

# Understanding the JVM

## JVM and the main method

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Waterford Institute *of* Technology  
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Department of Computing and Mathematics  
<http://www.wit.ie/>

# Topics list

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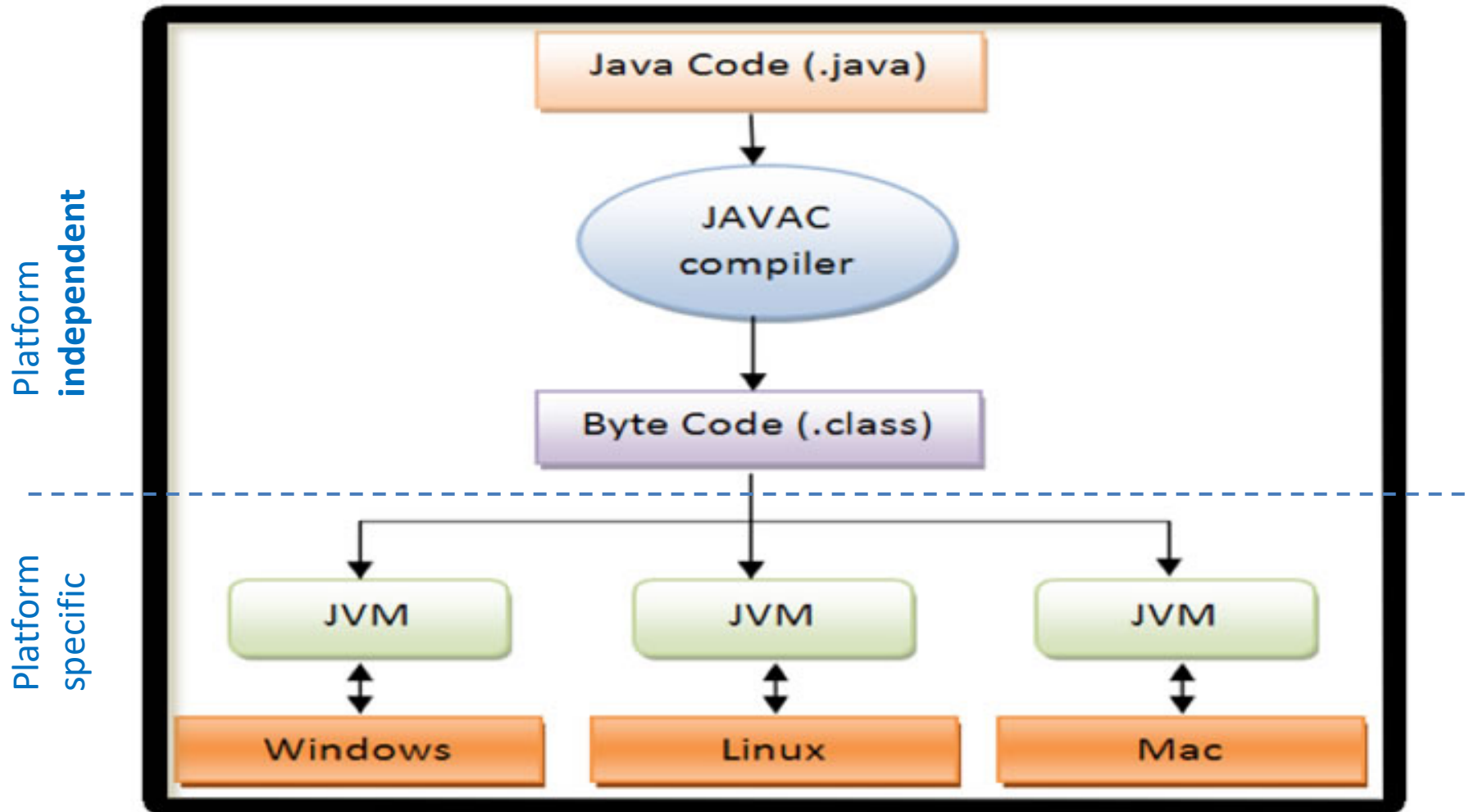
**1. Files** in Java

2. Java Virtual Machine (**JVM**)

3. **main()** method

4. Installing **JDK**

# Files in Java (1)



# Files in Java (2)

---

- **Java code** is written in **.java** file.
  - code contains one or more Java language constructs e.g. Classes, Methods, Variable, Objects etc.
- **Compiling** this code generates a **.class** file
- A **.class** file
  - is also known as “**byte code**”
  - it is the input to Java Virtual Machine (JVM)
  - The **JVM** (*for a specific platform*)
    - **reads** this byte code
    - **interprets** it as machine code instructions (*for that platform*)
    - and **executes** the program (*on that platform*)

# Topics list

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**1. Files** in Java

**2. Java Virtual Machine (JVM)**

**3. main()** method

**4. Installing JDK**

# Java Virtual Machine (JVM)

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- Java Virtual Machine (**JVM**)
  - is a “**virtual**” computer that resides in the “real” computer as a software process.
- The JVM gives Java the flexibility of **platform independence**.
- The **.class** files can be run on any OS, once a JVM has been installed
  - (NB: JVM is installed when you install the JDK).

