Internet of Things

Date: 1 – 5 March 2021 **Week:** 4

Task I: Tutorial questions

1. Explain the difference between a digital sensor and an analog sensor.
2. Describe the responsibilities of the "Cloud processing unit" (the top layer of IoT).
3. Explain the difference between a microcontroller (e.g. Arduino) and an embedded board (e.g. Raspberry Pi).

Task II: Practical exercises

In this lab, we will attempt to compile and execute Java programs from the command line.

1. Download Java SDK from Oracle webpage.

   Go to : https://bit.ly/3aYUmtU

   Pick the SDK corresponding to your Operating System (Windows, macOS, Linux).

   Alternatively, you may download Java directly from the Linux command line as follows.

   $ sudo yum install java-latest-openjdk-devel.x86_64

   (assuming we have a 64-bit machine)

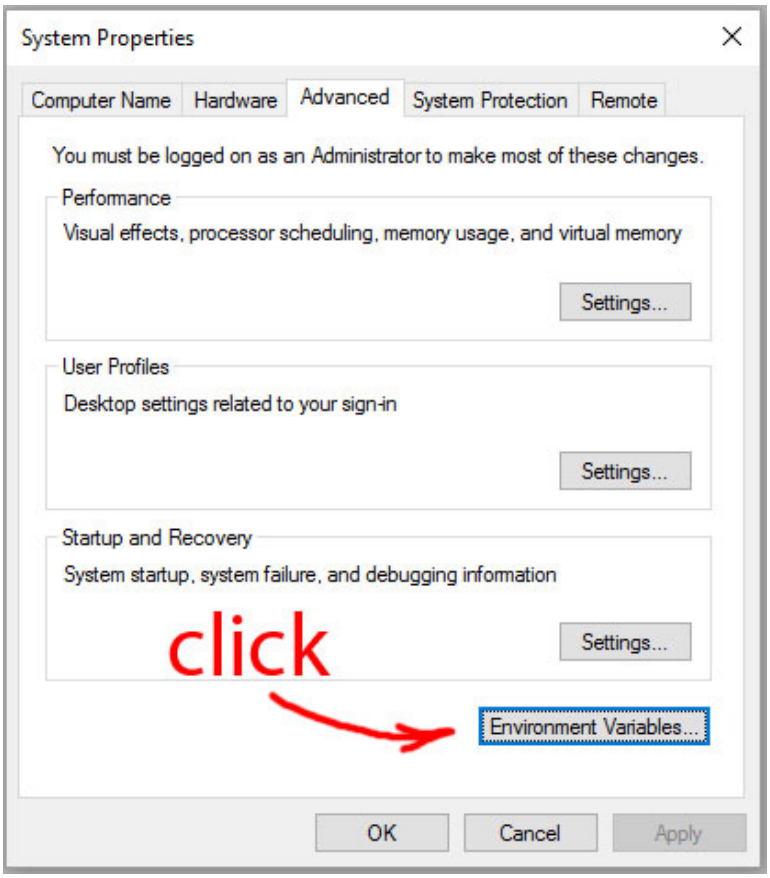
   Enter the system's password to execute the sudo command.

   Note: This will not work on Brighton.domains, as we do not have the admin privilege.

