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FACULTY OF ENGINEERING & TECHNOLOGY

BCS-503: Object Oriented Techniques

Lecture-17

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OBJECTIVES

In this PPT, you will learn to:

- Explain the history of Java
- Explain Java in brief
- List the types of Java programs
- List Java Capabilities
- Explain the Java Virtual Machine (JVM)
- Examine the JDK and tools under it

HISTORY OF JAVA

- Introduced in 1995 by Sun Microsystems.
- Its objective was to develop a software for embedding in consumer electronic devices.
- Initially called ‘Oak’.
- Java being secure, portable, and platform-independent was found to be capable of addressing large scale problems across the Internet.

WHAT IS JAVA?

- An object-oriented programming language.
- A cross platform language.
- It is used to create stand-alone applications, net based programs and programs for consumer devices.

Example : cellular phones, palm pilots

TYPES OF JAVA PROGRAMS

Applets

It is a program written in Java for a web application, which can be downloaded on any client system.
Applets are more intelligent programs as compared to other dynamic programs on the Internet. An applet can react and respond to user inputs and actions.

Applications

It is a program that runs on the computer under the operating system of the computer. The application can either be GUI based or based on command line interface.

APPLICATIONS OF JAVA

- Create a wide variety of applications from a simple computation program to complex distributed application.
- One can develop:
  - Colorful scrolling banner for web pages
  - Interactive quizzes
  - Program that plays audio, displays a banner and animates images at the same time.
  - Games that can run as stand alone or be deployed on the web.

FEATURES OF JAVA

- **Simple -** The Java designers removed a number of complex features that existed in C, such as pointer manipulation, operator overloading etc.
- **Object-Oriented -** Everything is an object in Java. Therefore, the focus is on the data, and the methods that operate on the object in the application instead of procedures.
- **Platform-independent -** It refers to the ability of the program at the source level, which allows the user to move the source code from one system to another, compile the code, and run it cleanly on a system.
- **Robust -** Java checks the code at the time of compilation, and also at the time of interpretation.
- **Secure -** Java provides a controlled environment for the execution of the program, for which it provides several layers of security control.
- **Distributed -** Java can be used to develop applications that are portable across multiple platforms, operating systems, and graphic user interfaces.
- **Multithreaded -** Java programs use a process called ‘multithreading’ to perform many tasks simultaneously.

THE JAVA VIRTUAL MACHINE

- It has an interpreter component that enables communication between Java byte code and a computer's operating system.
- Java code can run on any platform by using JVM.
- JVM normally reads and executes Java statements one at a time.
- JVM is responsible for platform independence.
- Recognizes only a particular binary format called a class file.

THE JAVA DEVELOPMENT KIT

- It contains the software and tools needed to compile, debug and execute applets and applications written in the Java language.
- It is a set of command-line tools.

TOOLS UNDER JDK

- **javac:** Compiler used to compile Java source code.
  - Syntax: javac [option] source
  - Source files end with an extension of `.java`
  - Options can include:
    - -classpath
    - -d

- **java:** Interpreter used to execute Java byte codes.
  - java [option] classname [arguments]
  - Options can include
    - -classpath

- **appletviewer:** Used to view and test applets.

Syntax: appletviewer [options] url

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Multiple Choice Question:

Q1. Which statement is true about java?

a) Platform independent programming language

b) Platform dependent programming language

c) Code dependent programming language

d) Sequence dependent programming language

Multiple Choice Question:

Q2. Which component is responsible to run java program?

a) JVM

b) JDK

c) JIT

d) JRE

Multiple Choice Question:

Q3. What is use of interpreter?

a) They convert bytecode to machine language code

b) They read high level code and execute them

c) They are intermediated between JIT and JVM

d) It is a synonym for JIT

Multiple Choice Question:

Q4. Which component is responsible for converting bytecode into machine specific code?

a) JVM

b) JDK

c) JIT

d) JRE

Multiple Choice Question:

Q5. Which component is used to compile, debug and execute java program?

a) JVM

b) JDK

c) JIT

d) JRE

Summary

In this PPT, you learned that:

- Java was introduced by Sun Microsystems in 1995.
- Java is object-oriented and a cross platform language.
- Applets are Java programs that run through a Java enabled web browser.
- Java bytecodes are machine language instructions understood by the Java Virtual Machine (JVM) and usually generated as a result of compiling Java language source code.
- A "Just-In-Time" (JIT) Java compiler produces native code from Java byte code instructions during program execution.
- The Java Development Kit (JDK) contains the software and tools needed to compile, debug and execute applets and applications written in the Java language. It’s basically a set of command-line tools.