Day 1

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

Lab environment.

Home Network Topology:

* Internet Connection: Typically, a home network starts with an internet connection provided by an ISP (Internet Service Provider), such as cable, DSL, or fiber.

* Modem: The ISP connection usually connects to a modem, which translates the incoming signal from the ISP into a format your network can use.

* Router: From the modem, a router directs network traffic to various devices within your home. It acts as a gateway, providing local IP addresses to devices like computers, smartphones, smart home devices, etc.

* Switches and Access Points (Optional): In larger setups, switches may be used to expand the number of wired connections, while access points extend Wi-Fi coverage.

* Devices: This includes computers, laptops, smartphones, printers, smart TVs, IoT devices, etc., connected either via wired Ethernet or Wi-Fi.

Example: [Modem] --- [Router] --- [Devices]

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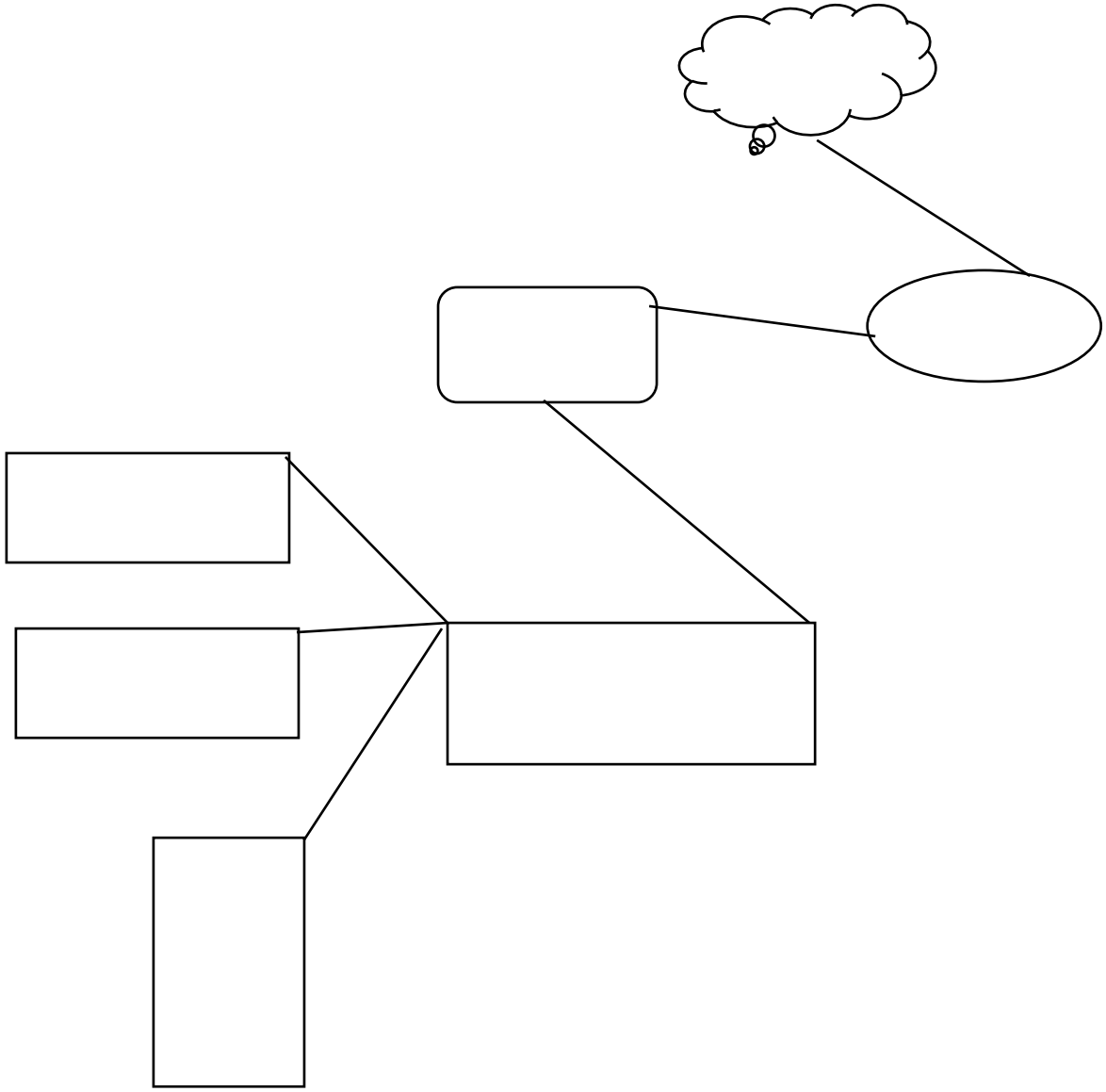
Switch

Home Network Topology



Accessing RPS Lab Environment:

Assuming the RPS Lab is a remote environment for programming or testing purposes, accessing it typically involves:

* Remote Access Tools: You might use Remote Desktop Protocol (RDP), SSH (Secure Shell), or a VPN (Virtual Private Network) to connect securely to the RPS Lab servers.

* VPN Setup: If the RPS Lab requires a VPN for secure access, you would install and configure VPN client software on your local device (computer or smartphone).

* Credentials: You would typically have login credentials (username/password) or SSH keys provided by the lab administrator to authenticate and gain access to the lab environment.

* Network Configuration: Depending on the lab's setup, you may need to configure your local firewall or network settings to allow traffic to and from the lab environment. This could involve port forwarding, firewall rules, or network address translation (NAT) configurations.

* Usage: Once connected, you can use the remote environment just like a local one. You can run tests, develop software, or perform any tasks required within the scope of the lab's purpose.

Example Scenario
Let's say you're accessing an RPS Lab environment:

Home Setup: You have a standard home network with a modem and router.
Access Method: You use a VPN client to connect securely to the lab's network.
Credentials: You enter the provided username and password to authenticate.
Work: You perform programming tasks or tests using tools available within the RPS Lab environment.

---- 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: Weather Forecasting

Parallel Computing:

Application: Weather forecasting models for numerical weather prediction.

Usage: Divides computational workload into smaller tasks for simultaneous processing.

Example: European Centre for Medium-Range Weather Forecasts (ECMWF) uses HPC facilities. Importance: Speeds up model execution, provides timely and accurate forecasts critical for agriculture, transportation, disaster preparedness, and energy management.

Networked Systems

Application: Integration of observational data from weather stations, satellites, radar systems, and ocean buoys.

Usage: Facilitates real-time data acquisition, quality control, and assimilation into weather models.

Example: Global Telecommunication System (GTS) by the World Meteorological Organization (WMO).

Importance: Ensures weather models are updated with the latest data, improving forecast accuracy and reliability. Helps in safety, planning, and resource management.

Summary:

Parallel Computing: Enhances speed and efficiency of weather models.

Networked Systems: Integrates real-time data for accurate forecasting.

These technologies collectively enhance the reliability and application of weather forecasting, benefiting sectors reliant on accurate weather information for planning and decision-making.