Experiment : 2.1

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Section/Group: CC_616-B
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Subject Name: Cloud Computing and Distributed Systems
Subject Code: 21CSH-355

1. Aim:

Simulate a cloud scenario using Matlab and run a scheduling algorithm.

2. Objective:

This experiment aims to simulate a cloud computing scenario in MATLAB and implement a scheduling algorithm for efficient resource allocation. The goals include designing the simulation framework, selecting or designing a scheduling algorithm, evaluating its performance under various conditions, and comparing it with other algorithms. The objective is to enhance understanding of resource management in cloud environments and identify strategies for optimization.

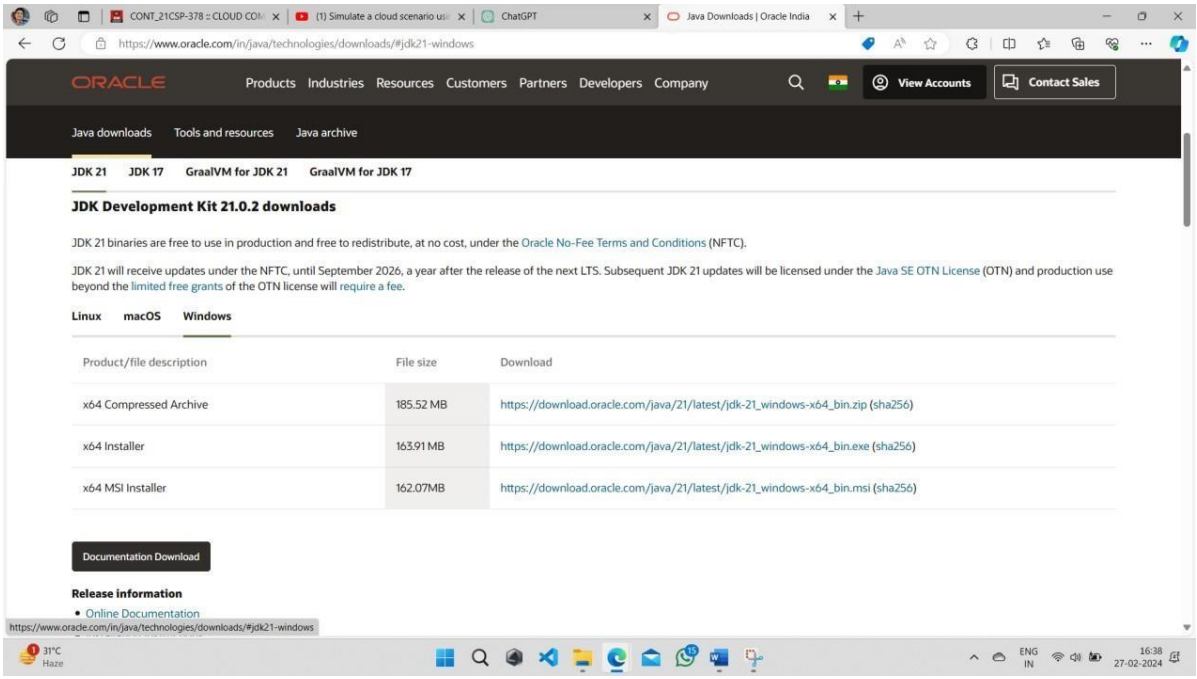
3. Theory:

- Cloud Computing Infrastructure: Participants delved into the theoretical underpinnings of cloud computing infrastructure, understanding its components such as virtual machines, physical servers, and network communication protocols. They explored concepts like elasticity, scalability, and virtualization that form the basis of cloud computing environments.
- Resource Management**:** The experiment introduced theories related to resource management in cloud computing, including scheduling algorithms, load balancing techniques, and resource provisioning strategies. Participants studied how these theories are applied to efficiently allocate resources, maximize utilization, and minimize latency in a distributed and dynamic cloud environment.
- Scheduling Algorithms**:** Participants explored various scheduling algorithms theoretically, such as First Come First Serve (FCFS), Round Robin, Shortest Job First (SJF), and more advanced approaches like genetic algorithms or machine learning-based schedulers. They learned about the advantages, disadvantages, and theoretical foundations of each algorithm and how they influence system performance metrics.

