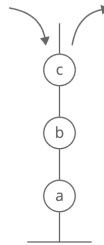


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# Stack

## Data Structure

### Quick reference

A **stack** stores items in a last-in, first-out (LIFO) order.

Picture a pile of dirty plates in your sink. As you add more plates, you bury the old ones further down. When you take a plate off the top to wash it, you're taking the last plate you put in. "Last in, first out."



#### Worst Case

<b>space</b>	$O(n)$
<b>push</b>	$O(1)$
<b>pop</b>	$O(1)$
<b>peek</b>	$O(1)$

#### Strengths:

- **Fast operations.** All stack operations take  $O(1)$  time.

#### Uses:

- **The call stack** is a stack that tracks function calls in a program. When a function returns, which function do we "pop" back to? The last one that "pushed" a function call.
- **Depth-first search** uses a stack (sometimes the call stack) to keep track of which nodes to visit next.
- **String parsing**—stacks turn out to be useful for [several types of string parsing](#).

## Implementation

You can implement a stack with either a [linked list](#) or a [dynamic array](#)—they both work pretty well:

	Stack Push	Stack Pop
Linked Lists	insert at head	remove at head



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