DATA STRUCTURE -BIT-EXERCISE NO:4

Project 30

QUEUE QUESTIONS

Challenge: Build queue for restaurant food orders. What issue arises with stack?

Algorithm: Restaurant Food Order Queue

1. **Start**
2. **Initialize** an empty queue

   `OrderQueue`
3. **When a new order arrives:**
   - `Enqueue(OrderQueue, NewOrder)`
   - *Explanation:* Add the new order to the back of the queue.
4. **When an order is ready to be served:**

   `OrderToServe = Dequeue(OrderQueue)`
5. **Repeat** steps 3 and 4 for each new order received and order served.
6. **End**

Issue with using a stack instead:

- A **stack operates on Last In, First Out (LIFO)**, meaning the most recent order added would be served first.
- This causes **orders to be served in reverse order**, which is unfair and unrealistic in a restaurant setting.
- Using a stack would mean earlier orders wait indefinitely while newer orders are prioritized, violating the expected service order.

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Reflection: Why does FIFO give fairness in service centers?

- FIFO (First In, First Out) ensures that customers or tasks are served in the **exact order they arrive**.
- This approach prevents **any individual from cutting ahead** or being unfairly delayed.
- By treating the earliest arrivals first, FIFO maintains **equal opportunity and predictable waiting times**.
- It models real-life queues where fairness is essential, such as banks, call centers, or ticket counters.
- Theoretically, FIFO eliminates bias and promotes **systematic, just, and transparent service management**.