EXPERIMENT No. 1

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TITLE: Introduction to Java Environment

OBJECTIVE: To get started with JAVA

LIST OF LAB ACTIVITIES:

Write in your own words your understanding about todays lab covering:
1. Java Versions
2. JDK and JRE
3. Setting Path
4. Code Editors
5. Sample Hello World Program.

All with supporting screenshots. Make sure to upload in a pdf file.

1. Java Versions

The Java language has undergone several changes since JDK 1.0 as well as numerous additions of classes and packages to the standard library. Since J2SE 1.4, the evolution of the Java language has been governed by the Java Community Process (JCP), which uses Java Specification Requests (JSRs) to propose and specify additions and changes to the Java platform. The language is specified by the Java Language Specification (JLS); changes to the JLS are managed under JSR 901.

In addition to the language changes, other changes have been made to the Java Class Library over the years, which has grown from a few hundred classes in JDK 1.0 to over three thousand in J2SE 5. Entire new APIs, such as Swing and Java2D, have been introduced, and many of the original JDK 1.0 classes and methods have been deprecated. Some programs allow conversion of Java programs from one version of the Java platform to an older one

2. JDK and JRE

JRE is a piece of a software which is designed to run other software. It contains the class libraries, loader class, and JVM. In simple terms, if you want to run Java program you need JRE. If you are not a programmer, you don't need to install JDK, but just JRE to run Java programs. Though, all JDK versions comes bundled with Java Runtime Environment, so you do not need to download and install the JRE separately in your PC. The full form of JRE is Java Runtime Environment.

Q. Why use JDK?

Here are the important reasons of using JDK:

JDK contains tools required to write Java programs, and JRE to execute them.
It includes a compiler, Java application launcher, Appletviewer, etc.
Compiler converts code written in Java into byte code.
Java application launcher opens a JRE, loads the necessary class, and executes its main method.
The Java Development Kit (JDK) is one of three core technology packages used in Java programming, along with the JVM (Java Virtual Machine) and the JRE (Java Runtime Environment). It's important to differentiate between these three technologies, as well as understanding how they're connected:

The JVM is the Java platform component that executes programs.
The JRE is the on-disk part of Java that creates the JVM.
The JDK allows developers to create Java programs that can be executed and run by the JVM and JRE.
Developers new to Java often confuse the Java Development Kit and the Java Runtime Environment. The distinction is that the JDK is a package of tools for developing Java-based software, whereas the JRE is a package of tools for running Java code.

The JRE can be used as a standalone component to simply run Java programs, but it's also part of the JDK. The JDK requires a JRE because running Java programs is part of developing them.

3. Setting Path

PATH is an environment variable on Unix-like operating systems, DOS, OS/2, and Microsoft Windows, specifying a set of directories where executable programs are located. In general, each executing process or user session has its own PATH setting.

The path is required to be set for using tools such as javac, java, etc.

If you are saving the Java source file inside the JDK/bin directory, the path is not required to be set because all the tools will be available in the current directory.

However, if you have your Java file outside the JDK/bin folder, it is necessary to set the path of JDK.

There are two ways to set the path in Java:

Temporary
Permanent

1) How to set the Temporary Path of JDK in Windows
To set the temporary path of JDK, you need to follow the following steps:

Open the command prompt
Copy the path of the JDK/bin directory
Write in command prompt: set path=copied_path
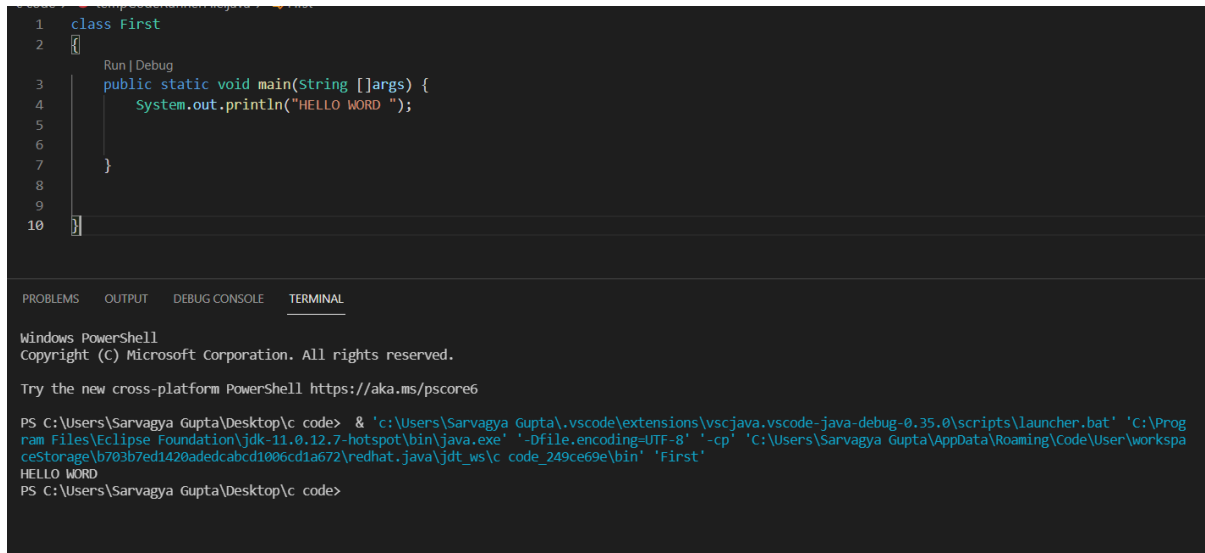
2) How to set Permanent Path of JDK in Windows
For setting the permanent path of JDK, you need to follow these steps:

