



JAVA PROGRAMMING BASICS

Module 1: Java Overview



Training program

1. Java Fundamentals
2. Start programming with Java, create simple console application
3. Classification of Data Types
4. Primitive types in java
5. Control Flow Statements
6. Arrays

Module contents

- Start programming with Java, create simple console application
 - JDK tools and utilities
 - Overview of IDE
 - Create simple console application
 - Structure of simple console application
 - The main() method
 - String output and input to console
 - Java Code Conventions

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Standard JDK Tools and Utilities

- **Basic Tools** (appletviewer, apt, extcheck, jar, java, javac, javadoc, javah, javap, jdb)
- **Security Tools** (keytool, jarsigner, policytool, kinit, klist, ktab)
- **Internationalization Tools** (native2ascii)
- **Remote Method Invocation (RMI) Tools** (rmic, rmiregistry, rmid, serialver)
- **Java IDL and RMI-IIOP Tools** (tnameserv, idlj, orbd, servertool)
- **Java Deployment Tools** (javafxpackager, pack200, unpack200)
- **Java Web Start Tools** (javaws)
- **Java Troubleshooting, Profiling, Monitoring and Management Tools** (jcmd, jconsole, jmc, jvisualvm)
- **Java Web Services Tools** (schemagen, wsgen, wsimport, xjc)

Installing Java JDK 1/3

The screenshot shows the Oracle website's navigation menu. The 'Продукти' (Products) menu item is highlighted with a dashed box. Below it, a list of product categories is displayed, including 'Постачання', 'Керування проектами', 'Керування ризиками та комплаєнс', 'Керування ефективністю організації', 'постачання', 'Керування запасами', 'Виробництво', 'Обслуговування', 'Інші програми для SCM', 'Продажі', 'Обслуговування', 'Керування контентом', 'Підвищення кваліфікації персоналу', 'Інші програми для HCM', 'Усі хмарні програми', and 'NetSuite'. At the bottom of the menu, the section 'Обладнання та програмне забезпечення' (Hardware and Software) is visible, with 'Java' highlighted by a yellow box. Other items in this section include 'База даних Oracle', 'MySQL', 'Linux', 'Локальні програми', 'Усе програмне забезпечення', 'Сервери та сховище', and 'Exadata'.

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Продукти Галузі Ресурси Клієнти Партнери Розробники Події

- Постачання
- Керування проектами
- Керування ризиками та комплаєнс
- Керування ефективністю організації

постачання

- Керування запасами
- Виробництво
- Обслуговування
- Інші програми для SCM

- Продажі
- Обслуговування
- Керування контентом

- Підвищення кваліфікації персоналу
- Інші програми для HCM
- Усі хмарні програми
- NetSuite

Обладнання та програмне забезпечення

- Java**
- База даних Oracle
- MySQL
- Linux
- Локальні програми
- Усе програмне забезпечення
- Сервери та сховище
- Exadata

Installing Java JDK 2/3

The screenshot shows the Oracle website for Java. The browser address bar displays 'oracle.com/ua/java/'. The Oracle logo is in the top left. A search icon and a button labeled 'Переглянути облікові записи' (View accounts) are in the top right. Below the navigation bar, a list of products is shown: 'Java SE', 'GaalVM Enterprise', 'Java on OCI', 'Oracle WebLogic Server', 'Java Card', and 'Verrazzano'. The 'Java SE' item is highlighted. The main content area features the heading 'The world's most popular modern development platform' and a paragraph describing Java SE. To the right is the Java logo with the text 'Java™ ORACLE'. At the bottom, there are two buttons: 'Download Java now' (circled in red) and 'Explore Java SE Subscription'.

ORACLE

Пошук

Переглянути облікові записи

Зв'язатися з відділом продажу

Продукти Галузі Ресурси Клієнти Партнери Розробники Події

Java SE

GaalVM Enterprise

Java on OCI


Oracle WebLogic Server

Java Card

Verrazzano

The world's most popular modern development platform

The world's most popular modern development platform, Java SE reduces costs, shortens development time, drives innovation, and improves application services as the programming language of choice for enterprise applications. Protect your Java investment with Oracle Java SE Subscription, which now includes GraalVM Enterprise and Java Management Service for free.

