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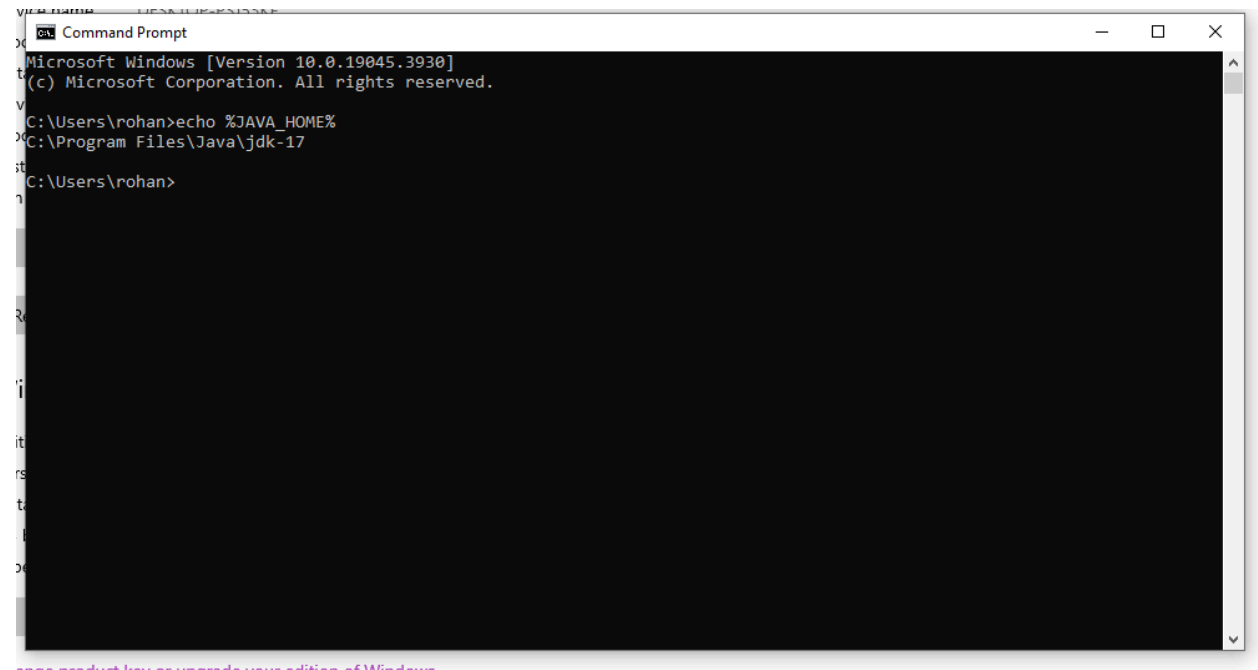
SOFE 3980U - LAB 1

YOUTUBE VIDEO LINK - https://youtu.be/yQ8RxIZ_06k

GITHUB:

<https://github.com/rohanradadiya/Rohan-Radadiya-Lab-deliverable-1---Maven-Unit-Testing>

The list of screenshots below are from the steps done by following the GitHub link given for the lab.



```
Command Prompt
Microsoft Windows [Version 10.0.19045.3930]
(c) Microsoft Corporation. All rights reserved.

C:\Users\rohan>echo %JAVA_HOME%
C:\Program Files\Java\jdk-17

C:\Users\rohan>
```

Steps as followed from given GitHub

```
Command Prompt
Microsoft Windows [Version 10.0.19045.3930]
(c) Microsoft Corporation. All rights reserved.

C:\Users\rohan>mvn -v
Apache Maven 3.9.6 (bc0240f3c744dd6b6ec2920b3cd08dccc295161ae)
Maven home: C:\Users\rohan\Documents\MAVEN\apache-maven-3.9.6
Java version: 17.0.10, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk-17
Default locale: en_CA, platform encoding: Cp1252
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"

C:\Users\rohan>
```

```
Command Prompt - mvn archetype:generate -DgroupId=com.ontariotechu.sofe3980U -DartifactId=BinaryCalculator -Dversion=1.0.0 -Darchetype...
Downloading from central: https://repo.maven.apache.org/maven2/antlr/antlr/2.7.7/antlr-2.7.7.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-lang3/3.8.1/commons-lang3-3.8.1.jar (502 kB at 132 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/4.0/asm-tree-4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/4.0/asm-tree-4.0.jar (22 kB at 5.4 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/4.0/asm-commons-4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/4.0/asm-commons-4.0.jar (38 kB at 8.8 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm/4.0/asm-4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm/4.0/asm-4.0.jar (46 kB at 10 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-util/4.0/asm-util-4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-util/4.0/asm-util-4.0.jar (37 kB at 7.9 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-analysis/4.0/asm-analysis-4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/groovy/groovy/2.0.1/groovy-2.0.1.jar (3.3 MB at 689 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/beanshell/bsh/2.0b4/bsh-2.0b4.jar
Downloaded from central: https://repo.maven.apache.org/maven2/antlr/antlr/2.7.7/antlr-2.7.7.jar (445 kB at 93 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/ant/ant/1.8.1/ant-1.8.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-analysis/4.0/asm-analysis-4.0.jar (20 kB at 4.1 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/beanshell/bsh/2.0b4/bsh-2.0b4.jar (282 kB at 58 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/com/ibm/icu/icu4j/70.1/icu4j-70.1.jar (14 MB at 2.8 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/ant/ant/1.8.1/ant-1.8.1.jar (1.5 MB at 271 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/groovy/groovy-all/2.4.16/groovy-all-2.4.16.jar (7.2 MB at 1.1 MB/s)
[INFO] Generating project in Batch mode
```

