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BIT LEVEL 2

DATA STRUCTURE AND ALGORITHM

Part I – STACK

Practical (Rwanda)

Q1: In Irembo, push ["Upload ID", "Fill Form", "Confirm"]. Undo one. Which remains?

Answer: After undoing (popping) "Confirm", stack = ["Upload ID", "Fill Form"].

Q2: UR pushes ["TopicA", "TopicB", "TopicC"]. Pop all. Which remains?

Answer: After popping all elements, stack = [] (empty).

Challenge

Task: Push ["A", "B", "C", "D"], pop 2, push "E". Which is top?

Algorithm:

1. Start with empty stack.
2. Push A, B, C, D → [A, B, C, D].
3. Pop 2 → [A, B].
4. Push E → [A, B, E].
5. Top element is E.

Answer: E

Reflection

Q: Why does a stack naturally model undo operations?

Answer: Because the last action performed is the first to be undone, which matches the LIFO (Last-In, First-Out) behavior of a stack. For example, if you type "abc" and press undo, "c" (the last action) is removed first.

Part II – QUEUE

Practical (Rwanda)

Q1: At Airtel, 5 clients queue. After 1 served, who is next?

Answer: The 2nd client becomes next.

Q2: At CHUK, 9 patients queue. Who is third served?

Answer: The 3rd patient in the line.

Challenge

Q: Queue vs stack for event ticketing. Which is correct?

Answer: A queue is correct because ticketing must be fair (first come, first served). A stack would give priority to latecomers, which is unfair.

Reflection

Q: Why does FIFO prevent chaos at concerts?

Answer: FIFO ensures people are served in the exact order they arrived. This prevents unfairness, fights, or disorder. Everyone knows their turn will come fairly, reducing stress and maintaining peace.