Object Oriented Programming – SCJ2153

Introduction to JAVA Programming Language

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Origins of the Java Language

- Java was created by Sun Microsystems team led by Patrick Naughton and James Gosling in 1991.
- Originally named Oak (Gosling liked the look of an oak tree that was outside his window at Sun).
- Later, renamed to *Java* - Java coffee
- In 1995, Java is released as a core component of Sun Microsystems' Java platform.
- Now Java is part of Oracle corporation.

Java logo

Duke the Java mascot

Origins of the Java Language (cont.)

- The challenge:
  - Intended to design a small computer language that could be used for consumer devices/appliances such as the cable TV switchboxes.
  - It is a difficult task because these devices do not have a lot of power or memory, the language had to be small and generate very tight code. Also, because different manufacturers may choose different central processing units (CPUs), it was important that the language not be tied to any single architecture.

Origins of the Java Language (cont.)

- The team developed a two-step translation process to simplify the task of compiler writing for each class of appliances
  - Program written in Java were translated into an intermediate language that is the same for all types of processors : Java *byte-code*
  - Then, the byte-code would be translated into the machine code for each processor

Origins of the Java Language (cont.)

- In 1994, Patrick Naughton and Jonathan Payne at Sun Microsystems developed a Web browser that could run programs over the Internet
- It then evolved into the **HotJava** browser.
  - The browser able to download and run small Java programs over the internet, known as the *applets*
  - Capable to display animation and interact with the user.
- Beginning of Java's connection to the Internet
- In 1995, Netscape incorporated Java technology into its Netscape browser.
  - Then, other internet companies followed …

The Java Language (cont.)

- Java is a full-featured, general-purpose programming language that is capable of developing robust mission-critical applications for:
  - Desktops
  - Servers
  - Mobile devices
- The Java programming language is a relatively high level language, class-based and object-oriented.

The Java Language (cont.)

- Java running on the desktop is called *application.*
- Java running on the web browser is called the *applets.*
- Java developed on the server side is called *Java servlets* or *Java server pages (JSP)*
- Java can also be used to develop applications for small hand-held devices, such as personal digital assistants and cell phones.

Java Application Program Interface (API)

- Java *application program interface* (API) contains predefined classes and interfaces for developing Java programs.
- In 1995, Java 1.0 was introduced.
- In December 1998, Sun announced the Java 2 platform – the brand that applies to current Java technology.
- There are 3 editions of the Java API:
  - Java 2 standard edition (J2SE)
    - client-side standalone applications or applets
  - Java 2 Enterprise Edition (J2EE)
    - server-side applications, such as Java servlets and JavaServer Pages
  - Java 2 Micro Edition (J2ME)
    - mobile devices, such as cell phones

Java Application Program Interface (API)

Link to Java API

Java Development toolkit (JDK)

- Java Development toolkit (JDK) consists of a set of separate programs for developing and testing Java programs, each of which is invoked from a command line.
- Sun releases each version of J2SE with a JDK and can be downloaded for free.

Link to J2SE JDK

Integrated Java Development Tools

- For rapid development of Java programs, a software that provides an integrated development environment (IDE) may be used.
- Integrated Java development tools available:
  - JBuilder by Borland
  - NetBeans open source by Sun
  - Eclipse open source by IBM
- Other useful tools:
  - Code warrior by Metrowerks
  - TextPad Editor
  - JCreator LE
  - JEdit
  - JGrasp
  - BlueJ
  - DrJava

Java Program Development Process

Text Editor

Saves Java source code file

Source Code (.java)

Is read by

Java Compiler

Produces

Byte Code (.class)

Interpreted by

Java Virtual Machine

Results in

Program Execution

The Compiler and the Java Virtual Machine

- A programmer writes Java programming statements for a program – known as **source code**
- A **text editor** is used to edit and save the Java **source code file** - should have a `.java` file extension.
- Java **compiler** will then translates the source code file into a **byte code** instruction.
  - If there are **syntax errors** made by programmer that violate the rules of the programming language, then need to be corrected in the text editor.
- The **Java Virtual Machine** is a program that and executes the byte code file into program result.