Generating object in batch

```
Command Prompt
/maven-archetype-quickstart-1.4.pom (1.6 kB at 28 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-bundles/1.4/m
aven-archetype-bundles-1.4.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-bundles/1.4/m
aven-archetype-bundles-1.4.pom (4.5 kB at 112 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-quickstart/1.
4/maven-archetype-quickstart-1.4.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-quickstart/1.4
/maven-archetype-quickstart-1.4.jar (7.1 kB at 237 kB/s)
[INFO] -----
[INFO] Using following parameters for creating project from Archetype: maven-archetype-quickstart:1.4
[INFO] -----
[INFO] Parameter: groupId, Value: com.ontariotechu.sofe3980U
[INFO] Parameter: artifactId, Value: BinaryCalculator
[INFO] Parameter: version, Value: 1.0.0
[INFO] Parameter: package, Value: com.ontariotechu.sofe3980U
[INFO] Parameter: packageInPathFormat, Value: com/ontariotechu/sofe3980U
[INFO] Parameter: package, Value: com.ontariotechu.sofe3980U
[INFO] Parameter: groupId, Value: com.ontariotechu.sofe3980U
[INFO] Parameter: artifactId, Value: BinaryCalculator
[INFO] Parameter: version, Value: 1.0.0
[INFO] Project created from Archetype in dir: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 24.446 s
[INFO] Finished at: 2024-01-28T17:09:08-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING>
```

```
Command Prompt
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/maven-archiver/3.1.1/maven-archiver-3.1.
1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/maven-archiver/3.1.1/maven-archiver-3.1.1
.jar (24 kB at 473 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-utils/3.0.1/maven-sh
ared-utils-3.0.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/3.4/plexus-archiver-3
.4.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-compress/1.11/commons-compress
-1.11.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/2.7.1/plexus-io-2.7.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/tukaani/xz/1.5/xz-1.5.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/2.7.1/plexus-io-2.7.1.jar (8
6 kB at 561 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-utils/3.0.1/maven-sha
red-utils-3.0.1.jar (154 kB at 739 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/3.4/plexus-archiver-3.
4.jar (187 kB at 677 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-compress/1.11/commons-compress
-1.11.jar (426 kB at 1.1 MB/s)
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 13.296 s
[INFO] Finished at: 2024-01-28T17:11:00-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

mvn clean package

```
Command Prompt
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-utils/3.0.1/maven-shared-utils-3.0.1.jar
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/3.4/plexus-archiver-3.4.jar
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-compress/1.11/commons-compress-1.11.jar
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/2.7.1/plexus-io-2.7.1.jar
Downloading from central: https://repo.maven.apache.org/maven2/org/tukaani/xz/1.5/xz-1.5.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/tukaani/xz/1.5/xz-1.5.jar (100 kB at 1.3 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/2.7.1/plexus-io-2.7.1.jar (86 kB at 561 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-utils/3.0.1/maven-shared-utils-3.0.1.jar (154 kB at 739 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/3.4/plexus-archiver-3.4.jar (187 kB at 677 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-compress/1.11/commons-compress-1.11.jar (426 kB at 1.1 MB/s)
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 13.296 s
[INFO] Finished at: 2024-01-28T17:11:00-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>java -cp target/BinaryCalculator-1.0.0.jar com.ontariotechu.sofe3980U.App
Hello World!
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

`java -cp target/BinaryCalculator-1.0.0.jar com.ontariotechu.sofe3980U.App`

```
Command Prompt
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\src\test\resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ BinaryCalculator ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\test-classes
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ BinaryCalculator ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running com.ontariotechu.sofe3980U.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.05 s - in com.ontariotechu.sofe3980U.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- jar:3.0.2:jar (default-jar) @ BinaryCalculator ---
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 5.448 s
[INFO] Finished at: 2024-01-28T18:26:55-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

After updating pom.xml and `mvn clean package`

```
Command Prompt
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ BinaryCalculator ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\test-classes
[INFO] --- surefire:2.22.1:test (default-test) @ BinaryCalculator ---
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running com.ontariotechu.sofe3980U.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.05 s - in com.ontariotechu.sofe3980U.AppTest
[INFO] Results:
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO] --- jar:3.0.2:jar (default-jar) @ BinaryCalculator ---
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 5.448 s
[INFO] Finished at: 2024-01-28T18:26:55-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>java -jar target/BinaryCalculator-1.0.0.jar
Hello World!
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

java -jar target/BinaryCalculator-1.0.0.jar

```
Command Prompt
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\src\test\resources
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ BinaryCalculator ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\test-classes
[INFO] --- surefire:2.22.1:test (default-test) @ BinaryCalculator ---
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running com.ontariotechu.sofe3980U.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.05 s - in com.ontariotechu.sofe3980U.AppTest
[INFO] Results:
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO] --- jar:3.0.2:jar (default-jar) @ BinaryCalculator ---
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 3.802 s
[INFO] Finished at: 2024-01-28T18:42:57-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

After copying v1 files into src folder and mvn clean package

```
Command Prompt
[INFO] Compiling 1 source file to C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\test-classes
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ BinaryCalculator ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running com.ontariotechu.sofe3980U.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.05 s - in com.ontariotechu.sofe3980U.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- jar:3.0.2:jar (default-jar) @ BinaryCalculator ---
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 3.802 s
[INFO] Finished at: 2024-01-28T18:42:57-05:00
[INFO]
[INFO] -----

C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>java -jar target/BinaryCalculator-1.0.0.jar
First binary number is 10001000
Second binary number is 111000
Their summation is 11000000

