OBJECT ORIENTED PROGRAMMING WITH JAVA (20CP204T)

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Outline

- Applications of Java
- Major Impacts of Java on Internet
- OOP Principles
- What is Compiler?
- How Java works?

Applications of Java

- Mobile Applications (Twitter, Minecraft)
- Desktop GUI Applications.
- Web-based Applications.
- Enterprise Applications.
- Scientific Applications.
- Gaming Applications.
- Big Data Technologies.
- Business Applications.
- Distributed Applications
- Cloud-based Applications

Major Impacts of Java on Internet

- Java Applets
  - Java program to be transmitted over the Internet
  - Automatically executed inside a Java-compatible web browser
- Security
  - Applications are executed in Java execution environment
- Portability
  - Heterogeneous types of computers and operating systems

OOP Principles

1. Encapsulation

Student

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rollNo, name,
nameDepartment,
nameDiv,
semester, subjects,
attendance, grades,
SPI, CPI
…

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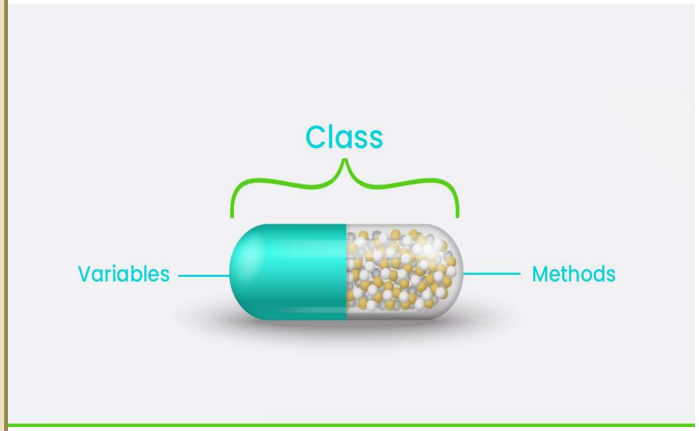
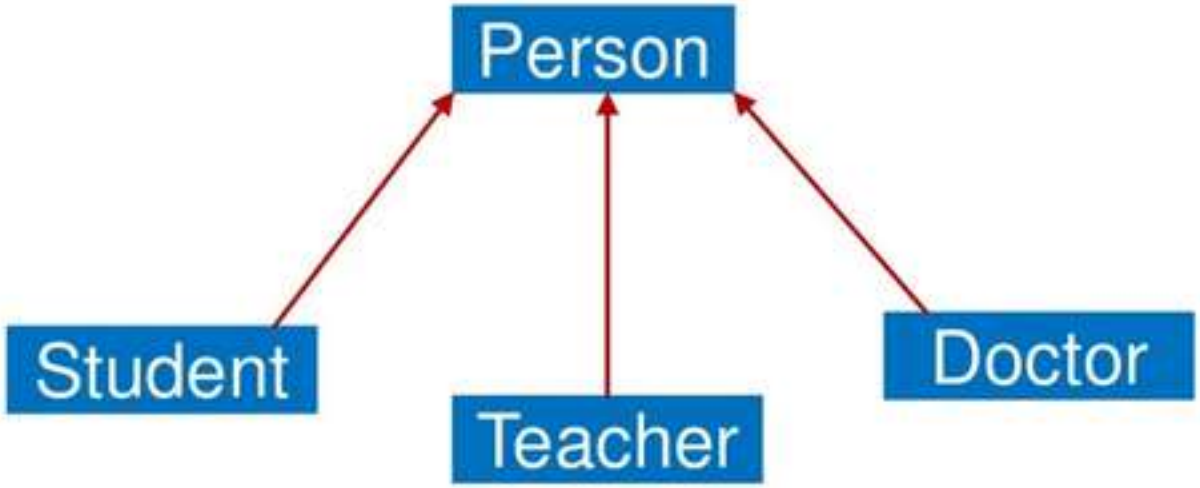
enrollDepartment(),
enrollSemester(),
attendLectures(),
appearExamination(),
getResults()
partActivities()
…