Go to My Computer properties -> advanced tab -> environment variables -> new tab of user variable -> write path in variable name -> write path of bin folder in variable value -> ok -> ok -> ok

4. Code Editors

A source-code editor is a text editor program designed specifically for editing source code of computer programs. It may be a standalone application or it may be built into an integrated development environment (IDE) or web browser. Source-code editors are a fundamental programming tool, as the fundamental job of programmers is to write and edit source code.

5. Sample Hello World Program.

```
    1   class First
    2   {
            Run | Debug
    3       public static void main(String []args) {
    4           System.out.println("HELLO WORD ");
    5
    6
    7       }
    8
    9
   10   }
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Sarvagya Gupta\Desktop\c code>  & 'c:\Users\Sarvagya Gupta\.vscode\extensions\vscjava.vscode-java-debug-0.35.0\scripts\launcher.bat' 'C:\Prog
ram Files\Eclipse Foundation\jdk-11.0.12.7-hotspot\bin\java.exe' '-Dfile.encoding=UTF-8' '-cp' 'C:\Users\Sarvagya Gupta\AppData\Roaming\Code\User\workspa
ceStorage\b703b7ed1420adedcabcd1006cd1a672\redhat.java\jdt_ws\c code_249ce69e\bin' 'First'
HELLO WORD
PS C:\Users\Sarvagya Gupta\Desktop\c code>
```

Installation of JDK

Step 1: Latest Java was downloaded from the link below
         Download it according to your system
https://www.oracle.com/java/technologies/javase/javase-jdk8-downloads.html

Step 2: After downloading it

Open the setup

Read instructions and click next

Step 3: After it gets successfully install, click finish

Permanent setting for PATH

Step 1: Go to This PC properties → advanced tab → environment variables → new tab of user/system variable → write path in variable name → write path of bin folder in variable value

System Properties

Computer Name | Hardware | Advanced | System Protection | Remote

You must be logged on as an Administrator to make most of these changes.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory

Settings...

User Profiles
Desktop settings related to your sign-in

Settings...

