**Stack essentials**

**Stack** is an abstract data type where elements are inserted and removed according to the **last-in-first-out (LIFO)** principle. The **push** operation inserts an item in the top of the stack, the **pop** operation removes the top item from the stack. Access to arbitrary elements is restricted. As a rule, a stack also supports the **peek** operation that just returns the current top element. In some cases, it may also be useful to check whether the stack is empty or what is its size, so these operations should be also supported.

## Stacks in real-life and programming

The simplest real-life example is a stack of books. Only a book placed at the top can be removed at a time, but a new book is always added on the top of the stack.

In programming, stacks are used to:

* evaluate arithmetic expressions;
* store arguments of functions and result of the functions' calls;
* reverse the order of elements.

## Call stack

Every production Java program has a large number of standard and programmer-defined methods which invoke each other. To understand which method should be invoked next and access information regarding to the method, JVM uses a special data structure called **call stack** (or **execution stack**). This structure is composed of **stack frames** that store information about methods which have not yet terminated. The information includes the address of a method, parameters, local variables, intermediate computations and some other data.

As a regular stack, the call stack follows the rule **Last In First Out (LIFO)**. It means stack frames are pushed at the top, and move everything down. A new stack frame is added when the execution enters the method. And the stack frame is removed, from the call stack if the execution of a method is done.

## Stack overflow

The number of possible method invocations depends on the amount of memory allocated to the stack. When your stack contains too many stack frames, it can be overflowed. It leads to the StackOverflowError that will stop the execution. The stack size can be set with the -Xss command line switch like:

java YourProgramName -Xss256k

But we recommend you to be careful with it and read some articles on the Internet before modifying the default stack size. Also, sometimes the StackOverflowError says about incorrect recursion calls in your program. In this case, increasing the size of the stack will not help you.