Assignment-1

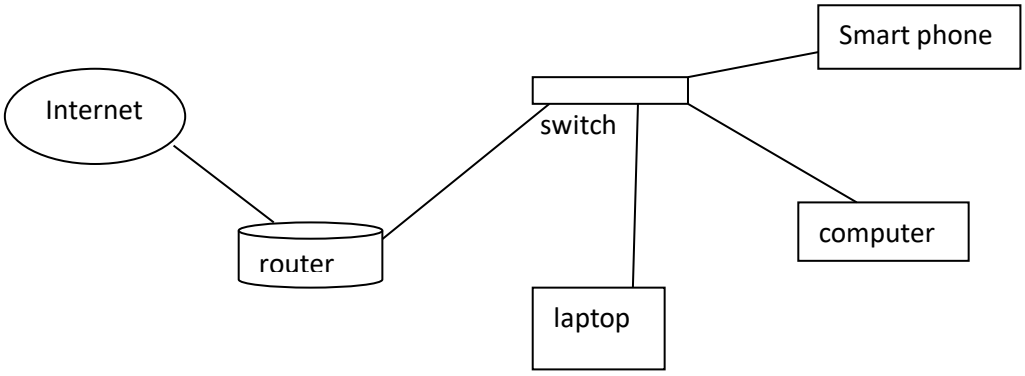
Home Network Topology:

- Router : The central device that connects all devices to the internet.

- Modem : Connects the router to the internet service provider (ISP).

- Switch : Connects multiple devices to the router.

- Devices : Computers, laptops, smartphones, smart TVs, and other devices connected to the network.



Assignment-2

Application: Distributed Data Processing for Big Data Analytics

Parallel Computing: Big data analytics often involves processing huge volumes of data, which can be computationally intensive and time-consuming. Parallel computing involves breaking down these tasks into smaller, more manageable sub-tasks that can be processed simultaneously across multiple computing resources. For example, a big data analytics task might involve analyzing millions of records to identify patterns or trends.

Network Systems: In a distributed data processing system, data is often distributed across multiple nodes or servers connected through a network. Each node can process a portion of the data independently and then share the results with other nodes.

How They Are Used Together: In a distributed data processing system for big data analytics, parallel computing and network systems work together to achieve efficient data analysis. The dataset is partitioned and distributed across multiple nodes in the network. Each node processes its portion of the data in parallel using parallel computing techniques, such as parallel algorithms or MapReduce frameworks. The results from each node are then combined or aggregated to produce the final result.

Why They Are Important:

Scalability: Distributed data processing systems can scale horizontally by adding more nodes to the network. This allows organizations to handle increasing volumes of data without a proportional increase in processing time.

Fault Tolerance: By distributing data and processing across multiple nodes, distributed systems can be more resilient to hardware failures or network issues. If one node fails, the processing can continue on other nodes without significant disruption.

Performance: Parallel computing and distributed processing can significantly reduce the time required to analyze large datasets. By processing data in parallel across multiple nodes, tasks can be completed much faster than on a single machine.

Cost-Effectiveness: Distributed data processing systems can be more cost-effective than traditional monolithic systems. Instead of investing in expensive high-end servers, organizations can use commodity hardware and scale-out architectures to achieve their processing needs.

Overall, the combination of parallel computing and network systems is crucial for efficiently processing large volumes of data in fields such as big data analytics, scientific computing, and machine learning.