Startup and Recovery
System startup, system failure, and debugging information
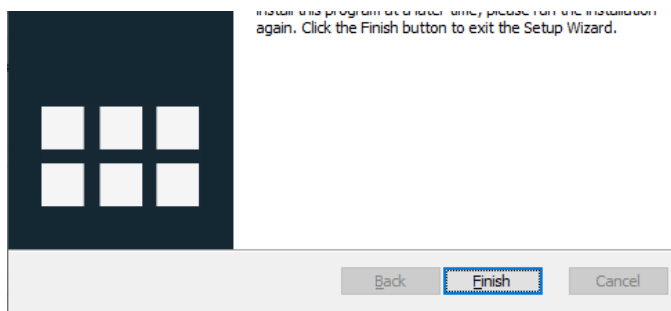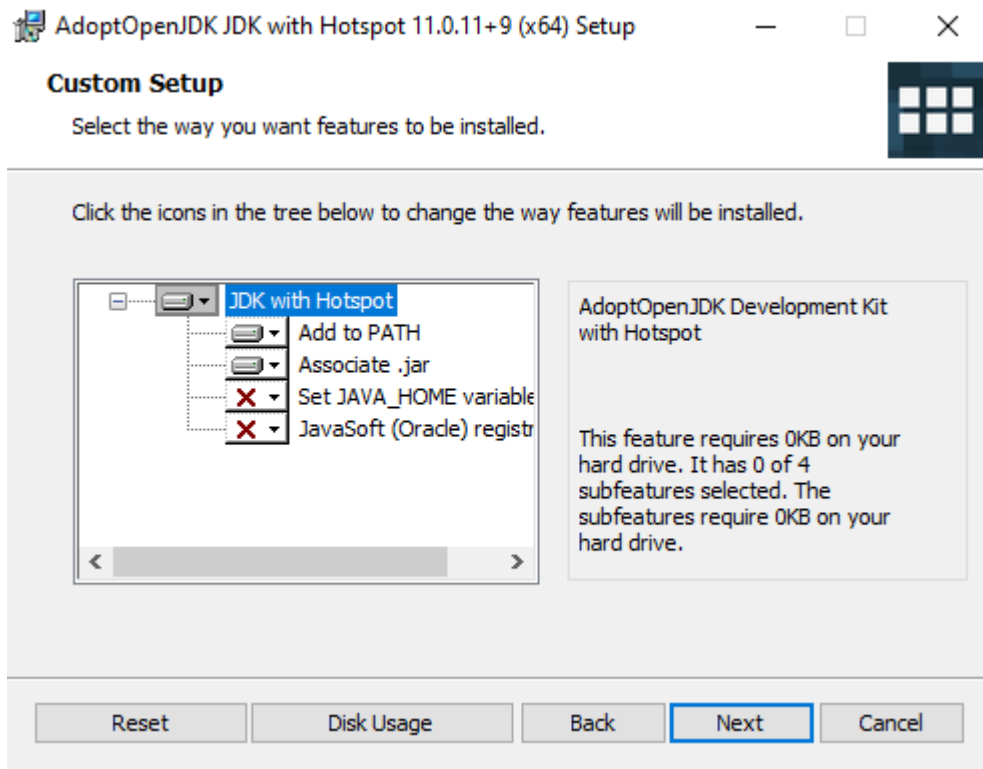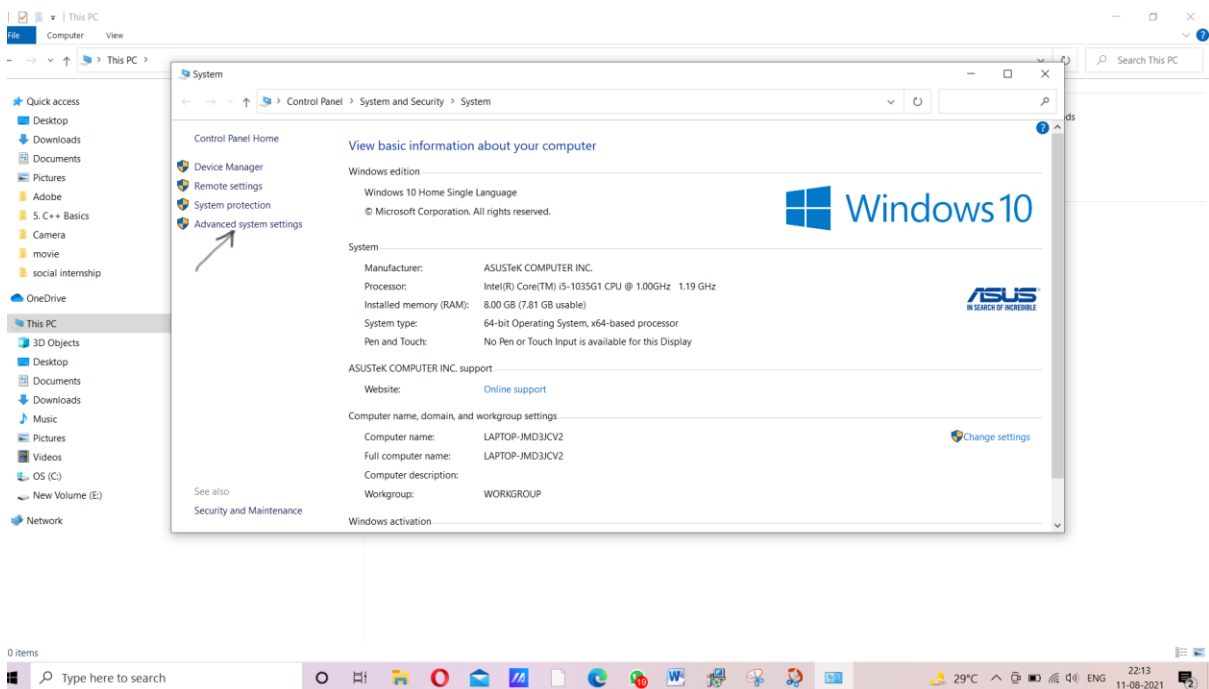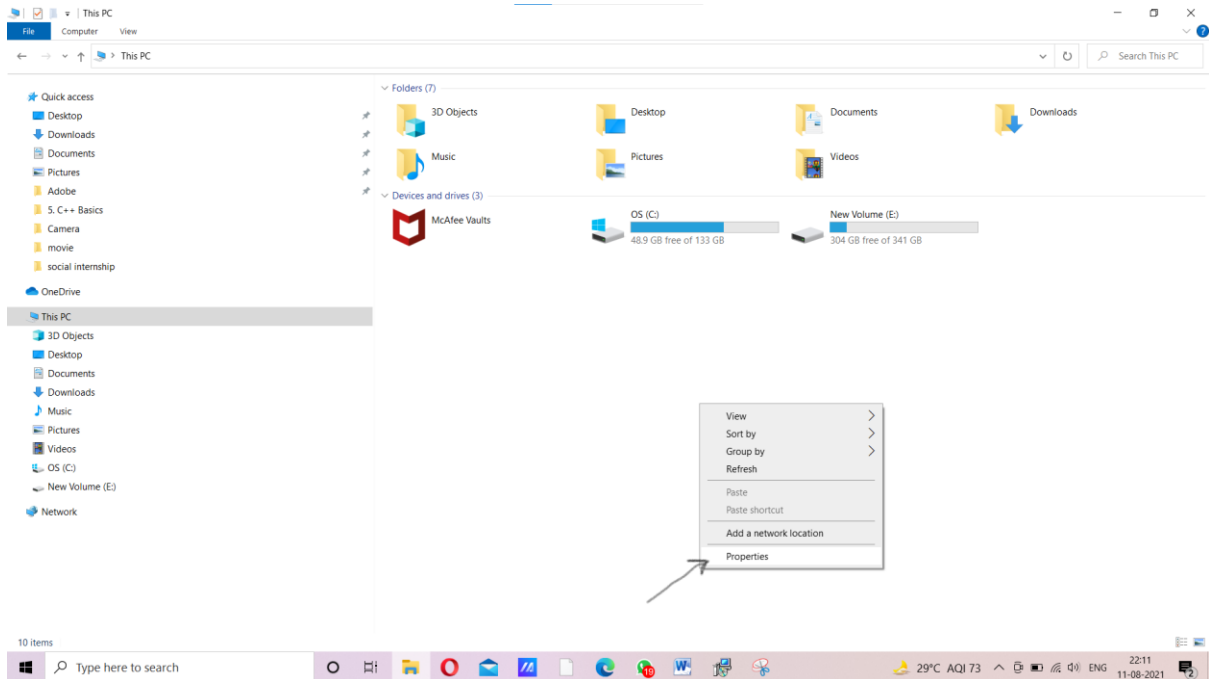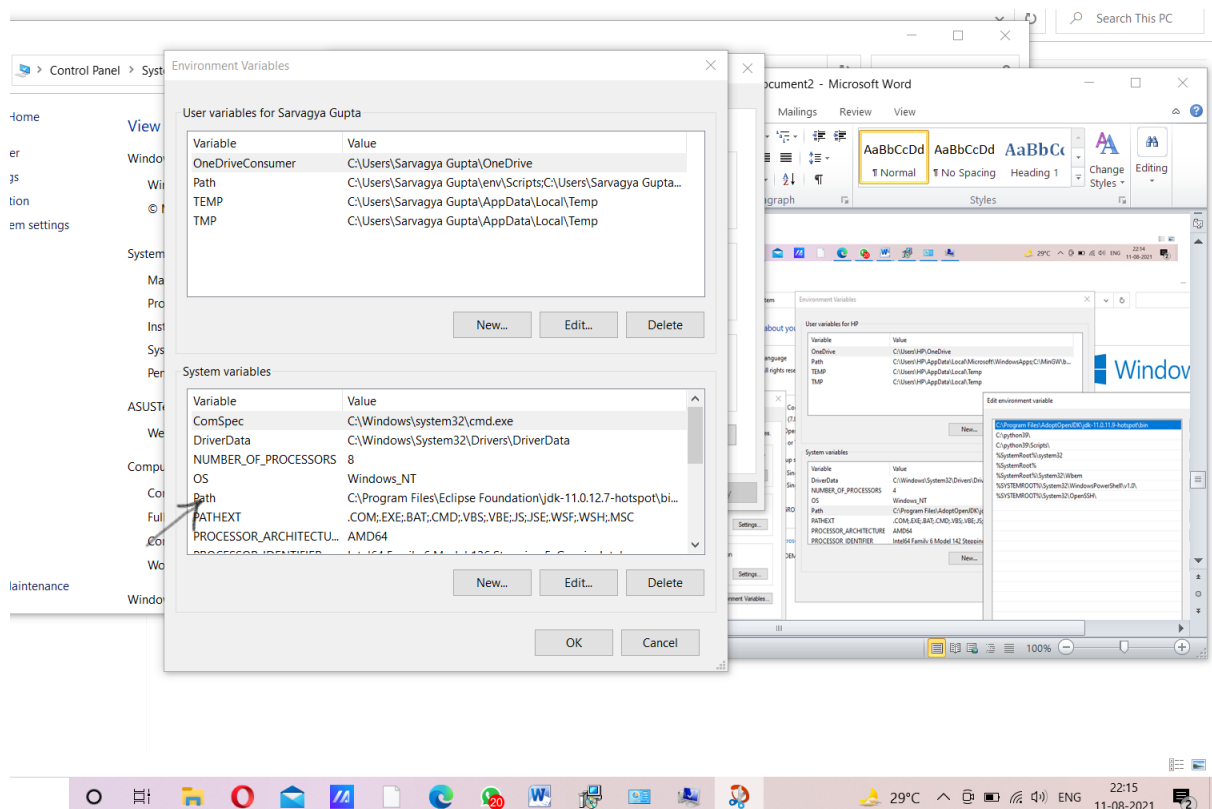