OOP Principles…

2. Inheritance



OOP Principles…

3. Polymorphism (same name, many forms)

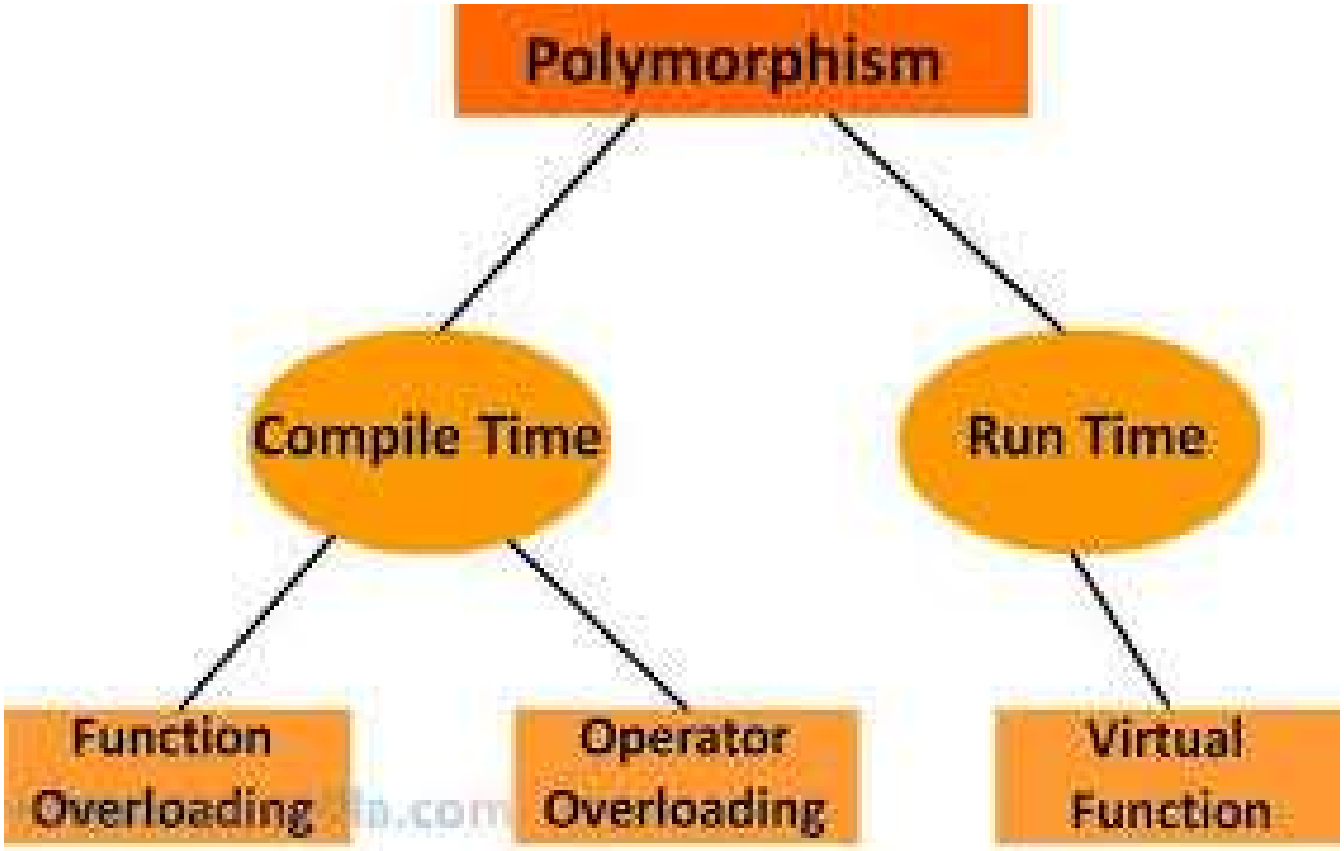


Image source: http://spiroprojects.com/blog/cat-view-more.php?blogname=What-is-Polymorphism-in-Java?&id=330

What is Compiler?

