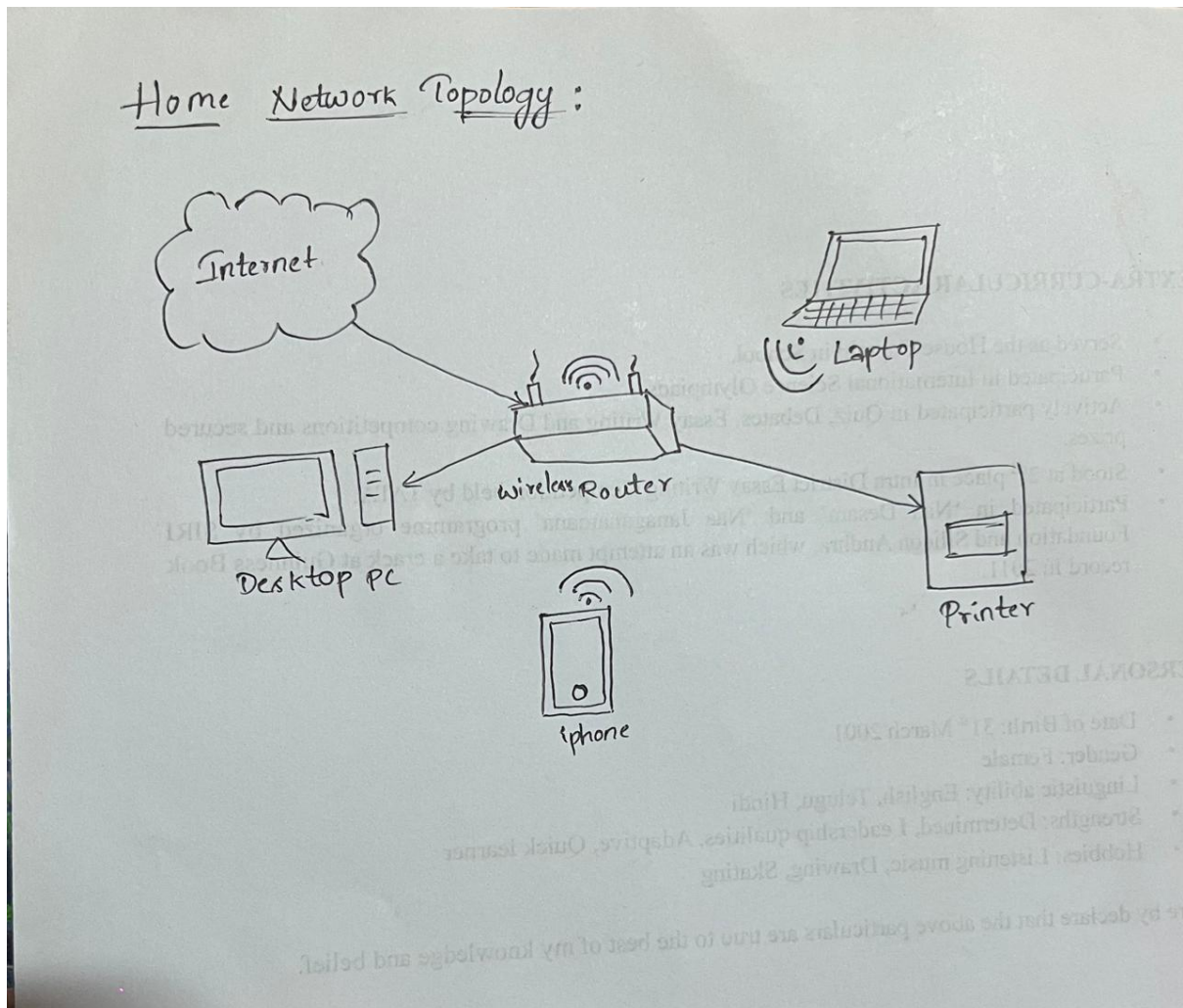**COMPUTER ARCHITECTURE -  HARDWARE, NETWORK AND SOFTWARE**

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

**Home Network Topology:**



**Accessing the RPS Lab environment:**

**Step-1:** Start by connecting to your local internet to the laptop through your router.

**Step-2:** When I connect to the lab's network using VPN software on my computer, it's like putting my data in a secure, encrypted tunnel. This tunnel protects my data. It's as if my information is wrapped in a strong, secret code that only the lab's network can understand. So, with VPN, I can safely access the lab from home without worrying about anyone snooping on my activities.

**Step-3:** I need to verify my identity using credentials provided by my college or office, typically a username and password. Sometimes, they might ask for an additional security measure, like a code from a mobile app. These authentication steps ensure that only authorized individuals can access the lab's network, maintaining security and protecting sensitive information from unauthorized access.

**Step-4:** Once I authenticate my computer through VPN, it gains secure access to the lab's network. This access allows me to interact with resources such as servers, printers, and files just as if I were physically present in the lab. It's extending the lab's network to my computer, enabling seamless collaboration and productivity regardless of my physical location.

**Step-5**: Operating remotely, I can effectively utilize the lab's network resources, conduct experiments, and securely access restricted databases from my home.

**Assignment 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.**

**Real-world application**: Online shopping platforms.

**Parallel Computing:**

Online shopping platforms employ parallel computing methodologies to expedite search query processing. Rather than relying on a single computing unit, parallel computing distributes the workload across multiple servers or computing units. Each server independently handles a segment of the search query, enabling simultaneous processing and accelerating the search process.

**Networked Systems:**

Now, let's say you find the product you want to purchase and proceed to checkout. Behind the scenes, the online shopping platform communicates with various systems, including inventory databases, payment gateways, and shipping services. These systems are often distributed across different locations and connected via networked infrastructure. Networked systems ensure seamless communication between these components, enabling the website to update inventory levels in real-time, securely process payment transactions, and coordinate product shipments efficiently.

**Importance:**

**Fast Response**: Parallel computing ensures that online shopping websites can handle a large number of concurrent user requests without slowing down. This translates to faster response times for users, improving their shopping experience and increasing customer satisfaction.

**Reliability:** Networked systems enable online shopping platforms to communicate with various backend services reliably. This reliability ensures that orders are processed accurately, payments are

securely handled, and product shipments are tracked effectively, leading to a trustworthy shopping experience for customers.

**Scalability**: As online shopping platforms grow in popularity and user traffic increases, parallel computing and networked systems allow these platforms to scale their infrastructure dynamically. This scalability ensures that the website can accommodate spikes in traffic during peak shopping seasons without experiencing downtime or performance issues.

**Global Reach**: Networked systems enable online shopping platforms to serve customers worldwide. By leveraging network infrastructure, these platforms can reach customers in different geographic regions, process transactions in multiple currencies, and coordinate international shipping, expanding their market reach and driving business growth.

The integration of parallel computing and networked systems in online shopping platforms enhances responsiveness, reliability, scalability, and global accessibility, ultimately delivering a seamless and enjoyable shopping experience for customers