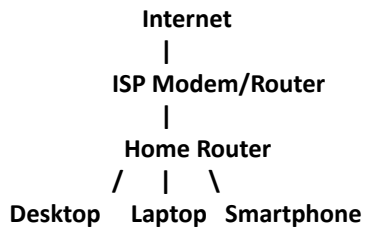NAME : Ankit Kumar Keshri

DAY1:

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

```
        Internet
           |
     ISP Modem/Router
           |
      Home Router
      /    |    \
 Desktop  Laptop  Smartphone
```

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.

Answer:

A real-world application that utilizes both parallel computing and networked systems is weather forecasting.

Parallel Computing:

Weather forecasting involves complex mathematical models that simulate the behavior of the atmosphere. These models require significant computational power to process vast amounts of data, perform simulations, and generate predictions. Parallel computing

allows weather forecasting centers to distribute these computational tasks across multiple processors or computers, enabling them to run simulations faster and more efficiently.

In parallel computing for weather forecasting, tasks such as data preprocessing, numerical simulations, and post-processing of results can be divided into smaller subtasks that can be executed simultaneously on different processing units. This parallelization speeds up the overall computation time, allowing meteorologists to generate forecasts in a timely manner.

Networked Systems:

forecasting centers often rely on a networked system to gather data from various sources, such as weather stations, satellites, radar systems, and buoys, distributed across different geographical locations. These data sources continuously collect observations of temperature, humidity, wind speed, atmospheric pressure, and other relevant parameters.

A networked system aggregates these observations and transmits them to central forecasting centers for analysis and model initialization. Additionally, forecast models may be run on distributed computing clusters connected through a network to leverage computational resources efficiently.

Importance:

Accuracy and Timeliness: Parallel computing allows weather models to run faster, enabling meteorologists to generate forecasts with higher spatial and temporal resolution. This leads to more accurate predictions, crucial for making informed decisions in various sectors such as agriculture, aviation, disaster management, and public safety.

Scalability: As computational demands for weather forecasting increase with the need for higher resolution and longer-range predictions, parallel computing provides scalability by allowing forecasting centers to add more processing units or computing nodes to handle larger workloads.

Resilience: Networked systems ensure redundancy and resilience in data collection and processing. Multiple data sources and redundant communication links help mitigate the risk of data loss due to hardware failures or network outages, ensuring the reliability of weather forecasts.

Global Collaboration: Networked systems enable collaboration among meteorological agencies worldwide by facilitating the exchange of observational data, forecast models, and

expertise. This global collaboration enhances the quality and coverage of weather forecasts, benefiting regions that lack adequate observational infrastructure.

In summary, the integration of parallel computing and networked systems in weather forecasting improves forecast accuracy, timeliness, scalability, resilience, and global collaboration, making it a critical application where these technologies are indispensable.