SYSTEM REQUIREMENTS

Hardware Requirements :-

- Processor :- Intel Core i5-7400 or Core i7-7700k clocked CPU @3.40GHz

- RAM :- 16GB DDR3

- Hard Disk :- 1TB at 7200 rpm

- GPU :- Nvidia GTX 1050 or Intel 640

Software Requirements :-

- Operating System :- Windows 10 pro 64 bit version 1803

- Netbeans IDE v8.1 (Complete Package)

- JDK version 7.1

After all the above hardware requirements are met, download all the software's that are listed above in software requirement.

Now, install all the software's in the following order :-

1) JDK 7.1 or higher
2) Netbeans IDE v8.1 or higher

The steps to install JDK are listed below :-

Step 0: Un-Install Older Version(s) of JDK/JRE

I recommend that you install only the *latest* JDK. Although you can install multiple versions of JDK/JRE concurrently, it is messy.

If you have previously installed older version(s) of JDK/JRE, un-install ALL of them. Goto "Control Panel" ⇒ "Programs" ⇒ "Programs and Features" ⇒ Un-install ALL programs begin with "Java", such as "Java SE Development Kit ...", "Java SE Runtime ...", "Java X Update ...", and etc.

Step 1: Download JDK

1. Goto JavaSE download site @ http://www.oracle.com/technetwork/java/javase/downloads/index.html.

2. Under "Java Platform, Standard Edition" ⇒ "Java SE 10.0.{x}", where {x} denotes a fast running update number ⇒ Click the JDK's "Download" button.

3. Under "Java SE Development Kit 10.0.{x}" ⇒ Check "Accept License Agreement".

4. Choose the JDK for your operating system, i.e., "Windows" (for 64-bit Windows OS), and download the installer (e.g., "jdk-10.0.{x}_windows-x64_bin.exe" - 390MB).

Step 2: Install JDK and JRE

Run the downloaded installer (e.g., "jdk-10.0.{x}_windows-x64_bin.exe"), which installs both the JDK and JRE.
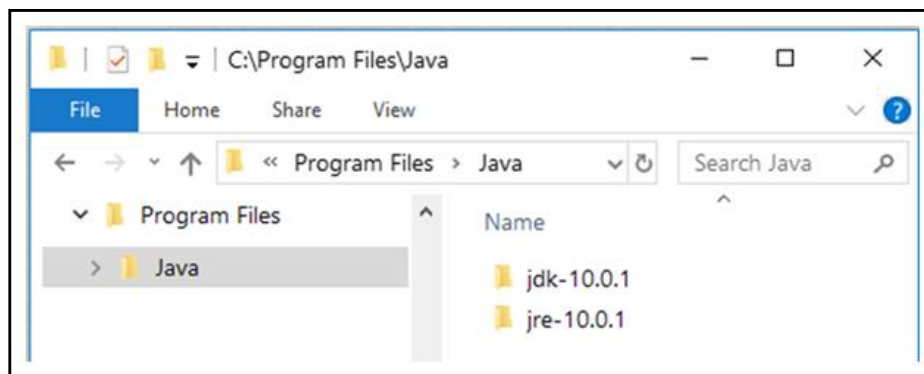
By default:

- JDK is installed in directory "C:\Program Files\Java\jdk-10.0.{x}", where {x} denotes the upgrade number; and
- JRE is installed in "C:\Program Files\Java\jre-10.0.{x}".

Notes: In 64-bit Windows, "Program Files" is meant for 64-bit programs; while "Program Files (x86)" for 32-bit programs.

Accept the defaults and follow the screen instructions to install JDK and JRE.

Use the "File Explorer", goto "C:\Program Files\Java" to inspect these folders. Take note of your **JDK installed directory**, in particular, the varying upgrade number, which you will need in the next step.

In the following diagram, the JDK installed directory is "C:\Program Files\Java\jdk-10.0.1", where {x}=1. I shall refer to the **JDK installed directory** as **<JAVA_HOME>**, hereafter, in this article.

Step 3: Include JDK's "bin" Directory in the PATH

Windows' Shell searches the current directory and the directories listed in the PATH *environment variable* (*system variable*) for executable programs. JDK's programs

(such as Java compiler javac.exe and Java runtime java.exe) reside in the *sub-directory* "bin" of the JDK installed directory. You need to include "bin" in the PATH to run the JDK programs. To edit the PATH environment variable in Windows 7/8/10:

1. Launch "Control Panel" ⇒ (Optional) System and Security ⇒ System ⇒ Click "Advanced system settings" on the left pane.

2. Switch to "Advanced" tab ⇒ Push "Environment Variables" button.

3. Under "System Variables" (the bottom pane), scroll down to select "Path" ⇒ Click "Edit...".

4. **For Windows 10 (newer releases)**: You shall see a **TABLE** listing all the existing PATH entries (if not, goto next step). Click "New" ⇒ Enter the JDK's "bin" directory "c:\Program Files\Java\jdk-10.0.{x}\bin" (Replace {x} with your installation number!!!) ⇒ Select "Move Up" to move this entry all the way to the TOP.

