UNIT – 5

Introduction to the Internet:

The **Internet** is a global network of interconnected computers that enables billions of devices and people worldwide to communicate, share information, and access services. It functions as the backbone for countless digital technologies, connecting individuals, businesses, governments, and organizations in ways that were unimaginable just a few decades ago.

Key Features of the Internet:

1. **Global Connectivity:** The internet connects users across the world, regardless of geographical location, through a combination of wired and wireless technologies.

2. **Information Sharing:** One of the primary purposes of the internet is to facilitate the exchange of information. Users can access and share data, such as documents, images, and videos, with others in real time.

3. **Decentralized Structure:** Unlike traditional communication networks, the internet is decentralized. There is no central governing authority controlling all aspects of it, making it more resilient and flexible.

4. **Multifunctional Use:** The internet serves as a platform for many different services, including email, social media, e-commerce, video streaming, cloud computing, and online gaming.

5. **Hypertext and Hyperlinks:** The World Wide Web (WWW), a major part of the internet, relies on hypertext and hyperlinks to connect different web pages, allowing users to navigate between pieces of information easily.

How the Internet Works:

The internet uses a series of **protocols** to transmit data. The most important of these are the **Internet Protocol (IP)** and **Transmission Control Protocol (TCP)**. Together, they ensure that data sent from one computer is accurately received by another.

Data on the internet is broken into small packets that are transmitted through various networks and reassembled at the destination. Each device on the internet has an **IP address**, a unique identifier that enables this data transmission.

Major Uses of the Internet:

1. **Communication:** Through services like email, instant messaging, and video conferencing, the internet has revolutionized how people communicate.

2. **Information Access:** Search engines like Google allow users to find information on virtually any topic in a matter of seconds.

3. **Entertainment:** The internet provides endless entertainment options, from video streaming platforms like YouTube and Netflix to online games.

4. **E-Commerce:** Businesses use the internet to sell products and services through online platforms like Amazon and eBay.

5. **Education:** Online learning platforms and educational resources enable remote learning, giving students access to a wide range of information and instructional materials.

Importance of the Internet:

The internet has become essential to modern life, influencing nearly every aspect of daily activities, including work, education, entertainment, and social interactions. It plays a critical role in driving innovation, fostering global connectivity, and supporting the digital economy.

In conclusion, the internet is a powerful and transformative tool that continues to shape the future, making information, communication, and services more accessible than ever before.

Explain the procedure to get connected with Internet.

To get connected to the internet, one can follow these general steps, which may vary slightly depending on the type of connection (Wi-Fi or Ethernet) and the device which they were using (e.g., Windows PC, Mac, smartphone).

1. Connecting to Wi-Fi (Wireless Internet)

Most people use Wi-Fi to connect wirelessly to the internet. Here's the procedure:

On a Windows PC:

1. **Turn on Wi-Fi:**
   - Make sure that the Wi-Fi feature on the device is turned on.
   - Click on the **Wi-Fi icon** in the taskbar (usually located on the bottom-right of the screen).

2. **Select a Network:**
   - A list of available Wi-Fi networks will appear.
   - Click on the network that need to be connected.

3. **Enter the Password:**
   - If the network is password-protected, a window will appear asking for the **Wi-Fi password**.
   - Enter the password and click **Connect**.

4. **Check Connection:**
   - Once connected, the Wi-Fi icon will show a solid signal.
   - One can now be connected to the internet.

On a Mac:

1. **Turn on Wi-Fi:**
   - Click on the **Wi-Fi icon** in the menu bar (top-right corner of the screen).
   - Ensure **Wi-Fi is turned on**.

2. **Choose a Network:**
   - A list of available Wi-Fi networks will appear.
   - Select the network that need to be connected.

3. **Enter the Password:**
   - If required, enter the Wi-Fi password and click **Join**.

4. **Verify Connection:**
   - Once connected, the Wi-Fi icon will show a solid signal. One can now connected to the internet.

On Smartphones (Android/iOS):

1. **Open Settings:**
   - Go to **Settings** on the phone.

2. **Turn on Wi-Fi:**
   - In the settings menu, tap **Wi-Fi** (or **Connections** on Android) and ensure it is switched on.

3. **Select a Network:**
   - A list of available Wi-Fi networks will appear. Tap on the network that need to be joined.

