

## Assignment No.1

### JAVA

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

- **Task:** Read about the history and development of Java.
- **Link:** <http://sunsite.uakom.sk/sunworldonline/swol-07-1995/swol-07-java.html>

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

- **Task:** Learn about the main features of Java.
- **Link:** <https://javaalmanac.io/features/>

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

- **Task:** Find out which JDK version is right for you.
- **Link:** <https://whichjdk.com/>

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

- **Task:** Understand the folder structure and files in the JDK installation.
- **Link:** <https://docs.oracle.com/javase/8/docs/technotes/tools/windows/jdkfiles.html>

#### 5. Reading Assignment: About Java Technology

- **Task:** Read about the basics of Java technology and its components.
- **Link:** <https://docs.oracle.com/javase/tutorial/getStarted/intro/definition.html>

#### 6. Coding Assignments

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

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

**Output:**

```
D:\CDAC\Java_Module_2\Java_Programs>javac Hello_World.java
```

```
D:\CDAC\Java_Module_2\Java_Programs>java Program
Hello World
```

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

**Output:**

```
D:\CDAC\Java_Module_2\Java_Programs>javac -verbose Hello_World.java
```

```
[parsing started
SimpleFileObject[D:\CDAC\Java_Module_2\Java_Programs\Hello_World.java]]
```

```
[parsing completed 35ms]
```

```
[loading /modules/java.base/module-info.class]
```

```
[loading /modules/jdk.charsets/module-info.class]
```

```
[loading /modules/jdk.sctp/module-info.class]
```

```
[loading /modules/jdk.management/module-info.class]
```

```
[loading /modules/jdk.editpad/module-info.class]
```

```
[loading /modules/jdk.net/module-info.class]
```

```
[loading /modules/java.datatransfer/module-info.class]
```

```
[loading /modules/jdk.jconsole/module-info.class]
```

```
[loading /modules/jdk.localedata/module-info.class]
```

```
[loading /modules/jdk.zipfs/module-info.class]
```

```
[loading /modules/java.desktop/module-info.class]
```

```
[loading /modules/jdk.crypto.mscapi/module-info.class]
```

```
[loading /modules/jdk.naming.dns/module-info.class]
```

```
[loading /modules/java.se/module-info.class]
```

```
[loading /modules/java.security.sasl/module-info.class]
```

```
[loading /modules/jdk.xml.dom/module-info.class]
```

```
[loading /modules/java.instrument/module-info.class]
```

[loading /modules/jdk.jdi/module-info.class]

[loading /modules/jdk.jcmd/module-info.class]

[loading /modules/jdk.security.jgss/module-info.class]

[loading /modules/jdk.jstatd/module-info.class]

[loading /modules/java.scripting/module-info.class]

[loading /modules/java.net.http/module-info.class]

[loading /modules/jdk.internal.vm.compiler/module-info.class]

[loading /modules/jdk.crypto.cryptoki/module-info.class]

[loading /modules/jdk.management.agent/module-info.class]

[loading /modules/jdk.internal.jvmstat/module-info.class]

[loading /modules/jdk.jsobject/module-info.class]

[loading /modules/java.xml/module-info.class]

[loading /modules/jdk.incubator.vector/module-info.class]

[loading /modules/jdk.attach/module-info.class]

[loading /modules/java.sql/module-info.class]

[loading /modules/jdk.internal.le/module-info.class]

[loading /modules/java.management/module-info.class]

[loading /modules/java.smartcardio/module-info.class]

[loading /modules/jdk.dynalink/module-info.class]

[loading /modules/jdk.random/module-info.class]

[loading /modules/jdk.jdwp.agent/module-info.class]

[loading /modules/jdk.jdeps/module-info.class]

[loading /modules/jdk.unsupported.desktop/module-info.class]

[loading /modules/jdk.security.auth/module-info.class]

[loading /modules/jdk.hotspot.agent/module-info.class]

[loading /modules/java.rmi/module-info.class]

[loading /modules/jdk.jpackage/module-info.class]

[loading /modules/jdk.internal.ed/module-info.class]

[loading /modules/jdk.compiler/module-info.class]

[loading /modules/jdk.javadoc/module-info.class]

[loading /modules/java.management.rmi/module-info.class]

[loading /modules/jdk.jlink/module-info.class]

[loading /modules/jdk.jartool/module-info.class]

[loading /modules/java.transaction.xa/module-info.class]

[loading /modules/java.security.jgss/module-info.class]

[loading /modules/jdk.unsupported/module-info.class]

[loading /modules/java.compiler/module-info.class]

[loading /modules/jdk.crypto.ec/module-info.class]

[loading /modules/jdk.jshell/module-info.class]

[loading /modules/java.naming/module-info.class]

[loading /modules/jdk.internal.opt/module-info.class]

[loading /modules/java.sql.rowset/module-info.class]

[loading /modules/jdk.management.jfr/module-info.class]

[loading /modules/java.logging/module-info.class]

[loading /modules/jdk.internal.vm.ci/module-info.class]

[loading /modules/jdk.naming.rmi/module-info.class]

[loading /modules/jdk.internal.vm.compiler.management/module-info.class]

[loading /modules/jdk.nio.mapmode/module-info.class]

[loading /modules/java.xml.crypto/module-info.class]

[loading /modules/jdk.httpserver/module-info.class]

[loading /modules/jdk.accessibility/module-info.class]

[loading /modules/java.prefs/module-info.class]

[loading /modules/jdk.jfr/module-info.class]

[search path for source files: .]

[search path for class files: C:\Program Files\Java\jdk-21\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 Program]

[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/io/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 Program.class]

[total 524ms]

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

```
D:\CDAC\Java_Module_2\Java_Programs>javap -c Program.class
Compiled from "Hello_World.java"
class Program {
    Program();
    Code:
        0: aload_0
        1: invokespecial #1          // Method java/lang/Object."<init>":()V
        4: return

    public static void main(java.lang.String[]);
    Code:
        0: getstatic     #7          // Field java/lang/System.out:Ljava/io/PrintStream;
        3: ldc          #13         // String Hello World
        5: invokevirtual #15         // Method java/io/PrintStream.println:(Ljava/lang/String;)V
        8: return
}
```

## 7. Reading Assignment: The JVM Architecture Explained

- **Task:** Learn about how the Java Virtual Machine (JVM) works.
- **Link:** <https://dzone.com/articles/jvm-architecture-explained>

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

- **Task:** Explore the content and features of the Java language environment.
- **Link:** <https://www.oracle.com/java/technologies/language-environment.html>