

## ASSIGNMENT NO.1

### 1. Reading Assignment: A Short History of Java

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# Short History on Java.

- > Java creators James Gosling, Patrick Naughton, Mike Sheridan, (key members) Green Project Team.
- Java is initiated at Sun Microsystems. in 1991  
It is initially designed for interactive television  
but was too advanced for the cable TV industry  
at that time. In 1992, Green project created  
the device called "Star T".
- Initially the name of language was "Oak" and later  
renamed to JAVA. The name Java was inspired  
by the coffee that the developers drank while  
working on the project and was famous at  
that time.
- 1995 - Java was officially launched as "Java 1.0" by  
Sun Microsystems with slogan "Write once,  
Run anywhere"
- 1996 - The first version major release of Java (JDK)  
was made available to developers and Java quickly  
became popular due to its portability  
and robust feature.
- 1997 - JDK 1.1 was released, bringing in  
major improvements including the introduction  
of inner classes, Java beans, JDBC

**2. Reading Assignment: Java Language Features**

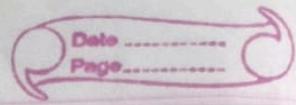
## # Java Features

- Object-oriented - Java is an object oriented programming language. Java includes concepts such as classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Simple - Java is simple and easy to learn language. It simplifies the complex features in it.
- Java language is both technology as well as platform.
- Procedural and functional-oriented - As we know Java is object oriented language but also supports procedural and functional programming paradigms.
- Java is statically typed language. It means type checking is done at compile time.
- Case sensitive in nature.
- Java is platform independent as it can run on any device equipped with JVM installed in it. Makes it highly portable.

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### 3. Reading Assignment: Which Version of JDK Should I Use?

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## # Versions of JDK -

There are almost 22 versions of JDK on the only oracle website there are other organizations who provides their JDK versions. Here are some best JDK versions -

## 1. JDK 8 -

Widely used, specially used in enterprise environment to solve the business problem using it. It has been stable and reliable for many years.

It supports most of the features in java very efficiently also it provides other features like AWT, swing, JDBC. It has vast community and ecosystem using it.

There might be some lack newer features which are added after this version.

## 2. JDK 11 - JDK 17.

A popular choice for production environment. Best for stability and long term support suitable for production and enterprise application.

Better than JDK 8 as it contains some new features and security support.

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### 4. Reading Assignment: JDK Installation Directory Structure

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# JDK Installation Directory structure.

- The JDK installation directory structure is organized into several key folders and files, each serving a specific purpose.

**Root directory ( jdk-1.8/ )**  
This is main directory where JDK is installed contains copyright licence and README file, src.zip archive containing the source code for the Java platform.

**Bin directory ( jdk-1.8/bin )**  
Contains executable files for the development tools included in JDK.

Key files - java, javac, jar, jarsigner, javadoc.