4. **Enter the Password:**
   - Enter the Wi-Fi password (if needed) and tap **Connect** (Android) or **Join** (iOS).

5. **Check Connection:**
   - Once connected, a person may see a Wi-Fi symbol on the status bar at the top of the screen.

2. Connecting via Ethernet (Wired Connection)

An Ethernet connection is a wired method to connect the device to the internet. Here's how:

On Windows PC or Mac:

1. **Check Ethernet Port:**
   - Make sure the computer has an **Ethernet port**. Some newer laptops may require an adapter if they lack this port.

2. **Connect the Cable:**
   - Plug one end of the **Ethernet cable** into the computer and the other end into the **router** or **modem**.

3. **Automatic Connection:**
   - In most cases, the computer will automatically connect to the internet once the cable is plugged in. If not, go to **Settings > Network & Internet > Ethernet** (Windows) or **System Preferences > Network** (Mac) and ensure Ethernet is selected.

4. **Check Connection:**

   o Once connected, the device will show the Ethernet icon or indicate that it's connected to the internet in the network settings.

3. Using a Mobile Hotspot (Tethering)

One can also connect to the internet using a mobile device as a hotspot. Here's how:

On Android:

1. **Open Settings:**

   o Go to **Settings > Network & Internet** (or **Connections**).

2. **Turn on Hotspot:**

   o Tap on **Hotspot & Tethering** or **Mobile Hotspot**, then turn on the **Mobile Hotspot** feature.

3. **Connect to Hotspot:**

   o On the PC or other devices, find the mobile hotspot in the Wi-Fi network list and connect to it by entering the password.

On iOS (iPhone):

1. **Open Settings:**

   o Go to **Settings > Personal Hotspot**.

2. **Enable Hotspot:**

   o Turn on **Allow Others to Join**.

3. **Connect to the Hotspot:**

   o On the PC or other devices, find the iPhone's hotspot in the Wi-Fi network list and connect to it using the password provided in the Personal Hotspot settings.

4. Troubleshooting Connection Issues

If a person encounter any problems while trying to connect, here are a few steps one can take:

- **Restart the Router/Modem:** Unplug the router/modem, wait for 30 seconds, and plug it back in to reset the connection.

- **Check Network Settings:** Ensure that the correct network is selected and that Airplane Mode is disabled.

- **Forget the Network and Reconnect:** On Wi-Fi, one can **forget the network** and reconnect by re-entering the password.
- **Update Network Drivers:** On a PC, outdated drivers may prevent internet connections. One can update drivers through **Device Manager** on Windows.

By following these steps, one should be able to connect to the internet successfully, whether they were using Wi-Fi, Ethernet, or a mobile hotspot.

Explain the Types of Internet Connections:

There are several types of internet connections available today, each with varying speeds, reliability, and technologies. Here's an overview of the most common types:

1. Dial-Up Internet

- **Description:** Dial-up was the first widely available method of internet access, using the telephone line to connect to the internet.
- **How it Works:** It requires a landline telephone and a modem to dial a connection to an Internet Service Provider (ISP).
- **Speed:** Very slow, typically around **56 Kbps**.
- **Usage:** Rarely used today due to its low speed and the inability to use the phone and the internet simultaneously.
- **Advantages:**
  - Available in remote areas.
  - Very low cost.
- **Disadvantages:**
  - Very slow compared to modern connections.
  - Inconvenient as it ties up the phone line.

2. Broadband Internet

- **Description:** Broadband is a high-speed internet connection that is always on, offering much faster speeds than dial-up. It includes various subtypes like DSL, cable, and fiber-optic connections.
- **Speed:** Ranges from **several Mbps** to **Gbps** (Gigabit per second).

a) DSL (Digital Subscriber Line)

- **How it Works:** Uses existing telephone lines to transmit data, but it doesn't interfere with voice calls.
- **Speed:** Usually between **1 Mbps** and **100 Mbps**, depending on the distance from the service provider.
- **Usage:** Suitable for home users and small businesses.
- **Advantages:**
  - Affordable and available in many areas.
  - Allows simultaneous use of the phone and internet.
- **Disadvantages:**
  - Speed decreases with distance from the provider's office.
  - Not as fast as fiber or cable.

