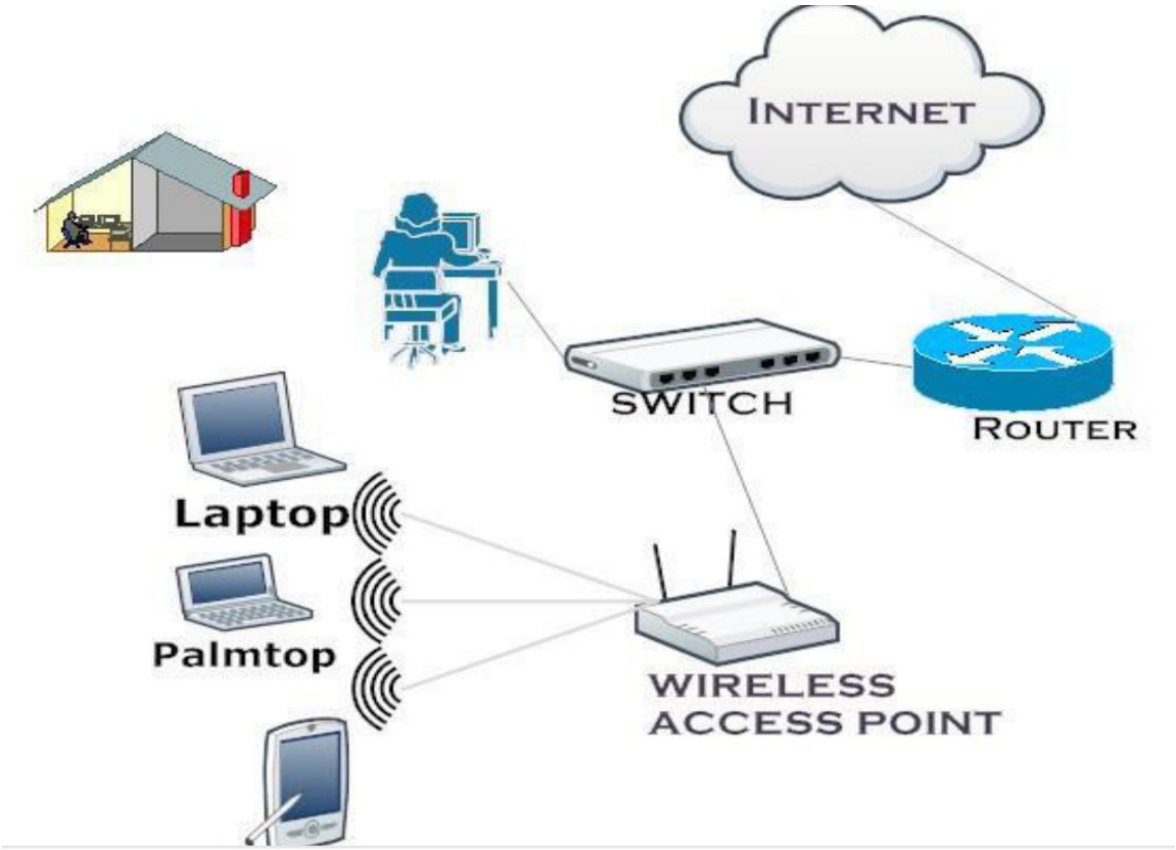
Assignment-1

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

Solution:-



By connecting my laptop to the home network and using a VPN client, I can securely access the RPS Lab environment. Depending on the lab's setup, I use either Remote Desktop or SSH to interact with lab resources, ensuring that all data transmitted between my home network and the RPS Lab is secure and encrypted.

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.

Solution:-

Real-World Application of Parallel Computing: Weather Forecasting

How Parallel Computing is Used:
Weather forecasting relies heavily on parallel computing due to the complexity and vast amount of data involved. The process involves:

Data Collection: Gathering data from satellites, radars, weather stations, and other sources.
Data Processing: Using numerical weather prediction (NWP) models that simulate the atmosphere.

These models involve solving complex mathematical equations that represent physical processes in the atmosphere.
Parallel Processing: Breaking down these large computational tasks into smaller tasks that can be processed simultaneously across multiple processors. High-performance computing (HPC) clusters or supercomputers are used to handle these tasks.

Why Parallel Computing is Important in Weather Forecasting:

Speed: Weather predictions must be timely. Parallel computing allows for faster data processing and model execution, providing more accurate forecasts quickly.
Accuracy: High-resolution models require substantial computational power. Parallel computing enables these models to run efficiently, improving the precision of forecasts.
Scalability: As computational needs grow, parallel computing allows weather forecasting systems to scale by adding more processors.
Real-World Application of Networked Systems: Online Banking
How Networked Systems are Used:
Online banking systems depend on networked systems to provide secure, reliable, and real-time banking services. This involves:

Client-Server Architecture: Users interact with banking services through web or mobile applications that connect to backend servers.
Database Systems: Centralized databases store and manage customer data, transaction records, and other essential information.
Secure Communication: Secure protocols (e.g., HTTPS, TLS) ensure data transmitted over the network is encrypted and protected from unauthorized access.
Distributed Systems: Banks use distributed systems to manage load balancing, fault tolerance, and ensure high availability of services.
Why Networked Systems are Important in Online Banking:

Accessibility: Customers can access their accounts and perform transactions from anywhere at any time, increasing convenience and satisfaction.
Efficiency: Networked systems allow for real-time processing of transactions, reducing delays and improving the overall user experience.
Security: With robust security measures in place, networked systems protect sensitive financial data, maintaining customer trust and compliance with regulations.
Scalability: Networked systems can handle a large number of concurrent users and transactions, essential for managing peak loads during busy periods.

Summary:-

Parallel Computing in Weather Forecasting: Enhances the speed, accuracy, and scalability of weather models, crucial for timely and precise weather predictions.
Networked Systems in Online Banking: Provide accessible, efficient, secure, and scalable banking services, essential for modern financial operations and customer satisfaction.
These applications illustrate the critical role of parallel computing and networked systems in addressing complex problems and delivering essential services in today's technology-driven world.