Introduction to Computer Programming (Java A)
Lab 1

[Objectives]
1.   Install JDK 8 and configure environment variable.
2.   Learn compilation and execution of your first Java program in command line.

[Course Information]
1. **Lab exercise:** The content of lab exercise is prepared according to the knowledge introduced in lectures. Normally, we provide 3 to 7 exercises per lab.

2. **Assignment:** The assignment is independent from the lab exercise and will be sent to you separately. All of you should submit the assignment before the deadline. There will be about 5 assignments in this course.

    Submission of Assignment:
    We will use an Online Judge (OJ) platform to automatically grade your programming assignments. More instructions will be given later.

3. **Grading Scheme:**
    Lecture attendance and quizzes (5%)
    Lab attendance and exercise (5%)
    Assignments (30%)
    Project (20%)
    Final exam (40%)

4. **Project:** Before the end of this semester, all of you should accomplish a project. The number of group members is 2-3.

[Software Installation]
1. JDK: The Java Development Kit (JDK) is a software development environment for developing Java applications and applets. It includes a Java Runtime Environment (JRE), an interpreter/loader (java), a compiler (javac), an archiver (jar), a documentation generator (javadoc) and other tools needed in Java development.

Download JDK at the following url:

https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html

Note: The version of JDK provided at the above link may be newer than 8u201. This does not matter.

Installation:

Once downloaded, run the executable. Follow the prompts to install the JDK. You'll need administrator access.

a) Double click the JDK Software, and install it according to the prompt.

Today's exercise is designed to make sure that the Java programming environment is correctly installed on your machine.

Open a terminal window or command prompt. In Windows 7 or newer, Start Menu | All Programs | Accessories | Command Prompt, or type "cmd" at the search box. Type the following command:

java –version

Then if it returns as following, you have installed it successfully.

```
C:\Program Files\Java\jdk1.8.0_201\bin>java -version
java version "1.8.0_201"
Java(TM) SE Runtime Environment (build 1.8.0_201-b09)
Java HotSpot(TM) Client VM (build 25.201-b09, mixed mode, sharing)
```

2. Java Environment Variable:

   If you are a Mac OS user, you can ignore environment variable in this lab.

   If you are a Windows user, you need to do as following steps.

   a) Advanced System Settings: Type advanced system settings (高级系统设置) in the search box (beside the Windows start button), clicks View advanced system settings.
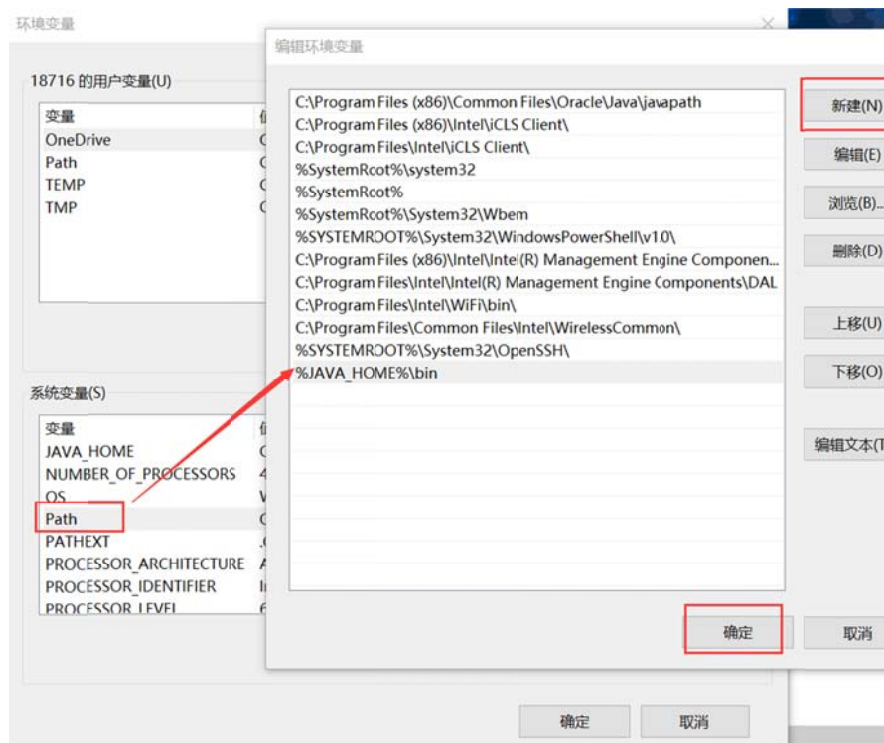
b) Add JAVA_HOME：In System variables, add a new JAVA_HOME variable and point it to the JDK installed folder.

