

Programmazione a oggetti

(09CBIPL)

2021-2022

Goals

- To present a brief introduction to problems associated with software production (life cycle, quality attributes, etc.)
- To introduce the opportunities offered by object-oriented programming (OOP)
- To analyze the object orientation paradigm in software production
- To provide the basics of OOP using the Java language, a cornerstone in the creation of distributed applications running on heterogenous platforms

Learning outcomes

- Knowledge of the principles of object-oriented programming (classes, objects, attributes, methods, inheritance, interfaces, etc.)
- Ability to write software programs able to satisfy given requirements by following the object-oriented approach, specifically using the Java language and available tools to deal with concrete problems

Pre-requisites

- Knowledge of core programming constructs (types and data structures, control statements, functions and function calls)
- Ability to develop basic algorithms to solve simple problems (e.g., using the C or Python programming languages)

Syllabus (hours on the Portale)

- Software production
 - ◆ Processes, tools and risks: Software Engineering
 - ◆ Object Orientation: inform. hiding, encapsulation and other key concepts
- The Java programming language
 - ◆ Java Virtual Machine, bytecode
 - ◆ Java basics: types, control statements, etc., comparison with other lang.
 - ◆ Classes: definition, new, private, public
 - ◆ Memory management
 - ◆ Packages: declaration and use
 - ◆ Inheritance, interfaces and polymorphism
 - ◆ Collections: List, Map
 - ◆ Exceptions: throw, throws, catch
 - ◆ Input/Output
 - ◆ Use of databases
- Tools:
 - ◆ Java SDK and Eclipse (coding)
 - ◆ JUnit (testing)

Organization

- Theoretical (50h) and practical (15+15h) parts
- Some lab exercises (usually, 2 weeks each) for students to familiarize w/ Java–Eclipse
- Schedule
 - ◆ Lectures, in-class exercises and lab solutions
 - Thu 8.30–11.30, Room 16
 - Fri 11.30–13.00, Room 16
 - ◆ Lab (starting week 2, i.e., October 8)
 - Fri 13.00–14.30 (half class), LAIB4
 - Fri 14.30–16.00 (other half) , LAIB4
 - ◆ Addit. optional. hours (lab assistant/s only)
 - TBD

Teaching staff

- **Fabrizio Lamberti**
 - ◆ Dip. Automatica e Informatica, 3rd floor
 - ◆ fabrizio.lamberti@polito.it
 - ◆ Consultation dates to be agreed upon by email
- **Fabio Garcea**
 - ◆ Dip. Automatica e Informatica, 2nd floor (LAB2)
 - ◆ fabio.garcea@polito.it
- **Lab assistants**
 - ◆ Michele Cerra (301117/259105)
 - ◆ Filippo Mattio (257509)

Teaching material

- Reference website: Portale della Didattica
 - ◆ Slides & recordings
 - ◆ In-class exercises (problems+Java solutions) ...
 - ◆ ... added topic by topic
 - ◆ Previous exams (with solutions)
- Books
 - ◆ C. Horstmann “Core Java 2, Volume I: Fundamentals”, 11th Edition, Pearson, 2018
 - ◆ B. Eckel, “Thinking in Java”, 4th Edition, Pearson, 2006, (Java 5/6, printed and electronic, CC)

Eclipse IDE for Java Developers

The screenshot shows a web browser displaying the Eclipse Foundation's download page at [eclipse.org/downloads/](https://www.eclipse.org/downloads/). An orange arrow points from the top left towards the URL bar. A large orange box contains the text "1. Go to <https://www.eclipse.org/downloads/>". Below this, a call-to-action box says "Download Eclipse Technology that is right for you". To the right, there's a sponsored advertisement for KONDUIT AI Infrastructure for Enterprise. The main content area features the Eclipse IDE 2021-09 R download section, which includes a note about the JRE inclusion, the Eclipse IDE logo, and download links for "Get Eclipse IDE 2021-09" and "Install your favorite desktop IDE packages". An orange arrow points from the bottom left towards the "Get Eclipse IDE 2021-09" button. Another orange box contains the text "2. Download the installer (including the JRE)". To the right, there are sections for "Tool Platforms" featuring Eclipse Che and Orion.

1. Go to <https://www.eclipse.org/downloads/>

Download Eclipse Technology that is right for you

The Eclipse Installer 2021-09 R now includes a JRE for macOS, Windows and Linux.

Get Eclipse IDE 2021-09

Install your favorite desktop IDE packages.

Download x86_64

Tool Platforms

Eclipse Che

Eclipse Che is a developer workspace server and cloud IDE.

ORION

A modern, open source software development environment that runs in the cloud.

