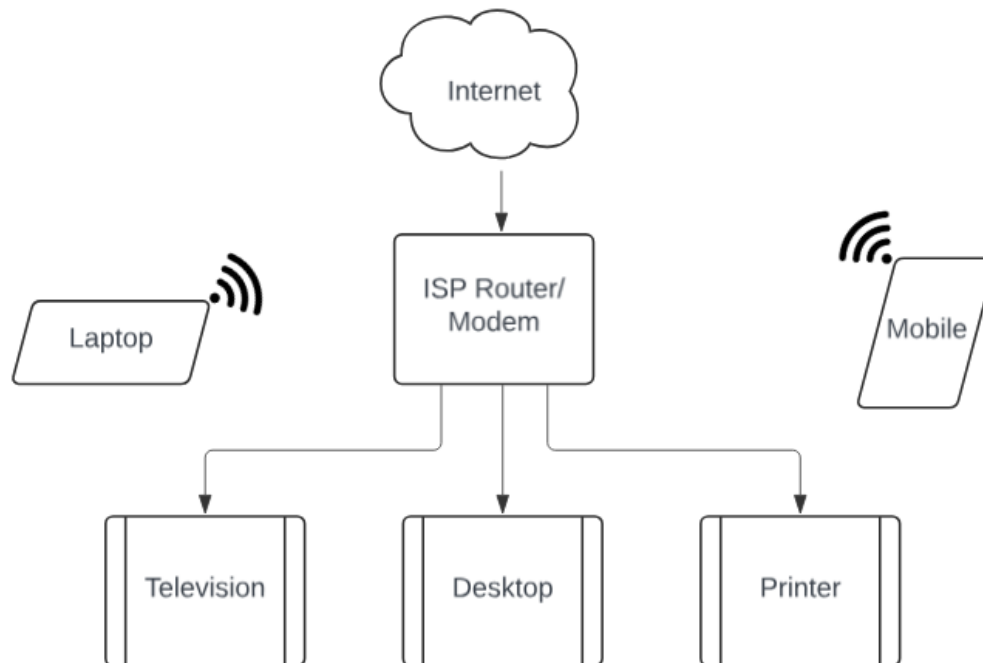


CA-Assignment 01

Question 01 : Draw your Home Network Topology and explain how you are accessing the RPS Lab environment.

Answer :

Home Network Topology:



A home network is a group of devices such as computers, Television, printers, and mobile devices that connect to the internet and each other. Here's a common home network setup with a star topology.

Accessing the RPS Lab environment:

VPN (Virtual Private Network) : If the RPS lab environment is behind a corporate or university firewall, I might need to connect to a VPN provided by XYZ to access their internal resources securely.

Remote Desktop Protocol (RDP) or SSH (Secure Shell) : Once connected to the VPN, I would use remote desktop software like RDP (for Windows) or SSH (for Unix-based systems) to connect to specific machines or servers within the RPS lab environment.

Credentials: I would need appropriate login credentials provided by RPS to authenticate myself and gain access to their systems.

Question 02 : 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.

Answer :

Parallel Computing: Autonomous Vehicle Technology

Application: Autonomous vehicles (AVs), including self-driving cars and unmanned aerial vehicles (UAVs), heavily utilize parallel computing to enable safe and efficient operation. This technology involves processing vast amounts of sensor data to make real-time decisions in dynamic environments.

How it's used:

Sensor Data Processing: Autonomous vehicles are equipped with multiple sensors including cameras, radar, LIDAR, and ultrasonic detectors. These sensors generate large volumes of data that must be processed in real-time to understand the vehicle's environment accurately. Parallel computing allows the simultaneous processing of data from all these sensors, integrating the information to create a coherent model of the surroundings.

Decision Making: The decision-making process in AVs involves complex algorithms, including machine learning models for object detection, classification, and path planning. These tasks are computationally intensive as they require rapid analysis of the environmental data to make driving decisions like steering, braking, and accelerating. Using parallel computing, these computations can be distributed across multiple processors or cores, greatly speeding up the process and ensuring that decisions are made in a timely manner.

Importance:

Safety and Efficiency: The ability to process and react to environmental data faster and more accurately is critical for the safety of autonomous vehicles. Parallel computing ensures that AVs can detect and respond to obstacles, changes in road conditions, or unexpected events quickly enough to operate safely.

Scalability: As the technology for autonomous vehicles evolves, the computational demands will continue to increase, particularly as the algorithms become more sophisticated and the sensor data becomes more comprehensive. Parallel computing allows for scalability in computational power, supporting more advanced functionalities and greater levels of autonomy.

Innovation and Development: The use of parallel computing accelerates the development cycle of autonomous vehicle technologies by enabling more efficient testing and simulation. Developers can run multiple simulations in parallel to test different scenarios and refine algorithms more rapidly.

Networked Systems: Telemedicine

Application: Telemedicine is a significant application of networked systems, transforming healthcare delivery by connecting patients with medical providers remotely through telecommunications technology.

How it's used: In telemedicine, networked systems facilitate the exchange of medical information from one site to another via internet, wireless, satellite, or telephone media. This includes video conferencing for real-time consultations, sharing of diagnostic images and medical reports, and remote monitoring of patients' vital signs. Doctors can provide consultations, follow-ups, and even some forms of treatment without the patient needing to travel to a healthcare facility.

Importance: Networked systems in telemedicine increase the accessibility of healthcare services, especially important in rural or under-served regions where medical expertise may be scarce. It reduces the need for and the cost of traveling, and it minimizes the strain on healthcare facilities by managing patient care remotely when possible. During public health emergencies like the COVID-19 pandemic, telemedicine played a crucial role in maintaining continuity of care while minimizing the risk of spreading the virus. It not only enhances the efficiency of healthcare delivery but also supports public health surveillance and chronic disease management.