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LEVEL 2

MODULE NAME: DATA STRUCTURE AND Algorithms

Questions:

Q1 Practical (Rwanda): UR pushes ["Quiz1", "Quiz2", "Quiz3"]. Undo two. Which is top?

Let show step by step:

Push Quiz1 → Stack →: (Quiz1)

Push Quiz2 → Stack : (Quiz1, Quiz2)

Push Quiz3 → Stack: (Quiz1, Quiz2, Quiz3)

Undo one → Remove Quiz3 → Stack: (Quiz1, Quiz2)

Undo another → Remove Quiz2 Stack: (Quiz1)

Top of Stack is Quiz1

Q2 Practical (Rwanda): In Irembo, push ["Upload ID", "Fill Form", "Submit"]. Undo one. Which is left?

The following are the steps show the top of stack remain:

Push Upload Id → Stack: Upload Id

Push Fill Form → Stack Upload Id, Fill Form

Push Submit → Stack: Upload Id, Fill Form, Submit

Undo one → Remove Submit → Stack: Upload Id, Fill Form

Then top of Stack is "Fill Form"

Q3 Challenge: Push ["1", "2", "3", "4"], pop one, push "5". Which is top?

Steps

Push 1 → Stack 1

Push 2 → stack 1,2

Push 3 → Stack 1,2,3

Push 4 → Stack 1,2,3,4

Pop one → Remove 4 → Stack 1,2,3

Push 5 → Stack 1,2,3,5

So the top of Stack is 5

Q4 Reflection: Why stack suits tracking browser history?

A stack makes browser history because it follows the Last in First Out principle. A stack is a data structure that can hold many elements, and the last element added is the first one to be removed. It means LIFO order makes it easy to go back also. The stack can grow dynamically.

Queue Questions:

Q1. Practical (Rwanda): At Airtel, 6 clients queue. After 2 served, who is in front?

Queues use FIFO, the first person to join is served first, then the next, and so on. So the first two are served, the third is now at the front.

Q2. Practical (Rwanda): At CHUK, 8 patients queue. Who is last served?

The 8 patients will be served last because the last to join wait until everyone is served.

Q3. Challenge: Queue vs stack for election voting lines. Which is proper?

A queue is proper for election voting line because the person to arrive would be served first.

Q4. Reflection: Why FIFO supports democracy? FIFO supports democracy by ensuring equality, fairness and served in the order. No one or something can jump the line so it means that FIFO promotes equal.