

Practical No. 1 and 2: Setup a Java programming development environment and test using small program.

I. Practical Significance:

Java is the popular platform, which is used to develop various applications for the systems as well as embedded devices like mobile, laptops, tablets and many more. It is an object-oriented programming language. Students will be able to setup Java environment for executing Java programs, using command prompt or using different IDEs like Eclipse, JCcreator and test the setup using small java program.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming technologies and tools with an understanding of the limitations.
- **Individual and Teamwork:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

“Develop Applications using Java”.

The practical is expected to develop the following skills:

1. Set up Java Environment for executing Java programs.
2. Execute simple program by setting path variable .

Setup a java programming development environment.

1. Using Command prompt
2. Using IDEs.

IV. Relevant Course Outcome(s)

Develop programs using Object Oriented methodology in Java.

V. Practical Outcome (PrOs)

Setup a java programming development environment.

VI. Relevant Affective domain related Outcome(s)

1. Follow safety practices.
2. Practice good housekeeping
3. Demonstrate working as a leader/ a team member.
4. Follow ethical practices.

VII. Minimum Theoretical Background

Java language is compiled and interpreted.

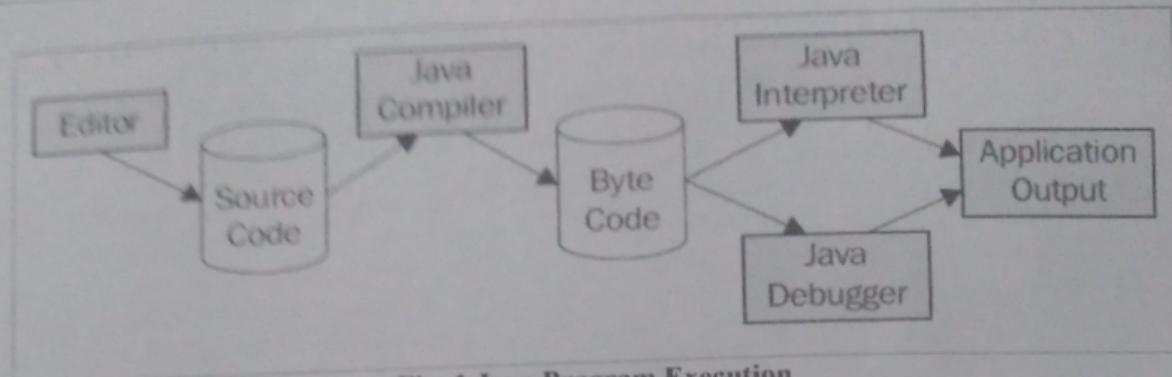


Fig. 1 Java Program Execution

I. Procedure

Installation for Java Software:

(On a PC loaded with windows OS – 2000/2003/2007 onwards with notepad)

1. Download JDK (jdk 1.4.0 onwards)

Visit the

<https://www.oracle.com/technetwork/java/javase/downloads/index.html>

Download the windows version to suitable folder.

2. Double click the setup file.

3. Follow onscreen instruction.

4. When the setup is done, the complete screen appears, click on the 'Finish' Button.
This completes the installation of JDK. To ensure the JDK installation / to determine the java version, type the following command at the MS Dos prompt:

<system prompt> java -version

It should show the output similar to following

```

C:\Program Files\IBM\Java60\bin>java -version
java version "1.6.0"
Java(TM) SE Runtime Environment (build pwi3260sr5-20090529_04<SR5>)
IBM J9 VM (build 2.4, J2RE 1.6.0 IBM J9 2.4 Windows XP x86-32 jvmwi3260sr5-20090
519_35743 (JIT enabled, AOT enabled)
J9VM - 20090519_035743_1HdSMr
JIT - r9_20090518_2017
GC - 20090417_AA>
JCL - 20090529_01

C:\Program Files\IBM\Java60\bin>

```

Fig. 2 Java Version

If not then set 'path' environment variable

1. Go to start -> control panel -> system

2. System properties dialogbox will appear.

3. Select 'advanced tab' -> environment variables.

4. In the system variable list, select path and click 'edit'

5. Edit the system variable dialogbox appears. In the variable value field , append the path to the JDK bin directory (generally 'c:\program files\java\jdk1.6.0\bin') at the end. Use semicolon to separate the path of bin directory from the rest of values already available. Click 'Ok'.

