Q. write the network terminologies with example in short

 **IP Address**

* **Definition:** A unique string of numbers separated by periods that identifies each computer using the Internet Protocol to communicate over a network.
* **Example:** 192.168.1.1

 **Subnet Mask**

* **Definition:** A 32-bit number that divides the IP address into network and host portions.
* **Example:** 255.255.255.0

 **Gateway**

* **Definition:** A network node that serves as an access point to another network.
* **Example:** 192.168.1.254

 **DNS (Domain Name System)**

* **Definition:** A hierarchical system for naming resources on the internet.
* **Example:** Translating www.example.com to 93.184.216.34

 **DHCP (Dynamic Host Configuration Protocol)**

* **Definition:** A network management protocol used to dynamically assign an IP address to a device on a network.
* **Example:** Automatically assigning 192.168.1.10 to a laptop.

 **MAC Address**

* **Definition:** A hardware identification number that uniquely identifies each device on a network.
* **Example:** 00:1A:2B:3C:4D:5E

 **LAN (Local Area Network)**

* **Definition:** A network that connects computers within a limited area.
* **Example:** A network within an office building.

 **WAN (Wide Area Network)**

* **Definition:** A telecommunications network that extends over a large geographical area.
* **Example:** The internet or a company’s network connecting offices in different cities.

 **TCP (Transmission Control Protocol)**

* **Definition:** A core protocol of the Internet Protocol Suite that ensures data is transmitted reliably.
* **Example:** Ensuring a file is completely and accurately downloaded.

 **UDP (User Datagram Protocol)**

* **Definition:** A communications protocol that facilitates the exchange of messages without establishing a connection.
* **Example:** Streaming video where occasional data loss is acceptable.

Q . Draw your Home Network Topology and explain how you are accessing the RPS Lab environment.

Internet

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[ISP Modem/Router]

|

[Wi-Fi Router]

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| | |

Laptop PC Smartphone

**Accessing the RPS Lab Environment**

1. **Connect to Home Network:**
   * Ensure your device (Laptop, PC, Smartphone) is connected to the Wi-Fi Router.
2. **VPN (if required):**
   * Use VPN software to securely connect to the RPS Lab:
     + Install and configure VPN software with provided credentials.
     + Connect to the VPN server.
3. **Access RPS Lab:**
   * **Web Interface:**
     + Open a web browser.
     + Enter the URL (e.g., https://gmail.com).
     + Log in with your credentials.
   * **SSH Access:**
     + Open a terminal and use SSH:

ssh username@rpslab.example.com

* + - Enter your password when prompted.

Q. Identify a real-world application for both parallel computing and networked systems. Explain how these technologies are used and why they are important in that context.

**Parallel Computing: Weather Prediction**

**Application:** Weather forecasting and climate modeling.

**Usage:**

* **Parallel Computing:** Weather prediction models simulate atmospheric conditions using vast amounts of data from satellites, weather stations, and sensors. Parallel processing divides these computations across multiple processors, enabling faster and more accurate predictions.

**Importance:**

* **Accuracy and Preparedness:** Parallel computing enhances the accuracy of weather forecasts, providing valuable information for disaster preparedness, agricultural planning, and resource management. Timely and precise weather predictions help mitigate risks and optimize decision-making in various sectors.

**Networked Systems: Online Gaming**

**Application:** Multiplayer online games.

**Usage:**

* **Networked Systems:** Players connect to game servers over the internet, allowing real-time interaction and gameplay. Servers synchronize game state and player actions across all connected players.

**Importance:**

* **Real-Time Interaction:** Provides a seamless gaming experience with real-time communication and interaction between players worldwide, enhancing the social and competitive aspects of gaming.