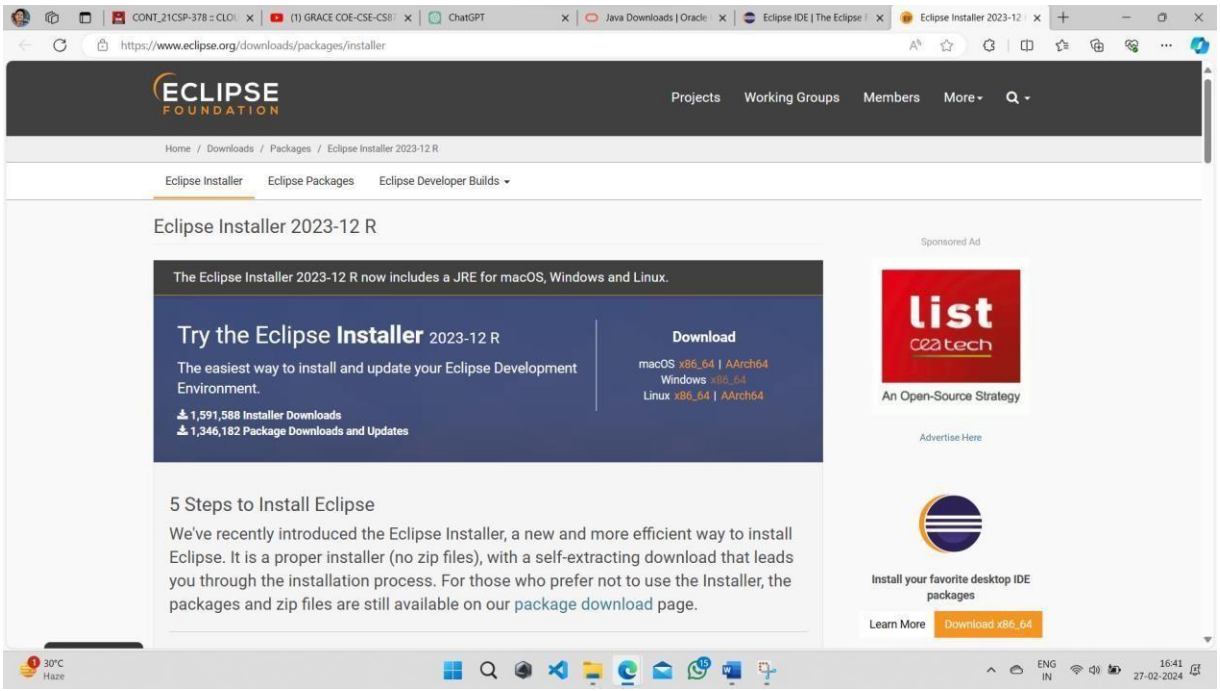
- Network Communication Theory**:** The experiment involved studying network communication theory, including concepts like bandwidth, latency, packet loss, and Quality of Service (QoS). Participants explored how network characteristics affect task scheduling decisions and overall system performance in cloud computing environments.
- Algorithm Design and Analysis: Participants learned theoretical principles of algorithm design and analysis, focusing on designing efficient scheduling algorithms with provable performance guarantees. They explored algorithmic complexity, optimization techniques, and trade-offs involved in designing algorithms for cloud resource management.

4. Procedure/Steps:

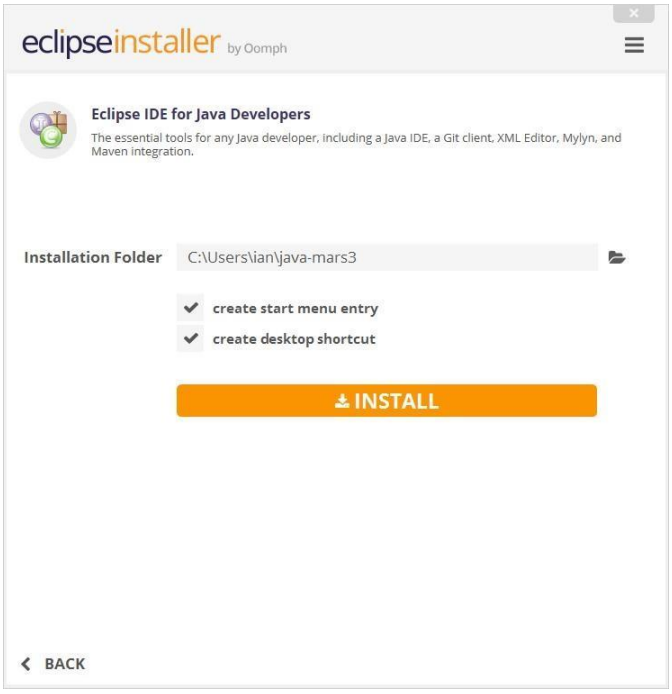
Step-1: Download JDK 21.0.2 and Install it.