C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

java -jar target/BinaryCalculator-1.0.0.jar

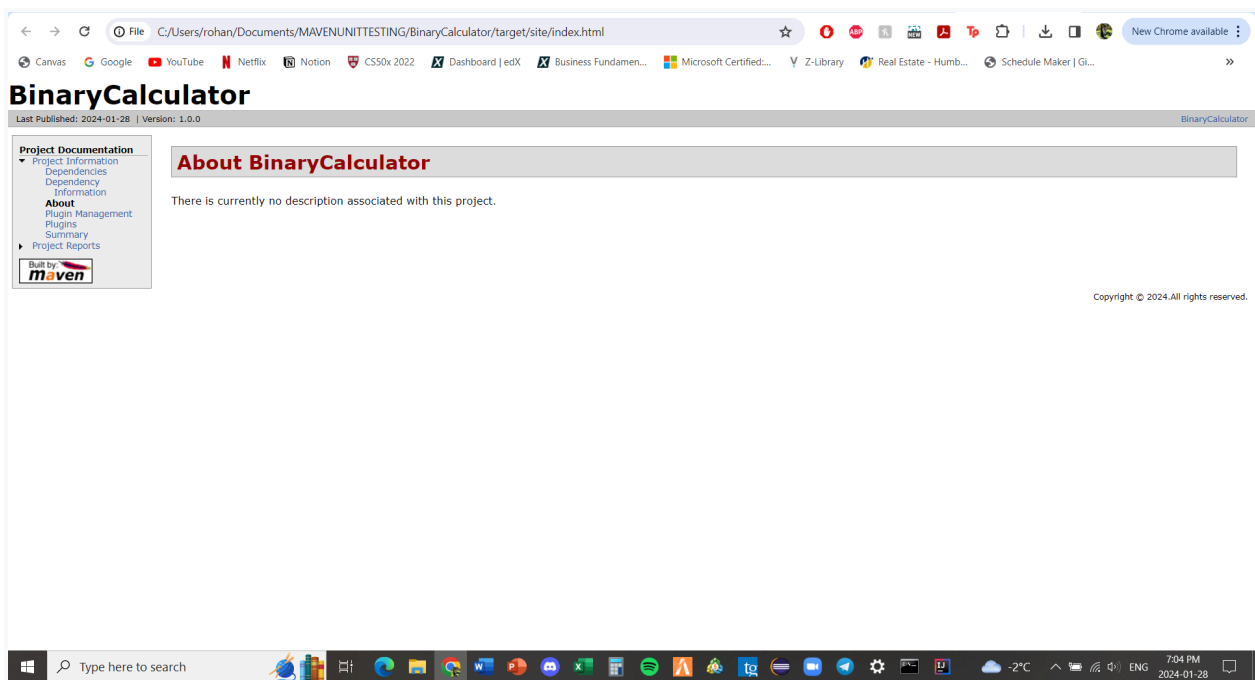
Received the correct output

```
Command Prompt
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/skins/maven-default-skin/1.2/maven-default-skin-1.2.jar (14 kB at 342 kB/s)
[INFO] Rendering content with org.apache.maven.skins:maven-default-skin:jar:1.2 skin.
[INFO] Generating "Dependencies" report --- maven-project-info-reports-plugin:3.0.0:dependencies
[INFO] Generating "Dependency Information" report --- maven-project-info-reports-plugin:3.0.0:dependency-info
[INFO] Generating "About" report --- maven-project-info-reports-plugin:3.0.0:index
[INFO] Generating "Plugin Management" report --- maven-project-info-reports-plugin:3.0.0:plugin-management
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-deploy-plugin/2.8.2/maven-deploy-plugin-2.8.2.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-deploy-plugin/2.8.2/maven-deploy-plugin-2.8.2.pom (7.1 kB at 238 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-plugins/25/maven-plugins-25.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-plugins/25/maven-plugins-25.pom (9.6 kB at 239 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-install-plugin/2.5.2/maven-install-plugin-2.5.2.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-install-plugin/2.5.2/maven-install-plugin-2.5.2.pom (6.4 kB at 214 kB/s)
[INFO] Generating "Plugins" report --- maven-project-info-reports-plugin:3.0.0:plugins
[INFO] Generating "Summary" report --- maven-project-info-reports-plugin:3.0.0:summary
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 23.673 s
[INFO] Finished at: 2024-01-28T18:47:25-05:00
[INFO]
[INFO] -----

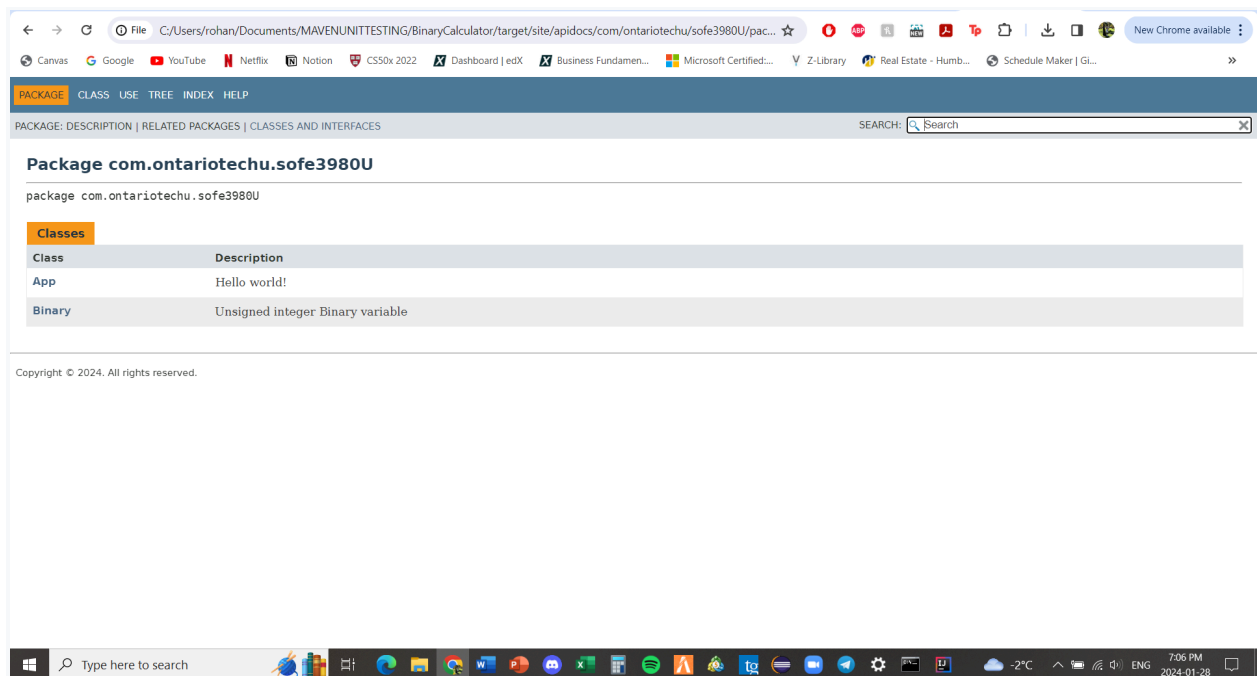
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

Generating documentation using `mvn site`

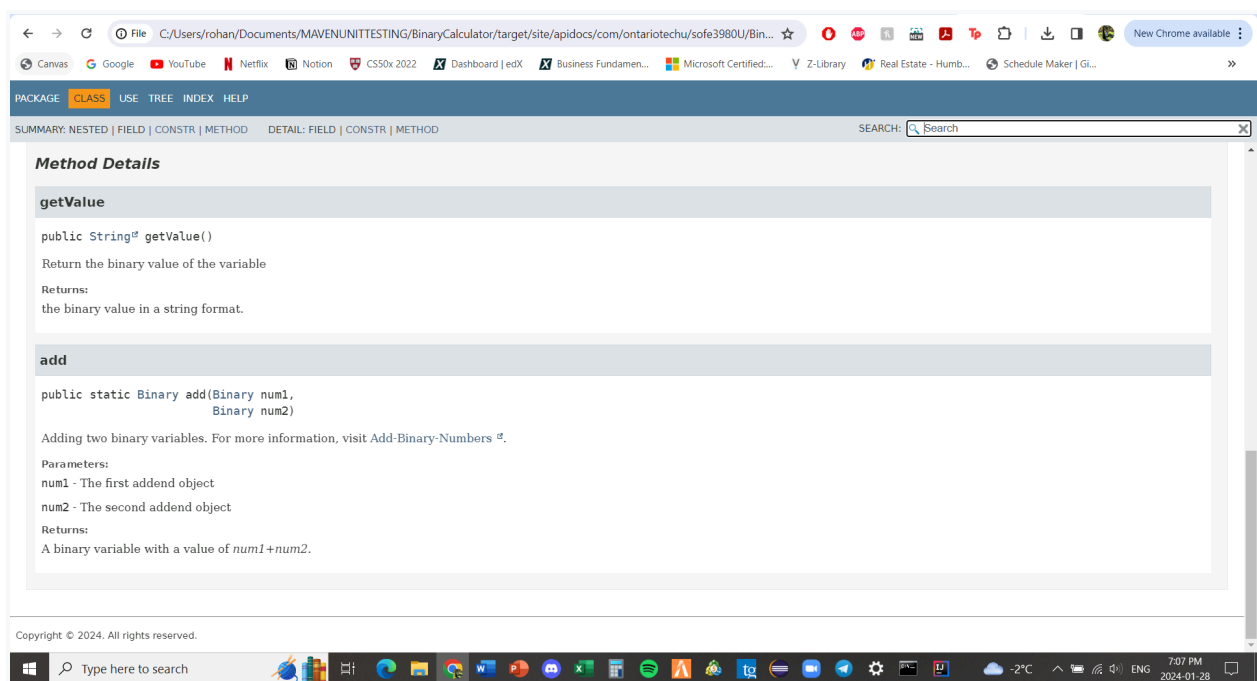
```
67 <plugin>
Command Prompt