b) Cable Internet

- **How it Works:** Delivered through the same coaxial cables used for cable TV.
- **Speed:** Ranges from **25 Mbps** to **1 Gbps** or more.
- **Usage:** Suitable for households with multiple users streaming, gaming, or working from home.
- **Advantages:**
  - Faster than DSL, especially for downloads.
  - Can reach high speeds depending on the provider.
- **Disadvantages:**
  - Shared bandwidth, so speed can drop during peak usage times.
  - Availability may be limited in rural areas.

c) Fiber-Optic Internet (Fiber)

- **How it Works:** Uses fiber-optic cables, which transmit data as light, resulting in extremely fast and reliable connections.
- **Speed:** Ranges from **100 Mbps** to **1 Gbps** or more.
- **Usage:** Ideal for heavy internet usage like 4K video streaming, online gaming, and businesses with high data demands.
- **Advantages:**
    - Extremely fast and reliable.
    - Doesn't degrade over long distances like DSL or cable.
- **Disadvantages:**
    - Expensive to install.
    - Limited availability, especially in rural or remote areas.

3. Satellite Internet

- **Description:** Uses satellites to provide internet access, especially useful in remote or rural areas where other connections like DSL or fiber are unavailable.
- **How it Works:** A satellite dish connects with a satellite orbiting the Earth, which then communicates with ground stations.
- **Speed:** Typically ranges from **10 Mbps** to **100 Mbps**, but can vary.
- **Usage:** Used in areas with limited or no other internet options.
- **Advantages:**
    - Available almost everywhere, including remote regions.
- **Disadvantages:**
    - High latency (delay) due to the distance data must travel.
    - Affected by weather conditions, leading to signal interruptions.
    - More expensive compared to other types of connections.

4. Wireless Internet (Fixed Wireless)

- **Description:** Uses radio signals to provide internet without the need for cables. A fixed wireless antenna installed at your location communicates with a nearby tower.
- **How it Works:** Signals are transmitted wirelessly between a tower and a receiver at your location.

- **Speed:** Typically ranges from **5 Mbps** to **50 Mbps**, though some services can offer speeds over **100 Mbps**.
- **Usage:** Common in rural areas where wired broadband options like DSL or cable are not available.
- **Advantages:**
    o No need for cables, making it easier to install.
    o Good for areas without wired infrastructure.
- **Disadvantages:**
    o Signal quality depends on proximity to the tower and line of sight.
    o Can be affected by weather or physical obstructions.

5. Cellular (Mobile) Internet

- **Description:** Uses cellular networks (such as 3G, 4G, and 5G) to provide internet access to mobile devices.
- **How it Works:** Internet is delivered over the same network used by mobile phones. Can be accessed via smartphones, tablets, or by using a mobile hotspot device.
- **Speed:**
    o **3G:** Typically ranges from **0.5 Mbps to 3 Mbps**.
    o **4G (LTE):** Ranges from **10 Mbps to 100 Mbps**.
    o **5G:** Capable of speeds over **1 Gbps**.
- **Usage:** Ideal for mobile users, as well as for those in areas without wired broadband access.
- **Advantages:**
    o Available in most places where there is cell phone coverage.
    o Portable, allowing users to connect on the go.
- **Disadvantages:**
    o Data caps and high costs, especially on 4G and 5G plans.
    o Speeds can vary depending on location and network congestion.

6. Hotspot Internet

- **Description:** A hotspot is a location where internet access is provided via Wi-Fi.

- **How it Works:** Many devices, including smartphones, can be used as hotspots, sharing their mobile data connection with other devices.

- **Speed:** Depends on the mobile connection (3G, 4G, or 5G) and the carrier's network.

- **Usage:** Ideal for connecting multiple devices to the internet via a mobile connection.

- **Advantages:**
  - Portable and can be used anywhere there's mobile coverage.
  - Easy to set up using a smartphone.

- **Disadvantages:**
  - Limited by mobile data plan restrictions (data caps, throttling).
  - Speeds depend on mobile network conditions.

7. Broadband over Power Lines (BPL)

- **Description:** Uses electrical power lines to deliver internet to homes and businesses.

- **How it Works:** Internet data is sent over the same lines that deliver electricity.

- **Speed:** Typically similar to DSL speeds, ranging from **256 Kbps** to **10 Mbps**.

- **Usage:** This technology is still in limited use and not widely available.

- **Advantages:**
  - Can leverage existing infrastructure (power lines).

- **Disadvantages:**
  - Interference issues can affect speed and reliability.
  - Not widely available.

