responses in JSON or XML format.
- SOAP APIs: Simple Object Access Protocol (SOAP) APIs are based on a more structured and standardized messaging protocol. They use XML for data exchange and often rely on web services description language (WSDL) files to define the API structure. SOAP APIs typically require more overhead for communication but offer robustness and support for features like encryption and authentication.
- GraphQL APIs: GraphQL APIs provide a flexible and efficient way of querying and manipulating data. Unlike RESTful APIs, which often return fixed data structures, GraphQL APIs allow clients to request specific data fields and shape the response according to their needs. This reduces data over-fetching and under-fetching, making GraphQL APIs highly efficient for client-server communication.

Web API Methods:

- *GET:* Retrieves a resource or collection of resources from the server.
- *POST:* Creates a new resource on the server.
- *PUT:* Updates an existing resource on the server.
- *DELETE:* Deletes a resource on the server.

Real-Life Examples of Web APIs:

- **Social Media APIs**: Platforms like Facebook, Twitter, and Instagram allow developers to access user data, post content, and interact with social media features programmatically. These APIs enable integration with third-party applications, social login functionality, and content sharing.

- **Payment Gateway APIs**: Payment gateway providers such as PayPal and Stripe offer APIs that allow developers to integrate secure payment processing into their applications or websites. These APIs enable the seamless processing of transactions, handling of payments, and management of financial data.

- **Mapping and Geolocation APIs**: Services like Google Maps and Mapbox enable developers to embed interactive maps, geocoding, and routing capabilities into their

applications. These APIs allow users to search for locations, get directions, and display maps with customized markers and overlays.

- **Weather APIs:** Weather data providers like OpenWeatherMap and Weather.com can access current weather conditions, forecasts, and historical weather data. These APIs allow developers to integrate weather information into applications, websites, and IoT devices.

- **E-commerce APIs**: E-commerce platforms such as Shopify and WooCommerce offer APIs that enable developers to manage inventory, process orders, and retrieve product information. These APIs facilitate the integration of external systems with e-commerce platforms, enabling customizations and automation.

Web APIs is vital in modern application development, enabling seamless integration, interoperability, and access to various services and functionalities. They provide standardized and efficient communication between applications, opening up endless possibilities for innovation and collaboration.

Self-Check Sheet 6: Interpret Data Layers

Questionnaire:

1. Which type of API is commonly used in web development and follows the principles of the REST architectural style?
   - a) RESTful API
   - b) SOAP API
   - c) GraphQL API
   - d) None of the above

2. Which tool is commonly used for managing MySQL databases through a web-based interface?
   - a) PHPMyAdmin
   - b) MongoDB
   - c) Redis
   - d) None of the above

3. Which cloud platforms provide Web APIs for accessing services and data stored in the cloud?
   - a) AWS (Amazon Web Services)
   - b) Azure
   - c) Google Cloud
   - d) All of the above

4. Which database management system is widely used for storing and managing structured data?
   - a) MySQL
   - b) MongoDB
   - c) Cassandra
   - d) None of the above

5. Which type of API allows clients to request specific data fields and shape the response according to their needs?
   - a) RESTful API
   - b) SOAP API
   - c) GraphQL API
   - d) None of the above

6. Which tool is commonly used for managing NoSQL databases?
   - a) PHPMyAdmin
   - b) MySQL
   - c) MongoDB
   - d) None of the above

Answer Key - 6: Interpret Data Layers

1. Which type of API is commonly used in web development and follows the principles of the REST architectural style?

   a) RESTful API

2. Which tool is commonly used for managing MySQL databases through a web-based interface?
   a) PHPMyAdmin

3. Which cloud platforms provide Web APIs for accessing services and data stored in the cloud?
   a) All of the above

4. Which database management system is widely used for storing and managing structured data?
   a) MySQL

5. Which type of API allows clients to request specific data fields and shape the response according to their needs?

   a) GraphQL API

6. Which tool is commonly used for managing NoSQL databases?

   a) MongoDB

Task Sheet-6.1: Interpret Data Layers within the Context of Data Management

Objectives: The objective of this task sheet is to interpret and analyze data layers within the context of data management and visualization. You will be required to explore and explain different data layers, their characteristics, and their significance in data-driven decision-making processes.

Working Procedure:

Introduction to Data Layers:
1. Define data layers and their role in organizing and representing different types of data.
2. Explain the concept of data abstraction and its significance in data layering.