- Compiler
  - Converts the high-level language (human language) into lower level code
    - a sequence of executable machine instructions - directly executed by CPU
    - an assembly code that is processed by assembler
    - an intermediate representation that is interpreted

How Java works?

- Java Compiler
  - Generates intermediate representation- the Bytecode (.class file)
    - platform-independent (executed on all operating systems)
    - adds to an important feature in the JAVA language termed as portability
    - needs an interpreter to execute on a machine - JVM
- JVM (Java Virtual Machine)
  - provides a runtime environment
  - loads, verifies and executes Java Bytecode
  - known as the interpreter or the core of Java programming language because it executes Java programming
  - does not exists physically, resides in memory as a software program
  - it actually calls the **main** method present in a java code

How Java works?...

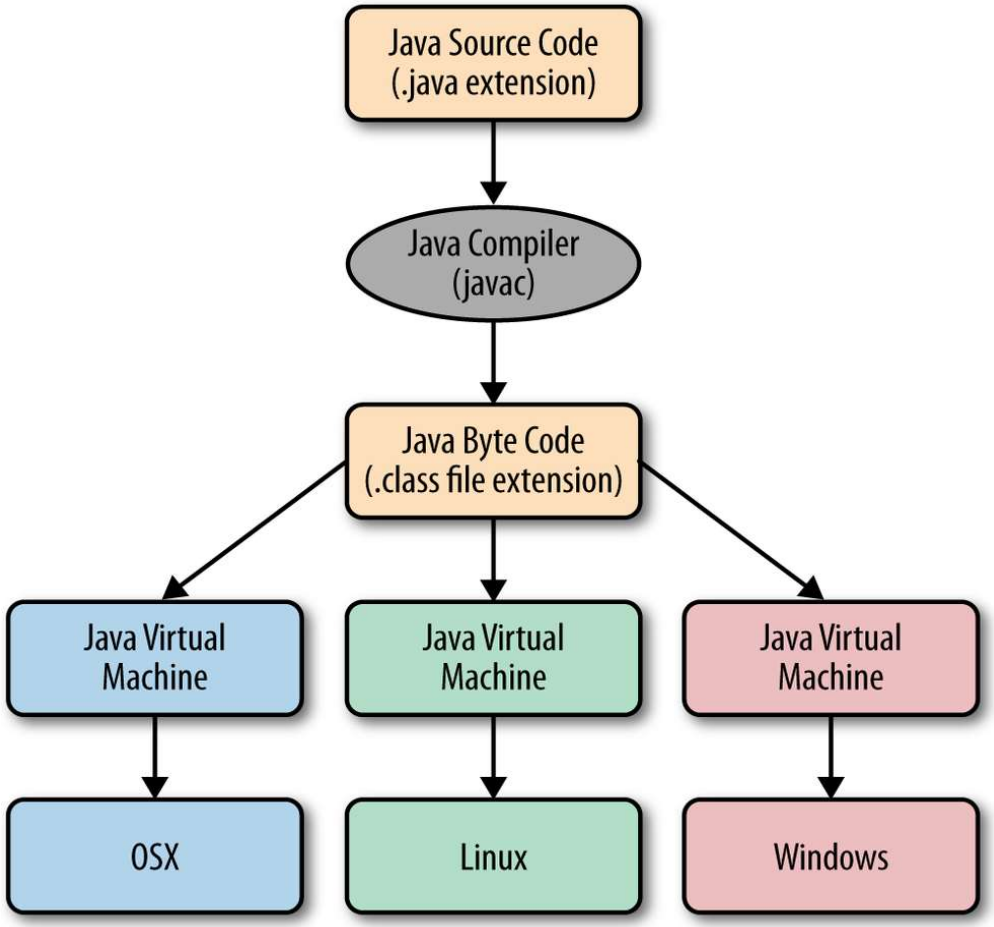


Image Source: "How does the Java compilation process work? What is JAS? : r/java"

- **Java is platform-independent but JVM is platform dependent**

How Java works?...

