

## Zero Lab

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Java is a high-level, general-purpose, object-oriented, and secure programming language developed by James Gosling at Sun Microsystems, Inc. in 1991. It is formally known as OAK. In 1995, Sun Microsystem changed the name to Java. In 2009, Sun Microsystem takeover by Oracle Corporation.

### Editions of Java

Each edition of Java has different capabilities. There are three editions of Java:

**Java Standard Editions (JSE):** It is used to create programs for a desktop computer.

**Java Enterprise Edition (JEE):** It is used to create large programs that run on the server and manages heavy traffic and complex transactions.

**Java Micro Edition (JME):** It is used to develop applications for small devices such as set-top boxes, phone, and appliances.

### Types of Java Applications

There are four types of Java applications that can be created using Java programming:

- **Standalone Applications:** Java standalone applications uses GUI components such as AWT, Swing, and JavaFX. These components contain buttons, list, menu, scroll panel, etc. It is also known as desktop alienations.
- **Enterprise Applications:** An application which is distributed in nature is called enterprise applications.
- **Web Applications:** An application that run on the server is called web applications. We use JSP, Servlet, Spring, and Hibernate technologies for creating web applications.
- **Mobile Applications:** Java ME is a cross-platform to develop mobile applications which run across smartphones. Java is a platform for App Development in Android.

### Features of Java

- **Simple:** Java is a simple language because its syntax is simple, clean, and easy to understand. Complex and ambiguous concepts of C++ are either eliminated or re-

implemented in Java. For example, pointer and operator overloading are not used in Java.

- **Object-Oriented:** In Java, everything is in the form of the object. It means it has some data and behaviour. A program must have at least one class and object.
- **Robust:** Java makes an effort to check error at run time and compile time. It uses a strong memory management system called garbage collector. Exception handling and garbage collection features make it strong.
- **Secure:** Java is a secure programming language because it has no explicit pointer and programs runs in the virtual machine. Java contains a security manager that defines the access of Java classes.
- **Platform-Independent:** Java provides a guarantee that code writes once and run anywhere. This byte code is platform-independent and can be run on any machine.

## **Data Types in Java**

Data types specify the different sizes and values that can be stored in the variable. There are two types of data types in Java:

**Primitive data types:** The primitive data types include boolean, char, byte, short, int, long, float and double.

**Non-primitive data types:** The non-primitive data types include Classes, Interfaces, and Arrays.

### **Java Primitive Data Types**

In Java language, primitive data types are the building blocks of data manipulation. These are the most basic data types available in Java language.

1. boolean data type
2. byte data type
3. char data type
4. short data type
5. int data type
6. long data type
7. float data type
8. double data type

### **I. Boolean Data Type**

The Boolean data type is used to store only two possible values: true and false. This data type is used for simple flags that track true/false conditions.

The Boolean data type specifies one bit of information, but its "size" can't be defined precisely.

#### **Example:**

```
Boolean one = false
```

### **2. Byte Data Type**

The byte data type is an example of primitive data type. It is an 8-bit signed two's complement integer. Its value-range lies between -128 to 127 (inclusive). Its minimum value is -128 and maximum value is 127. Its default value is 0.

The byte data type is used to save memory in large arrays where the memory savings is most required. It saves space because a byte is 4 times smaller than an integer. It can also be used in place of "int" data type.

### **3. Short Data Type**

The short data type is a 16-bit signed two's complement integer. Its value-range lies between -32,768 to 32,767 (inclusive). Its minimum value is -32,768 and maximum value is 32,767. Its default value is 0.

The short data type can also be used to save memory just like byte data type. A short data type is 2 times smaller than an integer.

### **4. Int Data Type**

The int data type is a 32-bit signed two's complement integer. Its value-range lies between -2,147,483,648 (- $2^{31}$ ) to 2,147,483,647 ( $2^{31} - 1$ ) (inclusive). Its minimum value is -2,147,483,648 and maximum value is 2,147,483,647. Its default value is 0.

The int data type is generally used as a default data type for integral values unless if there is

no problem about memory.

#### 5. Long Data Type

The long data type is a 64-bit two's complement integer. Its value-range lies between -9,223,372,036,854,775,808( $-2^{63}$ ) to 9,223,372,036,854,775,807( $2^{63} - 1$ )(inclusive). Its minimum value is -9,223,372,036,854,775,808 and maximum value is 9,223,372,036,854,775,807. Its default value is 0. The long data type is used when you need a range of values more than those provided by int.

#### 6. Float Data Type

The float data type is a single-precision 32-bit IEEE 754 floating point. Its value range is unlimited. It is recommended to use a float (instead of double) if you need to save memory in large arrays of floating-point numbers. The float data type should never be used for precise values, such as currency. Its default value is 0.0F.

#### 7. Double Data Type

The double data type is a double-precision 64-bit IEEE 754 floating point. Its value range is unlimited. The double data type is generally used for decimal values just like float. The double data type also should never be used for precise values, such as currency. Its default value is 0.0d.

#### 8. Char Data Type

The char data type is a single 16-bit Unicode character. Its value-range lies between "\u0000" (or 0) to "\uffff" (or 65,535 inclusive). The char data type is used to store characters

A string constant is a sequence of characters enclosed in double quotes. The characters may be alphabets, numbers special characters and blank space. Ex: "Hello", "2002", "Wel Come", "5+3"