Each type of internet connection serves different needs, depending on speed, availability, and location. For home use, broadband options like fiber, DSL, or cable are common, while mobile and satellite connections offer flexibility in remote or mobile scenarios.

Summary of Connection Types and Usage

1. **Dial-Up:** Very slow, basic internet, rarely used today.
2. **DSL:** Common home broadband using phone lines, good for moderate internet usage.
3. **Cable:** Fast, reliable, uses TV cables, shared with neighbours.
4. **Fiber-Optic:** Fastest and most reliable, though limited availability.
5. **Satellite:** Useful in remote areas, but slower with high latency.
6. **Fixed Wireless:** Great for rural areas, but signal issues may occur.
7. **Cellular (3G, 4G, 5G):** Portable, mobile internet, speeds depend on network.
8. **Hotspot:** Share mobile data through Wi-Fi, portable but limited by data plan.
9. **BPL:** Still emerging, uses power lines, limited availability.

What is meant by internet terminology?

Internet terminology refers to the specialized vocabulary and key terms used to describe concepts, technologies, and protocols related to the internet. These terms help explain how the internet works, how data is transmitted, and the tools or services that enable communication, information exchange, and online interactions.

Understanding internet terminology is essential for navigating the digital world, as it provides insight into the mechanisms and infrastructure that power the internet, as well as the services and security measures involved in using it.

For example, terms like **IP address**, **URL**, **browser**, **bandwidth**, **Wi-Fi**, and **DNS** are part of internet terminology that helps users understand different aspects of how devices connect, how websites are accessed, and how data travels across the network.

Write a note on Internet Terminology

Here is a note on key **Internet Terminology** that will help us to understand the concepts and technologies related to the internet:

1. Internet: A global system of interconnected computer networks that use the Internet Protocol (IP) to communicate. It allows billions of devices worldwide to connect and

share data. Its key use is to access to information, communication, and online services such as websites, social media, and email.

2. World Wide Web (WWW): A collection of information and resources (such as web pages) accessed via the internet. It operates through the HTTP (Hypertext Transfer Protocol). It enables users to navigate between pages using hyperlinks and view multimedia content.

3. Browser: A software application used to access and display web pages on the internet (e.g., Google Chrome, Mozilla Firefox, and Microsoft Edge). It helps users browse websites by interpreting HTML and presenting content interactively.

4. URL (Uniform Resource Locator): The web address used to locate a resource (such as a website or document) on the internet.

- **Example:** https://www.example.com
- **Key Use:** Provides a way to access specific content on the web.

5. IP Address (Internet Protocol Address: A unique numerical identifier assigned to every device connected to the internet. It is used to locate and identify devices on a network.

- **Types:**
    - **IPv4:** 32-bit addresses (e.g., 192.168.1.1).
    - **IPv6:** 128-bit addresses (e.g.,2001:0db8:85a3:0000:0000:8a2e:0370:7334).
- **Key Use:** Enables data to be sent and received between devices over the internet.

6. DNS (Domain Name System): The system that translates domain names (like www.google.com) into IP addresses (like 172.217.12.174), allowing users to access websites without memorizing numeric IPs. It makes navigating the web easier by using domain names instead of IP addresses.

7. Bandwidth: The amount of data that can be transmitted over an internet connection in a given amount of time. It is measured in bits per second (bps). Higher bandwidth means faster internet speeds and better performance for streaming, downloads, and web browsing.

8. Broadband: A high-speed internet connection that provides faster data transmission compared to traditional dial-up. It includes technologies such as DSL, cable, fiber-optic, and satellite. It is used for high-speed internet access, allowing for streaming, gaming, and other high-data-demand activities.

9. Wi-Fi (Wireless Fidelity): A wireless networking technology that uses radio waves to provide high-speed internet and network connections without the need for cables. It enables devices like laptops, smartphones, and tablets to connect to the internet without physical wires.

10. Modem: A device that converts digital data from a computer into an analog signal to be transmitted over phone lines (or other media) and vice versa. It connects a device to the internet.

It is essential for connecting to the internet, especially for DSL or cable connections.

11. Router: A networking device that forwards data between computer networks. It directs traffic from your local network to the internet and vice versa.

- **Key Use:** Helps multiple devices connect to the internet and each other within a local network.

12. Firewall: A security system designed to protect a network or device from unauthorized access while allowing legitimate communications.