[INFO] 15 reports detected for maven-project-info-reports-plugin:3.0.0: ci-management, dependencies, dependency-info, de
dependency-management, distribution-management, index, issue-management, licenses, mailing-lists, modules, plugin-managem
nt, plugins, scm, summary, team
[INFO] Rendering site with default locale English (en)
[INFO] Relativizing decoration links with respect to localized project URL: http://www.example.com
[INFO] Rendering content with org.apache.maven.skis:maven-default-skin:jar:1.2 skin.
[INFO] Skipped "Javadoc" report (maven-javadoc-plugin:3.4.1:javadoc), file "apidocs/index.html" already exists.
[INFO] Skipped "Javadoc" report (maven-javadoc-plugin:3.4.1:javadoc-no-fork), file "apidocs/index.html" already exists.
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc), file "testapidocs/index.html" already ex
ists.
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc-no-fork), file "testapidocs/index.html" al
ready exists.
[INFO] Generating "Javadoc" report --- maven-javadoc-plugin:3.4.1:aggregate-no-fork
[INFO] No previous run data found, generating javadoc.
[INFO] Generating "Test Javadoc" report --- maven-javadoc-plugin:3.4.1:test-aggregate-no-fork
[INFO] Configuration changed, re-generating javadoc.
[INFO] Generating "Dependencies" report --- maven-project-info-reports-plugin:3.0.0:dependencies
[INFO] Generating "Dependency Information" report --- maven-project-info-reports-plugin:3.0.0:dependency-info
[INFO] Generating "About" report --- maven-project-info-reports-plugin:3.0.0:index
[INFO] Generating "Plugin Management" report --- maven-project-info-reports-plugin:3.0.0:plugin-management
[INFO] Generating "Plugins" report --- maven-project-info-reports-plugin:3.0.0:plugins
[INFO] Generating "Summary" report --- maven-project-info-reports-plugin:3.0.0:summary
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 23.741 s
[INFO] Finished at: 2024-01-28T19:02:43-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```



