Programming 1
Lesson 02 - Basic Knowledge about Java

Basic Knowledge about Java

JVM

- Java compiler compiles Java code to Bytecode,
- Java Virtual Machine (JVM) will translate the Bytecode to the machine code, based on the model of a CPU.
- You can also understand JVM as a Virtual CPU that directly execute the bytecode as machine code.

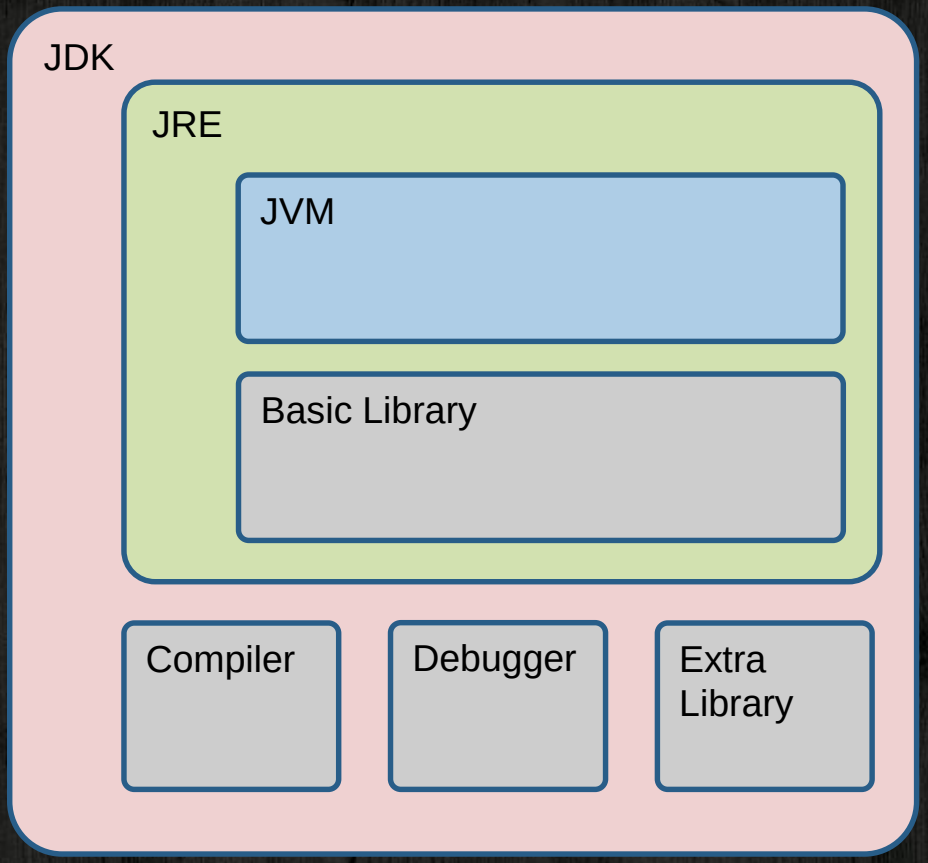
JRE

- Having only JVM is not enough for both Java user and Java programmer.
- To execute any Java code, we also need some fundamental code (libraries) to support. These codes are part of Java Runtime Environment (JRE).
- JRE contains JVM
- If you only need to execute (run) Java code, without writing any Java code, you need to have JRE installed on your computer.

JDK

- JRE is not enough for Java development
- First, we need to have a complier
- Also, we need a debugger
- Besides, we need a larger range of Java library for Java developing
- All of these are part of the Java Developing Kit (JDK)
- JDK contains JVM

JVM, JRE, and JDK



Platforms

- JDK has different platforms
  - SE: Standard Edition. When we talk about Java developing, most of the time we are talking about this platform.
  - EE: Enterprise Edition. This is for large-scale network applications development.
  - ME: Micro Edition. This is for mobile Java applications development.
  - FX: FX is a common abbreviation of special effects. This is for rich internet application development.

Version

- The latest version is Java 12 (March 2019)
- Version earlier than 8 might be too old


Question?

Text Editor VS IDE

- Java code are pure text
- You can use a pure text editor to write it
- Text Editors are light, do not need much CPU and memory, but do not support a lot of tools for programming
- Text Editor:
  - NotePad (try to avoid)
  - NotePad++
  - Sublime
  - TextPad

Text Editor VS IDE

- For a beginner, Integrated development environment (IDE) is a better choice than text editor.
- An IDE is a software application that provides comprehensive facilities to computer programmers for software development.
- An IDE normally consists of a source code editor (text editor), build automation tools and a debugger.
- There are so many different IDEs for Java (e.g. Eclipse, NetBeans, BlueJ, JDeveloper, etc)

Text Editor VS IDE

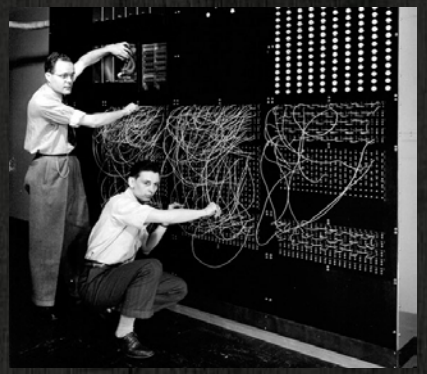
- Here at Vanier College, we have Java 8 and NetBeans 8 installed in the lab
- NetBeans 8 can only support Java 8, but not 8+
- If you want to use NetBeans for higher version, you can use Apache NetBeans (recently released) instead
- The layouts are the same.

