



Introduction to java

The Java execution model

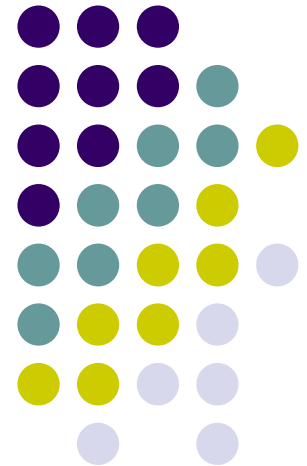
<https://www.baeldung.com/get-started-with-java-series>

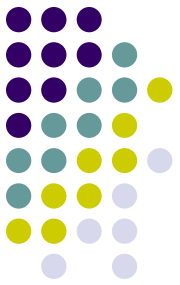
<https://docs.oracle.com/javase/tutorial>

<https://www.w3schools.com/java/default.asp>

<https://developer.ibm.com/learningpaths/java-get-started>

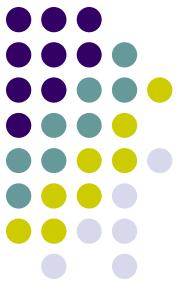
<https://www.baeldung.com/category/java>





Unit Objectives

- After completing this unit, you should be able to:
 - Explain the Java execution model, including the use of bytecode and the Java virtual machine
 - Outline the types of programs and components that can be built using Java

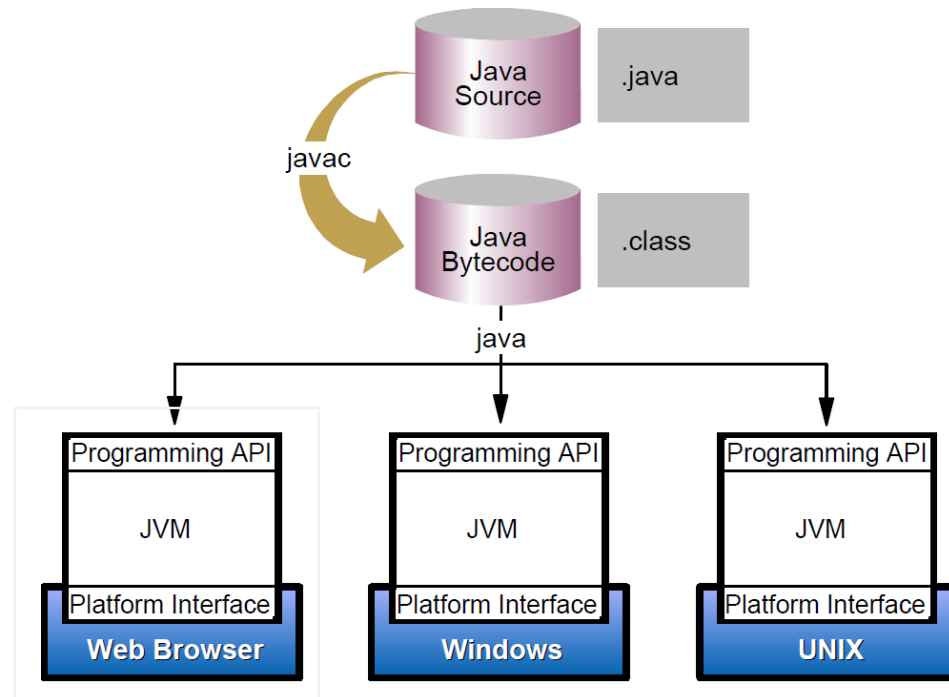
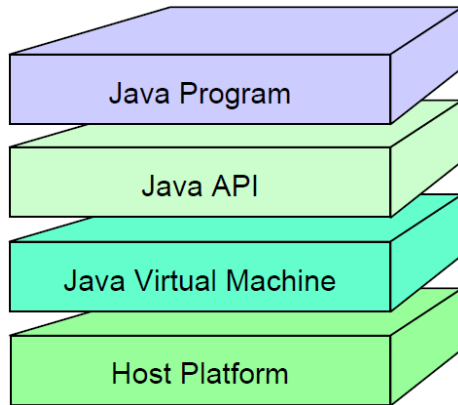


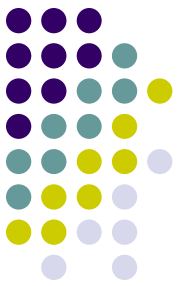
What is Java?