2. Download the installer (including the JRE)

Eclipse IDE for Java Developers

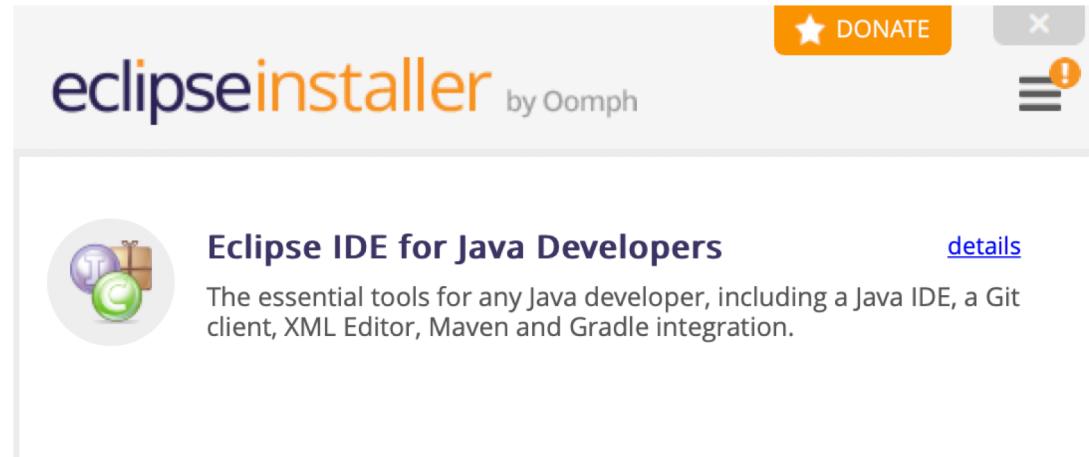
3. Launch the installer



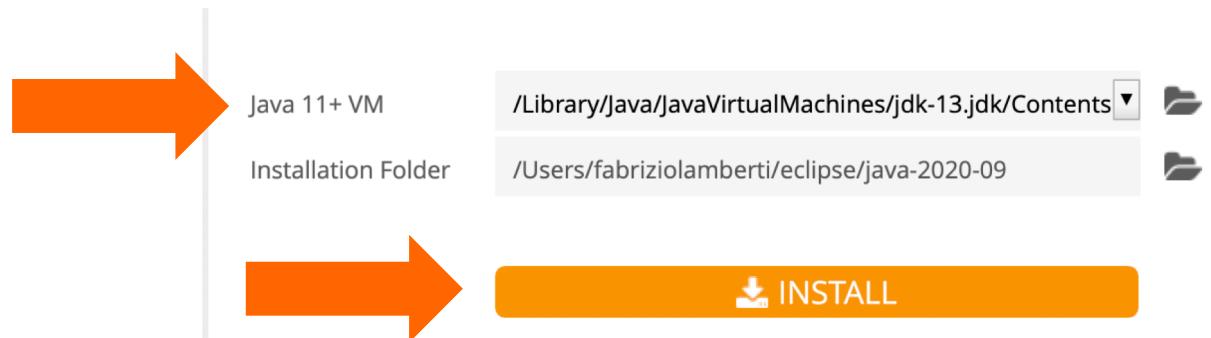
The screenshot shows the homepage of the [eclipseinstaller](#) website. At the top right, there are buttons for "DONATE" and a menu icon. Below the header, there is a search bar. The main content area displays four options:

- Eclipse IDE for Java Developers**: This option is highlighted with a large orange arrow pointing to it. The description states: "The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Maven and Gradle integration".
- Eclipse IDE for Java EE Developers**: Description: "Tools for developers working with Java and Web applications, including a Java IDE, tools for Web Services, JPA and Data Tools, JavaServer Pages and Faces,...".
- Eclipse IDE for C/C++ Developers**: Description: "An IDE for C/C++ developers."
- Eclipse IDE for Web and JavaScript Developers**: Description: "The essential tools for any JavaScript developer, including JavaScript, TypeScript, HTML, CSS, XML, Yaml, Markdown... languages support;...".

Eclipse IDE for Java Developers



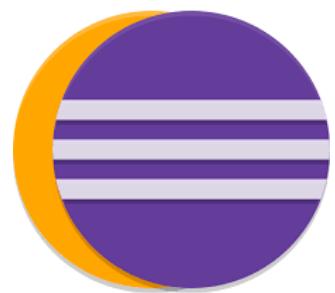
5. Check if JDK available on your machine (if not, see next slides)



6. Click "Install"



Eclipse IDE for Java Developers



6. Launch

Java SE Development Kit (JDK)



Java 17 available now

Java 17 LTS is the latest long-term support release for the Java SE platform. JDK 17 binaries are free to use in production and free to redistribute, at no cost, under the [Oracle No-Fee Terms and Conditions License](#).

[Learn about Java SE Subscription](#)

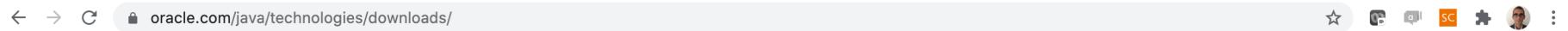
JDK 17 will receive updates under these terms, until at least September 2024.

Java SE Development Kit 17 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.

Java SE Development Kit (JDK)



Java SE Development Kit 17 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.

Documentation Download

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Product/file descrip

2. Choose appropriate version, download and install it

Arm 64 Compressed Archive	170.95 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-aarch64_bin.tar.gz (sha256)
Arm 64 RPM Package	153.12 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-aarch64_bin.rpm (sha256)
x64 Compressed Archive	172.19 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.tar.gz (sha256)
x64 Debian Package	147.98 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.deb (sha256)
x64 RPM Package	154.73 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.rpm (sha256)

JDK 17 Script-friendly URLs

The URLs listed above will remain the same for all JDK 17 updates to allow their use in scripts.

Final exam (rules on the Portale)

- Develop a program in Java @PC (use material)
 - ◆ Solve a problem (requirem.), send initial solution
 - Approximately 2 hours
 - Physical PC at LAIB (or virtual machine on vLAIB*)
 - ◆ Receive first evaluation (list of errors)
 - Tests launched by teaching staff on initial solution
 - Email sent to students few hours after the exam
 - ◆ Adjust initial solution and re-send
 - From home, typically within 1 week
 - ◆ Receive grade
- Same procedure used also for lab exercises
 - ◆ Up to +2 points (added to grade in case of passed exam)