Stack Using Array

MUHAMME TALHA SIDDIQUI

What is stack and its characteristics?

- **A stack is a data structure in computer science that stores a collection of elements and operates based on the principle of Last-In-First-Out (LIFO). It means that the last element added to the stack is the first element to be removed from the stack.**

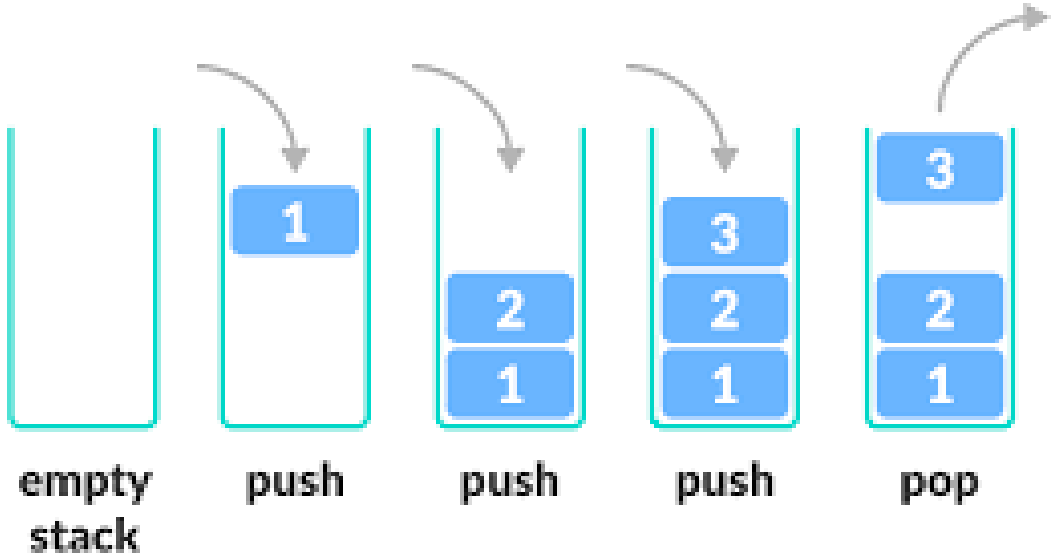
LIFO (Last-In-First-Out).

Characteristics?

- LIFO (Last-In-First-Out): The last element added to the stack is the first element to be removed from the stack.
- Push and Pop Operations: Elements can be added to the top of the stack using the "push" operation, and elements can be removed from the top of the stack using the "pop" operation.
- Peek Operation: The "peek" operation retrieves the topmost element from the stack without removing it.
- Stack Overflow: A stack overflow occurs when the stack is full and a new element cannot be added.
- Stack Underflow: A stack underflow occurs when the stack is empty and an element cannot be removed.

Stack using Array Operations.

- **Push operation** - adding an element to the top of the stack
- **Pop operation** - removing the top element from the stack
- **Peek operation** - accessing the top element without removing it



Stack using Array Advantages and Disadvantages.

- **Advantages:**
- **Efficiency**: Stacks implemented using arrays have constant-time complexity for push, pop, and peek operations, making them highly efficient. This is because arrays have constant time complexity for accessing elements using an index.
- **Easy to implement:** Implementing a stack using an array is relatively easy and straightforward, making it a popular choice for many programming applications.
- **Memory efficient**: Arrays are a memory-efficient way to store elements in a stack. Unlike linked lists, which require additional memory for each node, arrays store only the elements themselves.

- **Disadvantages:**
- **Fixed size:** The size of an array is fixed at the time of creation, which means that the maximum number of elements that can be stored in the stack is predetermined. This can be a disadvantage in situations where the size of the stack needs to change dynamically.
- **Inefficient use of memory:** If the size of the array is larger than the number of elements in the stack, memory is wasted. This can be a disadvantage in situations where memory usage is a concern.
- **Stack overflow:** If the size of the array is exceeded, a stack overflow can occur, which can lead to memory corruption and program crashes.

THANK YOU.....