- Java is an object-oriented programming language.
- Java has a set of standardized class libraries that support predefined reusable functionality
- Java has a runtime environment that can be embedded in Web browsers and operating systems

The Java execution model

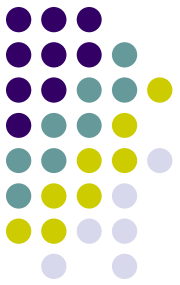
(Hybrid Translation: Compiled + Interpreted)





Tools

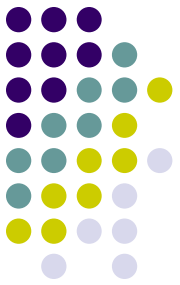
- Java Development Kits (OpenJDK General-Availability)
 - <https://jdk.java.net/18/>
- IDE (Integrated Development Environment)
 - <https://netbeans.apache.org/download/index.html>
 - <https://www.jetbrains.com/idea/download>
<http://jblicense.sit.kmutt.ac.th> (VPN)
 - <https://www.jgrasp.org>



Installing JDK

- Download OpenJDK 18.0.2 General-Availability
 - <https://jdk.java.net/18/>
- Extract to local drive
- Config System Environment
 - Create JAVA_HOME variable
 - Add %JAVA_HOME%\bin to Path variable
- Testing Java Compiler & Java Runtime

Setting Environment Variable



The image shows a Windows search interface with the following elements:

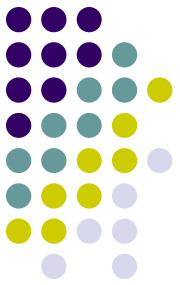
- Search Bar:** Contains the text "env".
- Best match:** "Edit the system environment variables" (Control panel).
- Settings:** "Edit environment variables for your account" (highlighted with a red circle).
- Search work and web:** "env - See work and web results".

The "System Properties" dialog box is open, showing the "Advanced" tab. It contains the following sections and buttons:

- Performance:** "Visual effects, processor scheduling, memory usage, and virtual memory" with a "Settings..." button (highlighted with a blue box).
- User Profiles:** "Desktop settings related to your sign-in" with a "Settings..." button.
- Startup and Recovery:** "System startup, system failure, and debugging information" with a "Settings..." button.
- Environment Variables:** "Environment Variables..." button (highlighted with a red circle).

At the bottom of the dialog box are "OK", "Cancel", and "Apply" buttons.

Create JAVA_HOME variable



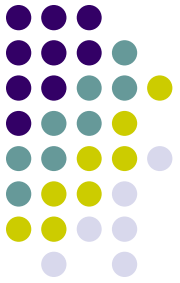
The image shows a Windows Environment Variables dialog box. The 'User variables for Khaitong Lim' section is visible, with a list of variables including OneDrive, Path, PhpStorm, PyCharm, and TEMP. The 'New...' button is circled in red. Below it, an 'Edit User Variable' dialog box is open, showing the 'Variable name' as 'JAVA_HOME' and the 'Variable value' as 'C:\Program Files\Java\jdk-18.0.1.1'. The 'OK' button is highlighted with a blue border.

Variable	Value
OneDrive	C:\Users\Khaitong Lim\OneDrive
Path	C:\Users\Khaitong Lim\AppData\Local\Programs\Python\Pyth...
PhpStorm	C:\Program Files\JetBrains\PhpStorm 2020.1.1\bin;
PyCharm	C:\Program Files\JetBrains\PyCharm 2021.1.2\bin;
TEMP	C:\Users\Khaitong Lim\AppData\Local\Temp

System variables

Variable	Value
ComSpec	
DriverData	
MVN_HOME	
NUMBER_OF...	
OS	
Path	
PATHEXT	
PROCESSOR_ARCHITECTU...	
PROCESSOR_ARCHITECTU...	

Add Path



The image shows a Windows Settings window for environment variables. The 'Path' variable is selected, and the 'Edit...' button is circled in red. A red arrow points from the 'Edit...' button to the 'Edit environment variable' dialog box. In this dialog, the 'New' button is also circled in red, and a red arrow points from it to the list of paths. The list of paths includes various system and user-specific paths, with '%JAVA_HOME%\bin' highlighted in blue.

