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Performance Modelling
EEX5362 Mini Project
part 01

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Identify a Complex System

System selection: Bank Branch Customer Service and Transaction Processing System.

The Bank Branch Customer Service and Transaction Processing System manages customer arrivals, counter services (cash deposits, withdrawals, account inquiries), loan applications, ATM operations, and internal transaction reconciliation. It creates a seamless workflow for customers, tellers, managers, and back-office staff to ensure secure and efficient banking operations.

This is a complex system because there are many components that are dependent on each other for acceptable performance:

- Customer arrival queues vary based on time of day, salary days, and service type.
- Teller service time depends on transaction complexity (e.g., cash vs. loan inquiry).
- ATM availability and cash replenishment impact self-service throughput.
- Transaction reconciliation and fraud detection are linked to real-time data from counters and ATMs.
- Real-time interdependencies between front desk, back office, and digital banking systems.

The dataset used will gather all of the dynamics across five files customers, tellers, transactions, ATMs, and queues to allow for analysis of the system for efficiency, throughput, and bottlenecks.

Define Performance Objectives

Performance Objective	Description
Minimize Customer Waiting Time	Reduce average time from arrival to service start to improve customer satisfaction.
Maximize Teller Utilization	Ensure tellers are efficiently engaged without idle time or overload.
Identify Bottlenecks in Service Counters	Detect peak hours or service types causing longest queues.
Improve Transaction Throughput	Increase number of transactions processed per hour across all channels.
Optimize ATM Availability	Maintain high uptime and cash availability to reduce customer diversion to counters.
Reduce Error Rate in Reconciliation	Identify discrepancies between recorded and actual cash/transactions.

Github Link :

Dataset and Document:

https://github.com/DulithaHarasara/Bank_Customer_Service_System_Mini_Project_EEX5362.git