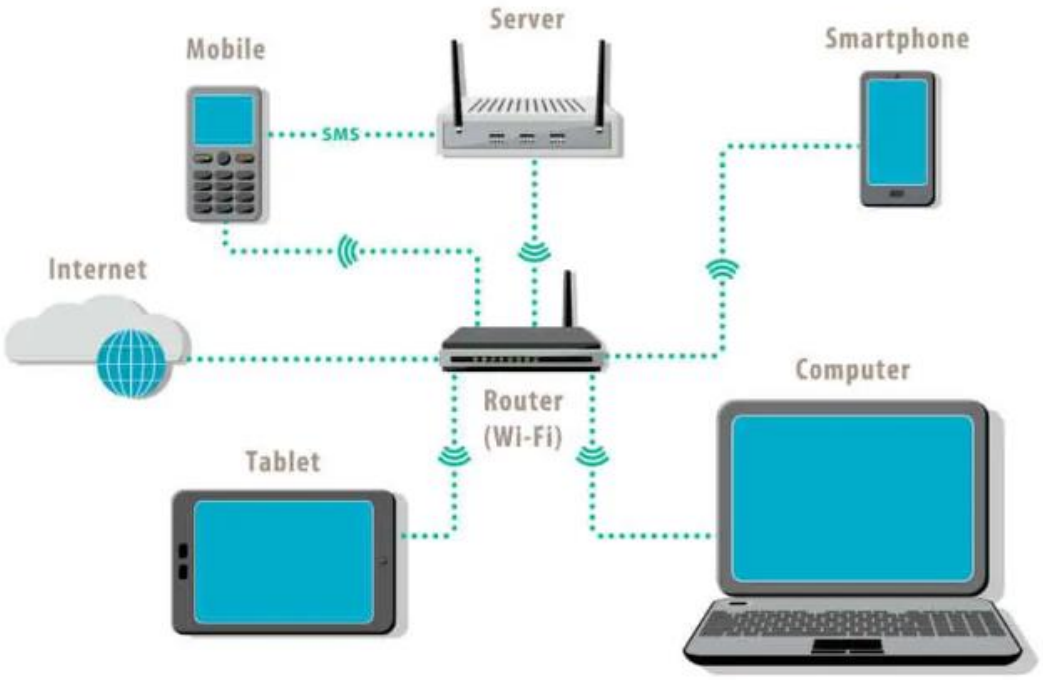
Assignment 1

1] Draw your Home Network Topology and explain how you are Accessing the Any (College lab, office lab) Lab environment.



1. **Internet Connection**: The network begins with an internet connection, which usually comes from an Internet Service Provider (ISP) via cable, DSL, fibre-optic, or other means.

2. **Router**: The modem is then connected to a router, which serves as the central hub of the home network. The router manages traffic between devices within the home network and also facilitates communication with external networks like the internet.

3. **Devices**: Connected to the router are various devices such as computers, smartphones, tablets, smart TVs, gaming consoles, IoT devices, etc. These devices communicate with each other and with external networks through the router.

4. **Wi-Fi Access Point**: The router may include a built-in Wi-Fi access point or be connected to a separate access point, allowing wireless devices to connect to the network.

Accessing Lab Environments:

1. VPN (Virtual Private Network): If the college, office, or other labs have VPN Access, I would connect to their VPN servers using VPN client software installed on my devices. This creates a secure connection to the lab network over the Internet, allowing me to access resources as if I were physically there.

2. Remote Desktop Protocol (RDP): If direct access to specific computers or Servers within the lab environment is required, I could use RDP software to Establish a remote desktop connection to those machines.

3. SSH (Secure Shell): For Unix/Linux-based systems SSH can be used to establish a secure command-line connection to servers within the lab environment.

4. Web-based Access: Some labs might offer web-based access to their resources Through a secure portal or web interface. In such cases, I would access the necessary tools or services using a web browser.

2] 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.

One real-world application that utilizes both parallel computing and networked systems is weather forecasting and climate modelling.

In weather forecasting, parallel computing is used to process vast amounts of data from various sources, such as weather stations, satellites, and radar systems. This data is then fed into complex mathematical models that simulate the Earth's atmosphere and predict future weather patterns. By dividing the problem into smaller tasks and running them concurrently on multiple processors, weather forecasting models can produce results much faster than they could on a single computer.

Networked systems play a crucial role in weather forecasting by enabling the

collection and sharing of data from different locations around the world. Weather data is gathered from various sources and transmitted over high-speed networks to central computing facilities, where it is processed and analysed. These networked systems allow for the integration of data from multiple sources, providing a more comprehensive picture of global weather patterns

Parallel computing and networked systems are important in weather forecasting for several reasons:

- Improved accuracy: By processing more data and running more complex models, parallel computing helps to improve the accuracy of weather forecasts
- Faster predictions: Parallel computing allows weather forecasting models to produce results more quickly, enabling timely warnings and alerts for severe weather events
- Global collaboration: Networked systems facilitate the sharing of data and models among weather agencies and researchers worldwide, leading to better understanding and prediction of global weather patterns
- Scalability: As the amount of weather data and the complexity of models increase, parallel computing and networked systems provide the scalability needed to handle these growing demand.

Parallel computing and networked systems are essential technologies in weather forecasting, enabling the processing of vast amounts of data, the running of complex models, and the sharing of information globally to improve the accuracy and timeliness of weather predictions.