**Library directory ( jdk-1.8/lib )**  
Contains libraries and property files needed by the development tools.

Key files - tools.jar, dt.jar

**JRE directory ( jdk-1.8/jre )**  
The runtime environment to run Java applications contains bin, lib Folders in fine.

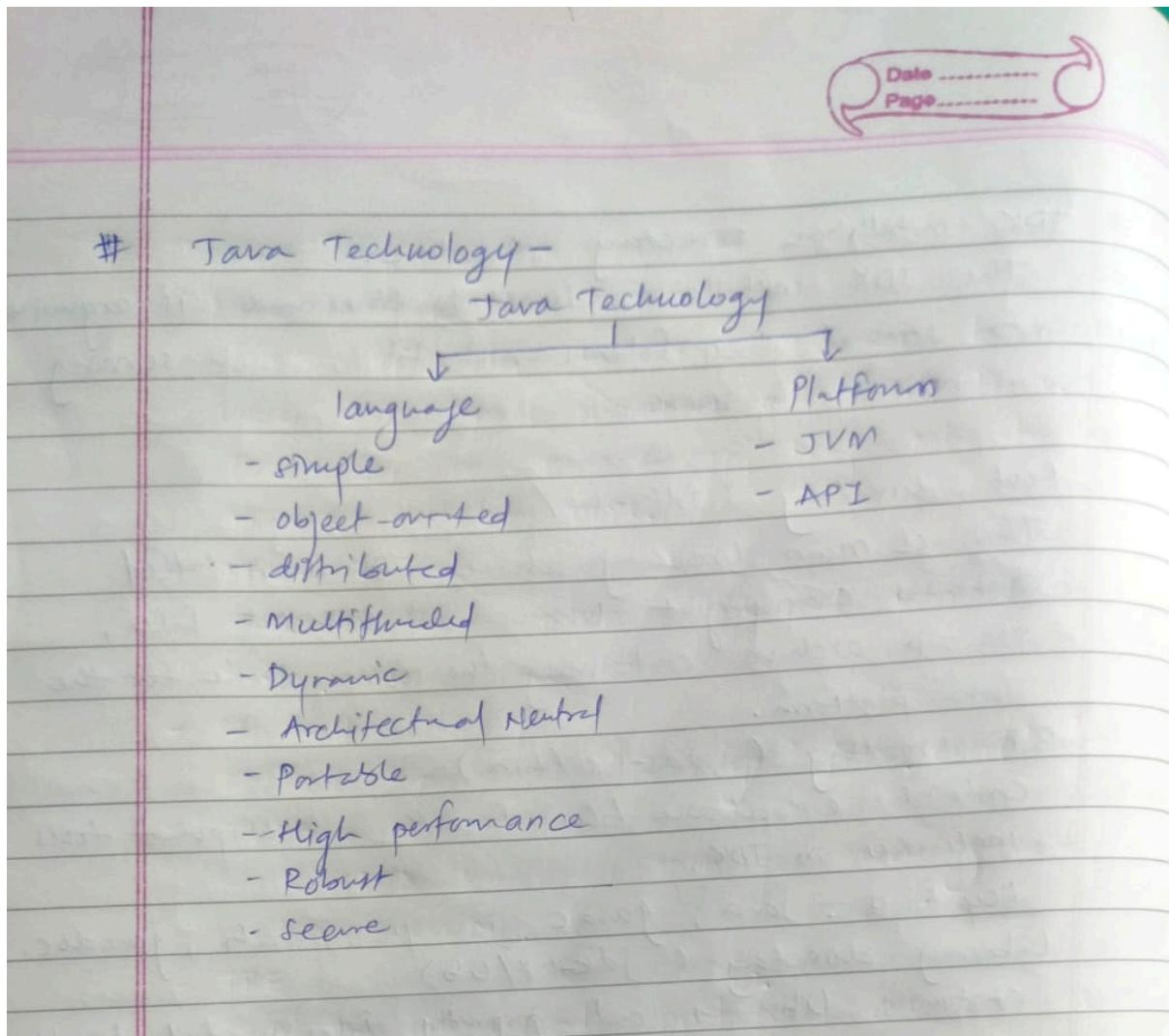
**JRE Library Directory**  
contains the library and resources for jre.