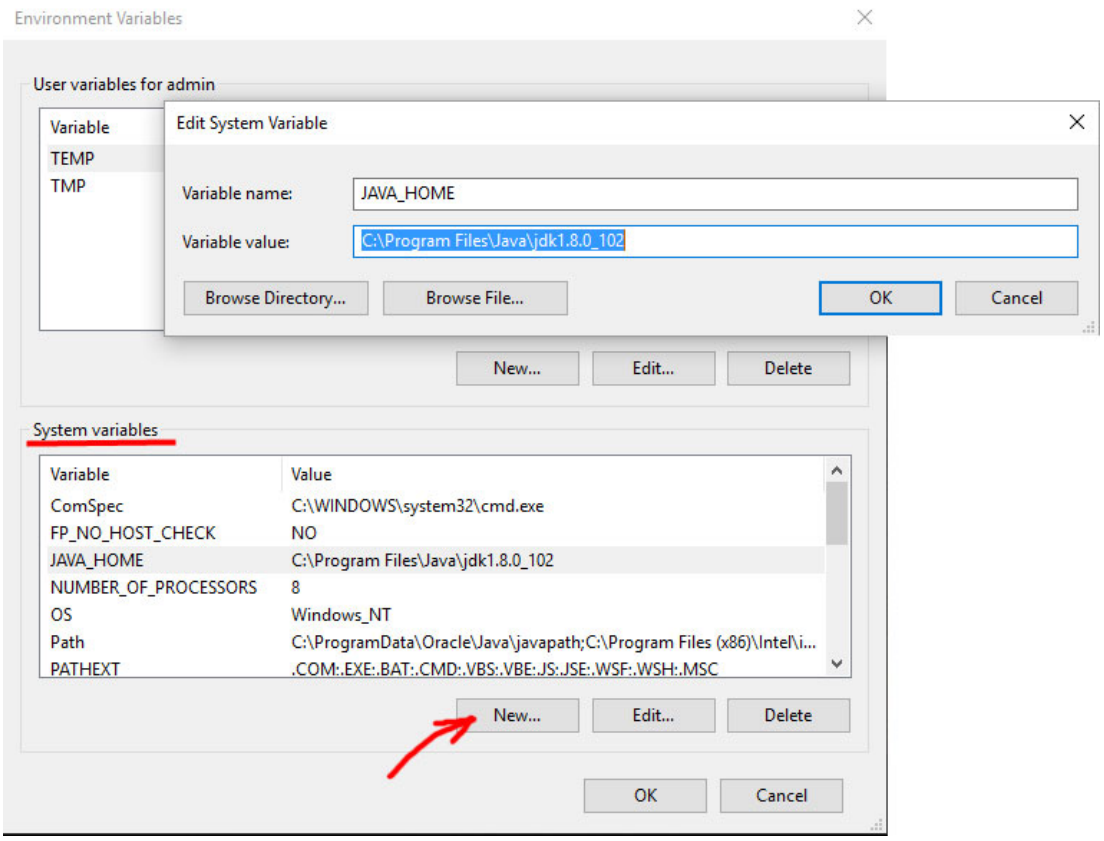
2. Setting the environment PATH.
   For Linux, type:
   $ sudo alternatives --config java
   Then select the latest SDK you just installed (e.g. 59 at the time of writing).

   For Windows (from JavaTutorial.net).
   a) Open Advanced System Settings
   In Windows 10 press Windows key + Pause Key. This will open the System Settings window.
   Type in the Search Bar "Advanced System Settings". Open the link.

   b) Set JAVA_HOME Environment variable
   In "System Properties window", click "Environment Variables…"



Under “System variables” click the “New…” button and enter JAVA_HOME as “Variable name” and the path to your Java JDK directory under “Variable value”.

