Introduction to programming with Java and IntelliJ. Datatypes and variables.

Agenda

- What is Java?
- Create your first Java application
- Datatypes and variables
- Exercises

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What is Java?

1. **One of the most** popular programming languages in the world
2. Developed in 1995 by Sun Microsystems
3. Currently owned by **Oracle**
4. **Billion devices** are using Java
5. Java works on different platforms
6. Open source and free*
7. **Huge** community support
8. Object oriented language

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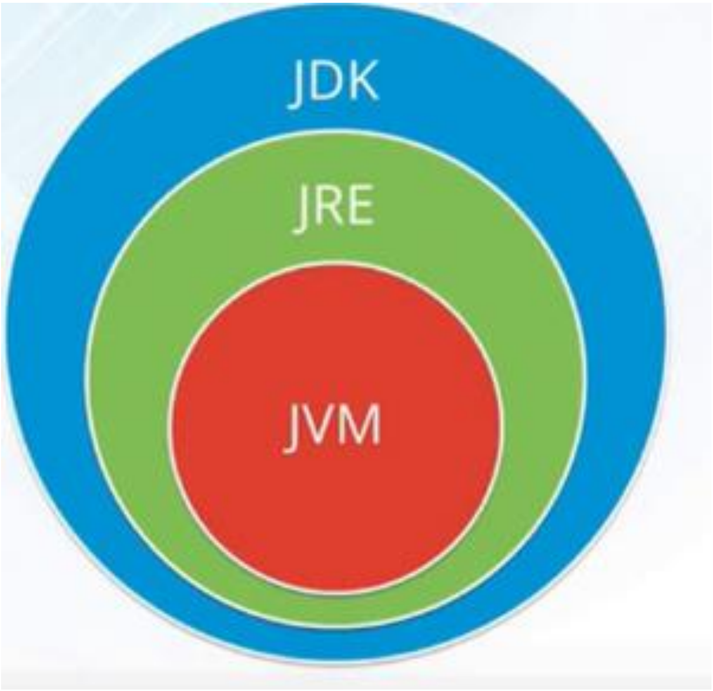
JRE, JDK and JVM

- **JDK** - JDK is a software development environment used for making applets and Java applications. The full form of JDK is Java Development Kit. Java developers can use it on Windows, macOS, Solaris, and Linux. JDK helps them to code and run Java programs. It is possible to install more than one JDK version on the same computer.

- **JRE** – Java Runtime Environment is a piece of a software which is designed to run other software. In simple terms, if you want to run Java program you need JRE. If you are not a programmer, you don't need to install JDK, but just JRE to run Java programs.



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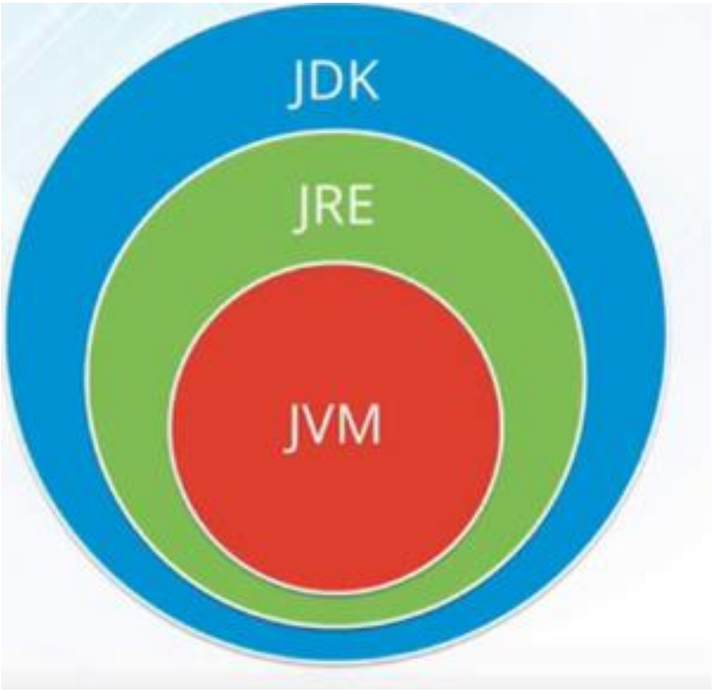
JRE, JDK and JVM

- **JVM** - JVM is an engine that provides a runtime environment to drive the Java Code or applications.
  It converts Java bytecode into machine language. JVM is a part of Java Run Environment (JRE). It cannot be separately downloaded and installed. To install JVM, you need to install JRE. The full form of JVM is Java Virtual Machine. Java compiler produces code for a virtual machine which is called as JVM.



