Data Structures

lecture 14

2-11-2022

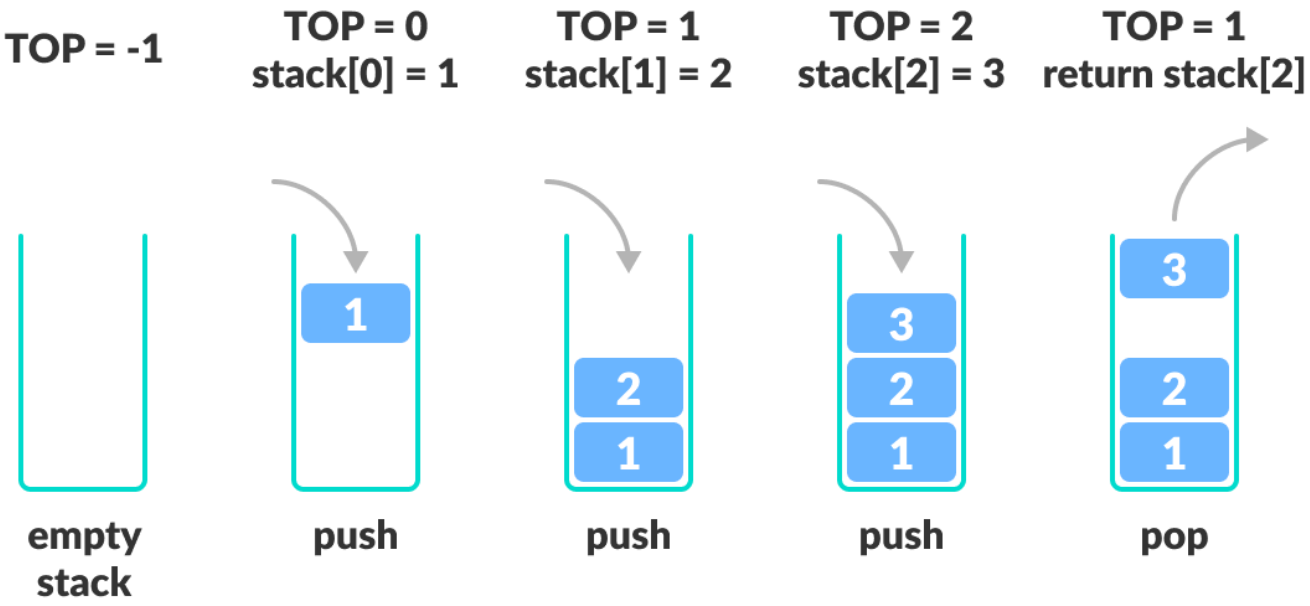
Unit 3: Stack and Queue

Stack

Stack

- Simple data structure allows adding and removing elements in a particular order **(LIFO).**
- only one open end called as **Top** from where elements are added or removed.

Basic Operations on Stack



Basic Operations on the stack

- Three basic operations can be possible on stack
  1. **Push:**
     - Inserting the element in to the stack.
     - Increments top by 1
  2. **Pop:**
     - Removing element from the stack.
     - Decrements top by 1
  3. **Peek**
     - Just view the element available at the top without removing it.
     - top of stack does not change

Conditions with stack

1. **Empty**
   - When stack does not contain single element
   - top has value of -1

2. **Full**
   - Stack is filled completely /no more space left in stack to add elements

Conditions with stack

4. **Under Flow**
   - Occurs when we try to pop element from empty stack

5. **Over Flow**
   - Occurs when we try to push element to already filled stack.

Implementing Stack as an Array

- A stack can be represented as an array
- the capacity of array (n) => max capacity of stack.
- Since the array index start from zero
  - top can go up to n-1 (n = capacity of array)