TITLE: DISCRETE EVENT SIMULATION

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MASTER OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

By

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INTRODUCTION:

Discrete event simulation (DES) is a powerful tool for modeling and simulating real-world systems. DES is particularly well-suited for modeling systems that are dynamic

and where events occur at discrete points in time. Examples of such systems include traffic flow, manufacturing processes, and computer networks.

In this project, we will use Java to develop a DES of a [insert system to be simulated]. We will use a priority queue to store the events in the system and event-driven simulation to process the events.

The project will be divided into two main phases:

Modeling: In this phase, we will develop a conceptual model of the system. We will identify the entities in the system, the events that can occur, and the relationships between the entities and events.
Simulation: In this phase, we will implement the conceptual model in Java. We will use a priority queue to store the events in the system and event-driven simulation to process the events.

The goals of this project are to:

Learn how to use DES to model and simulate real-world systems
Develop a deep understanding of the [insert system to be simulated]
Use the simulation to explore different scenarios and make predictions about the behavior of the real system

OBJECTIVES AND SCOPE:

The objectives of this project are to:

Learn how to use discrete event simulation (DES) to model and simulate real-world systems

Develop a deep understanding of the [insert system to be simulated]

Use the simulation to explore different scenarios and make predictions about the behavior of the real system

The scope of this project includes the following:

Developing a conceptual model of the [insert system to be simulated]

Implementing the conceptual model in Java using a priority queue and event-driven simulation

Validating the simulation by comparing its output to real-world data

Using the simulation to explore different scenarios and make predictions about the behavior of the real system

APPLICATION TOOLS:

Java: Java is a general-purpose programming language that is well-suited for developing DES simulations. Java provides a number of features that make it easy to implement priority queues and event-driven simulation, such as the PriorityQueue class and the java.util.Timer class.

Integrated development environment (IDE): An IDE is a software application that provides a comprehensive environment for developing and debugging Java programs. Some popular IDEs for Java include Eclipse, IntelliJ IDEA, and NetBeans.

METHADOLOGY:

Modeling: The first step in the project is to develop a conceptual model of the system to be simulated. This involves identifying the entities in the system, the events that can occur, and the relationships between the entities and events. The conceptual model can be documented using a variety of techniques, such as flow diagrams, entity-relationship diagrams, and pseudocode.

Implementation: Once the conceptual model is complete, it can be implemented in Java. This involves creating classes to represent the entities and events in the system, and writing code to process the events in a time-ordered manner. A priority queue can be used to store the events and ensure that they are processed in the correct order.

Validation: Once the simulation is implemented, it is important to validate it by comparing its output to real-world data. If the simulation is not accurate, the parameters or the structure of the model can be adjusted until a good fit is achieved.

Experimentation: Once the simulation is validated, it can be used to explore different scenarios and make predictions about the behavior of the real system. For example, the simulation could be used to predict the impact of a new road construction project on traffic flow or the impact of a new manufacturing process on productivity.