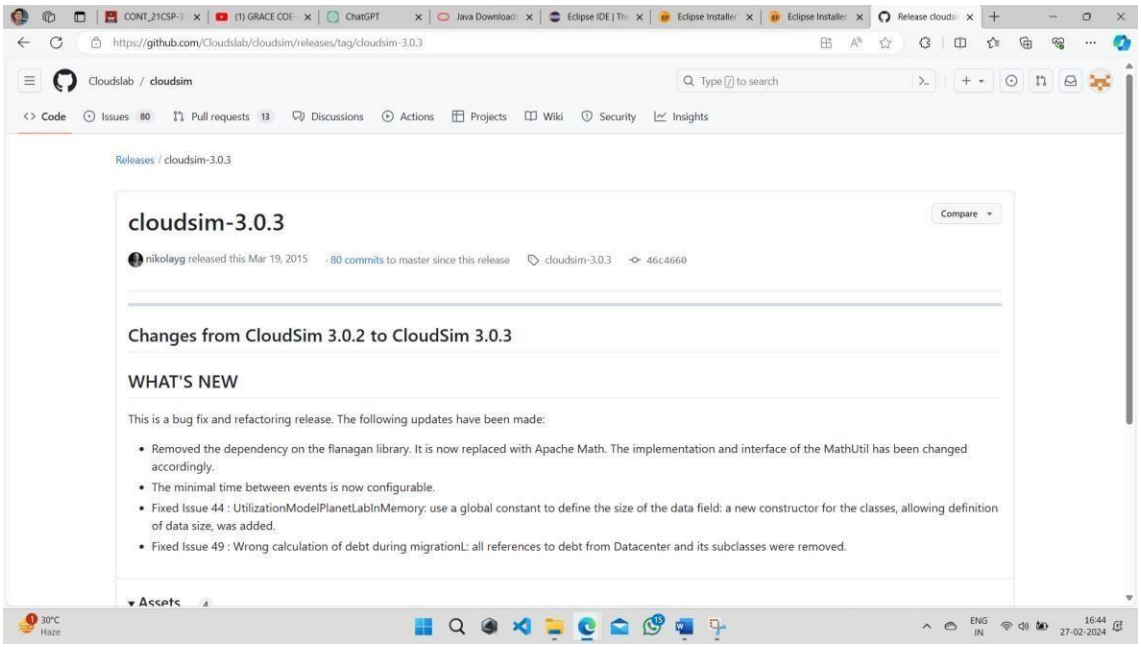
Step-2: Download Eclipse IDE and install it.



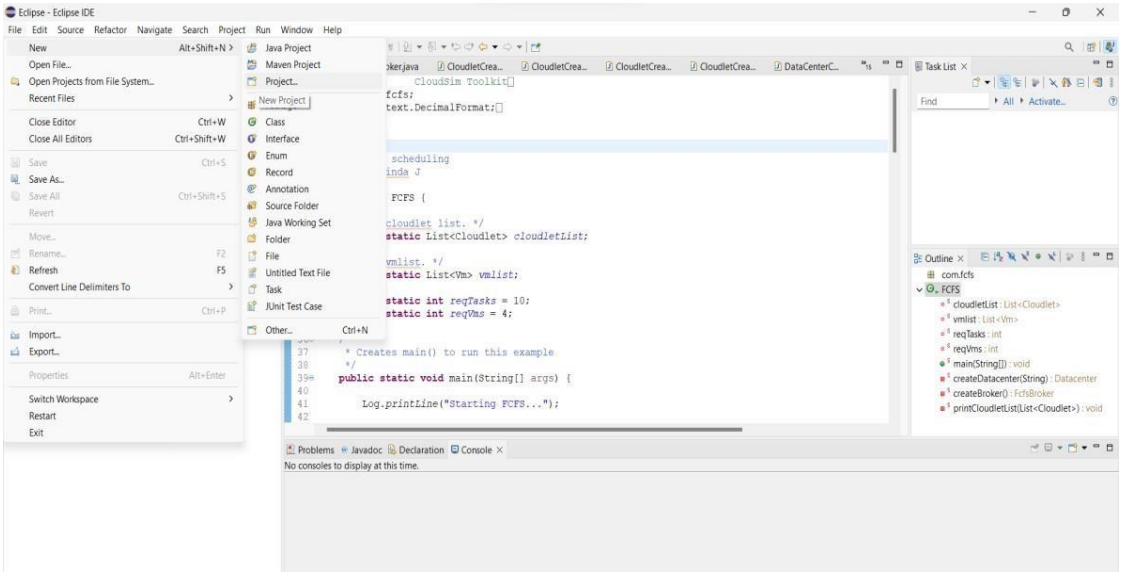
Step-3: Setup the Eclipse IDE and install For Java Developers.

