Reverse "KINYARWANDA" using a stack

Goal: Reverse the string using stack operations.

Algorithm Steps:

1. Initialize an empty stack.
2. Push each character of the string onto the stack.
3. Pop characters one by one and append to a new string.

Code with explanation

```
input_str = "KINYARWANDA"

stack = []

# Step 1: Push each character

for char in input_str:

    stack.append(char)  # Stack: ['K', 'I', 'N', 'Y', 'A', 'R', 'W', 'A', 'N', 'D', 'A']

# Step 2: Pop to reverse

reversed_str = ""

while stack:

    reversed_str += stack.pop()  # Pops last-in characters

print("Reversed:", reversed_str)
```

Reflection Question

Why stack is not used in customer queues?

Stacks follow **LIFO (Last-In, First-Out)** order, meaning the last person to arrive would be served first. This is unfair and inefficient in customer service scenarios.

Key Reasons:

- **Fairness:** Queues use **FIFO (First-In, First-Out)**, ensuring customers are served in the order they arrive.
- **Expectation:** Customers expect to be served based on arrival time.
- **Practicality:** Stack behavior would frustrate users and break service logic (e.g., bank lines, ticket counters).

🎯 Problem:

You need to decide whether a **queue** or a **stack** is fair for managing stadium entry.

✓ Algorithmic Solution:

Step-by-step comparison:

1. **Define Queue Behavior (FIFO):**

   python

   ```
   # First-In-First-Out
   stadium_queue = deque(["Alice", "Bob", "Charlie"])
   stadium_queue.popleft()  # Alice enters first
   ```

2. **Define Stack Behavior (LIFO):**

   python

   ```
   # Last-In-First-Out
   stadium_stack = ["Alice", "Bob", "Charlie"]
   stadium_stack.pop()  # Charlie enters first
   ```

Reflection: Why FIFO Prevents Conflict at Events?

🎓 Theoretical Insight:

- **FIFO (First-In-First-Out)** ensures that people are served in the order they arrive.
- This system:
  - Promotes **transparency** and **trust**.
  - Reduces **frustration** and **arguments**.
  - Prevents **line-cutting**, which is a major source of conflict.
- In high-stakes or crowded environments (e.g., concerts, sports events), FIFO maintains **order** and **safety**.