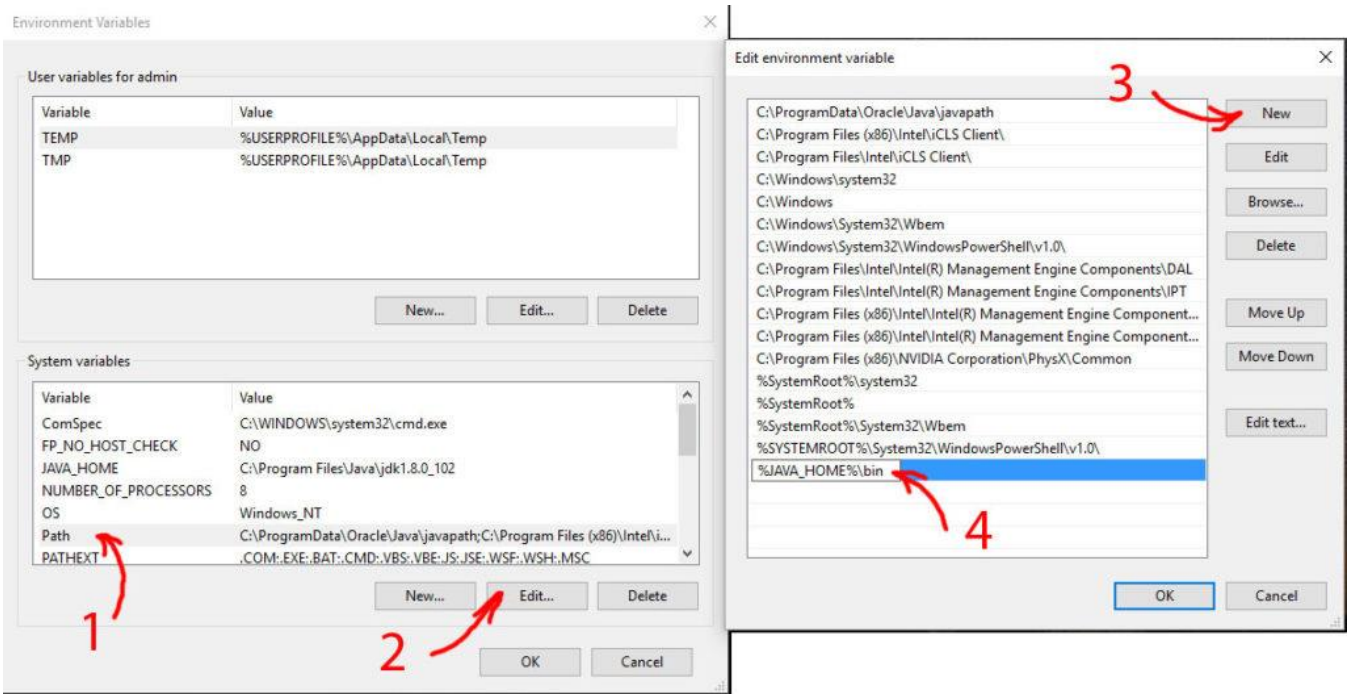


c) Update System PATH

In “Environment Variables” window under “System variables” select Path.

Click on “Edit…”. In “Edit environment variable” window click “New”

Type in %JAVA_HOME%\bin

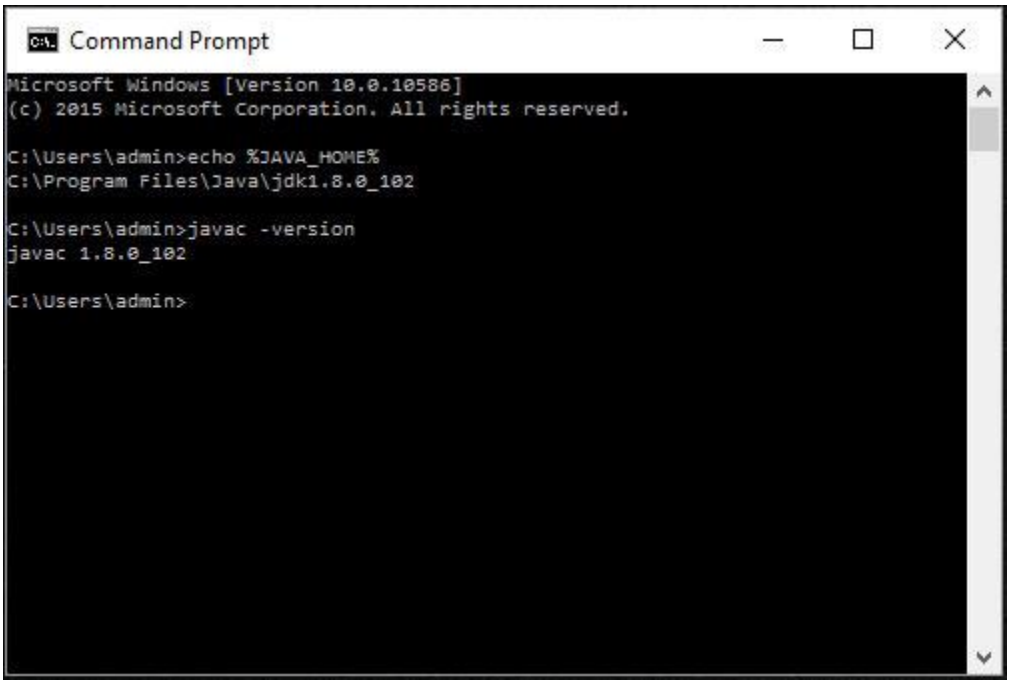


d) Test our new configuration

Open a new command prompt by pressing “Windows + R”, then type “cmd”.

Type in “javac -version”.

If there is no error message, we are good to go.



3. Open your favourite text editor. (Vi editor on Linux, or Notepad on Windows)

   For Vi, type:

   $ vi HelloWorld.java

   Then, switch to "Insert mode" by pressing "i" on the keyboard. Type in the following program:

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

   Save and quit Vi. (Press ESC to enter command mode. Then type ":wq").

   On Windows, make sure to save the file as "HelloWorld.java"

4. Compile and execute the program.
   In the command line, type
   $ javac HelloWorld.java
   It will compile your Java code.
   Your program can now be run by typing:
   $ java HelloWorld

5. Command line arguments
   You may wonder since the first semester, what does *"String[] args"* do ?
   Modify "HelloWorld.java" with some new code:

```
public class HelloWorld
{
     public static void main(String[] args)
     {
         System.out.print(args[0]);
         System.out.print(args[1]);
     }
 }
```

   Recompile the program:
   $ javac HelloWorld.java
   Then run it as follows.
   $ java HelloWorld Good Morning

   It should display "GoodMorning" on the screen.

   Anything we put via the command line will be passed directly into our program for processing.

Document your answers in the learning journal, including screenshots of the Linux commands