

# Assignment No.2

Q. 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.

What is Parallel Computing?

Parallel computing refers to the process of breaking down larger problems into smaller, independent, often similar parts that can be executed simultaneously by multiple processors communicating via shared memory, the results of which are combined upon completion as part of an overall algorithm.

Real World Application-:

## **How It is Used?**

Parallel computing enables researchers to perform large-scale simulations and modeling of physical systems, such as fluid dynamics, weather forecasting, and structural mechanics. These simulations involve solving complex mathematical equations that describe

the behaviour of physical phenomena. By distributing the computational workload across multiple processors or computing nodes, parallel computing accelerates the simulation process and allows researchers to explore a wider range of scenarios.

### **Importance-:**

Parallel computing plays a pivotal role in scientific research due to several key reasons:

**Speed and Efficiency:** Scientific research often involves computationally intensive tasks such as simulations, data analysis, and optimization. Parallel computing allows these tasks to be divided into smaller, independent subtasks that can be executed simultaneously on multiple processors or computing nodes. By harnessing the computational power of parallel architectures, researchers can significantly reduce the time required to perform complex computations, leading to faster results and increased productivity.

**Scalability:** As scientific datasets and computational models continue to grow in size and complexity, the need for scalable computing solutions becomes paramount. Parallel computing enables researchers to scale their computational workflows to handle larger

datasets, simulate more intricate systems, and explore higher-dimensional parameter spaces. By distributing the computational workload across multiple processors or computing clusters, parallel computing provides researchers with the scalability they need to tackle increasingly challenging scientific problems.

## **Real World Application In Networking Systems**

### **E-Commerce**

Application: E-commerce platforms like Amazon, eBay, and Alibaba are prime examples of networked systems in action. These platforms facilitate online transactions among users scattered across different geographical locations.

**How It's Used:** Networked systems in e-commerce connect numerous computers and servers across the Internet to manage and process a myriad of tasks such as user queries, transactions, data storage, and content delivery. They ensure that the e-commerce platform can handle vast amounts of data, support complex

interactions among users, and integrate with other services like payment gateways and shipping services.

**Importance:** Networked systems are crucial for the scalability and reliability of e-commerce platforms. They enable these platforms to serve millions of simultaneous users around the world, manage inventory, provide customer service, and process transactions securely. This connectivity is essential for the global reach of modern commerce, enabling businesses to expand their markets far beyond local boundaries and providing consumers with a broad array of products. Both parallel computing and networked systems are indispensable in their respective applications due to their ability to handle large-scale computations and data exchanges efficiently. Their roles in weather forecasting and e-commerce highlight how critical these technologies are in managing complex, real-time information and services on a global scale.