6. Similarly set 'classpath' environment variable

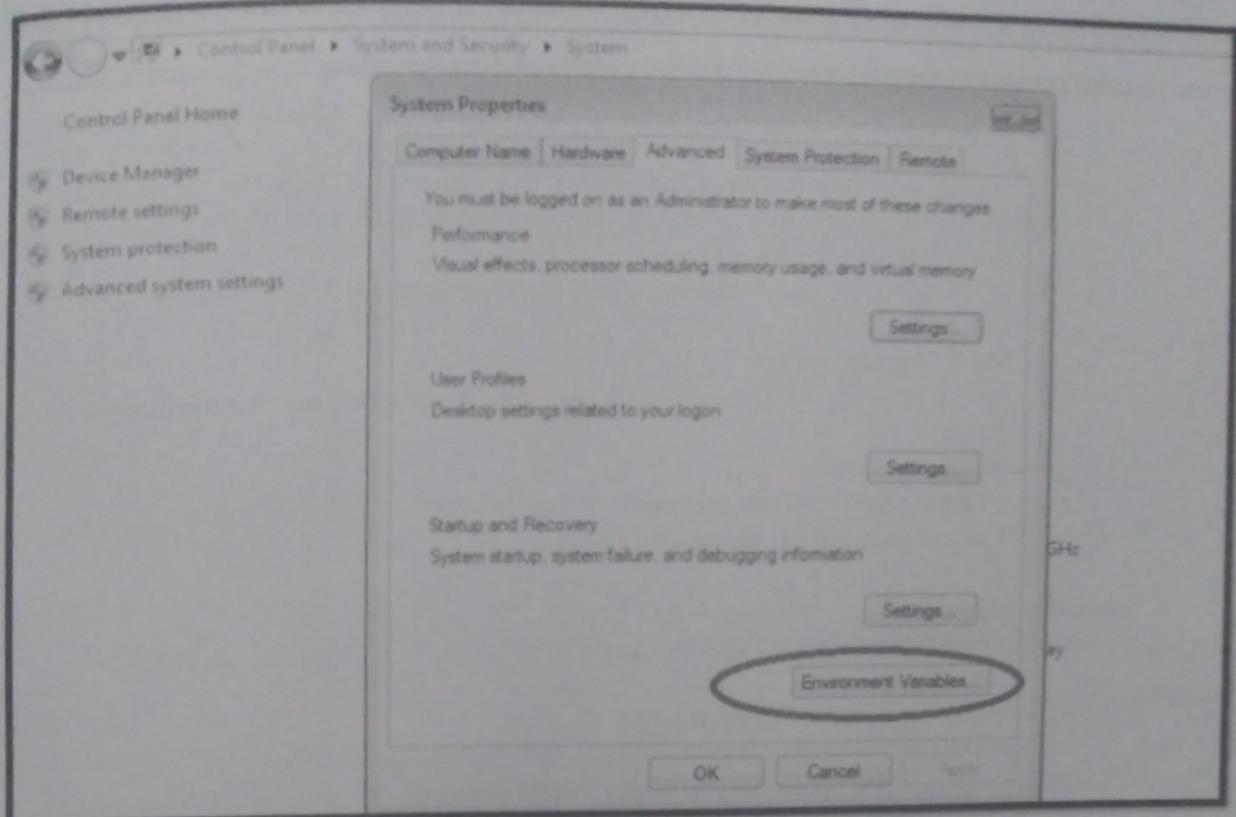


Fig. 3 Environment variable

Note: Follow the similar instructions for other platforms (say Unix, Linux, Mac) with appropriate jdk download.

2. Using an Eclipse for Java

Eclipse (www.eclipse.org) is an *open-source* Integrated Development Environment (IDE) supported by IBM. Eclipse is popular for Java application development (Java SE and Java EE) and Android apps.

Installing Eclipse 4.7.2 (Oxygen 2) for Java Developers

To use Eclipse for Java programming, you need to first install Java Development Kit (JDK).

1. Download Eclipse from <https://www.eclipse.org/downloads>. Under "Get Eclipse Oxygen" ⇒ Click "Download Packages".
2. To install Eclipse, unzip the downloaded file into a directory (e.g., "d:\myproject").

3. Testing setup using small program:

Steps for editing and executing java program:

Using an editor (e.g. Notepad)

1. Open notepad
2. Write the program (called java source code) in notepad
3. Save the file as 'filename.java' in some directory. The filename must be same as the classname containing main() method.
4. Open MS-Dos prompt
5. Change the directory containing to the one containing the program.
6. Compile the program by using the command `javac<filename.java>`

7. Execute/ Run the program by using the command `java <filename>`

4. Using Eclipse

1. Launch Eclipse by running "eclipse.exe" from the Eclipse installed directory.
2. Choose an appropriate directory for your *workspace*.
3. To create a new Java project using "File" menu \Rightarrow "New" \Rightarrow "Java project".
4. In "JRE", select "Use default JRE (currently 'JDK9.0.x')". But make sure that your JDK is 1.8 and above.
5. In "Project Layout" menu, select "Use project folder as root for sources and class files".
6. Push "Finish" button.
7. In the "Package Explorer" (left pane) \Rightarrow Right-click on "FirstProject" \Rightarrow New \Rightarrow Class.
8. Write a program.
9. Compile and execute program.
10. Observe output on the console panel.