Opening index.html file



Generated documents



Screen when navigating to Project Reports > Javadoc > Binary


```
Command Prompt
location: class com.ontariotechu.sofe3980U.App
[INFO] 3 errors
[INFO] -----
[INFO] BUILD FAILURE
[INFO] -----
[INFO] Total time: 2.332 s
[INFO] Finished at: 2024-01-29T02:26:22-05:00
[INFO] -----
[ERROR] Failed to execute goal org.apache.maven.plugins:maven-compiler-plugin:3.8.0:compile (default-compile) on project BinaryCalculator: Compilation failure: Compilation failure:
[ERROR] /C:/Users/rohan/Documents/MAVENUNITTESTING/BinaryCalculator/src/main/java/com/ontariotechu/sofe3980U/App.java:[3,21] package org.joda.time does not exist
[ERROR] /C:/Users/rohan/Documents/MAVENUNITTESTING/BinaryCalculator/src/main/java/com/ontariotechu/sofe3980U/App.java:[19,17] cannot find symbol
[ERROR]   symbol:   class LocalTime
[ERROR]   location: class com.ontariotechu.sofe3980U.App
[ERROR] /C:/Users/rohan/Documents/MAVENUNITTESTING/BinaryCalculator/src/main/java/com/ontariotechu/sofe3980U/App.java:[19,45] cannot find symbol
[ERROR]   symbol:   class LocalTime
[ERROR]   location: class com.ontariotechu.sofe3980U.App
[ERROR] -> [Help 1]
[ERROR]
[ERROR] To see the full stack trace of the errors, re-run Maven with the -e switch.
[ERROR] Re-run Maven using the -X switch to enable full debug logging.
[ERROR]
[ERROR] For more information about the errors and possible solutions, please read the following articles:
[ERROR] [Help 1] http://cwiki.apache.org/confluence/display/MAVEN/MojoFailureException
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

Output as expected

```
10  public class Apprest
11  {
12      /**
Terminal: Local +
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc), file "testapidocs/index.html" already exists.
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc-no-fork), file "testapidocs/index.html" already exists.
[INFO] Generating "Javadoc" report --- maven-javadoc-plugin:3.4.1:aggregate-no-fork
[INFO] No previous run data found, generating javadoc.
[INFO] Generating "Test Javadoc" report --- maven-javadoc-plugin:3.4.1:test-aggregate-no-fork
[INFO] Configuration changed, re-generating javadoc.
[INFO] Generating "Dependencies" report --- maven-project-info-reports-plugin:3.0.0:dependencies
[INFO] Generating "Dependency Information" report --- maven-project-info-reports-plugin:3.0.0:dependency-info
[INFO] Generating "About" report --- maven-project-info-reports-plugin:3.0.0:index
[INFO] Generating "Plugin Management" report --- maven-project-info-reports-plugin:3.0.0:plugin-management
[INFO] Generating "Plugins" report --- maven-project-info-reports-plugin:3.0.0:plugins
[INFO] Generating "Summary" report --- maven-project-info-reports-plugin:3.0.0:summary
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 25.386 s
[INFO] Finished at: 2024-01-29T02:57:48-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```



```
Command Prompt
[INFO]
[INFO] Results:
[INFO]
[ERROR] Failures:
[ERROR]   BinaryTest.add5:119
[ERROR]   BinaryTest.constructorEmptyString:64
[INFO]
[ERROR] Tests run: 12, Failures: 2, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD FAILURE
[INFO] -----
[INFO] Total time: 4.658 s
[INFO] Finished at: 2024-01-29T03:11:32-05:00
[INFO] -----
[ERROR] Failed to execute goal org.apache.maven.plugins:maven-surefire-plugin:2.22.1:test (default-test) on project BinaryCalculator: There are test failures.
[ERROR]
[ERROR] Please refer to C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\surefire-reports for the individual test results.
[ERROR] Please refer to dump files (if any exist) [date].dump, [date]-jvmRun[N].dump and [date].dumpstream.
[ERROR] -> [Help 1]
[ERROR]
[ERROR] To see the full stack trace of the errors, re-run Maven with the -e switch.
[ERROR] Re-run Maven using the -X switch to enable full debug logging.
[ERROR]
[ERROR] For more information about the errors and possible solutions, please read the following articles:
[ERROR] [Help 1] http://cwiki.apache.org/confluence/display/MAVEN/MojoFailureException

C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

Errors outputted as expected, shown above:

```
Command Prompt
[INFO] Relativizing decoration links with respect to localized project URL: http://www.example.com
[INFO] Rendering content with org.apache.maven.skins:maven-default-skin:jar:1.2 skin.
[INFO] Skipped "Javadoc" report (maven-javadoc-plugin:3.4.1:javadoc), file "apidocs/index.html" already exists.
[INFO] Skipped "Javadoc" report (maven-javadoc-plugin:3.4.1:javadoc-no-fork), file "apidocs/index.html" already exists.
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc), file "testapidocs/index.html" already exists.
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc-no-fork), file "testapidocs/index.html" already exists.
[INFO] Generating "Javadoc" report --- maven-javadoc-plugin:3.4.1:aggregate-no-fork
[INFO] No previous run data found, generating javadoc.
[INFO] Generating "Test Javadoc" report --- maven-javadoc-plugin:3.4.1:test-aggregate-no-fork
[INFO] Configuration changed, re-generating javadoc.
[INFO] Generating "Dependencies" report --- maven-project-info-reports-plugin:3.0.0:dependencies
[INFO] Generating "Dependency Information" report --- maven-project-info-reports-plugin:3.0.0:dependency-info
[INFO] Generating "About" report --- maven-project-info-reports-plugin:3.0.0:index
[INFO] Generating "Plugin Management" report --- maven-project-info-reports-plugin:3.0.0:plugin-management
[INFO] Generating "Plugins" report --- maven-project-info-reports-plugin:3.0.0:plugins
[INFO] Generating "Summary" report --- maven-project-info-reports-plugin:3.0.0:summary
[INFO]
[INFO] --- assembly:3.6.0:single (default-cli) @ BinaryCalculator ---
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0-jar-with-dependencies.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 20.057 s
[INFO] Finished at: 2024-01-29T03:16:20-05:00
[INFO] -----

