Introduction to Java and Java Programming

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Why Java is Important

- Two reasons :
  - Trouble with C/C++ language is that they are not portable and are not platform independent languages.
  - Emergence of World Wide Web, which demanded portable programs
- Portability and security necessitated the invention of Java

History

- James Gosling - Sun Microsystems
- Co founder – Vinod Khosla
- Oak - Java, May 20, 1995, Sun World
- JDK Evolutions
  - JDK 1.0 (January 23, 1996)
  - JDK 1.1 (February 19, 1997)
  - J2SE 1.2 (December 8, 1998)
  - J2SE 1.3 (May 8, 2000)
  - J2SE 1.4 (February 6, 2002)
  - J2SE 5.0 (September 30, 2004)
  - Java SE 6 (December 11, 2006)
  - Java SE 7 (July 28, 2011)
  - Java SE 8

Cont..

- Java **Editions.**

  - **J2SE**(Java 2 Standard Edition) - to develop client-side standalone applications or applets.
  - **J2ME**(Java 2 Micro Edition) - to develop applications for mobile devices such as cell phones.
  - **J2EE**(Java 2 Enterprise Edition) - to develop server-side applications such as Java servlets and Java ServerPages.

What is java?

- A general-purpose object-oriented language.
- Write Once Run Anywhere (WORA).
- Designed for easy Web/Internet applications.
- Widespread acceptance.
- Platform Independent programming language

How is Java different from C…

1. Major difference is that C is a structure oriented language and Java is an object oriented language and has mechanism to define classes and objects.
2. Java does not support an explicit pointer type
3. Java does not have preprocessor, so we cant use #define, #include and #ifdef statements.
4. Java does not include structures, unions and enum data types.
5. Java does not include keywords like goto, sizeof and typedef.
6. Java adds labeled break and continue statements.
7. Java adds many features required for object oriented programming.

How is Java different from C++…

1. Features removed in java:
2. Java doesn't support pointers to avoid unauthorized access of memory locations.
3. Java does not include structures, unions and enum data types.
4. Java does not support operator over loading.
5. Preprocessor plays less important role in C++ and so eliminated entirely in java.
6. Java does not perform automatic type conversions that result in loss of precision.

Cont...

7. Java does not support global variables. Every method and variable is declared within a class and forms part of that class.
8. Java does not allow default arguments.
9. Java does not support inheritance of multiple super classes by a sub class (i.e., multiple inheritance). This is accomplished by using 'interface' concept.
10. It is not possible to declare unsigned integers in java.
11. In java objects are passed by reference only. In C++ objects may be passed by value or reference.

New features added in Java

1. Multithreading, that allows two or more pieces of the same program to execute concurrently.
2. C++ has a set of library functions that use a common header file. But java replaces it with its own set of API classes.
3. It adds packages and interfaces.
4. Java supports automatic garbage collection.
5. break and continue statements have been enhanced in java to accept labels as targets.
6. The use of unicode characters ensures portability.

Features that differ

1. Though C++ and java supports Boolean data type, C++ takes any nonzero value as true and zero as false. True and false in java are predefined literals that are values for a boolean expression.
2. Java has replaced the destructor function with a finalize() function.
3. C++ supports exception handling that is similar to java's. However, in C++ there is no requirement that a thrown exception be caught.

