1 COMPUTER PROGRAMMING

Introduction to JAVA

CONTENTS

- The appearance of JAVA
- Programming language : JAVA
- Platform : JAVA

Course to JAVA

- **This course will teach students**
  - the syntax of the Java language,
  - concept and object-oriented programming in Java,
  - Java exceptions,
  - file input/output (I/O) using Java Foundation Class threads and networking.

The appearance of JAVA

- A language in 1991 is from Oak that is initiative language of Java.
- Java was appeared to be used for embedded program in electronic devices.
- In 1991, James Gosling in Sun Microsystems company choose Java language for Green project that was for developing home appliances.

The appearance of JAVA

- **Applications developed in WWW environment were developed by Oak lang**
  - Reason : because server-clients operation ways in WWW and Oak operation concepts is same way

The appearance of JAVA

Events in 1994

- World Wide Web has appeared.
- The name of Oak was changed named of Java.
- 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
  - Platform is a base environment to run a program based on H/W or S/W.
- Sun Microsystems released Java beta 1.
- Netscape company supported the functionality of Java in web browser.

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.

Programming Language : JAVA

- **As a programming language JAVA :**
  - A simple, Object-oriented, distributed, interpreted, robust, secure, architecture, neutral, portable, high-performance, multithreaded, dynamic language

Programming Language : JAVA

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.

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

Programming Language : JAVA

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.
- Object oriented programming methodology is similar to our real life world.

Programming Language : JAVA

☐ 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.

☐ 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.

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.

Programming Language : JAVA

Features : Robust

- No Pointer
- Automatic Garbage Collection
- Runtime Error Processing

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>

Programming Language : JAVA

Features : Architecture Neutral, Portable

- To separate running environment from development environment, it uses architecture neutral byte code format.
- Java is platform independent by using byte code running on JVM.
- So Java programs are compiled to a byte code format that can be read and run by interpreters on many platforms with JVM.

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
  - a thread of execution is the smallest unit of processing that can be scheduled by an operating system.
  - Multithread can execute more than one process at the same time in one program.
- 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 : JAVA

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).

Platform : JAVA

Two components of Java platform

- Java Virtual Machine (JVM)
  - Computer that uses byte codes into machine language.
  - Install JVM by building JDK environment.
  - Support interpreter to turn byte code.

- JAVA API (Application Programming Interface)
  - Is huge packages supported by JDK
  - Java programmers can write java programs using predefined SW packages within Java API.

Strength of Java

- **Learn quickly and write program coding fastly.**
- **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 And WEB(WWW)

- **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.