Overview of Intro. to Java Programming

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Objectives

- To understand computer basics, programs, and operating systems

- To understand the meaning of Java language specification, API, JDK, and IDE

- To write a simple Java program

- To display output on the console

- To explain the basic syntax of a Java program

- To create, compile, and run Java programs

Outline

- What is a computer?

- What is a program?

- What is a programing language?

- How do we let a computer run a program?

- What is an operating system?

- Why Java?

- How do we write a simple Java program?

What is a computer?

Components of Computers

- CPU

- Memory and Storage

- Input and Output Devices

- Communication Devices

CPU

- Instruction set

- Clock speed

- Cache

- Multi-core CPUs

Memory Hierarchy

- Roles
  - Main memory
  - Secondary storage
  - Tertiary storage (backup)
- Characteristics
  - Volatile vs non-volatile
  - Access latency (speed)
  - Capacity (size)
  - Reliability (e.g., MTBF)

How Data is Stored?

- Representation

  - Binary representation

  - Bits and Bytes

  - Units of measurement

- Addressing

Input and Output Devices

- Input devices

  - Mouse, keyboard, touch pad, joy sticker, …

- Output devices

  - Monitor

    - Resolution

    - Dot pitch

  - Printer

Communication Devices

- Examples

  - Bluetooth

  - Ethernet

  - Wireless LAN (e.g., Wi-Fi)

Questions?

What is a program?

- (computer) hardware vs. (computer) software

- Programs are software

- Instructions to a computer, written in a programming language

Questions?

What is a programming language?

- Machine language

- Assembly language

- High-level language

Examples of High-Level Languages

Questions?

How do we let a computer run a program?

- How do we let a computer run a program written in a high-level (or assembly) language?

  - Source code, interpreter, and compiler

  - Interpreting

  - Compilation

Questions?

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What is an operating system?

- Examples of operating systems?

- What does an operating system do?

Questions?

Why Java?

- Java is a general purpose high-level programming language? But why?

- JRE vs JDK

Questions?

Writing a simple Java program?

- Preferred development environment

  - Git bash + Atom editor + JDK 1.8 or newer

- (Optional) Using IDEs

  - IntelliJ IDEA

  - Eclipse

  - NetBeans

  - …

Let's write a simple Java program

- Class name

- Main method

- Statements

- Statement terminator

- Reserved words

- Comments

- Blocks

What if there is an error?

- What kind of error?

- How do we deal with errors?

Questions?

Assignments

- Journal Exercise 1

- Journal Exercise 2

- CodeLab Assignment 0

(Journal) Exercise 1

- Preparing programming environment

  - Download and set up Git, Atom, JDK

- Optionally, using an IDE

- Create a journal directory (e.g., journal), and create a subdirectory (e.g., C0826)

  - Document the experience (concisely) in a text file

(Journal) Exercise 2

- Write, compile, and run the "Hello, World" java program

  1. Create/Revise the program

  2. Compile the program

  3. Run the program

  4. Introduce errors on purpose (e.g., remove ";", remove "(", remove "}", change "main" to "primary"), repeat 1 - 3

(CodeLab) Exercise 0

- Complete CodeLab registration