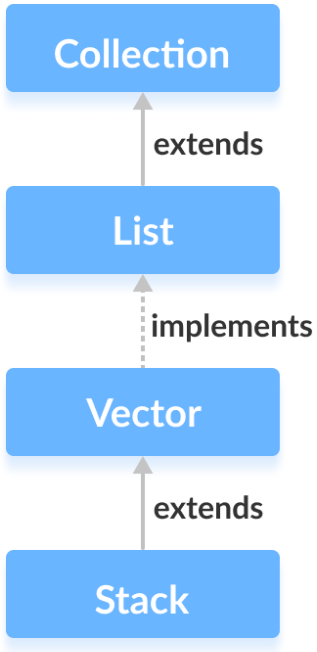
Java Stack Class

In this tutorial, we will learn about the Java Stack class and its methods with the help of examples.

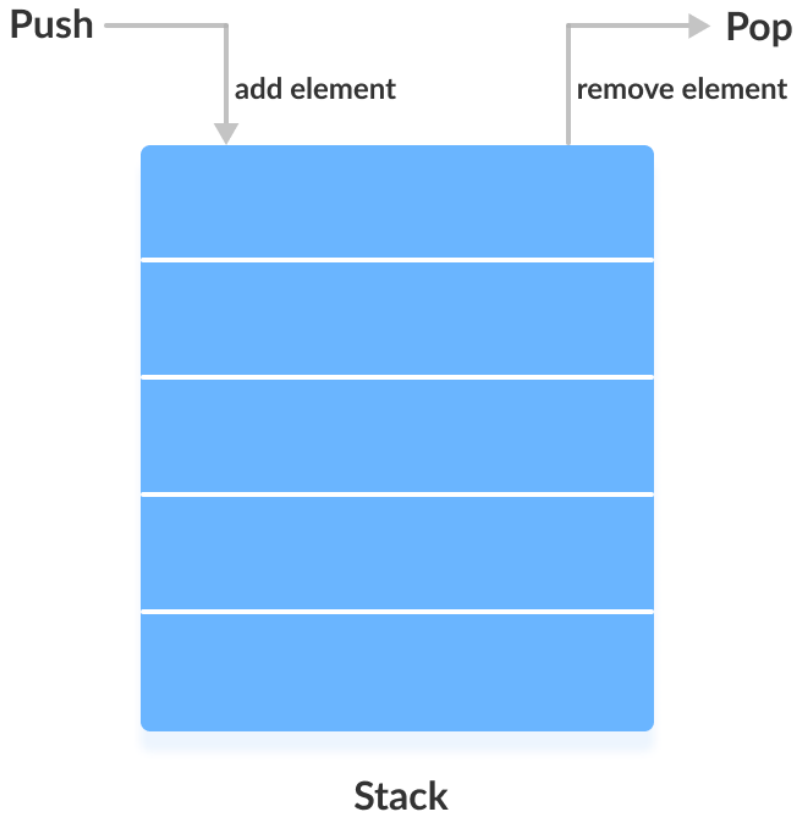
The Java collections framework has a class named `Stack` that provides the functionality of the stack data structure.

The `Stack` class extends the `Vector` class.



Stack Implementation

In stack, elements are stored and accessed in **Last In First Out** manner. That is, elements are added to the top of the stack and removed from the top of the stack.



Creating a Stack

In order to create a stack, we must import the `java.util.Stack` package first. Once we import the package, here is how we can create a stack in Java.

```
Stack<Type> stacks = new Stack<>();
```

Here, `Type` indicates the stack's type. For example,

```
// Create Integer type stack
Stack<Integer> stacks = new Stack<>();

// Create String type stack
Stack<String> stacks = new Stack<>();
```

Stack Methods

Since `Stack` extends the `Vector` class, it inherits all the methods `Vector`. To learn about different `Vector` methods, visit Java Vector Class.

Besides these methods, the `Stack` class includes 5 more methods that distinguish it from `Vector`.

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push() Method

To add an element to the top of the stack, we use the `push()` method. For example,

```
import java.util.Stack;

class Main {
    public static void main(String[] args) {
        Stack<String> animals= new Stack<>();

        // Add elements to Stack
        animals.push("Dog");
        animals.push("Horse");
        animals.push("Cat");

        System.out.println("Stack: " + animals);
    }
}
```

Output

```
Stack: [Dog, Horse, Cat]
```

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pop() Method

To remove an element from the top of the stack, we use the `pop()` method. For example,

```
import java.util.Stack;

class Main {
    public static void main(String[] args) {
        Stack<String> animals= new Stack<>();

        // Add elements to Stack
        animals.push("Dog");
        animals.push("Horse");
        animals.push("Cat");
        System.out.println("Initial Stack: " + animals);

        // Remove element stacks
        String element = animals.pop();
        System.out.println("Removed Element: " + element);
    }
}
```

Output

```
Initial Stack: [Dog, Horse, Cat]
Removed Element: Cat
```

peek() Method

The `peek()` method returns an object from the top of the stack. For example,

```
import java.util.Stack;

class Main {
    public static void main(String[] args) {
        Stack<String> animals= new Stack<>();

        // Add elements to Stack
        animals.push("Dog");
        animals.push("Horse");
        animals.push("Cat");
        System.out.println("Stack: " + animals);

        // Access element from the top
        String element = animals.peek();
        System.out.println("Element at top: " + element);

    }
}
```

Output

```
Stack: [Dog, Horse, Cat]
Element at top: Cat
```

search() Method

To search an element in the stack, we use the `search()` method. It returns the position of the element from the top of the stack. For example,

```
import java.util.Stack;

class Main {
    public static void main(String[] args) {
        Stack<String> animals= new Stack<>();

        // Add elements to Stack
        animals.push("Dog");
        animals.push("Horse");
        animals.push("Cat");
        System.out.println("Stack: " + animals);

        // Search an element
        int position = animals.search("Horse");
        System.out.println("Position of Horse: " + position);
    }
}
```

Output

```
Stack: [Dog, Horse, Cat]
Position of Horse: 2
```

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empty() Method

To check whether a stack is empty or not, we use the `empty()` method. For example,

```
import java.util.Stack;

class Main {
    public static void main(String[] args) {
        Stack<String> animals= new Stack<>();

        // Add elements to Stack
        animals.push("Dog");
        animals.push("Horse");
        animals.push("Cat");
        System.out.println("Stack: " + animals);

        // Check if stack is empty
        boolean result = animals.empty();
        System.out.println("Is the stack empty? " + result);
    }
}
```

Output

```
Stack: [Dog, Horse, Cat]
Is the stack empty? false
```

Use ArrayDeque Instead of Stack

The `Stack` class provides the direct implementation of the stack data structure. However, it is recommended not to use it. Instead, use the `ArrayDeque` class (implements the `Deque` interface) to implement the stack data structure in Java.