Source: https://www.guru99.com/difference-between-jdk-jre-jvm.html

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JRE, JDK and JVM

JDK	JRE	JVM
The full form of JDK is Java Development Kit.	The full form of JRE is Java Runtime Environment.	The full form of JVM is Java Virtual Machine.
JDK is a software development kit to develop applications in Java.	It is a software bundle which provides Java class libraries with necessary components to run Java code.	JVM executes Java byte code and provides an environment for executing it.
JDK is platform dependent.	JRE is also platform dependent.	JVM is platform-independent.
It contains tools for developing, debugging, and monitoring java code.	It contains class libraries and other supporting files that JVM requires to execute the program.	Software development tools are not included in JVM.
It is the superset of JRE	It is the subset of JDK.	JVM is a subset of JRE.
The JDK enables developers to create Java programs that can be executed and run by the JRE and JVM.	The JRE is the part of Java that creates the JVM.	It is the Java platform component that executes source code.
JDK comes with the installer.	JRE only contain environment to execute source code.	JVM bundled in both software JDK and JRE.

Source: https://www.guru99.com/difference-between-jdk-jre-jvm.html

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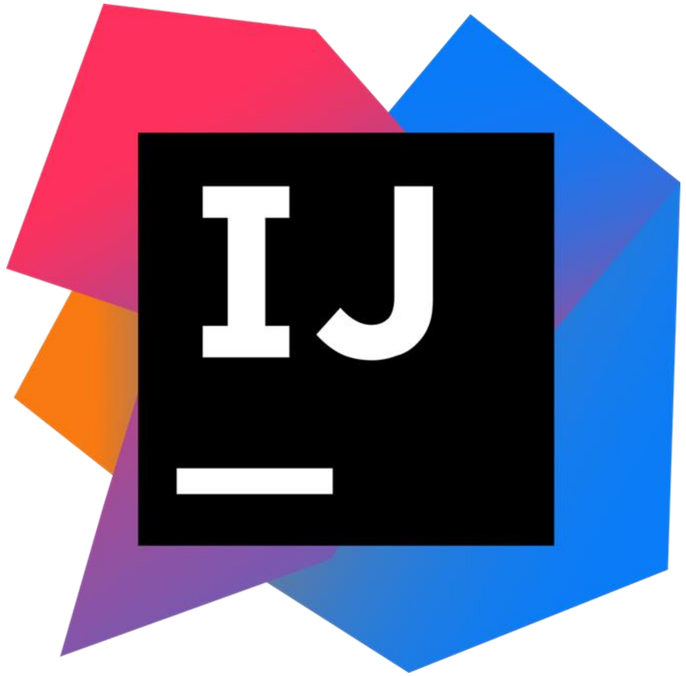
Create your first Java application

1. Download latest IntelliJ Community Edition here
2. Install IntelliJ
3. Start IntelliJ
4. Create your first project



Create your first Java application | IntelliJ IDEA Documentation

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Create your first project

1. Create a new Java project
2. Create a package and a class
3. Add the main() method
4. Call the println() method
5. Build and run the application

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Primitive Data types in Java

Data Type	Size	Description
byte	1 byte	Stores whole numbers from -128 to 127
short	2 bytes	Stores whole numbers from -32,768 to 32,767
int	4 bytes	Stores whole numbers from -2,147,483,648 to 2,147,483,647
long	8 bytes	Stores whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
float	4 bytes	Stores fractional numbers. Sufficient for storing 6 to 7 decimal digits
double	8 bytes	Stores fractional numbers. Sufficient for storing 15 decimal digits
boolean	1 bit	Stores true or false values
char	2 bytes	Stores a single character/letter or ASCII values

Source: https://www.w3schools.com/java/java_data_types.asp

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Non-Primitive Data types in Java

Strings, Arrays, Classes, Interface, etc.

1. Non-primitive data types are called reference types because they refer to objects
2. Primitive types are predefined. Non-primitive types predefined too (ex. String) but also can be created by the programmer
3. A primitive type starts with a lowercase letter, while non-primitive types starts with an uppercase letter.
4. The size of a primitive type depends on the data type, while non-primitive types have all the same size.

Source: https://www.w3schools.com/java/java_data_types_non-prim.asp

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Non-Primitive Data types example

Imagine you are a librarian managing a library. You need to keep track of the library inventory and some basic information about books, such as the number of pages, the book's rating, and whether it's currently checked out.

Primitive Data Types	Non-Primitive Data Types
Simple Attribute	*Complex entity*
Total book count (int)	**Book (class):**
Library rating (double)	• Title (String)
Library open status (boolean)	• Author (String)
	• Number of pages (int)
	• Rating (double)
	• Checked out status (boolean)