# Topics list

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1. **Files** in Java
2. Java Virtual Machine (**JVM**)
3. **main()** method
4. Installing **JDK**

# main() method

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- When you want to run a java project, the Java Virtual Machine (JVM) invokes the **main()** method in the project.
- For the JVM to recognise it, the main() method must have a specific method **signature**.

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



# main() method - signature

---

- “main” must exist
- “main” must be **public**
- “main” must be **static** (class method)
- “main” must have a **String array** parameter
- Only “main” can be invoked automatically.

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

# main() method

---

```
public static void main(String[] args)
{
    Driver driver= new Driver();
    driver.runMenu();
}
```

- The main method should
  - create an object
  - call the first method

# Topics list

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1. **Files** in Java
2. Java Virtual Machine (**JVM**)
3. **main()** method
4. Installing **JDK**

# What is a JDK?

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- Java Development Kit (**JDK**).
- It includes **tools** for developing Java applications.
- It also includes a Runtime Environment (**JRE**)
  - **JRE** is the implementation of the JVM.
  - It is a subset of the **JDK**
  - **Developers use the JDK, Customers use the JRE**
- Free from **Oracle** website.



# Note

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- If you are installing the JDK on a windows platform, **USE Internet Explorer!**
- There are **issues** with installing the JDK using the following browsers:
  - Firefox
  - Chrome
  - Microsoft Edge



# Note

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- If you are installing the JDK on the OSX platform, **USE Safari!**
- There are **issues** with installing the JDK using the following browsers:
  - Firefox
  - Chrome



# JDK Versions

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- Software is constantly changing.
- Software depends on other software, that is constantly changing!
- Ordinarily we use the latest versions of everything but there are times when we want to use specific versions (for compatibility)
- Mar 2019 - 2 versions are listed from the ORACLE JAVA site
  - JDK ver 8
  - JDK ver 11
- Any version is fine for Programming Fundamentals
- Ver 11 is incompatible with the tools used in Web Development
- Ver 1.8.202 and Ver 10 are compatible with the tools used in Web Development

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#### General FAQs

Java Platform, Standard Edition ([Java SE](#)) lets you develop and deploy Java applications on [desktops](#) and servers. Java offers the rich user interface, performance, versatility, portability, and security that today's applications require.

#### End of Public Updates for Oracle JDK 8

Oracle will not post further updates of Java SE 8 to its public download sites for commercial use after January 2019. Customers who need continued access to critical bug fixes and security fixes as well as general maintenance for Java SE 8 or previous versions can get long term support through Oracle Java SE Subscription or Oracle Java SE Desktop Subscription. For more information, and details on how to receive longer term support for Oracle JDK 8, please see the Oracle [Java SE Support Roadmap](#).

#### What's New

##### Java Platform, Standard Edition 11

Java SE 11.0.2 is the latest release of Java SE Platform. Oracle strongly recommends that all Java SE users upgrade to this release.

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##### Java Platform, Standard Edition 8 Update 201 (Java SE 8u201) / Java Platform, Standard Edition 8 Update 202 (Java SE 8u202)

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JDK for ARM releases are available on the same page as the downloads for other platforms

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Java 11 is the latest version

Java 8 is available here



**NOTE: Mar 2019**

We are using:

**JDK version 8** (*i.e. 1.8.202*)

OR

**JDK version 10**

*(you'll need to create an account on the Oracle site, search for jdk 10, and download it)*

If you already have 11 installed,  
install one of the versions above again

The following slides show installation for a version, any version will be similar

<a href="#">Java SE</a>
<a href="#">Java EE</a>
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#### Java Platform, Standard Edition

**Java SE 11.0.2(LTS)**  
Java SE 11.0.2 is the latest release for the Java SE 11 Platforms  
[Learn more](#)

- Installation Instructions
- Release Notes
- Oracle JDK License
- Java SE Licensing Information User Manual
  - Includes Third Party Licenses
- Certified System Configurations
- Readme

**Oracle JDK**  
[DOWNLOAD](#)

**Looking for Oracle OpenJDK builds?**

- Oracle Customers and ISVs targeting Oracle LTS releases:** Oracle JDK is Oracle's supported Java SE version for customers and for developing, testing, prototyping or demonstrating your Java applications.
- End users and developers looking for free JDK versions:** Oracle OpenJDK offers the same features and performance as Oracle JDK under the [GPL license](#).