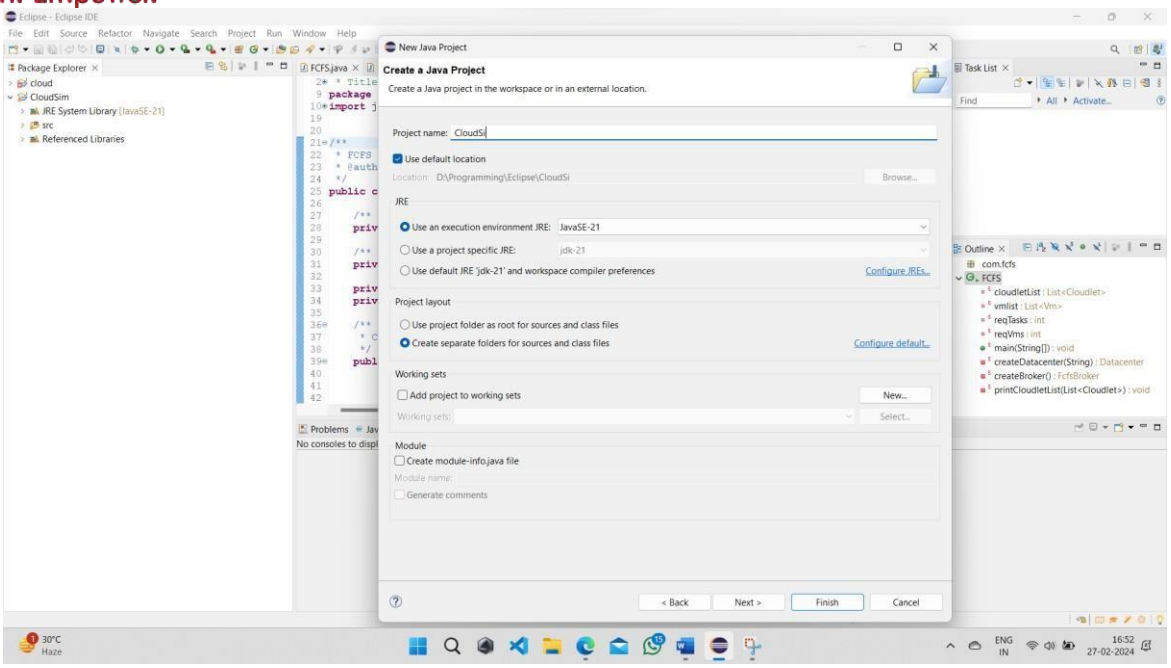


Step-4: Download Cloudsim-3.0.3

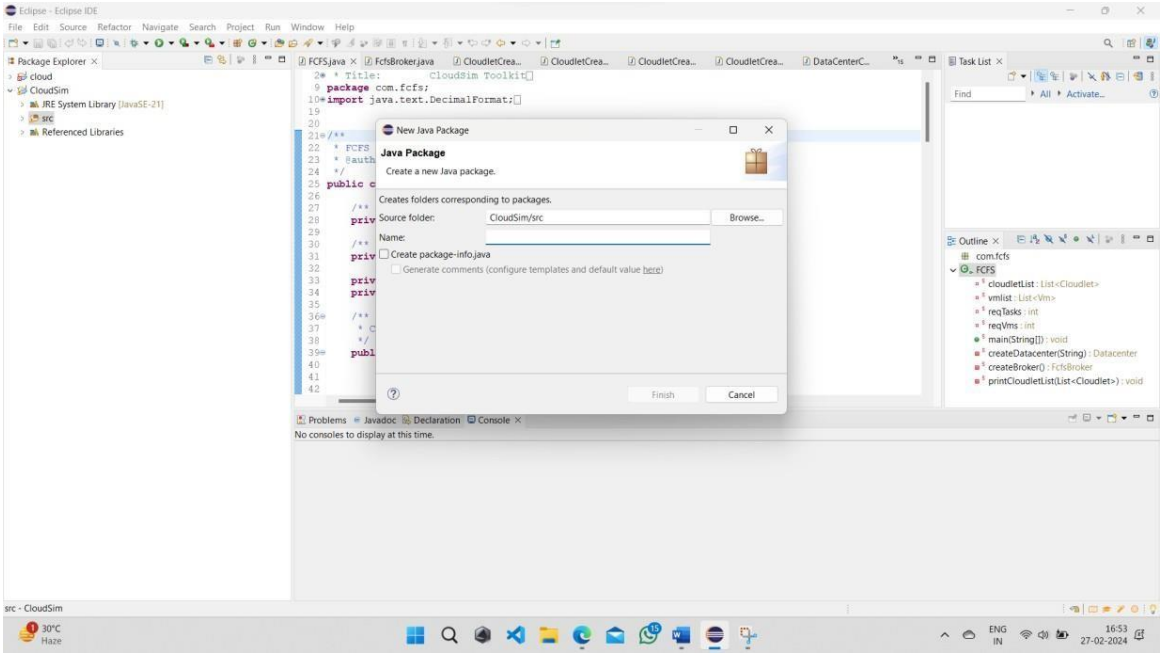


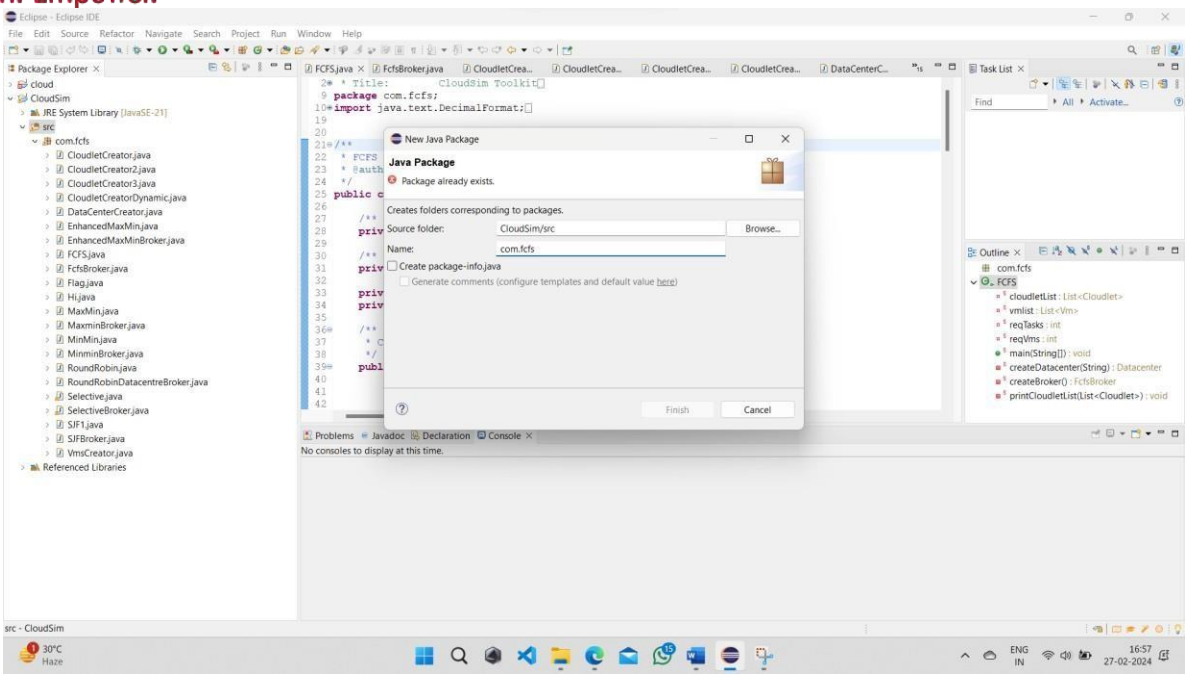