Sample program:

```
Class HelloWorld
{
    public static void main(String args[])
    {
        System.out.println("Welcome to Hello World program");
    }
}
```

5. Output:

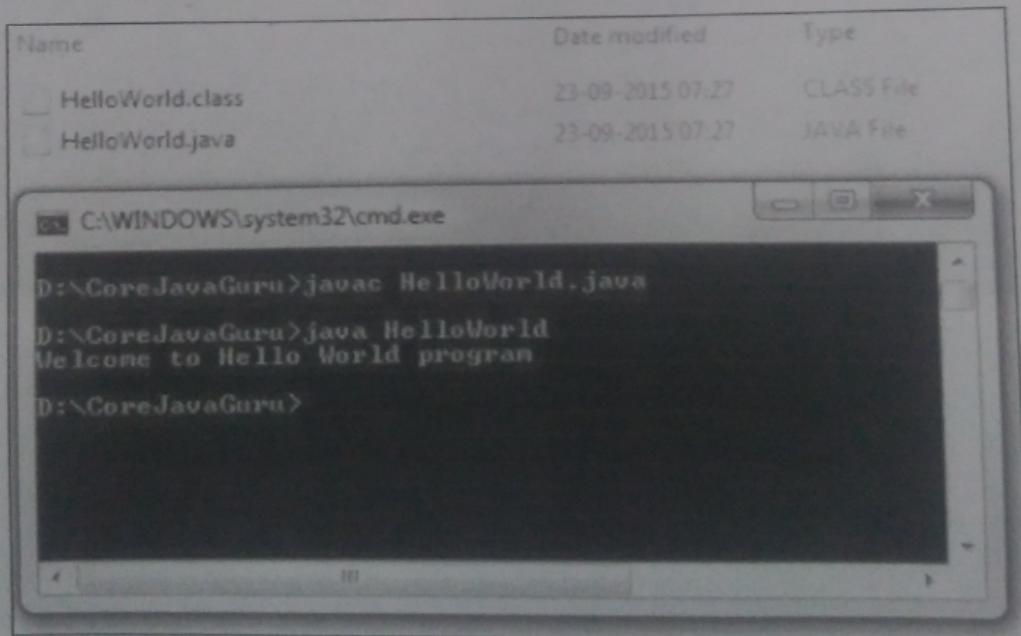


Fig 4. Output of the Program

VIII. Resources required

Sr. No.	Name of Resource	Suggested Broad Specification	Quantity	Remark
1	Hardware: Computer System	Computer (i3-i5 preferable), RAM minimum 2 GB and onwards	As per batch size	For all Experiments
2	Operating system	Windows / Linux		
3	Software	jdk1.8.0 or above.		

IX. Resources used

S. No.	Name of Resource	Broad Specification	Qty	Remarks (If any)
1	Computer System with broad specifications	i3, 4/256 SSD Asus vivobook15	1	
2	Software	JDK, Edit plus Browser		
3	Any other resource used	internet		

X. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write installation directory path of your directory?
2. Write value of path environment variable?
3. List folders created after installation.
4. Main method is declared as static. Justify.
5. Program is named with class containing main method. Justify.

(Space for answer)

- 1] C:\Program Files\Java\jdk-15.0.2
- 2] C:\Program Files\Java\jdk-15.0.2\bin
- 3] i) Java , ii) jdk-15.0.2 , iii) bin , iv) conf
v) include , vi) jmods , vii) legal , viii) lib
- 4] Main method is static so the compiler can ~~create~~
call it without or before creation of an object.

5) This is the way in Java to tell JVM that this file contains main method which is by naming file as same to class name, so the JVM can find the entry point of program.

XI Exercise:

- i) Java → used to run byte code in .class file.
- ii) javac → compile program in .java file and create byte code file.
- iii) jaradoc → To open HTML documentation of specified Java package.

12 Different versions of JDK.

- i) JDK 1.0
- ii) JDK 1.1
- iii) J2SE 1.2
- iv) J2SE 1.3
- v) J2SE 1.4
- vi) J2SE 1.5
- vii) Java SE 6
- viii) Java SE 7
- ix) Java SE 8
- x) Java SE 9
- xi) Java SE 10
- xii) Java SE 11
- xiii) Java SE 12
- xiv) Java SE 13
- xv) Java SE 14
- xvi) Java SE 15.

XI. Exercise

Write the options provided by following JDK tools along with their use

1. java
2. javac
3. javadoc
2. List different versions of JDK.
3. Test the setup using similar programs.

XII. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com/internal-details-of-jvm>
2. <https://www.geeksforgeeks.org/jvm-works-jvm-architecture/>
3. <https://www.youtube.com/watch?v=evoLlsLFn10>
4. <https://www.youtube.com/watch?v=c7DXhdCsSnw>

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related(35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission of report	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.
4.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total (50)	