Types of Data Layers:
3. Identify and explain various types of data layers commonly used in data management and visualization, such as:

Characteristics of Data Layers:
4. Describe the characteristics and features of each data layer.
5. Highlight the purposes and functions served by each data layer in data analysis.

Data Transformation:
6. Demonstrate how data is transformed from one layer to another during data processing.
7. Provide examples of data transformation techniques (e.g., filtering, cleansing, merging).

Data Aggregation:
8. Showcase how data is aggregated to create summaries and higher-level views of the data.
9. Explain the process of data aggregation and its application in reporting and analytics.

Data Visualization:
10. Illustrate how data layers contribute to data visualization practices.
11. Provide examples of visualizations created using different data layers.

Data Integration:
12. Explain how data integration across various layers can lead to a comprehensive understanding of the data.
13. Showcase the integration of data from different sources or systems.

Data Governance and Security:
14. Discuss the importance of data governance in managing data layers.
15. Explain the security considerations for protecting data at different layers.

Data Layering Best Practices:
16. Provide best practices for organizing and managing data layers efficiently.
17. Discuss strategies for optimizing data processing and analysis using data layers.

Review of Competency

Below is yourself assessment rating for module **Setup Web Design Environment**

Assessment of performance Criteria	Yes	No
Client-server architecture is identified.		
Types of networks and their functionality is interpreted.		
Types of websites are categorized.		
A local Web server is installed.		
The local web server is tested.		
A web browser is identified.		
Types of web browsers are introduced.		
A web browser is installed and used.		
Features/options of different web browsers are outlined.		
Cross-browser compatibility of websites is interpreted.		
The "Inspect element" tool is introduced.		
Web design software is interpreted.		
Web design platform is introduced.		
Web design software is familiarized.		
The web server is identified.		
The local web server is defined.		
The web server is interpreted.		
FTP client is interpreted		
FTP client is installed.		
FTP client is used to upload or move files to web server.		
Data layer is defined.		
Data layer is interpreted.		
Web API is introduced.		

I now feel ready to undertake my formal competency assessment.

Signed:

Date:

Reference

https://www.google.com/search?q=Data+Layer&tbm=isch&ved=2ahUKEwj0o9DW1t
GBAxUUjmMGHaBZBEIQ2-
cCegQIABAA&oq=Data+Layer&gs_lcp=CgNpbWcQAzIFCAAQgAQyBQgAEIAEMgU
IABCABDIFCAAQgAQyBQgAEIAEMgUIABCABDIFCAAQgAQyBQgAEIAEMgUIAB
CABDIFCAAQgARQ1QZY7xNg0xZoAHAAeACAAdcBiAHXCJIBBTAuNC4ymAEAo
AEBggELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=KLwXZfTvKpScjuMPoLORkAQ&
bih=629&biw=1366&hl=en#imgrc=G30Pvdc79Lk2QM

https://www.google.com/search?q=XAMPP%2C+WAMP%2C+MAMP%2C+and+LA
MP&sca_esv=569660528&hl=en&tbm=isch&source=hp&biw=1366&bih=629&ei=I7w
XZc-
IFfbi2roPyK2AwAI&iflsig=AO6bgOgAAAAAZRfKMy7gVqgROlsU4in5HyWY6hDrV-
nv&ved=0ahUKEwiPponU1tGBAxV2sVYBHcgWACgQ4dUDCAc&uact=5&oq=XAMP
P%2C+WAMP%2C+MAMP%2C+and+LAMP&gs_lp=EgNpbWciG1hBTVBQLCBXQ
U1QLCBNQU1QLCBhbmQgTEFNUEiBElCcBVjpD3ABeACQAQCYAa4BoAHMAqo
BAzAuMrgBA8gBAPgBAvgBAYoCC2d3cy13aXotaW1nqAIA&sclient=img#imgrc=Nhj
cFF8drA0YHM

https://www.google.com/imghp?hl=en&tab=ri&ogbl

Development of CBLM:

The Competency Based Learning Material (CBLM) of '**Setup Web Design Environment**' **(**Occupation: Web Design, Level-3**)** for National Skills Certificate is developed by NSDA with the assistance of SIMEC System, ECF consultancy & SIMEC Institute JV (Joint Venture Firm) in the month of June 2023 under the contract number of package SD-9A dated 07th May 2023.

Sl No.	Name & Address	Designation	Contact number
1	Khondoker Ali Asgor Pavel	Writer	01711 873 008
2	Fatema Tuj Johura Arzu	Editor	01912 464 747
3	Md. Amir Hossain	Co-Ordinator	01631 670 445
4	Md. Saif Uddin	Reviewer	01723 004 419