C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

```
Command Prompt
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc), file "testapidocs/index.html" already exists.
[INFO] Skipped "Test Javadoc" report (maven-javadoc-plugin:3.4.1:test-javadoc-no-fork), file "testapidocs/index.html" already exists.
[INFO] Skipped "Surefire Report" report (maven-surefire-report-plugin:3.0.0-M7:report-only), file "surefire-report.html" already exists.
[INFO] Generating "Javadoc" report --- maven-javadoc-plugin:3.4.1:aggregate-no-fork
[INFO] No previous run data found, generating javadoc.
[INFO] Generating "Test Javadoc" report --- maven-javadoc-plugin:3.4.1:test-aggregate-no-fork
[INFO] Configuration changed, re-generating javadoc.
[INFO] Generating "Surefire Report" report --- maven-surefire-report-plugin:3.0.0-M7:report
[WARNING] Unable to locate Test Source XRef to link to - DISABLED
[INFO] Generating "Dependencies" report --- maven-project-info-reports-plugin:3.0.0:dependencies
[INFO] Generating "Dependency Information" report --- maven-project-info-reports-plugin:3.0.0:dependency-info
[INFO] Generating "About" report --- maven-project-info-reports-plugin:3.0.0:index
[INFO] Generating "Plugin Management" report --- maven-project-info-reports-plugin:3.0.0:plugin-management
[INFO] Generating "Plugins" report --- maven-project-info-reports-plugin:3.0.0:plugins
[INFO] Generating "Summary" report --- maven-project-info-reports-plugin:3.0.0:summary
[INFO] --- assembly:3.6.0:single (default-cli) @ BinaryCalculator ---
[INFO] Building jar: C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\BinaryCalculator-1.0.0-jar-with-dependencies.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 21.531 s
[INFO] Finished at: 2024-01-29T03:20:57-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

Tests are completed successfully

```
Command Prompt
[INFO]
[INFO] Results:
[INFO]
[ERROR] Failures:
[ERROR]   BinaryTest.and3:163
[INFO]
[ERROR] Tests run: 19, Failures: 1, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD FAILURE
[INFO] -----
[INFO] Total time: 3.814 s
[INFO] Finished at: 2024-01-29T22:33:16-05:00
[INFO]
[ERROR] Failed to execute goal org.apache.maven.plugins:maven-surefire-plugin:2.22.1:test (default-test) on project BinaryCalculator: There are test failures.
[ERROR]
[ERROR] Please refer to C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator\target\surefire-reports for the individual test results.
[ERROR] Please refer to dump files (if any exist) [date].dump, [date]-jvmRun[N].dump and [date].dumpstream.
[ERROR] -> [Help 1]
[ERROR]
[ERROR] To see the full stack trace of the errors, re-run Maven with the -e switch.
[ERROR] Re-run Maven using the -X switch to enable full debug logging.
[ERROR]
[ERROR] For more information about the errors and possible solutions, please read the following articles:
[ERROR] [Help 1] http://cwiki.apache.org/confluence/display/MAVEN/MojoFailureException
C:\Users\rohan\Documents\MAVENUNITTESTING\BinaryCalculator>
```

Errors outputted after running the test shown below, it was initially commented when the other tests passed. Can be due to the fact of a different number of digits and the conditions placed.

```

156
157     @Test
158     public void and3()
159     {
160         Binary binary1 = new Binary( number: "0011");
161         Binary binary2 = new Binary( number: "1000");
162         Binary andResult = Binary.and(binary1, binary2);
163         assertTrue(andResult.getValue().equals("0000"));
164     }

```

BinaryCalculator - Surefire Report

Project Documentation

- Project Information
- Project Reports
- JavaDoc
- Test Results
- Surefire Report

Build by Maven

Surefire Report

Summary

[Summary] [Package List] [Test Cases]

Tests	Errors	Failures	Skipped	Success Rate	Time
12	0	0	0	100%	0.093

Note: failures are anticipated and checked for with assertions while errors are unanticipated.

Package List

[Summary] [Package List] [Test Cases]

Package	Tests	Errors	Failures	Skipped	Success Rate	Time
com.ontariotechu.sofe3980U	12	0	0	0	100%	0.093

Note: package statistics are not computed recursively, they only sum up all of its testsuites numbers.

com.ontariotechu.sofe3980U

Class	Tests	Errors	Failures	Skipped	Success Rate	Time
AppTest	1	0	0	0	100%	0.091
BinaryTest	11	0	0	0	100%	0.002

Test Cases

[Summary] [Package List] [Test Cases]

All tests are passed, shown in the summary table above within the Sunfire Report.

Design:

```
while (ind1 >= 0 || ind2 >= 0 || carry != 0) // loop until all digits are processed
{
    int sum = carry; // previous carry
    if (ind1 >= 0) { // if num1 has a digit to add
        sum += (num1.number.charAt(ind1) == '1') ? 1 : 0; // convert the digit to int and add it to sum
        ind1--;
    }
    if (ind2 >= 0) { // if num2 has a digit to add
        sum += (num2.number.charAt(ind2) == '1') ? 1 : 0; // convert the digit to int and add it to sum
        ind2--; //update ind2
    }
    carry = sum / 2; // the new carry
    sum = sum % 2; // the resultant digit
    num3.insert(0, (sum == 0) ? "0" : "1"); //convert sum to string and append it to num3
}
return new Binary(num3.toString()); // create a binary object with the calculated value.
//return result;
}

/**
 * Conducting the logical "OR" operation with two binary variables. For more information, visit <a href="https://www.wikihow.com/Add-Binary-Numbers"> Add-Binary-Numbers </a>.
 * By using an logical OR table, we understand that: 0 OR 0 = 0; 0 OR 1 = 1; 1 OR 0 = 1; 1 OR 1 = 1
 */
@docnum num1 The first object
@docnum num2 The second object
@docnum A binary variable with a value of <num1 OR num2>/s.
*/
public static Binary or(Binary num1, Binary num2) {
    int binary1length = num1.number.length();
    int binary2length = num2.number.length();
    int lengthMaximum = Math.max(binary1length, binary2length);
    StringBuilder result = new StringBuilder();
    //Allows to modify the content of the string

    for (int i = 0; i < lengthMaximum; i++) {
        char firstPositionNumber = (i < binary1length) ? num1.number.charAt(binary1length - 1 - i) : '0';
        //Utilizes a ternary operator and satisfies as an either/or, for the first binary variable
        char secondPositionNumber = (i < binary2length) ? num2.number.charAt(binary2length - 1 - i) : '0';
        //Utilizes a ternary operator and satisfies as an either/or, for the second binary variable
        char orResult = (firstPositionNumber == '1' || secondPositionNumber == '1') ? '1' : '0';
        result.insert(0, orResult);
    }
    return new Binary(result.toString());
}