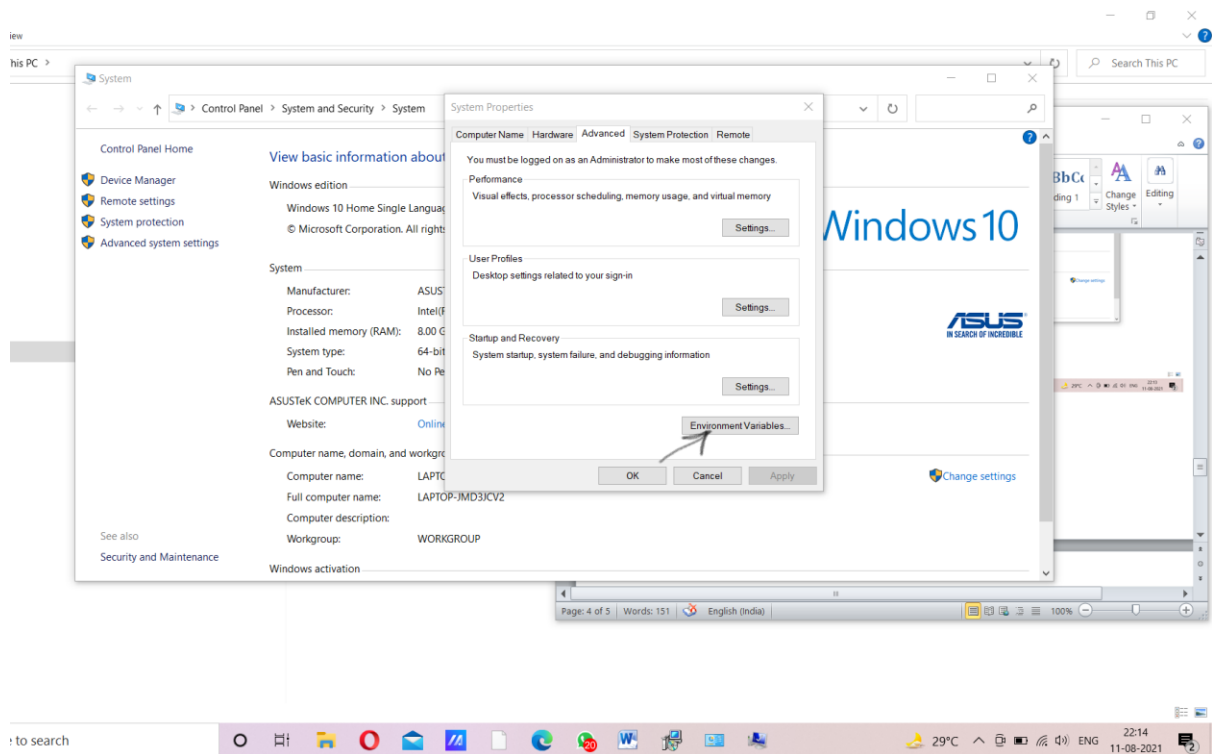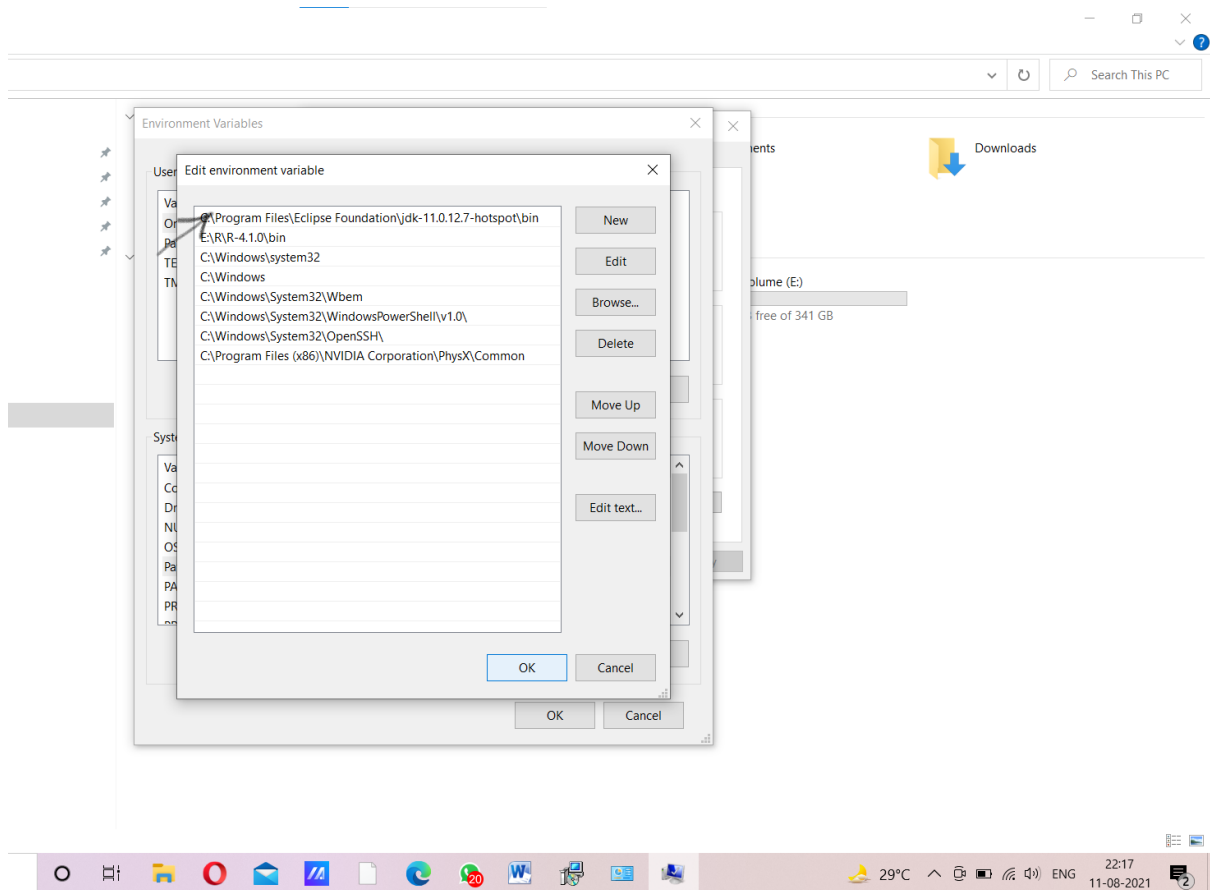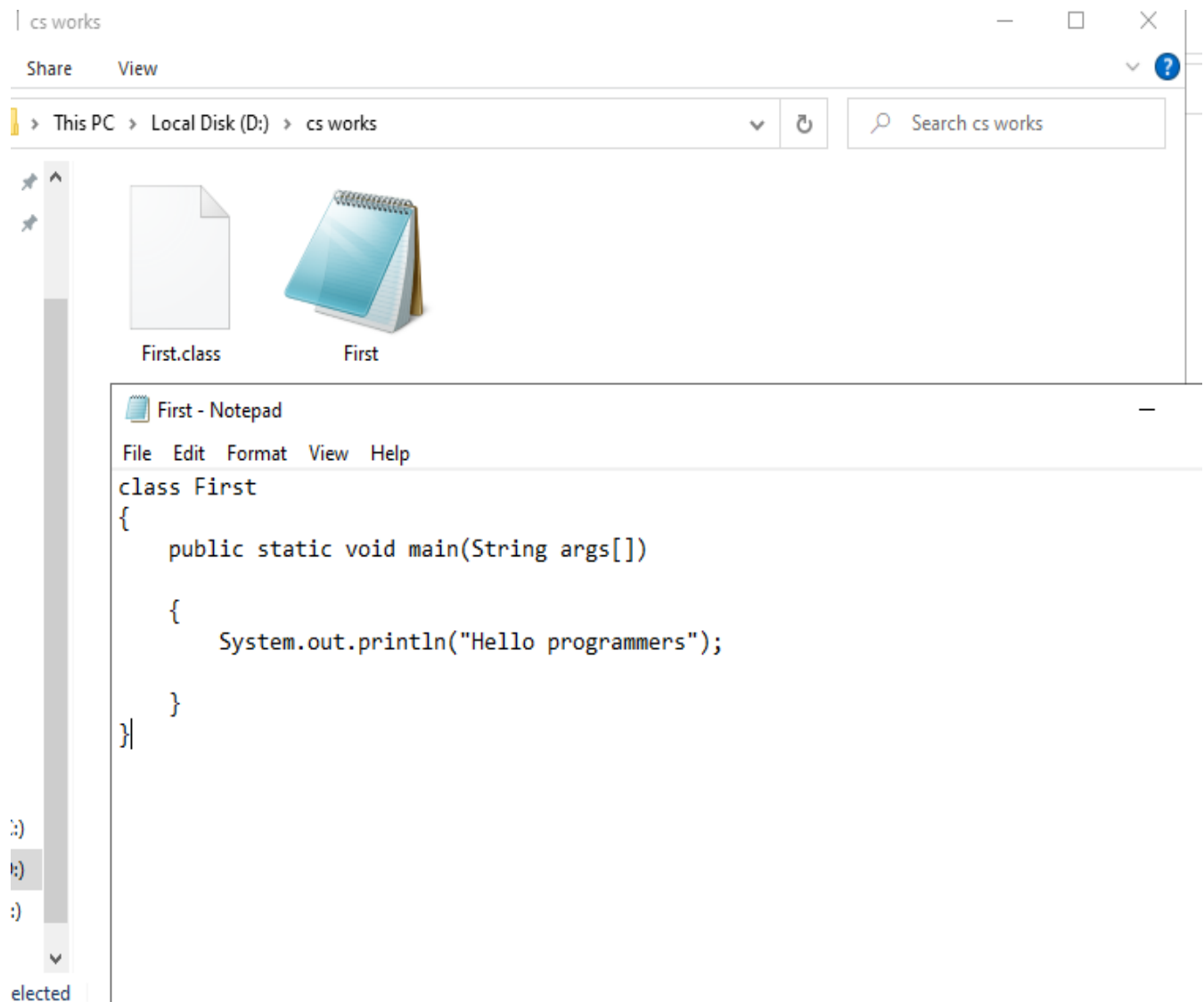
Settings...