**Include Directory ( jdk-1.8/include )**  
Contains C language header files that supports native code programming.

Key Headers - JNI, NMI, API

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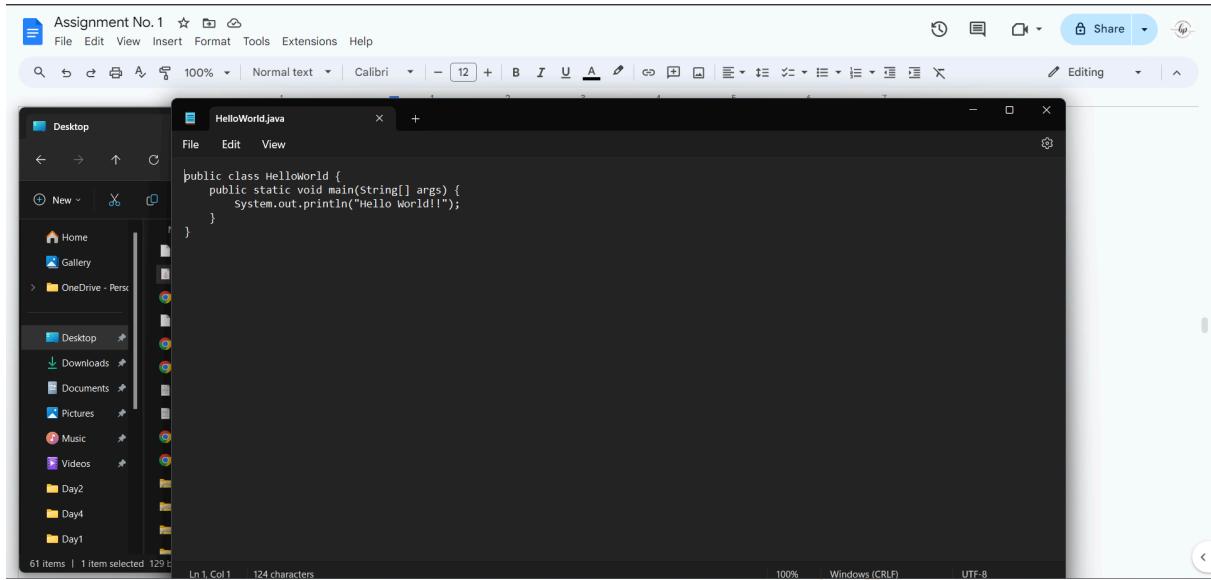
### 5. Reading Assignment: About Java Technology



### 6. Coding Assignments

1. **Hello World Program:** Write a Java program that prints "Hello World!!" to the console.

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2. **Compile with Verbose Option:** Compile your Java file using the `-verbose` option with `javac`. Check the output.

A screenshot of a Windows Command Prompt window titled "C:\Windows\System32\cmd.e". The command entered is "javac -verbose HelloWorld.java". The output shows the verbose compilation process, listing numerous class files being loaded from the Java runtime environment.

```
C:\Users\Samarth\Desktop>javac -verbose HelloWorld.java
[parsing started SimpleFileObject[C:\Users\Samarth\Desktop\HelloWorld.java]]
[parsing completed 4ms]
[Loading /modules/java.base/module-info.class]
[Loading /modules/jdk.internal.vm.ci/module-info.class]
[Loading /modules/jdk.internal.jvmsstat/module-info.class]
[Loading /modules/java.desktop/module-info.class]
[Loading /modules/jdk.accessibility/module-info.class]
[Loading /modules/jdk.dynalink/module-info.class]
[Loading /modules/jdk.security.jgss/module-info.class]
[Loading /modules/jdk.httpserver/module-info.class]
[Loading /modules/jdk.security.auth/module-info.class]
[Loading /modules/java.security.sasl/module-info.class]
[Loading /modules/jdk.net/module-info.class]
[Loading /modules/jdk.internal.opt/module-info.class]
[Loading /modules/java.compiler/module-info.class]
[Loading /modules/java.management/module-info.class]
[Loading /modules/jdk.graal.compiler/module-info.class]
[Loading /modules/java.sql/module-info.class]
[Loading /modules/jdk.management/module-info.class]
[Loading /modules/jdk.unsupported.desktop/module-info.class]
[Loading /modules/jdk.jdwz.agent/module-info.class]
[Loading /modules/java.scripting/module-info.class]
[Loading /modules/jdk.internal.le/module-info.class]
[Loading /modules/jdk.crypto.cryptoki/module-info.class]
[Loading /modules/java.xml/module-info.class]
[Loading /modules/java.xml.crypto/module-info.class]
[Loading /modules/jdk.jshell/module-info.class]
[Loading /modules/jdk.compiler/module-info.class]
[Loading /modules/java.naming/module-info.class]
[Loading /modules/java.instrument/module-info.class]
[Loading /modules/jdk.charsets/module-info.class]
[Loading /modules/java.management.rmi/module-info.class]
[Loading /modules/java.rmi/module-info.class]
[Loading /modules/jdk.internal.ed/module-info.class]
[Loading /modules/java.sql.rowset/module-info.class]
[Loading /modules/jdk.jpackage/module-info.class]
[Loading /modules/jdk.jdeps/module-info.class]
[Loading /modules/jdk.localedata/module-info.class]
[Loading /modules/java.security.jgss/module-info.class]
```

