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COMPUTER PROGRAMMING

Introduction to JAVA



CONTENTS

- The appearance of JAVA
- Strength of JAVA
- JAVA And WEB(WWW)



□ This course will teach students

- the syntax of the Java language,
- concept and object-oriented programming in Java,
- Java exceptions,

The appearance of JAVA

- A language in 1991 is from Oak that is initiative language of Java.

- In 1991, James Gosling in Sun Microsystems company choose Java language for Green project that was for developing home appliances.



The appearance of JAVA

- Gosling in 1994 named Oak JAVA which is a informal term for coffee.
 - James Gosling, Arthur Van Hoff, Andy Bechtolsheim
 - Java is a coffee raw material name of Indonesia



The appearance of JAVA

□ Events in 1994

- World Wide Web has appeared.
- Java, Hot Java project started.

□ Events in 1995

- Hot Java, Java, Java context, source code were published in Web.
- Platform : Sun SPARC Solaris, Windows NT, Windows95, Linux
- Netscape company supported the functionality of Java in web browser.
- Sun Microsystems released Java beta 2.
- Sun & Netscape published Java Script.

The appearance of JAVA

□ Events in 1996

- Sun Microsystems released Java version 1.0.
- Netscape supported the functionality of Java version 2.0.

□ Events in 1999

- Sun Microsystems released Java version 1.2.
- Java1.3 -> 1.4.2 / J2SE 5.0 used, Jbuilder 7 Enterprise
- Jbuilder 7 played a role of programming language and platform environment that was a kind of real-time system.

□ Description:

- Java is a programming language for distributed application.
- Also, Java lets you do almost you can do with a traditional programming language like Fortran or C++.
- Programmers familiar with C or C++ will learn easily how to develop Java applications and applets.
- However Java has learned from the mistakes of its predecessors. It is considerably cleaner and easier to use than those languages.

□ As a programming language JAVA :

- A simple, Object-oriented, distributed, interpreted, robust, secure, architecture, neutral, portable, high-performance, multithreaded, dynamic language

□ Features : simple

- Java has the bare bones functionality needed to implement its rich feature set, debug and learn easily.
- It does not add lots of syntactic sugar or unnecessary features.
- Java is based on C++
- But, it deletes confused things to let C or C++ programmers understand

- garbage collection feature to manage memory automatically
- Simple and powerful language to implement

□ Features : Object Oriented Language

- Almost everything in Java is either a class, a method or an object.
- Fully object oriented language
- It starts with class and ends with class.
- Only uses function and variables belong to a class.

□ Features : appropriation for distributed environment

- Throughout internet or network, Java was designed to execute efficiently through TCP/IP protocol in distributed environment.
- Java is embedding a TCP/IP network function.
- It supports libraries related to HTTP, FTP, TCP/IP protocols.
- Including Remote Method Invocation (RMI) function

Programming Language : JAVA

□ Features : interpreter execution methods

- a Java compiler turns to Java source code into byte code formats, and a Java interpreter runs Java programs after turning to execution codes.

바이트코드

번역기

Compiled Interpreted Language

Programming Language : JAVA

□ Features : run Java programs by interpreter

- Java byte codes are possible to be run on many platforms including Windows 95, Windows NT, and Solaris 2.3 and later available for JVM.

□ Features : Robust

- No Pointer
- Automatic Garbage Collection
- Strict Type Checking

□ Features : Secure

- The Java environments for running java programs are divided by developing and running environments
- JVM(Java Virtual Machine) checks integrity

< Java program running processes through network >

□ Features : Architecture Neutral, Portable

- So Java programs are compiled to a byte code format that can be read and run by interpreters on many platforms with JVM.
- Java is also designed as a system architecture neutral system on system dependence including syntax of language as well.
ex) a type int is always 32 bits. // 64 bits
- Once writing a computer program in Java, we can run the program at all kinds of computer with JVM. That is a powerful portable feature of Java.

Programming Language : JAVA

□ Features : Portable



□ Features : High Performance

- A byte code format can be run by interpreter.
- Java can be compiled on the fly with a Just-In-Time compiler (JIT) to code that rivals C++ in speed.
- Java translators (compiler and interpreter) make efficient byte codes by doing register allocation and optimization.

□ Features : Multithreaded, Dynamic

■ Multi-threaded

- Java uses thread to process jobs that need to be run concurrently.
- Java provides library classes to be convenient to use thread.

■ Dynamic

- Java supports functions to add new methods or properties to libraries not to affect existential programs, C, C++ etc.
- Java connects to library during running time not compile time.

□ platform

- Platform is a base environment to run a program based on H/W or S/W.
- It consists of operating system that is a kind of S/W which manages H/W.

□ Java platform consisting in S/W

- To set java platform developing program, it needs to install JDK (Java Developer's Kit).

□ Two components of Java platform

■ Java Virtual Machine (JVM)

- Support interpreter to turn byte code.
 - ✓ Interpreter or appletviewer of JDK
 - ✓ www retrieval engines supported by companies such as Netscape, Explorer, HotJava, support interpreter functions.

■ JAVA API (Application Programming Interface)

- Is huge packages supported by JDK

Strength of Java

- **Learn quickly and write program coding fastly.**
 - Java is Object Oriented Language. -> It is similar to real world.
 - because of code brevity

- **It is possible to reduce program code lines by using libraries.**

- **Java makes a level of program higher.**

- **Make program code platform independently by using byte code.**

- **Easy to write a distributed S/W.**
 - use directly remote files or objects in distributed network environments.

□ JAVA is a general purpose language and strong in NW.

□ Web and Java

- Applet program
 - A form running at clients

- Servlet program
 - A form running at server

- JSP (Java Server Page)
 - A form of scripts within HTML

JAVA And WEB(WWW) – Applet program

- ❑ Applet program is a program that runs on web retrieval engine of client after downloading the result from server.
- ❑ Usually use in small and simple applications.



JAVA And WEB(WWW) – Servlet program

- **Servlet program creates a thread from client request.**
 - Excellent in performance aspects not to load to server.



JAVA And WEB(WWW) – JSP 프로그램

- JSP is similar to ASP(active server page) of MS.
- Programming ways developed based on servlet program
- JSP is statements embedded in HTML.