Take Home Message

- If you want to write Java Code at home, on your local computer, you should have:
- Java JDK SE 8 (or higher) installed
- A text Editor (e.g. Sublime 3)
- Or an IDE (e.g. NetBeans)


Question?

Bug and Debug



- If your code cannot functionally working well, that means you might have errors or in computer science we say bug(s) in your code.
- The original bug in computer science field was found in 1944, and it was a moth. People found it between two electrical relays.
- Finding the bug in your code, it is called debugging. Debug is something painful, and it takes about 70% of the working time of a programmer.

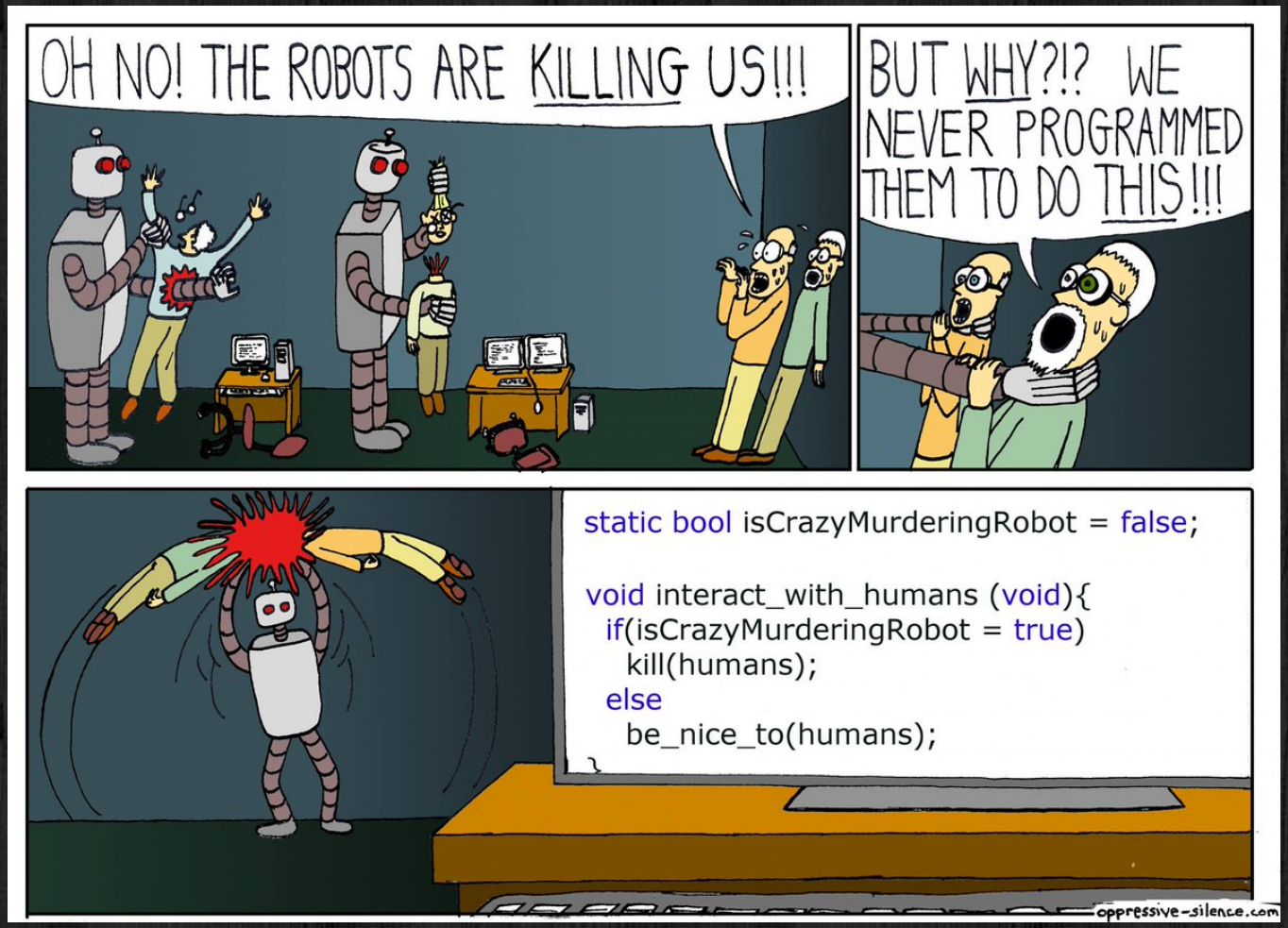
Bug and Debug

- There are few different kinds of bugs
  - Compiler Errors
    - The compiler cannot understand your code, and cannot translate it to bytecode. Usually it is caused by syntax error or misspellings.
  - Run-time Errors
    - Your code is successfully compiled, but then when you try to execute it, there is an error occur. Usually caused by problems using the rewritten classes
  - Logic Errors
    - Your code is executed successfully, but the result is not what you expected

Bug and Debug

- Beginners usually have compiler errors
- IDE will provide useful information to help you find where is the Compiler errors
- Logic errors are more difficult to be detected
- Debugger can help you to find and fix the logic errors
- But it comes with experiences

Bug and Debug




Question?

Pseudo Code

- Pseudocode, from pseudo, which means “appearing like”, is a method for expressing a program in the English language.

```
ask the user to input a number
read a number from user input

if the number is greater than 0
        display “the number is positive”
else if the number is equal to 0
        display “the number is 0”
else if the number is smaller to 0
        display “the number is negative”
```


Question?