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```
[loading /modules/jdk.graal.compiler.management/module-info.class]
[loading /modules/java.smartcardio/module-info.class]
[loading /modules/jdk.editpad/module-info.class]
[search path for source files: .]
[search path for class files: C:\Program Files\Java\jdk-22\lib\modules,..]
[loading /modules/java.base/java/lang/Object.class]
[loading /modules/java.base/java/lang/String.class]
[loading /modules/java.base/java/lang/Deprecated.class]
[loading /modules/java.base/java/lang/annotation/Retention.class]
[loading /modules/java.base/java/lang/annotation/RetentionPolicy.class]
[loading /modules/java.base/java/lang/annotation/Target.class]
[loading /modules/java.base/java/lang/annotation/ElementType.class]
[checking HelloWorld]
[loading /modules/java.base/java/io/Serializable.class]
[loading /modules/java.base/java/lang/AutoCloseable.class]
[loading /modules/java.base/java/lang/System.class]
[loading /modules/java.base/java/io/PrintStream.class]
[loading /modules/java.base/java/lang/Appendable.class]
[loading /modules/java.base/java/lang/Closeable.class]
[loading /modules/java.base/java/io/FilterOutputStream.class]
[loading /modules/java.base/java/io/OutputStream.class]
[loading /modules/java.base/java/io/Flushable.class]
[loading /modules/java.base/java/lang/Comparable.class]
[loading /modules/java.base/java/lang/CharSequence.class]
[loading /modules/java.base/java/lang/constant/Constable.class]
[loading /modules/java.base/java/lang/constant/ConstantDesc.class]
[wrote HelloWorld.class]
[total 252ms]