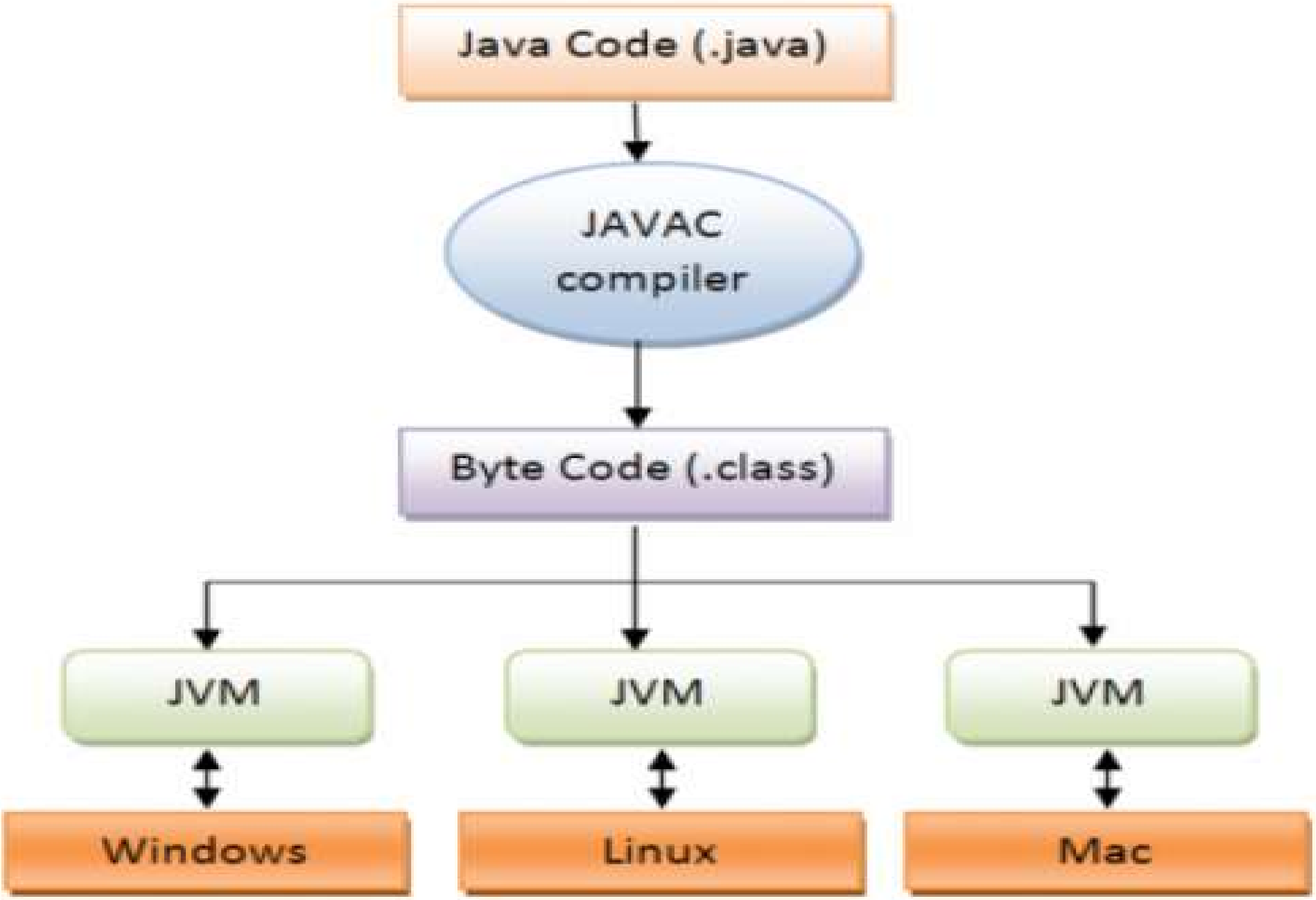
Characteristics of Java

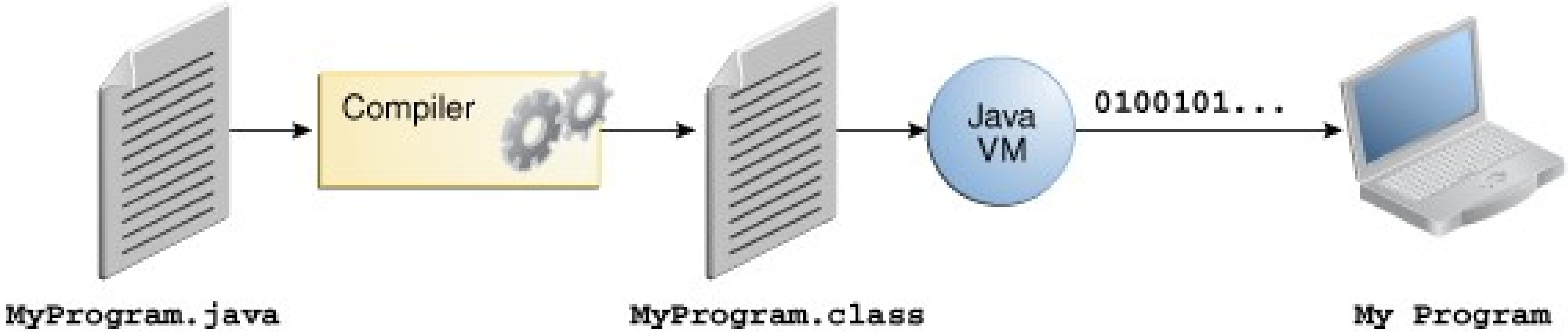
- Java is simple
- Java is object-oriented
- Java is distributed
- Java is interpreted
- Java is robust
- Java is architecture-neutral
- Java is portable
- Java's performance
- Java is multithreaded
- Java is dynamic
- Java is secure

Java Environment

- Java includes many development tools, classes and methods
  - Development tools are part of Java Development Kit (JDK) and
  - The classes and methods are part of **Java Standard Library** (JSL), also known as **Application Programming Interface** (**API**).