Environment Variables...

OK | Cancel | Apply

Change settings

Page: 4 of 5 | Words: 151 | English (India) | 100%

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Control Panel > Syst

Environment Variables

User variables for Sarvagya Gupta

Variable	Value
OneDriveConsumer	C:\Users\Sarvagya Gupta\OneDrive
Path	C:\Users\Sarvagya Gupta\env\Scripts;C:\Users\Sarvagya Gupta...
TEMP	C:\Users\Sarvagya Gupta\AppData\Local\Temp
TMP	C:\Users\Sarvagya Gupta\AppData\Local\Temp

New... | Edit... | Delete

System variables

Variable	Value
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PROCESSORS	8
OS	Windows_NT
Path	C:\Program Files\Eclipse Foundation\jdk-11.0.12.7-hotspot\bi...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTU...	AMD64
PROCESSOR_IDENTIFIER	

New... | Edit... | Delete

OK | Cancel

Document2 - Microsoft Word

Mailings | Review | View

AaBbCcDd | AaBbCcDd | AaBbC
¶ Normal | ¶ No Spacing | Heading 1

Change Styles | Editing

Styles

Environment Variables

User variables for HP

Variable	Value
OneDrive	C:\Users\HP\OneDrive
Path	C:\Users\HP\AppData\Local\Microsoft\WindowsApps;C:\MinGW\b...
TEMP	C:\Users\HP\AppData\Local\Temp
TMP	C:\Users\HP\AppData\Local\Temp

New...

