

Stack of integer values

```
final Stack<Integer> values = new Stack<>();           10
                                                         1
values.push(3);                                       3
values.push(1);
values.push(10);

while (!values.empty()) {
    final int i = values.pop();
    System.out.println(i);
}
```

Java™ collection features

- Supports searching of objects based on:
 - `public boolean equals(Object obj)`
 - `public int hashCode()`
- Objects only, no primitive types!

Behind the scenes

```
final Stack<Integer> values =  
    new Stack<>();
```

```
values.push(3);  
values.push(1);  
values.push(10);
```

```
while (!values.empty()) {  
    System.out.println(values.pop().  
        getClass().getName());  
}
```

```
java.lang.Integer  
java.lang.Integer  
java.lang.Integer
```

Boxing and unboxing

```
int iPrimitive ❶ = 7;
```

```
Integer iInteger = ❷  
    iPrimitive;
```

```
int iPrimitiveFromInteger = ❸  
    iInteger;
```

```
int iPrimitive ❶ = 7;
```

```
Integer iInteger = ❷  
    Integer.valueOf(iPrimitive);
```

```
int iPrimitiveFromInteger = ❸  
    iInteger.intValue();
```

Boxing syntax comparison

```
final Stack<Integer> values  
= new Stack<>();
```

```
values.push(Integer.valueOf(3));  
values.push(Integer.valueOf(1));  
values.push(Integer.valueOf(10));
```

```
while (!values.empty()) {  
    System.out.println(values.pop().  
        intValue());  
}
```

```
final Stack<Integer> values =  
    new Stack<>();
```

```
values.push(3);  
values.push(1);  
values.push(10);
```

```
while (!values.empty()) {  
    System.out.println(values.pop());  
}
```

Related exercises

Exercise 172: Auto boxing int to Double?

Parsing Integer user input

```
String userInput = null;
try (final Scanner scanner =
    new Scanner(System.in)) {
    System.out.println("Enter an integer:");
    userInput = scanner.nextLine();

    final int value = Integer.parseInt(userInput);

    System.out.println("You entered " + value);
} catch (final NumberFormatException e) {
    System.out.println("Sorry, but '" + userInput +
        "' is not an integer.");
}
```

Enter an integer: -34
You entered -34

Enter an integer: five
Sorry, but 'five' is
not an integer.

Related exercises

Exercise 173: Why using `String userInput = null`?

Parsing binary representation

```
final int value =  
    Integer.parseInt("1101", 2);  
System.out.println("Value: " + value);
```

Value: 13

```
final int value =  
    Integer.parseInt("201", 2);  
System.out.println("Value: " + value)
```

```
Exception in thread "main"  
java.lang.NumberFormatException:  
For input string: "201"  
...  
at de.hdmstuttgart.sd1...
```

Standard parse methods

- `parseByte()`
- `parseShort()`
- `parseInt()`
- `parseLong()`
- `parseFloat()`
- `parseDouble()`
- `parseBoolean()`

Related exercises

Exercise 174: Parsing short values

Exercise 175: Parsing short values in hexadecimal representation

Excerpt from `java.util.Locale`

A `Locale` object represents a specific geographical, political, or cultural region.

An operation that requires a `Locale` to perform its task is called locale-sensitive and uses the `Locale` to tailor information for the user.

For example, displaying a number is a locale-sensitive operation: Numbers should be formatted according to the customs and conventions of the user's native country, region, or culture.

Local e properties

- Language
- Encoding
- Country
- Extensible

Get a NumberFormat instance

```
final NumberFormat standard = new DecimalFormat();  
System.out.println(standard.format(1234.5678));
```

1234.5678

1.234,568

```
final NumberFormat de =  
    DecimalFormat.getInstance(Locale.GERMANY);  
System.out.println(de.format(1234.5678));
```

Create a custom formatter

```
final DecimalFormat Symbols unusual Symbols =  
    new DecimalFormat(Locale.getDefault());  
unusual Symbols.setDecimalSeparator('|');  
unusual Symbols.setGroupingSeparator('^');  
  
final String strange = "#, ##0. ###";  
final DecimalFormat weirdFormatter = new DecimalFormat(strange, unusual Symbols);  
weirdFormatter.setGroupingSize(4);
```

```
System.out.println(weirdFormatter.format(12345.678));
```

1^2345|678

Related exercises

Exercise 176: Local e definitions

Exercise 177: Formatting i nt , doubl e and Local eDat e

Polymorphic number parsing

```
final NumberFormat de = NumberFormat.getInstance(Locale.GERMANY),
                us = NumberFormat.getInstance(Locale.US);

try {
    final Number[] values = {
        de.parse("103.234"), de.parse("400.000,234"),
        us.parse("103.234"), us.parse("400.000,234"), };
    for (final Number n: values) {
        System.out.println(n + "(" + n.getClass().getSimpleName() + ")");
    } catch (ParseException e) { ... }
}
```

```
103234(java.lang.Long)
400000.234(java.lang.Double)
103.234(java.lang.Double)
400(java.lang.Long)
```

Limited float precision

```
final float result = 0.99f - 0.1f - 0.1f - 0.1f;  
System.out.println(result);
```

0.68999994

Limited double precision

```
final double result = 0.99 - 0.1 - 0.1 - 0.1;  
System.out.println(result);
```

0.6900000000000001

Using BigDecimal

```
final BigDecimal zero_dot_99 = new BigDecimal("0.99");  
final BigDecimal zero_dot_1 = new BigDecimal("0.1");
```

```
BigDecimal  
    result = zero_dot_99.subtract(zero_dot_1); // Subtracting 0.1  
  
    result = result.subtract(zero_dot_1); // Subtracting 0.1  
    result = result.subtract(zero_dot_1); // Subtracting 0.1
```

```
System.out.println(result);
```

0.69

Chaining Bi gDeci mal operations

```
final Bi gDeci mal zero_dot_99 = new Bi gDeci mal ("0.99");  
final Bi gDeci mal zero_dot_1 = new Bi gDeci mal ("0.1");
```

```
Bi gDeci mal result = zero_dot_99.  
    subtract(zero_dot_1).  
    subtract(zero_dot_1).  
    subtract(zero_dot_1);
```

```
System.out.println(result);
```

0.69

Related exercises

Exercise 178: Chaining subtract method calls

BigDecimal features

- Higher memory allocation hosting higher precision.
- Immutable instances
- Calculation performance penalty.
- Clumsy interface.

Using static double random()

```
for (int i = 0; i < 10; i++) {  
    System.out.println(Math.random());  
}
```

0. 4754286988826202

0. 0060114391743414375

...

0. 9047785351372987

0. 2516070321935864

Seeding a pseudo random generator

```
try(final Scanner scanner = new Scanner(System.in)) {  
    System.out.println("Enter an integer seed:");  
    final long seed = scanner.nextLong();  
  
    Random generator = new Random(seed);  
    for (int i = 0; i < 10; i++) {  
        System.out.println(generator.nextBoolean() + " ");  
    }  
}
```

```
Enter an integer seed: 4237549835735  
false true true true false false false true false true
```