- JDK constitutes of tools like java compiler, java interpreter and many.
- API includes hundreds of classes and methods grouped into several packages according to their functionality.

Java is architecture-neutral



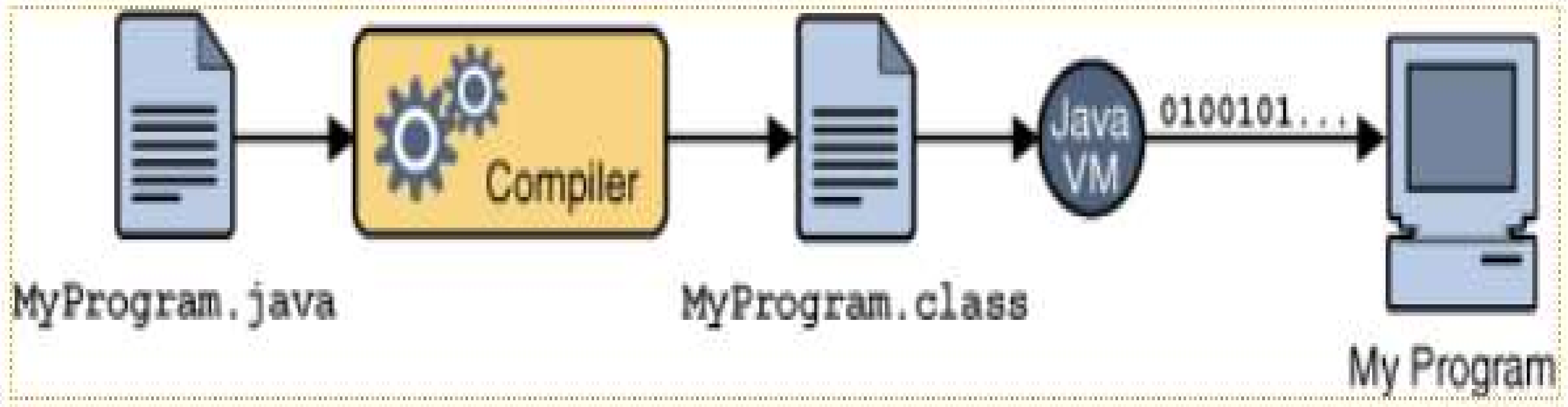


JAVA Program Execution

How it Works?

- Java is independent only for one reason:
  - Only depends on the Java Virtual Machine(JVM).
  - Code is Compiled to bytecode, which is interpreted by the resident JVM.
  - JIT(Just in Time) Compilers attempts to increase speed.

WORA(Write Once Run Anywhere)



Thank you