(The following picture assumes JDK 10 is installed, find your equivalent JDK 8 folder)
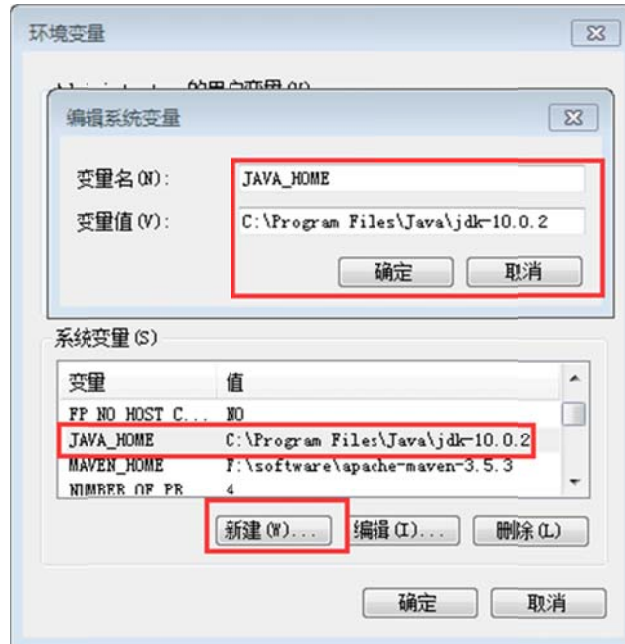
c) Update Path: In System variables, find `PATH`, clicks edit and append this `%JAVA_HOME%\bin` into the last line (Windows 10 user).

  d) Restart your command prompt.

  e) Checking.

Then type the command below:

javac -version

  You will see one of two things. If the JDK / Java compiler is correctly installed, you should see a version number like so:

```
C:\Program Files\Java\jdk1.8.0_201\bin>javac -version
javac 1.8.0_201
```

  However, if the JDK isn't installed or the environment variables are not properly configured, then you'll see an error like so:

```
C:\>javac -version
'javac' is not recognized as an internal or external command,
operable program or batch file.
```

3. Editor

  A simple editor **Notepad++** is recommended for beginners (For windows system user). For Mac users, **Visual Studio Code** is a good option.

   Download Notepad++: https://notepad-plus-plus.org/

   Download Visual Studio Code: https://code.visualstudio.com/

Or, you can simply use any text editor (the source code of Java programs is just a sequence of characters), for example **notepad** on windows and **TextEdit** on Mac.

[Exercise]

1. Compile a Java Program in CMD

(1) Open the notepad program and create a new text file and input the following code.

```
public class Demo {
    public static void main(String[] args) {
        System.out.println("Hello, world!");
    }
}
```

(2) Using the "save as" command in the "File" menu to save the File with the name "Demo.java". Note that the .java file name has to be the same as the main Class name in your program.
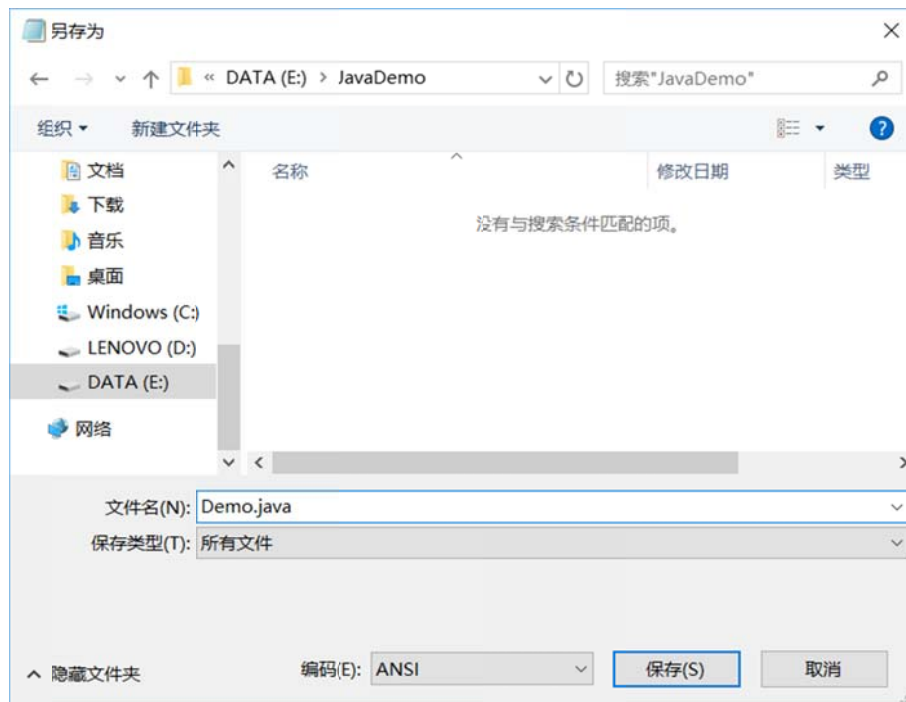
(3) Open the cmd program; in the cmd window, use "cd" command to go to the directory where you save your Demo.java; use javac command to compile your ".java" file; use java command to execute the .class file (which must have a main function). The procedure is as follows.

Now, you are using an editor and the compiler separately.

There are software (e.g. Eclipse, NetBeans, IDEA) that could link them up and facilitate your work.

In this semester, you are recommended to use IDEA. You can download the community version at the following link:

https://www.jetbrains.com/idea/download/