 Java™
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Explore Java SE Subscription

Installing Java JDK 3/3

Java downloads

Java 19 Java 17

Java SE Development Kit 19 downloads

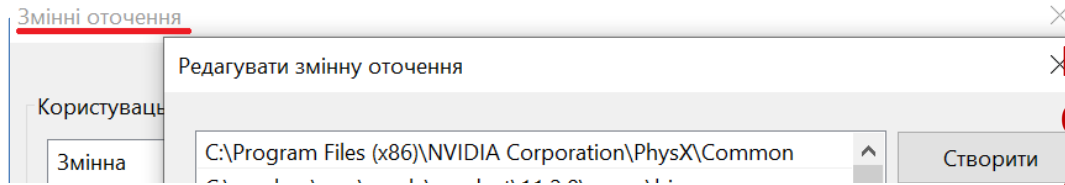
Thank you for downloading this release of the Java™ Platform, Standard Edition Development Kit (JDK™). The JDK is a development environment for building applications and components using the Java programming language.

The JDK includes tools for developing and testing programs written in the Java programming language and running on the Java platform.

Linux macOS **Windows**

Product/file description	File size	Download
x64 Compressed Archive	179.05 MB	https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.zip (sha256)
x64 Installer	158.84 MB	https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.exe (sha256)
x64 MSI Installer	157.70 MB	https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.msi (sha256)

Environment Variables



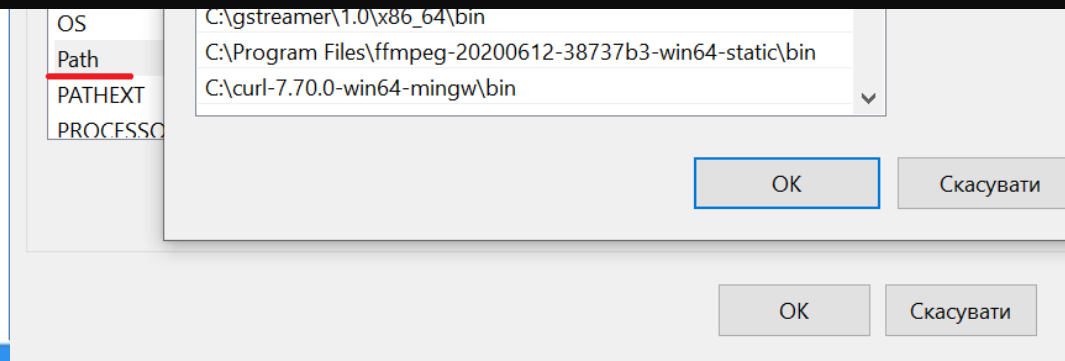
Панель керування -
Система -
Додаткові налаштування
системи

C:\Windows\system32\cmd.exe

```
Microsoft Windows [Version 10.0.19044.1766]
(c) Корпорація Майкрософт. Усі права захищені.

C:\Users\kgp>java -version
java version "19" 2022-09-20
Java(TM) SE Runtime Environment (build 19+36-2238)
Java HotSpot(TM) 64-Bit Server VM (build 19+36-2238, mixed mode, sharing)

C:\Users\kgp>javac
Usage: javac <options> <source files>
where possible options include:
```



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IDE

- **Eclipse** : <https://www.eclipse.org/downloads/>
- **NetBeans** : <https://netbeans.apache.org/>
- **Intelij IDEA** : <https://www.jetbrains.com/idea/>