- JRE (Java Runtime Environment)
  - a set of software tools which are used for developing Java applications
  - provides the runtime environment (installation package) that provides an environment to only run (not develop) the java program (or application)
  - the implementation of JVM, physically exists
  - contains a set of libraries + other files that JVM uses at runtime
- JDK (Java Development Kit)
  - a software development environment which is used to develop Java applications and applets
  - physically exists
  - a kit (or package) that includes JRE, an interpreter/loader (Java), a compiler (javac), an archiver (jar), a documentation generator (Javadoc), and other tools needed

How Java works?...

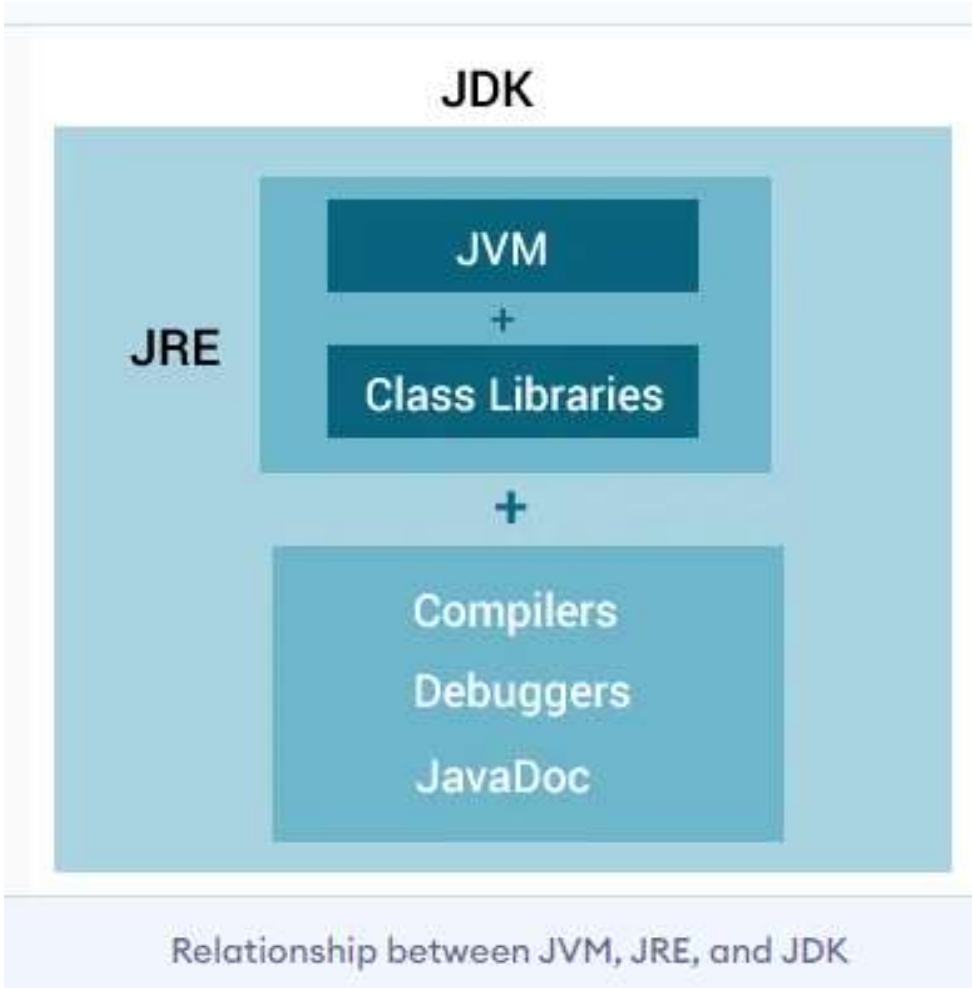


Image source: https://www.programiz.com/java-programming/jvm-jre-jdk