Binary = multiply()
```

Function created for OR

```
int binary2length = num2.number.length();
int lengthMaximum = Math.max(binary1length, binary2length);
StringBuilder result = new StringBuilder();
//Allows to modify the content of the string

for (int i = 0; i < lengthMaximum; i++) {
    char firstPositionNumber = (i < binary1length) ? num1.number.charAt(binary1length - 1 - i) : '0';
    //Utilizes a ternary operator and satisfies as an either/or, for the first binary variable
    char secondPositionNumber = (i < binary2length) ? num2.number.charAt(binary2length - 1 - i) : '0';
    //Utilizes a ternary operator and satisfies as an either/or, for the second binary variable
    char andResult = (firstPositionNumber == '1' && secondPositionNumber == '1') ? '1' : '0';
    result.insert(0, andResult);
}
return new Binary(result.toString());
//returns result
}

/**
 * Conducting the logical "AND" operation with two binary variables. For more information, visit <a href="https://www.wikihow.com/Add-Binary-Numbers"> Add-Binary-Numbers </a>.
 * By using an logical AND table, we understand that: 0 AND 0 = 0; 0 AND 1 = 0; 1 AND 0 = 0; 1 AND 1 = 1
 */
@docnum num1 The first object
@docnum num2 The second object
@docnum A binary variable with a value of <num1 AND num2>/s.
*/
public static Binary and(Binary num1, Binary num2) {
    int binary1length = num1.number.length();
    int binary2length = num2.number.length();
    int lengthMaximum = Math.min(binary1length, binary2length);
    StringBuilder result = new StringBuilder();

    for (int i = 0; i < lengthMaximum; i++) {
        char firstPositionNumber = num1.number.charAt(binary1length - 1 - i);
        //Utilizes the first binary variable
        char secondPositionNumber = num2.number.charAt(binary2length - 1 - i);
        //Utilizes the second binary variable
        char andResult = (firstPositionNumber == '1' && secondPositionNumber == '1') ? '1' : '0';
        result.insert(0, andResult);
    }
    return new Binary(result.toString());
}

/**
 * Conducting the logical "XOR" operation with two binary variables. For more information, visit <a href="https://www.wikihow.com/Add-Binary-Numbers"> Add-Binary-Numbers </a>.
 */
Binary = multiply()
```

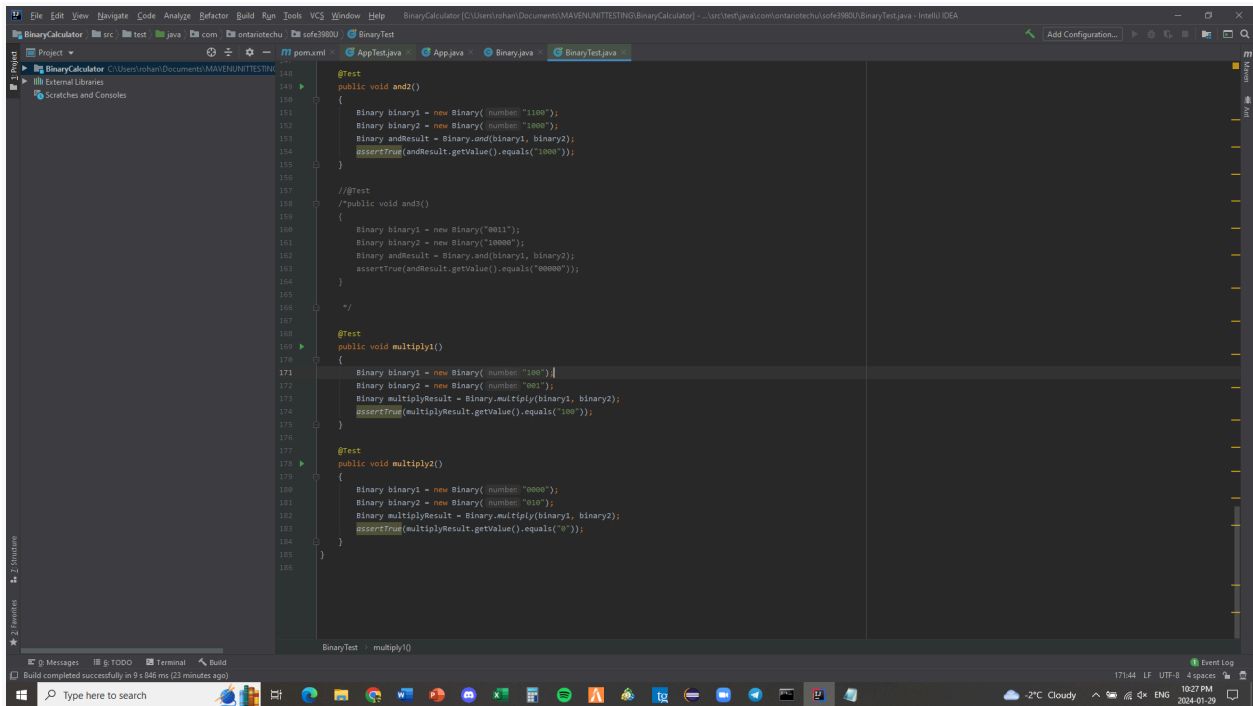
Function created for AND

