Topic: Bank Queue Simulation Using Discrete Event System

A bank experiences **random customer arrivals**, where customers join queues and are served by **multiple tellers with varying efficiency levels**. Some customers receive **priority service** (VIPs, elderly customers, appointments), while others follow a **first-come-first-served (FIFO) rule**. The bank aims to **minimize wait times, optimize teller workload, and reduce customer abandonment rates**.

Your task is to **simulate and analyze** this **bank queue system** using a **Discrete Event System (DES)**, incorporating:

1. **Dynamic queueing with priority scheduling** (VIPs, elderly, regular customers).
2. **Multiple tellers with different processing speeds** (fast, medium, slow tellers).
3. **Real-time event-driven simulation** using a **priority queue** for scheduling arrivals and departures.
4. **Customer abandonment modeling** when wait times exceed a threshold.

Implementation Requirements

1. Bank Queue System with Multiple Tellers

- Customers arrive **randomly**.
- Each **teller has a different service rate** (fast, medium, slow).
- Customers are assigned to **the first available teller** or **wait in the queue**.
- **Queue length and wait times** should be dynamically updated.

2. Priority-Based Scheduling

- **VIP customers** are served first.
- **Elderly customers** have second priority.
- **Regular customers** follow a **FIFO (First-In-First-Out) rule**.
- **Appointments vs. walk-ins** are handled differently.

3. Real-Time Teller Efficiency Optimization

- Assign **faster tellers to high-priority queues**.
- Dynamically **reassign tellers** based on workload.
- Track **teller utilization rates** and **service efficiency**.

4. Queue Abandonment & Customer Satisfaction Analysis

- Customers **leave the queue** if their wait time exceeds a **patience threshold**.
- Implement **queue-switching strategies** to reduce abandonment.