   Prior to newer Windows 10: **(CAUTION: Read this paragraph 3 times before doing this step! Don't push "Apply" or "OK" until you are 101% sure. There is no UNDO!!!)** (To be SAFE, copy the content of the "Variable value" to Notepad before changing it!!!) In "Variable value" field, INSERT "c:\Program Files\Java\jdk-10.0.{x}\bin" (Replace {x} with your installation number!!!) IN FRONT of all the existing directories, followed by a semi-colon (;) which separates the JDK's bin directory from the rest of the existing directories. DO NOT DELETE any existing entries; otherwise, some existing applications may not run.

5. Variable name : **PATH**

   Variable value : **c:\Program Files\Java\jdk-10.0.{x}\bin;[*do not delete exiting entries...*]**

Notes: Starting from JDK 1.8, the installation created a directory "c:\ProgramData\Oracle\Java\javapath" and added to the PATH. It contains only JRE executables (java.exe, javaw.exe, and javaws.exe), but NOT the JDK executables (e.g., javac.exe).

Step 4: Verify the JDK Installation

Launch a CMD shell via one of the following means:

1. Click "Search" button ⇒ Enter "cmd" ⇒ Choose "Command Prompt", or

2. right-click "Start" button ⇒ run... ⇒ enter "cmd", or

3. (Prior to Windows 10) click "Start" button ⇒ All Programs ⇒ Accessories (or Windows System) ⇒ Command Prompt, or

4. (Windows 10) click "Start" button ⇒ Windows System ⇒ Command Prompt.

Issue the following commands to verify your JDK installation:

1. Issue "path" command to list the contents of the PATH environment variable. Check to make sure that your <JAVA_HOME>\bin is listed in the PATH. Don't type prompt>, which denotes the command prompt!!! Key in the command (highlighted) only.

2. // Display the PATH entries

3. prompt> **path**

    PATH=**c:\Program Files\Java\jdk-10.0.{x}\bin**;[*other entries...*]

4. Issue the following commands to verify that JDK/JRE are properly installed and display their version:

5. // Display the JRE version

6. prompt> **java -version**

7. java version "10.0.{x}" 2018-04-17

8. Java(TM) SE Runtime Environment 18.3 (build 10.0.1+10)

9. Java HotSpot(TM) 64-Bit Server VM 18.3 (build 10.0.1+10, mixed mode)

10.

11. // Display the JDK version
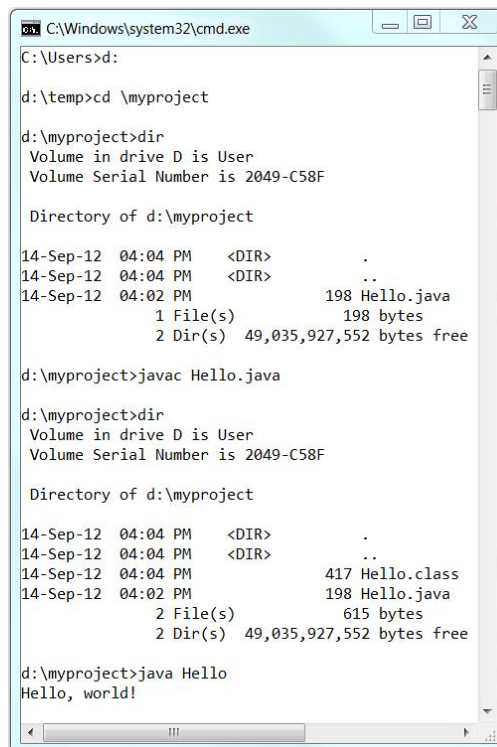
12. prompt> **javac -version**

    javac 10.0.{x}

Step 5: Write a Hello-World Java Program

1. Create a directory to keep your works, e.g., "d:\myProject", or "c:\myProject", or any directory of your choice. Do NOT save your works in "Desktop" or "Documents" as they are hard to locate. The directory name shall not contain *blank* or special characters. Use meaningful but short name as it is easier to type.

2. Launch a programming text editor (such as TextPad, or NotePad++, or Sublime Text, or Atom). Begin with a *new file* and enter the following source code. Save the file as "Hello.java", under your work directory (e.g., d:\myProject).