```
117     return new Binary(result.toString());
118 }
119
120 /**
121  * Conducting the logical "MULTIPLY" operation with two binary variables. For more information, visit <a href="https://www.wikihow.com/Add-Binary-Numbers">Add-Binary-Numbers</a>.
122  * By using an logical AND table, we understand that: 0 * 0 = 0; 0 * 1 = 0; 1 * 0 = 0; 1 * 1 = 1
123  *
124  * @param num1 The first object
125  * @param num2 The second object
126  * @return A binary variable with a value of (num1 * num2/10).
127  */
128 //public static Binary multiply(Binary num1, Binary num2) {
129     Binary result = new Binary("0");
130     Binary temp = new Binary(num1.number);
131     while (num2.getValue().equals("0")) {
132         if (num2.number.charAt(num2.number.length() - 1) == '1') {
133             result = add(result, temp);
134         }
135         temp = add(temp, temp);
136         //Used as a temporary variable
137         num2 = new Binary(num2.number.substring(0, num2.number.length() - 1));
138     }
139     return result;
140 }
```

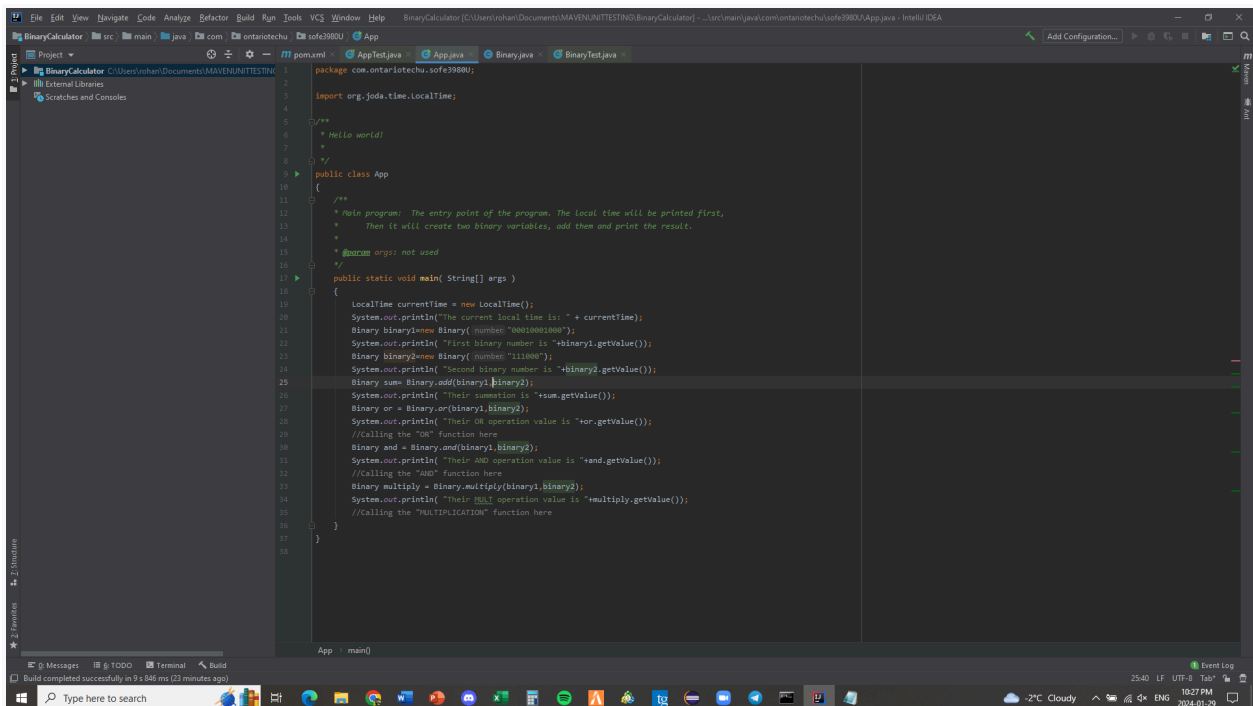
```
117     for (int i = 0; i < lengthOfNum1; i++) {
118         char firstPositionNumber = num1.number.charAt(binaryLength - 1 - i);
119         //Utilizes the first binary variable
120         char secondPositionNumber = num2.number.charAt(binaryLength - 1 - i);
121         //Utilizes the second binary variable
122         char andResult = (firstPositionNumber == '1' && secondPositionNumber == '1') ? '1' : '0';
123         result.insert(0, andResult);
124     }
125     return new Binary(result.toString());
126 }
127
128 /**
129  * Conducting the logical "MULTIPLY" operation with two binary variables. For more information, visit <a href="https://www.wikihow.com/Add-Binary-Numbers">Add-Binary-Numbers</a>.
130  * By using an logical AND table, we understand that: 0 * 0 = 0; 0 * 1 = 0; 1 * 0 = 0; 1 * 1 = 1
131  *
132  * @param num1 The first object
133  * @param num2 The second object
134  * @return A binary variable with a value of (num1 * num2/10).
135  */
136 //public static Binary multiply(Binary num1, Binary num2) {
137     Binary result = new Binary("0");
138     Binary temp = new Binary(num1.number);
139     while (num2.getValue().equals("0")) {
140         if (num2.number.charAt(num2.number.length() - 1) == '1') {
141             result = add(result, temp);
142         }
143     }
144     //
145     public static Binary multiply(Integer num1, Integer num2)
146     {
147         int num1Variable = Integer.parseInt(num1.toString(), 10);
148         int num2Variable = Integer.parseInt(num2.toString(), 10);
149         //parseInt takes the arguments and returns the integers
150         int finalProduct = num1Variable * num2Variable;
151         return new Binary(Integer.toString(finalProduct));
152     }
153 }
```

Function created for Multiply, both are usable, second is more user-friendly.

Tests Done:



Tests written for the "multiply" function



Classes are called here as shown above:

In conclusion, all of the instructions and testing done in this lab was very useful in terms of understanding the tool, creating and calling functions, and running tests to better understand the functionality. All of the tests show up as successfully passed as shown above, within the screenshots. Overall, the lab was a great method of better understanding the overall tools and unit testing programs in development not only in the course but in the work force.