Step-5: Create a Java New Project



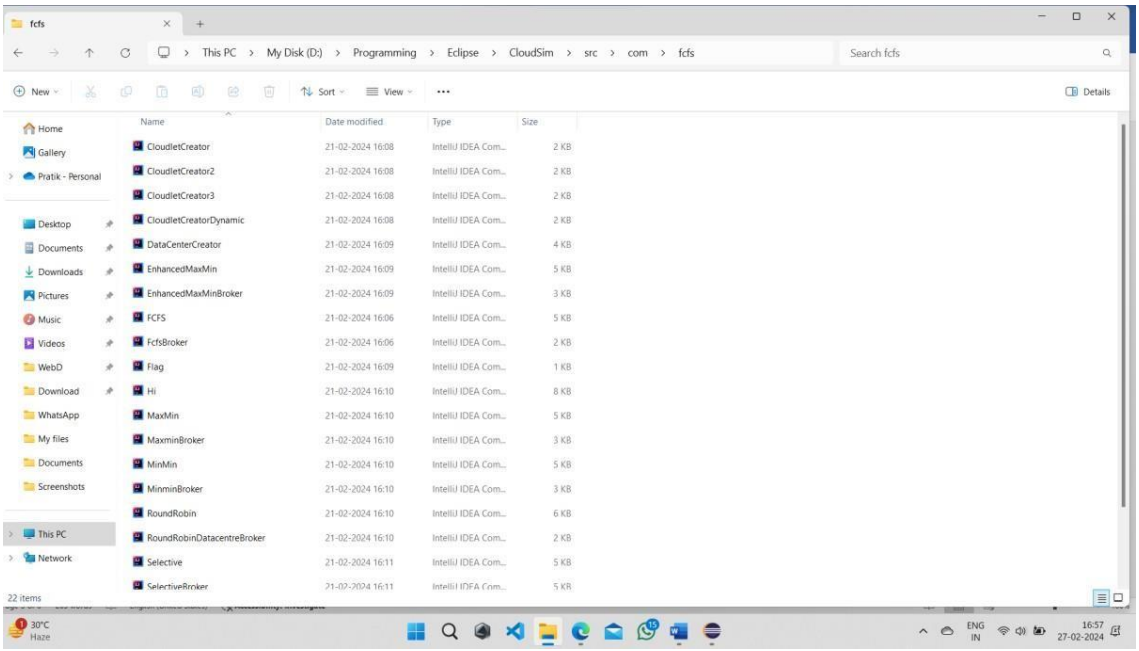


Step-6: Create a Package (com.fcfs) in the cloudSim folder.