3. /*
4. * First Java program to say Hello
5. */
6. public class Hello {   // Save as "Hello.java" under "d:\myProject"
7.   public static void main(String[] args) {
8.   System.out.println("Hello, world!");
9.   }

}

Step 6: Compile and Run the Hello-World Java Program


```
C:\Windows\system32\cmd.exe

C:\Users>d:

d:\temp>cd \myproject

d:\myproject>dir
 Volume in drive D is User
 Volume Serial Number is 2049-C58F

 Directory of d:\myproject

14-Sep-12  04:04 PM    <DIR>          .
14-Sep-12  04:04 PM    <DIR>          ..
14-Sep-12  04:02 PM               198 Hello.java
               1 File(s)            198 bytes
               2 Dir(s)  49,035,927,552 bytes free

d:\myproject>javac Hello.java

d:\myproject>dir
 Volume in drive D is User
 Volume Serial Number is 2049-C58F

 Directory of d:\myproject

14-Sep-12  04:04 PM    <DIR>          .
14-Sep-12  04:04 PM    <DIR>          ..
14-Sep-12  04:04 PM               417 Hello.class
14-Sep-12  04:02 PM               198 Hello.java
               2 File(s)            615 bytes
               2 Dir(s)  49,035,927,552 bytes free

d:\myproject>java Hello
Hello, world!
```

To compile the source code "Hello.java":

1. Start a CMD Shell (Click the "Start" button ⇒ "run..." ⇒ Enter "cmd").

2. Set the *Current Drive* to the drive where you saved your source file "Hello.java". For example, suppose that your source file is saved in drive "d", enter **"d:"** as follow:

3. prompt> **d:**

   D:\xxx>

   Don't enter prompt>, which denotes the command prompt.

4. Set the *Current Working Directory* to the directory that you saved your source file via the **cd** (*Change Directory*) command. For example, suppose that your source file is saved in directory "d:\myProject".

5. D:\xxx> **cd \myProject**

   D:\myProject>

6. Issue a **dir** (*List Directory*) command to confirm that your source file is present in the *current directory*.

7. D:\myProject> **dir**
8. ......
9. xx-xxx-xx 06:25 PM   277 **Hello.java**

   ......

10. Invoke the JDK compiler "**javac**" to compile the source code "Hello.java".

    D:\myProject> **javac Hello.java**

    The compilation is successful if the command prompt returns. Otherwise, error messages would be shown. Correct the errors in your source file and re-compile. Check "Common JDK Installation Errors", if you encounter problem compiling your program.

11. The output of the compilation is a Java class called "Hello.class". Issue a **dir** (*List Directory*) command again to check for the output.

12. D:\myProject> **dir**

```
13. ......
14. xx-xxx-xx  01:53 PM        416 Hello.class
15. xx-xxx-xx  06:25 PM        277 Hello.java

    ......
```

To run the program, invoke the Java Runtime "**java**":

```
D:\myProject> java Hello
Hello, world!
```

Everything that can possibly go wrong will go wrong: Read "JDK Installation Common Errors".

Step 7: (Optional) Download JDK API Documentation, Demos and Samples

The JDK download does not include the documentation, which needs to be downloaded separately. In the past, I always insist that my students should have a local copy of JDK API Documentation. But, today, you can easily access the online copy by googling "JDK 10 Documentation".

To install JDK API documentation:

1. From the Java SE download page (@ http://www.oracle.com/technetwork/java/javase/downloads/index.html), under "Additional Resources", look for "Java SE 10 Documentation" ⇒ Download ⇒ Accept the license agreement ⇒ Download the zip-file (e.g., "jdk-10.0.{x}_doc-all.zip" - about 66MB).
2. Unzip into the JDK installed directory <JAVA_HOME>. The documentation will be unzipped into "<JAVA_HOME>\docs". Browse the JDK documentation by opening "<JAVA_HOME>\docs\index.html".

You should also download the "JDK x Samples and Demos" from the Java SE download site.

Step 8: (For Advanced Users Only) JDK's Source Code

Source code for JDK is provided and kept in "<JAVA_HOME>\lib\src.zip" (or "<JAVA_HOME>\src.zip" prior to JDK 9). I strongly recommend that you to go through some of the source files such as "String.java", "Math.java", and "Integer.java", under "java\lang".

Now, the steps to install Netbeans IDE are listed below :-

Step 0: Install JDK

To use NetBeans for Java programming, you need to first install Java Development Kit (JDK). See "JDK - How to Install".

Step 1: Download

Download "NetBeans IDE" installer from http://netbeans.org/downloads/index.html. There are many "bundles" available. For beginners, choose the 1st entry "Java SE" (e.g., "netbeans-8.2-javase-windows.exe" 95MB).

Step 2: Run the Installer

Run the downloaded installer.

After Netbeans is installed import the "MSFS" project from the CD. All the installation and setup is complete, now clean and build your project and run the file to work on the system.