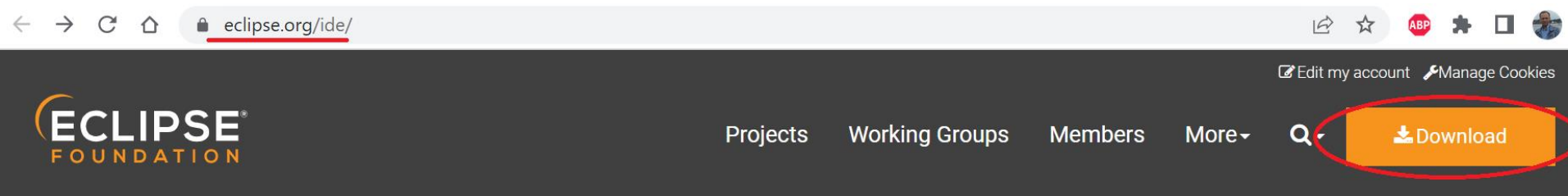


NetBeans



IntelijIDEA

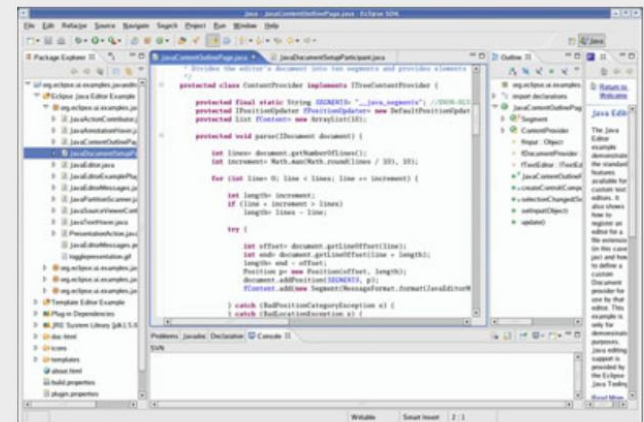
Eclipse



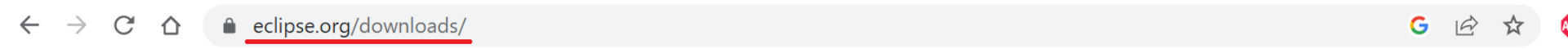
Desktop IDEs

The Eclipse IDE is famous for our Java Integrated Development Environment (IDE), but we have a number of pretty cool IDEs, including our C/C++ IDE, JavaScript/TypeScript IDE, PHP IDE, and more.

You can easily combine multiple languages support and other features into any of our default packages, and the Eclipse Marketplace allows for virtually unlimited customization and extension.



Installing Eclipse



The Eclipse Installer 2022-09 R now includes a JRE for macOS, Windows and Linux.



Get **Eclipse IDE 2022-09**

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The Eclipse Temurin™ project provides high-quality, TCK certified OpenJDK runtimes and associated technology for use across the Java™ ecosystem.

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Netbeans

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Apache NetBeans

Fits the Pieces Together

Development Environment, Tooling Platform and Application Framework.

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Apache NetBeans is much more than a text editor. It highlights source code **syntactically and semantically**, lets you easily **refactor code**, with a range of handy and powerful tools.

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Apache NetBeans provides editors, wizards, and templates to help you create applications in **Java**, **PHP** and many other languages.

Cross Platform

Apache NetBeans can be **installed** on all operating systems that support Java, i.e., Windows, Linux, Mac OSX and BSD. Write Once, Run Anywhere, applies to NetBeans too.

<https://netbeans.apache.org/>

Netbeans



netbeans.apache.org/download/nb15/



Apache NetBeans

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Downloading Apache NetBeans 15

Apache NetBeans 15 was released on August 31, 2022. [Go here on GitHub](#) for a list of fixed issues for Apache NetBeans 15.

Apache NetBeans 15 is available for download from your closest Apache mirror.

- Binaries: [netbeans-15-bin.zip](#) (SHA-512, PGP ASC)
- Installers:
 - [Apache-NetBeans-15-bin-windows-x64.exe](#) (SHA-512, PGP ASC)
 - [Apache-NetBeans-15-bin-macosx.dmg](#) (SHA-512, PGP ASC)
- Source: [netbeans-15-source.zip](#) (SHA-512, PGP ASC)

<https://netbeans.apache.org/download/>

IntelliJ IDEA

jetbrains.com/idea/

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Version: 2022.2.3
Build: 222.4345.14
5 October 2022
[Release notes](#)

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<https://www.jetbrains.com/idea/download>

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First java program



```
package com.mycompany.lesson1;
```

```
/**
```

```
 * Created by Student.
```

```
 */
```

```
public class MyFirstClass {  
    public static void main(String[] arg){  
        System.out.println("Hello World!");  
    }  
}
```

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Structure of simple console application

package com.mycompany.lesson1; → Package declaration

```
/**  
 * Created by Student. → Comments  
 */
```

```
public class MyFirstClass { → Class declaration  
    public static void main(String[] arg){  
        System.out.println("Hello World!");  
    } → The main  
} → method body
```

One source file can several classes, but just one can be public!

