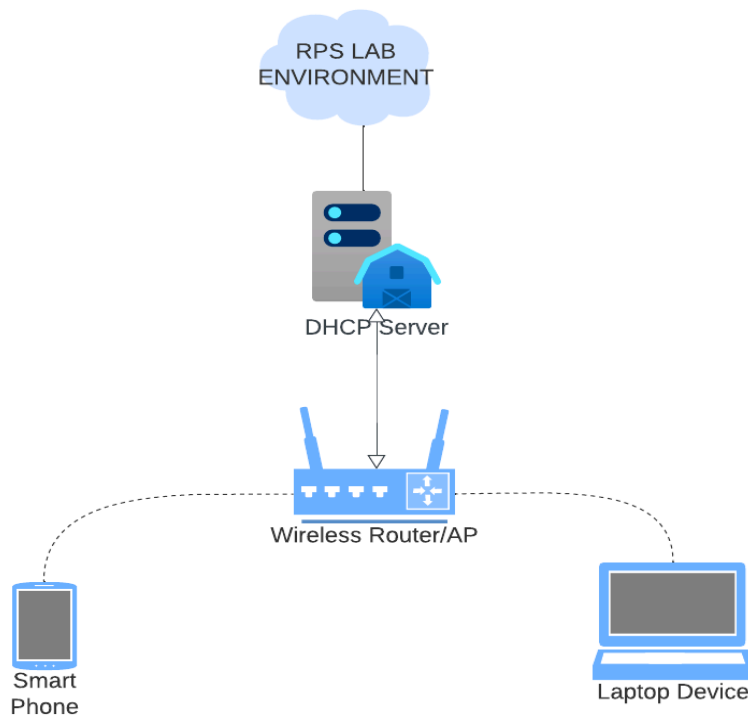**Karthik Koparde**

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

In this diagram:

1. Wired or Wireless Connection: The laptop can connect to the router either via a wired Ethernet connection or a wireless Wi-Fi connection.
2. Router : The laptop sends out a DHCP discovery broadcast message on the local network, looking for a DHCP server that can provide it with network configuration information..
3. DHCP: Upon connecting to the router, the laptop requests an IP address using DHCP. The router assigns a unique IP address to the laptop from the pool of available addresses in its DHCP server configuration.
4. DHCP Response: The router responds to the laptop's DHCP request by offering an IP address and other network configuration parameters, such as subnet mask, default gateway, and DNS servers.
5. IP Address Assignment: The laptop accepts the IP address offered by the router and then communicates with the internet.

Task 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.

Parallel Computing :

Examples and Use Cases:
- **Supercomputers for Astronomy:** In astronomy, supercomputers equipped with parallel processing capabilities are used to process vast amounts of data generated by telescopes and other observational instruments. These supercomputers can perform complex calculations in a fraction of the time it would take a single-processor computer.
- **Predictive Agriculture**: Parallel computing is used in agriculture to analyze data and make predictions that improve crop yields and efficiency. By analyzing weather data, soil conditions, and other factors, farmers can make informed decisions about planting, irrigating, and harvesting crops.

Significance:

- **Scalability**: Modern parallel computing systems can scale up to millions of computers, allowing efficient processing of massive datasets.
- **Speed and Efficiency**: Parallel computing significantly reduces computation time by distributing tasks across multiple processors. This speed is crucial for handling large-scale simulations, data analysis, and complex computations.
- **Scientific Discovery**: Parallel computing accelerates scientific research by enabling simulations, modeling, and data analysis that would be impractical with sequential computing.

Networked Systems :

Examples and Use Cases:
- **Databases and Data Mining**: Networked systems are crucial for managing large databases and performing data mining. Organizations use networked databases to store and retrieve information efficiently. Data mining techniques analyze patterns and extract valuable insights from these databases.
- **Collaborative Work Environments:** Networked systems facilitate collaboration among geographically dispersed teams. Video conferencing, document sharing, and collaborative software rely on networked communication to enhance productivity and teamwork.

Significance:

- Global Connectivity: Networked systems connect people, organizations, and devices worldwide. They enable seamless communication, information sharing, and collaboration.
- Resource Sharing: Networked systems allow resource sharing across different devices, improving efficiency and reducing redundancy.
- Business Operations: Organizations rely on networked systems for day-to-day operations, including email communication, online transactions, and supply chain management.