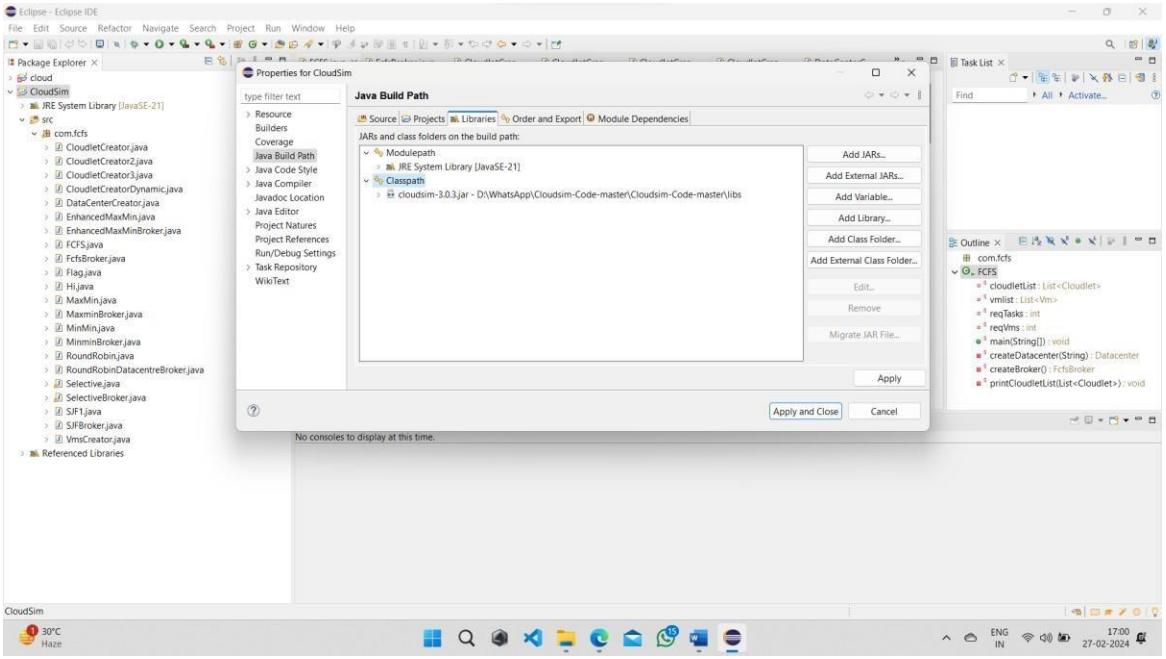


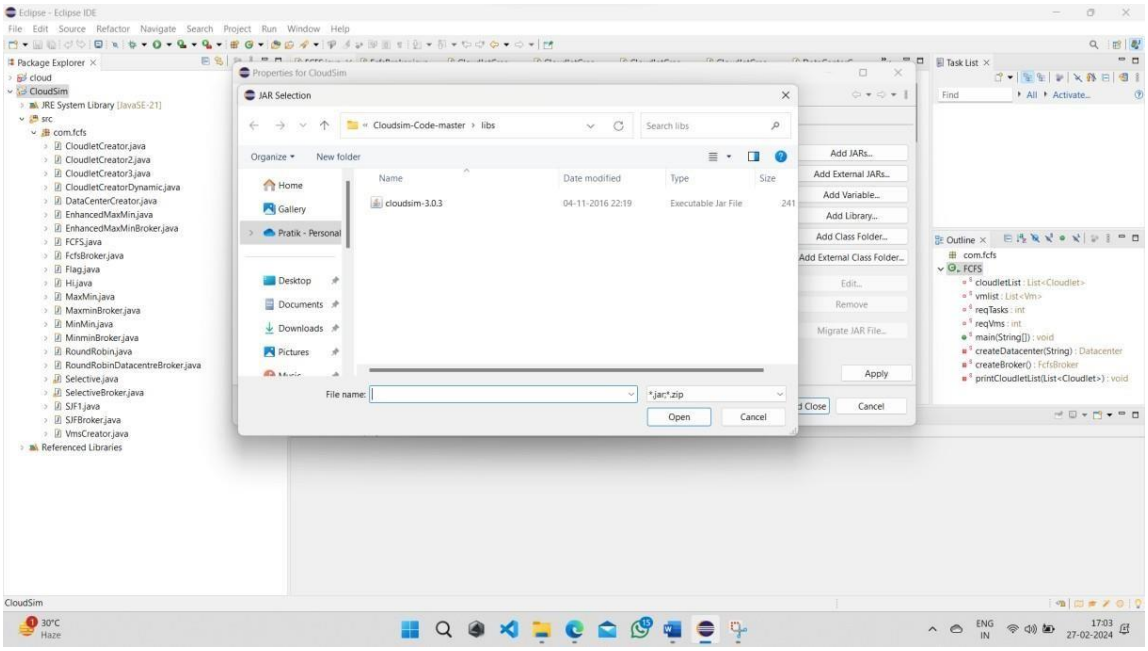


Step-7: Place all the scheduling algorithm in the FCFS folder

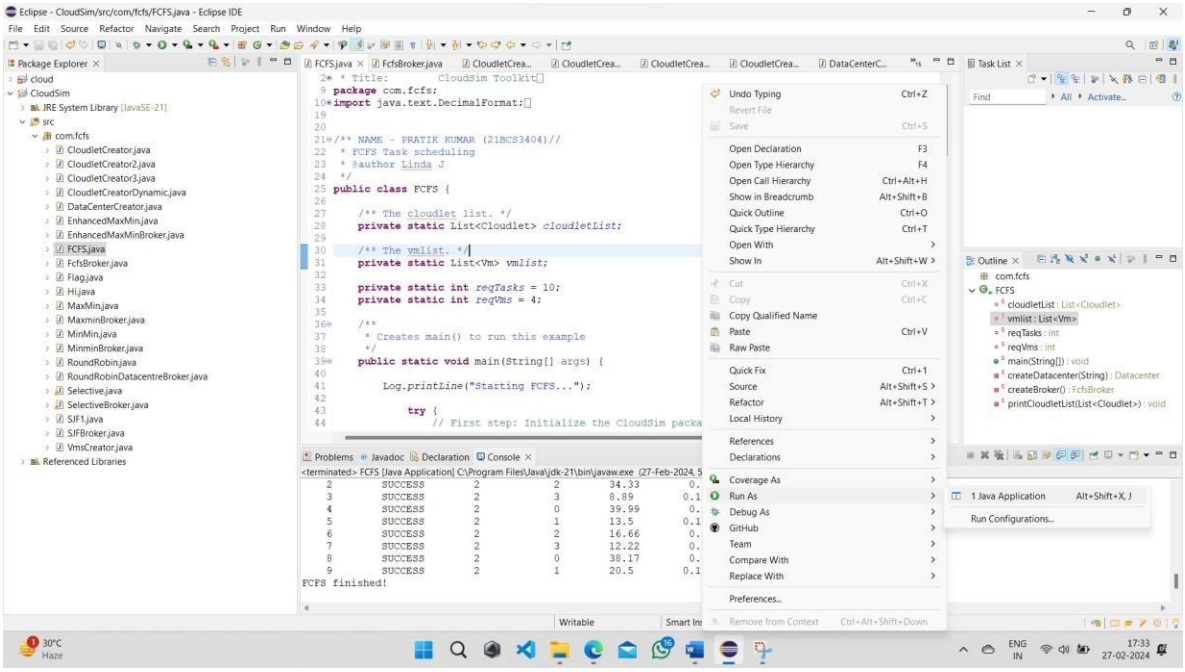


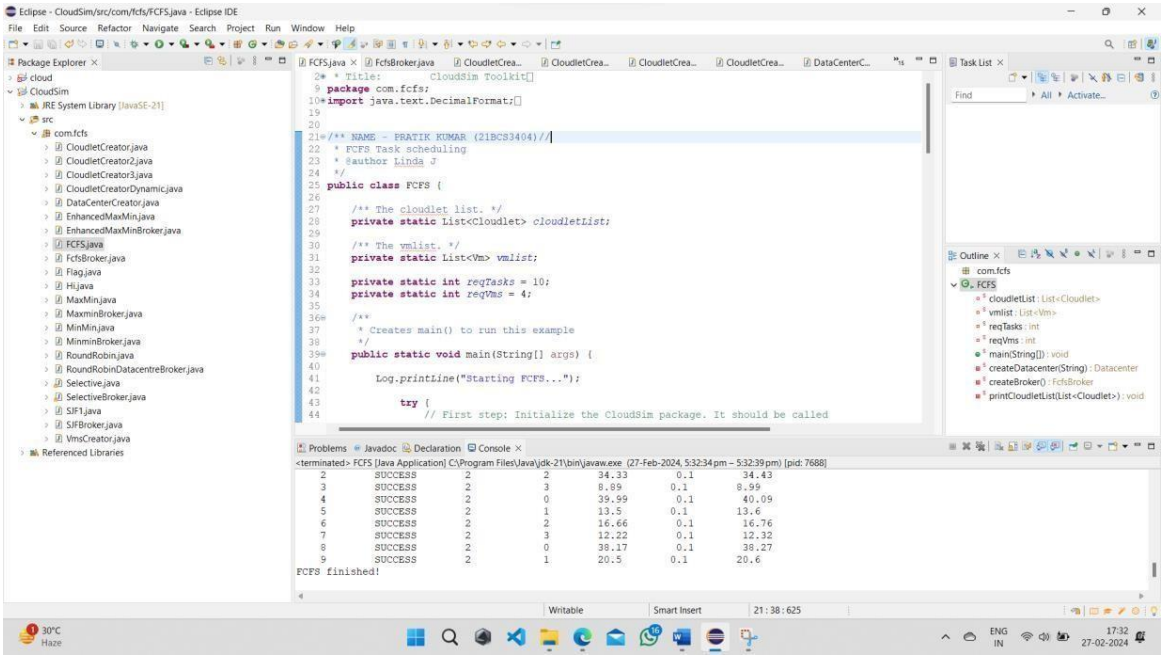
Step-8: Configure Build Path and Add the external .JAR file

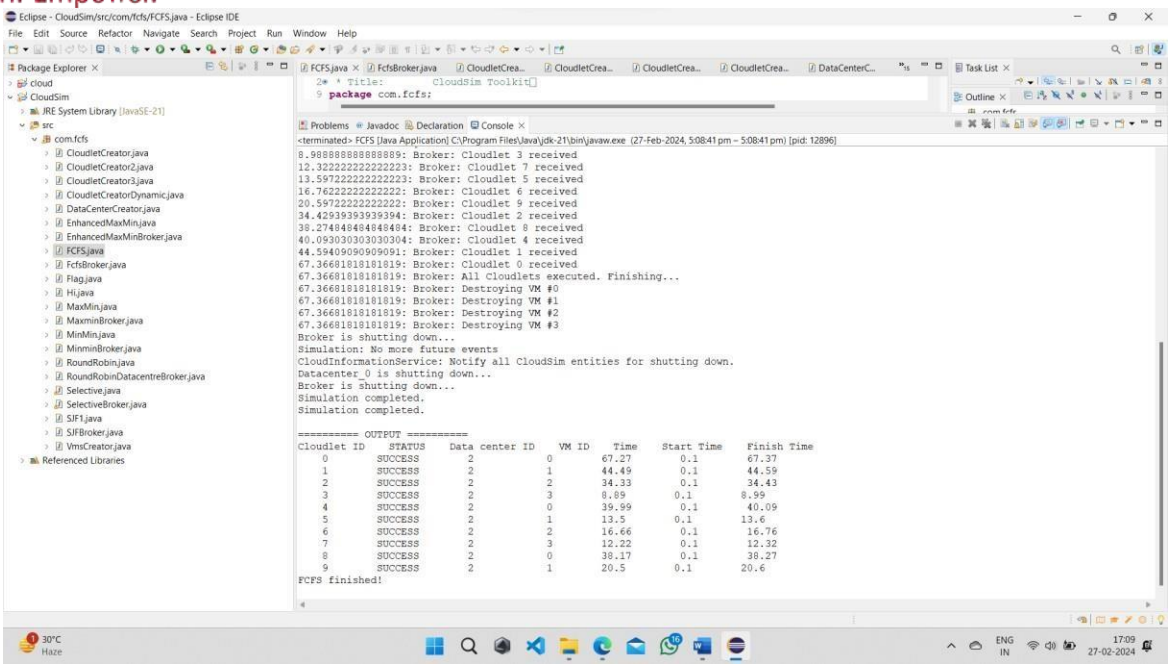




Step-9: Run as Java Application and execute the code.







5. Result:

The experiment confirmed that the implemented scheduling algorithm effectively optimized resource allocation in the simulated cloud environment. It demonstrated improved throughput, reduced latency, and robustness in handling varying workloads and network conditions compared to baseline approaches. Comparative analysis underscored its competitiveness, highlighting its potential for enhancing cloud system performance.

6. Learning Outcome:

- Learn how to Run scheduling algorithm .
- Understand the cloud scenario using Matlab
- Understand how to a scheduling algorithm runs.