

Algorithms and Data Structures - 2

Stack.

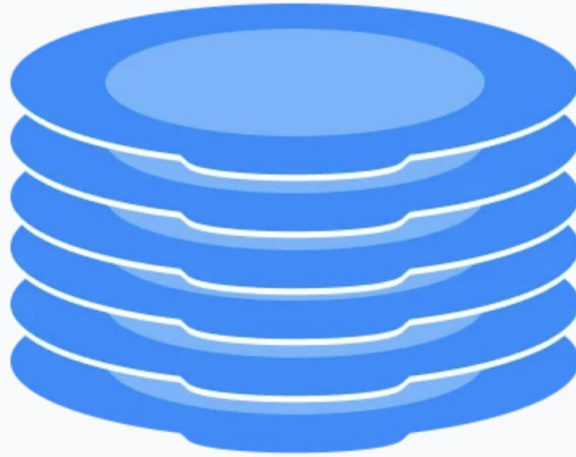
Plan

- Stack
- Applications
- Implementations
 - array
 - linked list
- Problems
 - minimum in stack
 - correct bracket sequence

Stack - 1

A stack is a linear data structure that follows the principle of **Last In First Out (LIFO)**. This means the last element inserted inside the stack is removed first.

You can think of the stack data structure as the pile of plates on top of another.



Stack representation similar to a pile of plate

Stack - 2

Here, you can:

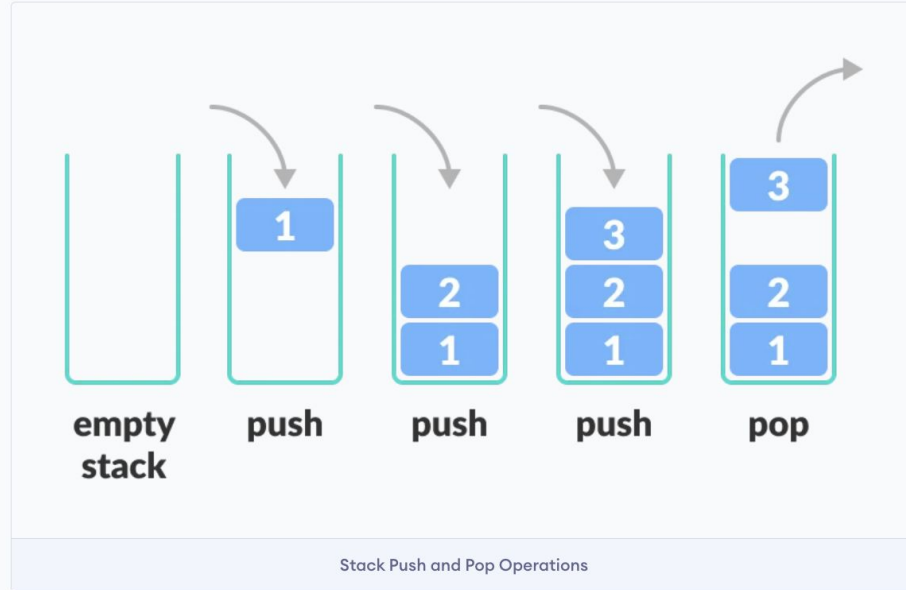
- Put a new plate on top
- Remove the top plate

And, if you want the plate at the bottom, you must first remove all the plates on top. This is exactly how the stack data structure works.

Stack - 4

LIFO Principle of Stack

In programming terms, putting an item on top of the stack is called **push** and removing an item is called **pop**.



In the above image, although item **3** was kept last, it was removed first. This is exactly how the **LIFO (Last In First Out) Principle** works.

Stack - 5

There are some basic operations that allow us to perform different actions on a stack.

- **Push:** Add an element to the top of a stack
- **Pop:** Remove an element from the top of a stack
- **IsEmpty:** Check if the stack is empty
- **IsFull:** Check if the stack is full
- **Peek:** Get the value of the top element without removing it

Applications

- <https://www.javatpoint.com/applications-of-stack-in-data-structure>

Implementation

- <https://www.codesdope.com/course/data-structures-stacks/>

Sources

- <https://www.programiz.com/dsa/stack>
- <https://www.javatpoint.com/applications-of-stack-in-data-structure>