To Learn more about these options visit [Oracle JDK Releases for Java 11 and Later](#)

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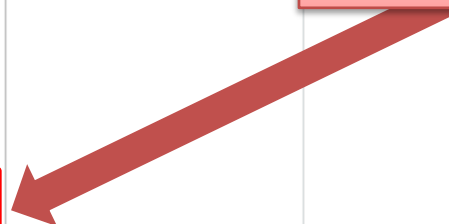
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Thank you for downloading this release of the Java™ Platform, Standard Edition Development Kit (JDK™). The JDK is a development environment for building applications, applets, and components using the Java programming language.

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

- See also:
- Java Developer Newsletter: From your Oracle account, select **Subscriptions**, expand **Technology**, and subscribe to **Java**.
  - Java Developer Day hands-on workshops (*free*) and other events
  - Java Magazine

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JDK 8u202 checksum

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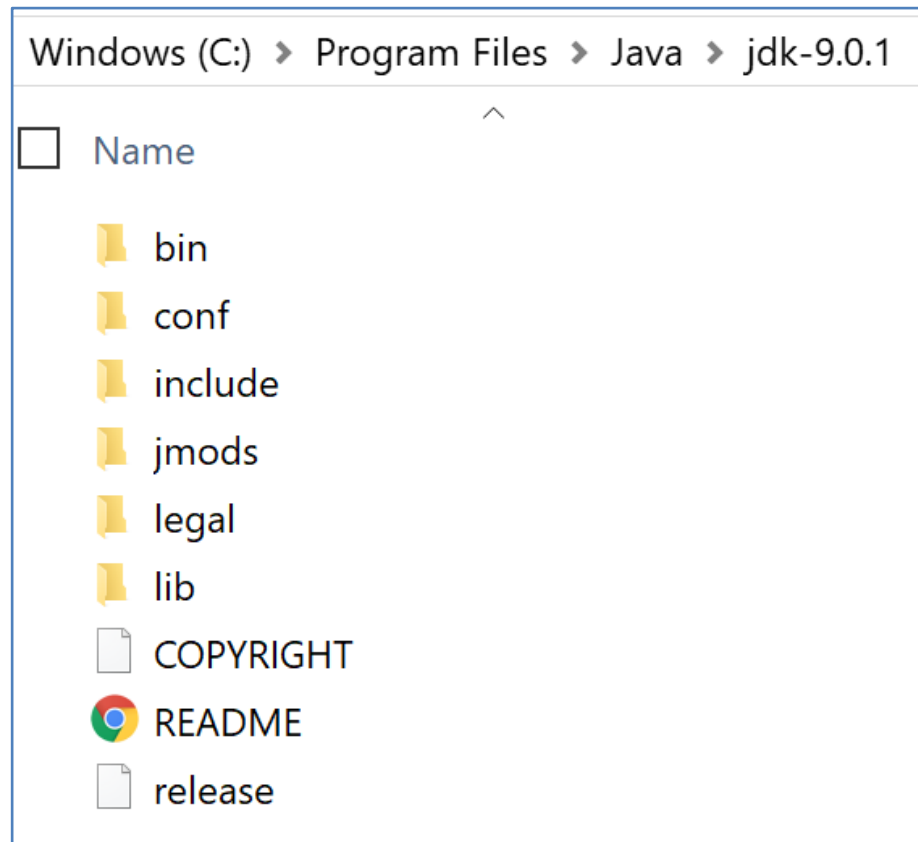
 jdk-10.0.2\_osx....dmg ^

5

Click on the downloaded file to start the JDK installation.

6

Once JDK is installed,  
you should have a folder structure  
similar to this one  
(obviously the version number will change):



# JDK Ver10

---

- If we wish to download ver 10, you'll need to create an account on Oracle's Java Site
- Search for "JDK ver 10"
- Download and install as highlighted on previous slides



# Version Check

---

In the terminal:

```
java -version
```

returns

```
java version "1.8.0_162"
```

In the terminal:

```
/usr/libexec/java_home -V
```

returns

```
Matching Java Virtual Machines(1):
```

```
1.8.0_162, x86_64: "Java SE 8"
```

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_162.jdk/Contents/Home
```

# Uninstalling JDK 9+ on OSX

---

In the terminal:

- `sudo rm -fr /Library/Java/JavaVirtualMachines/jdk-9.jdk/`
- `sudo rm -fr /Library/Internet\ Plug-Ins/JavaAppletPlugin.plugin`
- `sudo rm -fr /Library/PreferencePanels/JavaControlPanel.prefPane`

# Java Plugin in Browsers

---

- Safari and Internet Explorer Only
- Unavailable in Chrome, Firefox, Edge

In Safari:

<https://www.java.com/en/download/installed.jsp>

Select Run Everytime

**Verified Java Version**



**Congratulations!**

**You have the recommended Java installed (1.8.0\_162).**

# Questions?

---

