Challenge question

1. Stack for Browser History Use a stack to track the pages visited.

   When a user visits a new page, push the URL onto the stack. When the user clicks “Back,” pop the top URL from the stack to return to the previous page. The page currently being viewed is always the top element of the stack.

2. Queue for Playlist of 5 Songs Use a queue to handle the playlist because it plays songs in the order they were added (FIFO).

When a new song is added, it goes to the end of the queue. When a song is played, it is removed from the front of the queue. If a stack were used instead, songs would be played in reverse order (LIFO), breaking the natural playlist sequence.

Reflection questions

1. Why would replacing stack with queue break the undo functionality in Canvas or BK Mobile?

Example: Imagine you are editing a document and you perform three actions in this order:

1. Type "Hello"
2. Delete a word
3. Change font color

When you press “Undo,” you expect the last action (change font color) to be undone first, then the delete, then typing "Hello."

This is a Last-In-First Out (LIFO) behavior, perfectly suited for a stack.

If a queue (FIFO) was used instead, pressing undo would undo the first action you did (typing "Hello") before the later ones, which would confuse you and break the intuitive flow of undoing recent changes first.

2. Why is FIFO the fairest approach in real-life services such as banks or hospitals?

- Example: In a bank, customers arrive in this order 1. Alice arrives at 9:00 AM 2. Bob arrives at 9:05 AM 3. Carol arrives at 9:10 AM • Serving them in FIFO order means Alice is served first, then Bob, then Carol. This respects the time each customer has been waiting. • If the bank ignored FIFO and served Carol before Alice or Bob just because Carol complained louder or pushed ahead, this would be unfair and cause frustration. • Similarly, in hospitals, patients are usually seen in order of arrival (except emergencies), ensuring no one is unfairly skipped.