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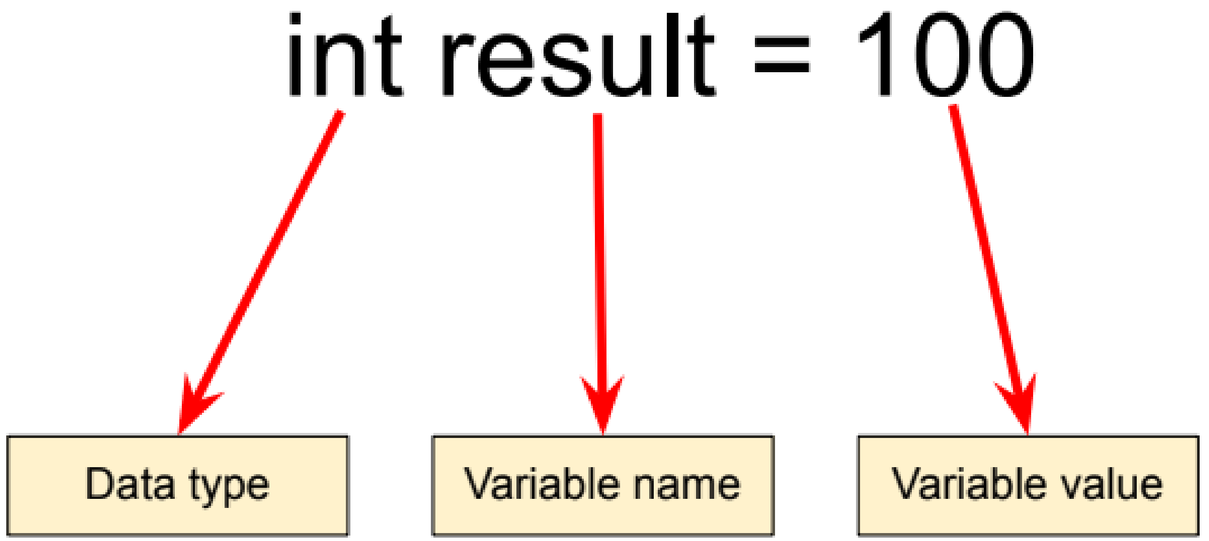
Variables

Variables act as containers to store data that your program can manipulate



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Variables naming conventions

1. Always declare the data type of the variable
2. Choose variable names that clearly describe the data they store
3. Make sure to initialize variables before using them
4. Use camelCase* for variable names
5. Variable names must begin with a letter or an underscore.

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What you should not do when declaring variables

1. Avoid using Java reserved words (keywords*) as variable names
2. Variable names should not start with a number
3. Variable names should not contain spaces
4. Do not use special characters other than an underscore “ _ “
5. Avoid using single-letter names unless their meaning is clear and commonly understood
6. Choose names that are not ambiguous or too similar to other variables

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Variables

Demo

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Datatypes casting

Type casting is when you assign a value of one primitive data type to another type.

In Java, there are two types of casting:

Widening Casting (automatically) - converting a smaller type to a larger type size
byte -> short -> char -> int -> long -> float -> double

Narrowing Casting (manually) - converting a larger type to a smaller size type
double -> float -> long -> int -> char -> short -> byte

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Datatypes casting

Demo

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Operators

Operator	Name	Description	Example
+	Addition	Adds together two values	x + y
-	Subtraction	Subtracts one value from another	x - y
*	Multiplication	Multiplies two values	x * y
/	Division	Divides one value by another	x / y
%	Modulus	Returns the division remainder	x % y
++	Increment	Increases the value of a variable by 1	++x
--	Decrement	Decreases the value of a variable by 1	--x

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Java user input

The Scanner class in Java is a convenient way to get user input from the console. It is part of the java.util package. It allows you to read different types of data, such as strings, integers, and floating-point numbers and helps make interactive programs

Source: https://www.w3schools.com/java/java_user_input.asp

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Java user input

Demo

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Exercises

1. Store your names in 3 different variables and print your whole name
2. Print the perimeter of a triangle by given sides. Use formula to calculate it.
3. Print the area of a triangle by given sides. Use formula to calculate it.
4. Print pine tree using asterisks in the console.
5. Using Java input and fine tune tasks 2 and 3.
6. Write a simple program to convert minutes into years and days.

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Homework

1. Complete the exercises from previous slide
2. Watch at least first 60 minutes of the following IntelliJ video
3. Configure theme you like / font sizes

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Time for Questions

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Setup Java environment

How to Install the Java Development Kit for Windows and macOS

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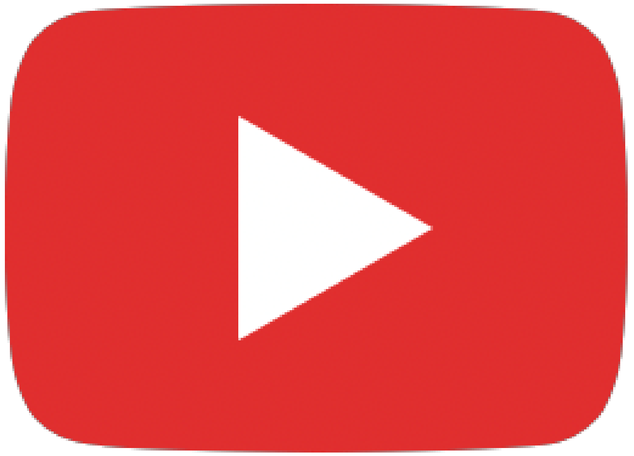
Working with IntelliJ

Watch the full video tutorial to enhance your skills



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