- **Key Use:** Monitors and filters incoming and outgoing network traffic based on predefined security rules, acting as a barrier between trusted and untrusted networks.

13. ISP (Internet Service Provider): A company that provides individuals and organizations access to the internet for a fee (e.g., AT&T, Verizon, Comcast).

- **Key Use:** Acts as the gateway for users to connect to the internet.

14. HTTP/HTTPS (Hypertext Transfer Protocol / Secure): HTTP is a protocol used for transmitting web pages and other content on the web. **HTTPS** is a secure version of HTTP that uses encryption (SSL/TLS) to protect data.

- **Key Use:** HTTP is used to load websites, while HTTPS ensures secure communication, often for online banking and shopping.

15. FTP (File Transfer Protocol): A protocol used to transfer files from one computer to another over a network (such as the internet). It is often used for uploading or downloading files to and from web servers.

16. VPN (Virtual Private Network): A service that encrypts a user's internet traffic and masks their IP address, providing online privacy and anonymity. It is used for secure access to the internet, especially on public Wi-Fi networks, and for accessing region-restricted websites.

17. Latency: The delay between a user's action and the response on the internet, often measured in milliseconds (ms).

- **Key Use:** Lower latency means faster response times, which is critical for online gaming and video conferencing.

18. Packet: A small unit of data transmitted over a network. Internet data is broken into packets for more efficient transmission and reassembled at the destination.

- **Key Use:** Fundamental to how data is transmitted across the internet, allowing information to travel faster and more securely.

19. Bandwidth Throttling: The intentional slowing down of internet service by an ISP, often to manage network congestion or enforce data caps.

- **Key Use:** ISPs may throttle bandwidth when users exceed a certain amount of data usage.

20. Cookies: Small pieces of data stored on a user's device by websites to remember user preferences and track browsing behaviour.

- **Key Use:** Enhance user experience by saving login details, site preferences, and shopping cart items.

21. Cloud Computing: The delivery of computing services (servers, storage, databases, networking, software, etc.) over the internet ("the cloud").

- **Key Use:** Allows users to store and access data and applications remotely rather than on a local computer.

22. Streaming

- **Definition:** A method of transmitting or receiving data (especially video and audio) over the internet in a continuous flow, without needing to download the entire file.

- **Key Use:** Used for services like Netflix, YouTube, and Spotify to play media content without long download times.

23. Phishing: A type of online scam where attackers impersonate legitimate organizations to steal personal information such as login credentials or financial details. A common form of cybercrime that targets unsuspecting users through emails or fake websites.

24. Botnet: A network of compromised devices controlled remotely by a hacker. These devices are often used to carry out large-scale attacks, such as **DDoS** (Distributed Denial of Service) attacks. It is used by cybercriminals to flood websites with traffic, rendering them unusable.

25. IoT (Internet of Things): A network of physical devices (such as smart home appliances, wearable's, and vehicles) connected to the internet, allowing them to collect and exchange data. It enables automation and smarter decision-making in various sectors, including healthcare, transportation, and home automation.

These internet terminologies cover a wide range of concepts from basic infrastructure (such as IP addresses and DNS) to more advanced concepts (such as cloud computing and IoT), providing a foundational understanding of how the internet works and the technologies that support it.

Write a short note on Web Browser.

Web browser is a software application that allows users to access, retrieve, and view content on the World Wide Web (WWW). It acts as an interface between users and the internet, enabling them to visit websites, search for information, and interact with online resources such as text, images, videos, and hyperlinks.

Key Functions of a Web Browser:

1. **Accessing Websites:** By entering a website's URL (Uniform Resource Locator) in the address bar, the browser retrieves the web page from a remote server and displays it to the user.

2. **Rendering Web Pages:** The browser translates HTML (HyperText Markup Language), CSS (Cascading Style Sheets), and JavaScript into a graphical interface that users can view and interact with.

3. **Navigating the Web:** Web browsers allow users to move from one webpage to another via links (hyperlinks), navigate back and forth between pages, and bookmark websites for future access.
4. **Security:** Many browsers offer security features, such as blocking malicious websites, managing cookies, and providing private browsing modes.

Popular Web Browsers:

- **Google Chrome**
- **Mozilla Firefox**
- **Microsoft Edge**
- **Safari (for Apple devices)**
- **Opera**

Each browser offers its own features and performance optimizations, but they all perform the same fundamental task of enabling web browsing.