

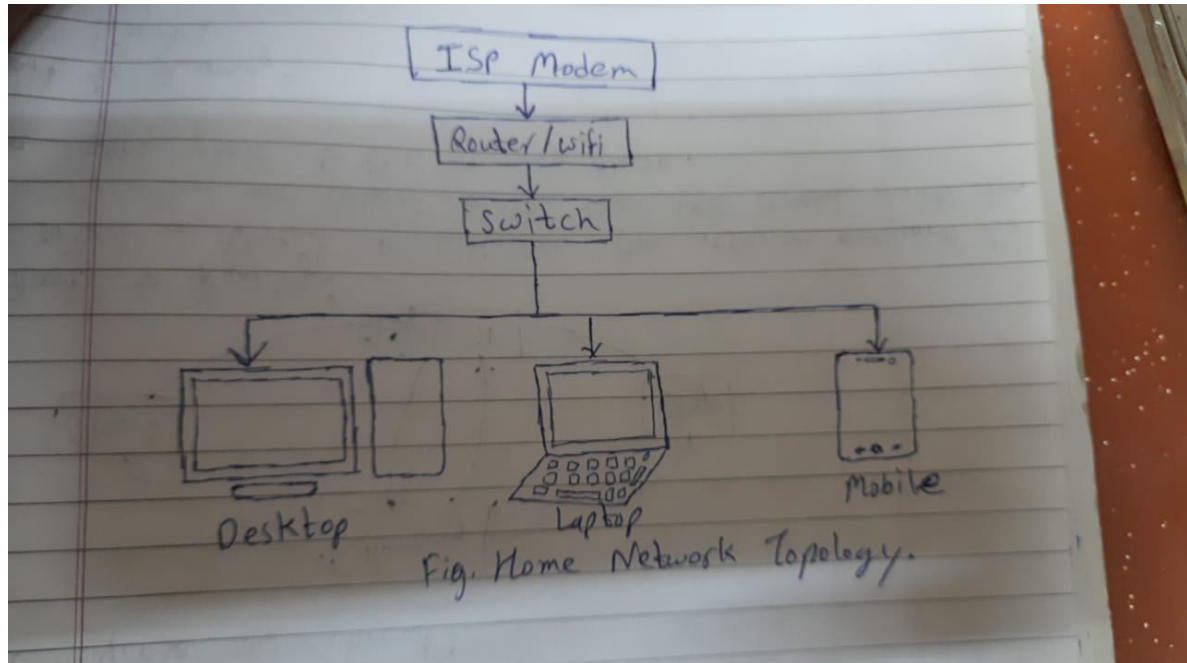
## Assignment 1:

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

Ans:



- **Modem/Router:** This is our internet connection comes into your home. It might be a single device provided by your internet service provider (ISP) or separate modem and router devices.
- **Router:** The router distributes the internet connection to various devices within the home network. It assigns IP addresses, manages traffic, and provides a firewall for security. This device connects your home devices to the internet and to each other.
- **Switches:** You might have switches to expand the number of wired connections available in your home. They connect devices together within your home network.
- **Devices:** This includes your computers, laptops, smartphones, tablets, smart home devices, and any other devices connected to your network.

When we attempt to access the cloud lab, our device sends a request to our router, which then goes out to the internet through our modem. The request travels across the internet to the cloud provider's data center and reaches the specific server hosting our lab. The server processes the request and sends the response back through the same path to our device.

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.

Ans : **Real World Application : Online Gaming Platforms**

**Explanation:**

**Parallel Computing:** In online gaming platforms, parallel computing is used to handle the computational workload required for rendering graphics, processing game physics. Modern video games often feature complex 3D graphics and large-scale multiplayer environments, all of which demand significant computational power. Parallel computing techniques, such as multithreading and GPU parallelism, are employed to distribute these tasks across multiple CPU cores and GPU (Graphics Processing Unit) threads efficiently. For instance, parallel computing enables the simultaneous rendering of multiple game elements, such as characters, objects, and environments, while also executing game logic and physics simulations in real-time.

**Networked Systems:** Networked systems are the backbone of online gaming platforms, enabling players to connect and interact with each other in real-time over the internet. These systems facilitate multiplayer gaming experiences by establishing reliable communication channels between players, game servers, and other networked components. In online multiplayer games, players from different locations join virtual game worlds hosted on centralized or distributed game servers. Network protocols and technologies, such as TCP/IP and client-server architecture, are utilized to transmit game data, synchronize player actions, and maintain the consistency of game states across all connected clients.

**Importance :**

**Scalability:** By parallelizing game processing tasks and optimizing network communication, these technologies ensure platforms can accommodate large player populations without sacrificing performance.

**Real-time Interactivity:** Parallel computing and networked systems enable real-time interaction in online multiplayer games. They minimize latency, ensuring seamless gameplay experiences for players worldwide.

**Reliability and Fairness:** Parallel computing and networked systems enforce consistent game rules and prevent cheating. Game servers validate player actions, resolve conflicts, and uphold game logic across all connected clients.

**Global Accessibility:** Parallel computing and networked systems enable online gaming platforms to reach a global audience. Players from different regions can connect to centralized or distributed servers worldwide, fostering diverse communities and cultural exchanges in real-time gaming environments.