Edit environment variable

C:\Program Files\AdoptOpenJDK\jdk-11.0.11.9-hotspot\bin
C:\python39\
C:\python39\Scripts\
%SystemRoot%
%SystemRoot%\System32
%SystemRoot%\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\

System variables

Variable	Value
DriverData	C:\Windows\System32\Drivers\Driv
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\Program Files\AdoptOpenJDK\j
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;
PROCESSOR_ARCHITECTURE	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 142 Steppin

New...

100%

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Edit environment variable ✕

C:\Program Files\Eclipse Foundation\jdk-11.0.12.7-hotspot\bin	New
E:\R\R-4.1.0\bin	Edit
C:\Windows\system32	
C:\Windows	Browse...
C:\Windows\System32\Wbem	
C:\Windows\System32\WindowsPowerShell\v1.0\	Delete
C:\Windows\System32\OpenSSH\	
C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common	

Move Up

Move Down

Edit text...

OK   Cancel

OK   Cancel

After the process
you don't need to set the path ever again

Temporary Setting of path variable

Step1: Open Notepad/Notepad++ in a folder, type the following program.

Step2: Save it with its extension JAVA (.java)

Step3: Run command prompt as administrator

```
Administrator: Command Prompt                                    —  □  ×

Microsoft Windows [Version 10.0.19043.1110]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>D:

D:\>cd "cs works"

D:\cs works>javac First.java

D:\cs works>set path =C:\Program Files\AdoptOpenJDK\jdk-11.0.11.9-hotspot\bin

D:\cs works>echo %path%
C:\Program Files\AdoptOpenJDK\jdk-11.0.11.9-hotspot\bin;C:\python39\;C:\python39\Scripts\;C:\WINDOWS\system32;C:\WINDOWS
;C:\WINDOWS\System32\Wbem;C:\WINDOWS\System32\WindowsPowerShell\v1.0\;C:\WINDOWS\System32\OpenSSH\;C:\Users\HP\AppData\L
ocal\Microsoft\WindowsApps;C:\MinGW\bin;C:\Users\HP\AppData\Local\Programs\Microsoft VS Code\bin

D:\cs works>java First
Hello programmers

D:\cs works>
```
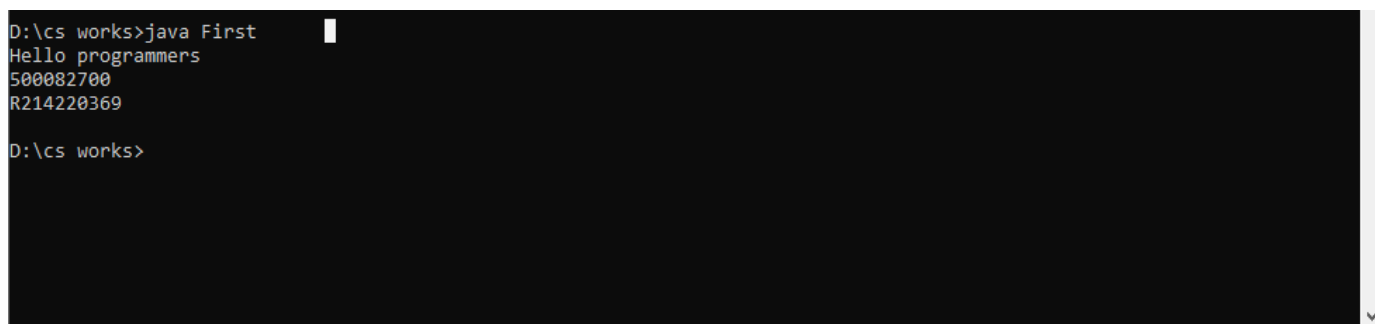
```
D:\cs works>java First
Hello programmers
500082700
R214220369

D:\cs works>
```

