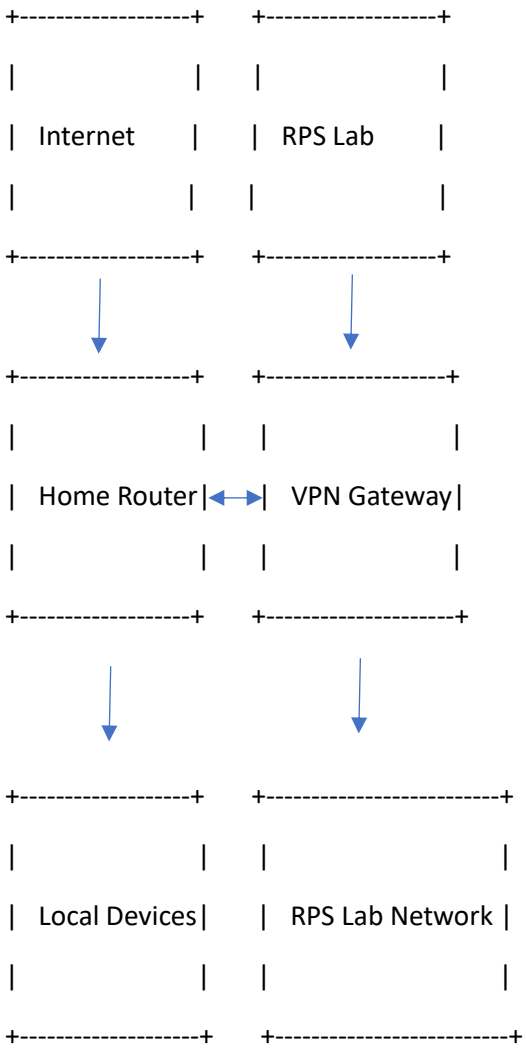
Assignment 1.1

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

Sample representation of my home network topology:



Explanation:

Internet: Represents the global network.

Home Router: Connects my local devices to the internet. It acts as a gateway.

VPN Gateway: Provides secure access to the RPS Lab environment. I connect to the lab via a VPN (Virtual Private Network) tunnel.

Local Devices: My computers, phones, and other devices at home.

RPS Lab Network: The internal network within the lab where I access resources and perform tasks.

Assignment 1.2

Given: 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.

Real-world Application: Online Marketplace

Parallel Computing: In the context of an online marketplace like Amazon or eBay, parallel computing is crucial for handling large volumes of transactions and processing user requests efficiently. Parallel computing can be used to parallelize tasks such as search indexing, recommendation algorithms, and order processing.

For example, when a user performs a search on the platform, parallel computing enables the system to distribute the search query across multiple servers or processing units, each responsible for searching a subset of the product record. This parallelization speeds up the search process, allowing users to quickly find relevant products.

Similarly, recommendation algorithms that analyse user behaviour and preferences to suggest products can benefit from parallel computing. By parallelizing the computation of recommendations, the system can process many user interactions simultaneously and provide personalized recommendations in real-time.

Networked Systems: Networked systems are essential for an online marketplace as they enable communication and data exchange between different components of the platform, such as web servers, databases, and third-party services. These systems facilitate the flow of information, including product listings, user data, and transaction details, across the platform's infrastructure.

Additionally, networked systems enable interactions with external services, such as payment gateways and shipping providers, allowing seamless transaction processing and order fulfilment. For example, when a user makes a purchase, networked systems coordinate with payment gateways to process the payment securely and with shipping providers to arrange for product delivery.

Importance: Parallel computing and networked systems are critical for the scalability and performance of online marketplaces, especially those experiencing high traffic and transaction volumes. By leveraging parallel computing, these platforms can handle concurrent user requests efficiently, ensuring a seamless user experience even during peak periods.

Furthermore, networked systems enable the integration of various services and data sources, enabling features such as personalized recommendations, secure payment processing, and efficient order fulfilment. The combination of parallel computing and networked systems allows online marketplaces to deliver a fast, reliable, and feature-rich shopping experience to users, ultimately driving customer satisfaction and business growth.