Name of source file and public class name must be the same !

Create simple console application

C:\Windows\system32\cmd.exe

```
E:\Java>dir
Volume in drive E is Data
Volume Serial Number is 4E8F-DDF7

Directory of E:\Java

2.10.2022  14:37    <DIR>          .
2.10.2022  14:37    <DIR>          ..
2.10.2022  14:38                118 MyFirstClass.java
                1 File(s)          118 bytes
                2 Dir(s)  165 010 956 288 bytes free

E:\Java>javac MyFirstClass.java

E:\Java>dir
Volume in drive E is Data
Volume Serial Number is 4E8F-DDF7

Directory of E:\Java

2.10.2022  14:38    <DIR>          .
2.10.2022  14:38    <DIR>          ..
2.10.2022  14:38                430 MyFirstClass.class
2.10.2022  14:38                118 MyFirstClass.java
                2 File(s)          548 bytes
                2 Dir(s)  165 010 956 288 bytes free

E:\Java>java MyFirstClass
Hello World!
```

Module contents

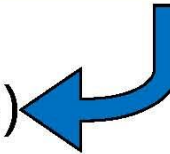
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The main() method

// This is a simple Java program.

```
public class MyFirstClass
{
    public static void main(String [] args)
    {
    }
}
```

**This is the method header
for the main method**



This area is the body of the main method.



Create simple application in IDE

The screenshot displays the IntelliJ IDEA IDE interface. At the top, a 'New Project' dialog is open. The main window shows the 'HelloJava - Main.java' file with the following code:

```
1 package academy.prog.lesson1;
2
3 /**
4  * Class that print a string.
5  *
6  * @author student
7  * @version 1.0
8  */
9 public class Main {
10     /**
11     * Start of the app.
12     *
13     * @param args command line args
14     */
15     public static void main(String[] args) {
16         System.out.println("Hello Java!");
17     }
18 }
```

The Project Browser on the left shows the project structure: HelloJava > src > academy.prog.lesson1 > Main. The Run window at the bottom shows the execution command and output:

```
Run: Main x
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.3\lib\idea_...
Hello Java!
Process finished with exit code 0
```

The status bar at the bottom indicates 'Build completed successfully in 3 sec, 93 ms (3 minutes ago)'. The system tray shows the time as 11:25, LF, UTF-8, and 4 spaces.

<https://youtu.be/YCnd0IAJHd4>

String output and input to console 1/2

- The previous example uses the line:
- `System.out.println("Hello World!");`
 - System class from the standard Java library.
- This class contains methods and objects that perform system level tasks.
- The out object, a member of the System class, contains the methods print and println.
- The value inside the parenthesis will be sent to the output device (in this case, a String).

String output and input to console 2/2

```
package com.mycompany.lesson1;  
import java.util.Scanner;  
/**  
 * Created by Student.  
 */  
  
public class MyFirstClass {  
    public static void main(String[] arg){  
        Scanner sc = new Scanner(System.in);  
        String line = sc.nextLine();  
        System.out.println(line);  
    }  
}
```

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Code Conventions

- Follow Code Conventions
- Improves readability
- For other programmers.
- For yourself.
- Readability means...
- ... less bugs.
- ... easier to debug.

Java Programming Language Coding Conventions 1/2

- Packages:
 - `com.example.domain;`
- Classes, interfaces, and enum types:
 - `SavingsAccount`
- Methods:
 - `getAccount()`
- Variables:
 - `currentCustomer`
- Constants:
 - `HEAD_COUNT`

Java Programming Language Coding Conventions 2/2

Control structures:

```
if (condition ) {  
    statement1;  
} else {  
    statement2;  
}
```

Spacing:

Use one statement per line.

Use two or four spaces for indentation.

Comments:

Use// to comment inline code.

Use/** documentation */ for class members.

Summary

- Downloading and installing JDK
- Set Environment variables
- Create Java source file and compile and run it
- Downloading IntelliJ IDEA
- Create sample Java project
- Executing a class that has main() method