C:\Users\Samarth\Desktop>
```

3. **Inspect Bytecode:** Use the `javap` tool to examine the bytecode of the compiled `.class` file. Observe the output.

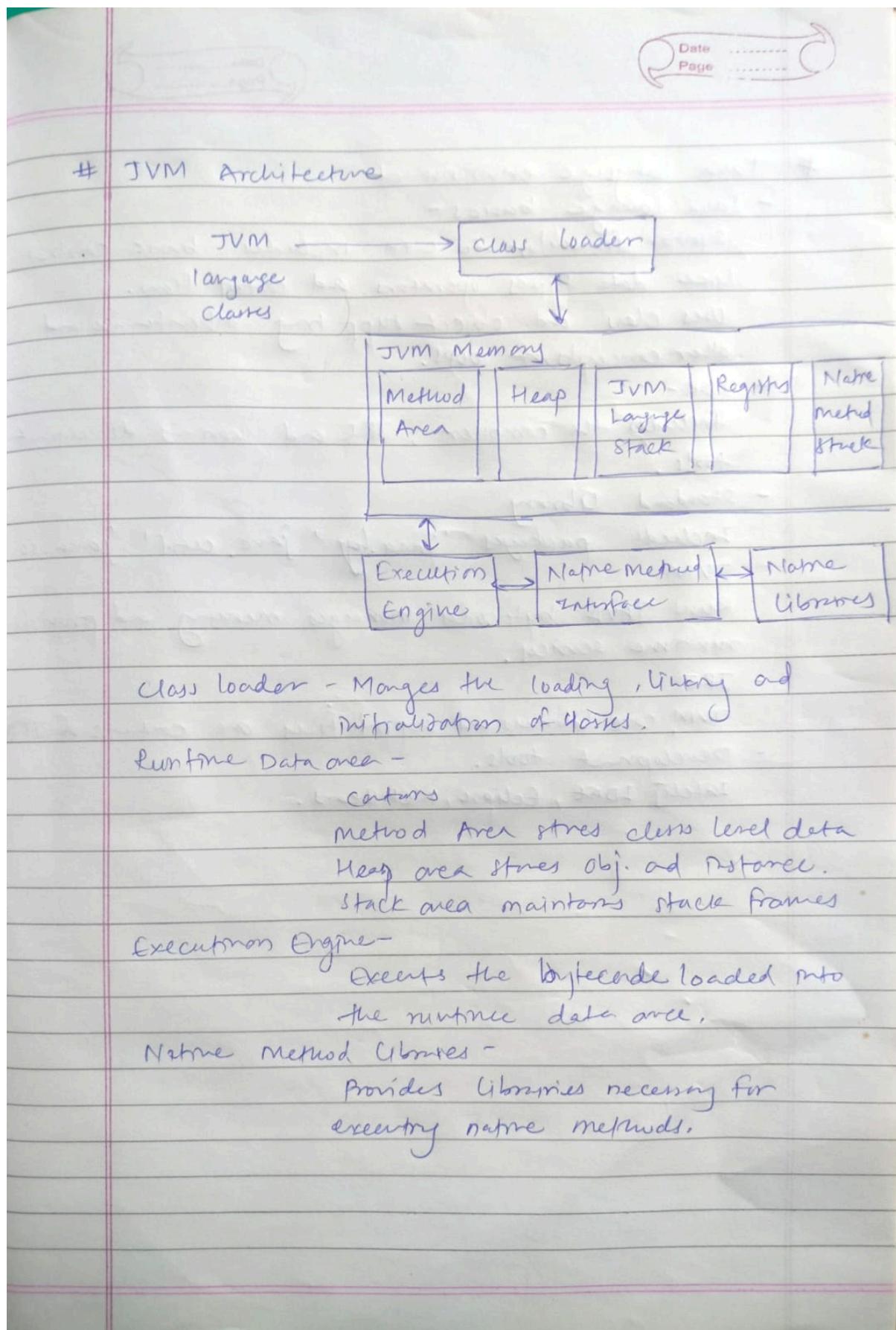
```
[loading /modules/jdk.graal.compiler.management/module-info.class]
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[loading /modules/jdk.editpad/module-info.class]
[search path for source files: .]
[search path for class files: C:\Program Files\Java\jdk-22\lib\modules,..]
[loading /modules/java.base/java/lang/Object.class]
[loading /modules/java.base/java/lang/String.class]
[loading /modules/java.base/java/lang/Deprecated.class]
[loading /modules/java.base/java/lang/annotation/Retention.class]
[loading /modules/java.base/java/lang/annotation/RetentionPolicy.class]
[loading /modules/java.base/java/lang/annotation/Target.class]
[loading /modules/java.base/java/lang/annotation/ElementType.class]
[checking HelloWorld]
[loading /modules/java.base/java/io/Serializable.class]
[loading /modules/java.base/java/lang/AutoCloseable.class]
[loading /modules/java.base/java/lang/System.class]
[loading /modules/java.base/java/io/PrintStream.class]
[loading /modules/java.base/java/lang/Appendable.class]
[loading /modules/java.base/java/lang/Closeable.class]
[loading /modules/java.base/java/io/FilterOutputStream.class]
[loading /modules/java.base/java/io/OutputStream.class]
[loading /modules/java.base/java/io/Flushable.class]
[loading /modules/java.base/java/lang/Comparable.class]
[loading /modules/java.base/java/lang/CharSequence.class]
[loading /modules/java.base/java/lang/constant/Constable.class]
[loading /modules/java.base/java/lang/constant/ConstantDesc.class]
[wrote HelloWorld.class]
[total 252ms]

C:\Users\Samarth\Desktop>javap -c HelloWorld
'javap' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Samarth\Desktop>
```

## 7. Reading Assignment: The JVM Architecture Explained

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### 8. Reading Assignment: The Java Language Environment: Contents

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## # Java language environment

### - Java language basics -

Syntax similar to C++ includes basic constructs like data types, operators and control flow. Uses class and object supporting inheritance and other concepts of OOPS.

### - JDK -

Includes the compiler, JRE and various development tools.

### - Standard Library

Includes packages 'java.lang', 'java.util', 'java.io'.

### - JVM

Runs JAVA bytecode, manages memory and provides runtime services.

### - JRE

JVM, core libraries and support files are contents of JRE.

### - Development tools.

IntelliJ IDEA, Eclipse, NetBeans.

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