Step 4: Locate cmd to the desired folder as shown

You can also check java/javac version by java –version command

Step 5: Compile the program javac First.java

If it shows an error

Step 6: Copy the path of jdk/bin directory where java located

set its path by using this command

set path =C:\Program Files\AdoptOpenJDK\jdk-11.0.11.9-hotspot\bin

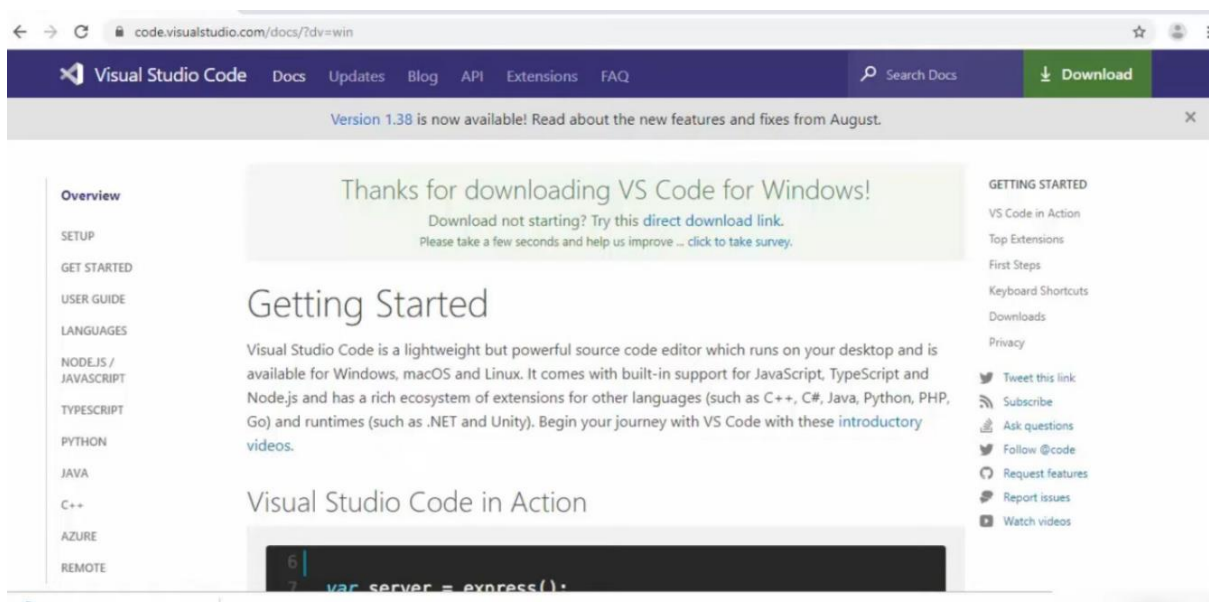C:\Program Files\AdoptOpenJDK\jdk-11.0.11.9-hotspot\bin

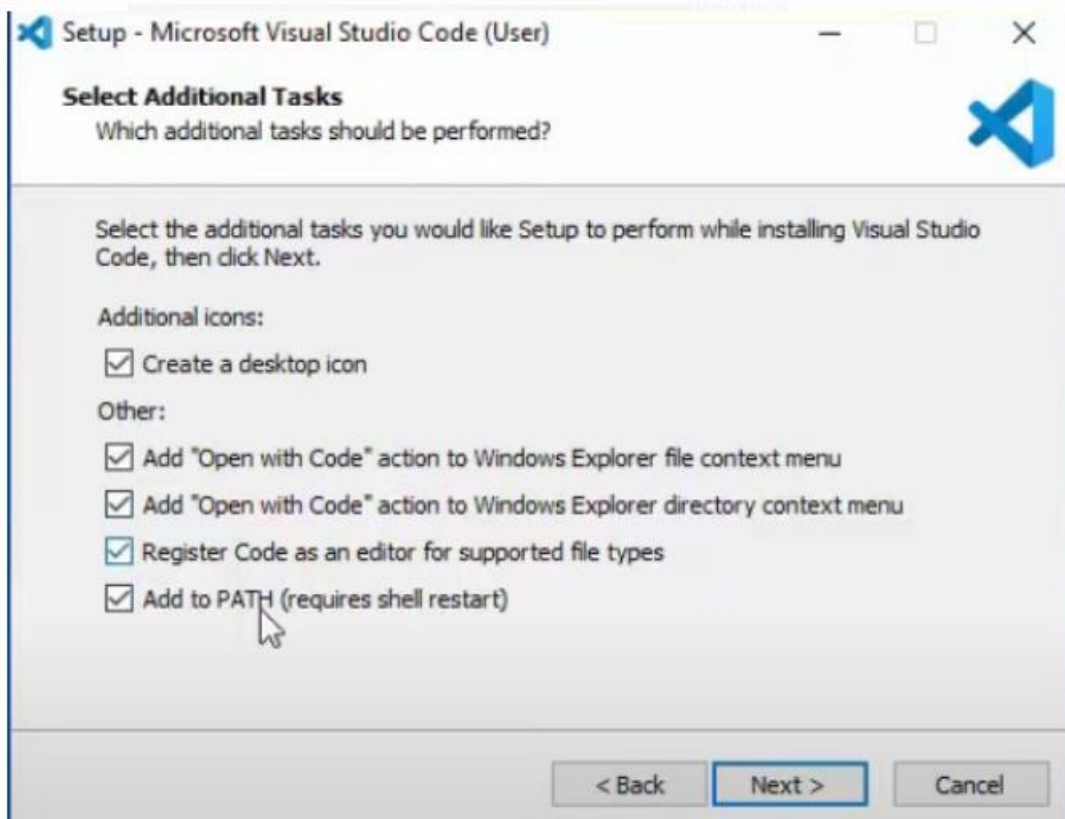# Step 7: Command for checking the values of PATH variable

echo %path%

Step 8: Again, compile the program and Execute the program.

Installation Of VS Code

Step 1 : Download the VS code

Step 2: Start the installation and click on next and finish

Step 3: It is installed