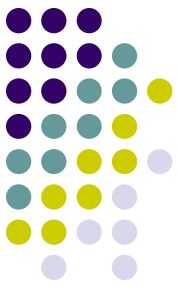
Variable	Value
IntelliJ IDEA	C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.3\bin;
JAVA_HOME	C:\Program Files\Java\jdk-18.0.1.1
OneDrive	C:\Users\Khaitong Lim\OneDrive
Path	C:\Users\Khaitong Lim\AppData\Local\Programs\Python\Pyth...
PhpStorm	C:\Program Files\JetBrains\PhpStorm 2020.1.1\bin;
PyCharm	C:\Program Files\JetBrains\PyCharm 2021.1.2\bin;
TEMP	C:\Users\Khaitong Lim\AppData\Local\Temp

Buttons: New... Edit... Delete

System Environment Variables

Variable Name

C:\Users\Khaitong Lim\AppData\Local\Programs\Python\Python...	New
C:\Users\Khaitong Lim\AppData\Local\Programs\Python\Python...	Edit
C:\Program Files\MySQL\MySQL Shell 8.0\bin\	Browse...
C:\Users\Khaitong Lim\AppData\Local\Microsoft\WindowsApps	Delete
C:\Users\Khaitong Lim\AppData\Roaming\Composer\vendor\bin	Move Up
C:\Users\Khaitong Lim\AppData\Local\Programs\Microsoft VS C...	Move Down
C:\Program Files\JetBrains\PhpStorm 2020.1.1\bin	Edit text...
C:\Program Files\JetBrains\DataGrip 2020.1.5\bin	
C:\Users\Khaitong Lim\AppData\Roaming\npm	
C:\Program Files\JetBrains\PyCharm 2021.1.2\bin	
C:\Program Files\JetBrains\IntelliJ IDEA 2021.2\bin	
C:\Users\Khaitong Lim\AppData\Local\JetBrains\Toolbox\scripts	
%IntelliJ IDEA%	
%JAVA_HOME%\bin	



Testing JDK & Java Execution Model

- Open Command Prompt
- Check Java Path Configuration
 - > java --version

```
C:\Users\Khaitong Lim>java --version ←
openjdk 18.0.1.1 2022-04-22
OpenJDK Runtime Environment (build 18.0.1.1+2-6)
OpenJDK 64-Bit Server VM (build 18.0.1.1+2-6, mixed mode, sharing)

C:\Users\Khaitong Lim>
```

Create Java Source Code

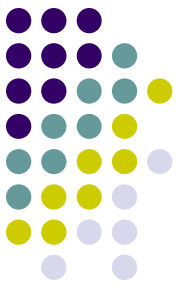


**** Case sensitive ****

```
C:\Users\Khaitong Lim>copy con Hello.java
public class Hello {
    public static void main(String args[]) {
        System.out.println("Hello World !!!");
    }
}^Z ← <ctrl-z>
    1 file(s) copied.

C:\Users\Khaitong Lim>
```

Compile & Execute (run)



```
C:\Users\Khaitong Lim>dir *.java
Volume in drive C has no label.
Volume Serial Number is C6D1-302B

Directory of C:\Users\Khaitong Lim

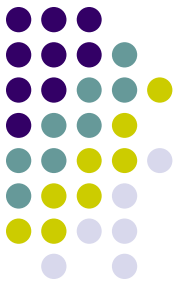
07/27/2022  03:35 PM                120 Hello.java
              1 File(s)                120 bytes
              0 Dir(s)  174,730,551,296 bytes free

C:\Users\Khaitong Lim>javac Hello.java

C:\Users\Khaitong Lim>java Hello
Hello World !!!

C:\Users\Khaitong Lim>java Hello.java
Hello World !!!
```

IDE : IntelliJ Ultimate2022.xx



<https://www.jetbrains.com/idea/download/#section=windows>

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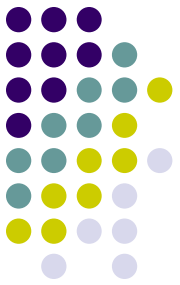
For JVM and Android development

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<http://jblicense.sit.kmutt.ac.th>