



FACULTY OF ENGINEERING AND APPLIED SCIENCE

SOFE 3980U SOFTWARE QUALITY LABORATORY REPORT

Professor: **Dr. Mohamed El-Darieby**

Experiment:

LAB REPORT #: **2**

LAB CRN NUMBER and group #: CRN: **73385** | Group: **N/A**

LAB GROUP MEMBERS				
#	Surname	Name	ID	Signature
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ROHAN RADADIYA - 100704614

SOFE 3980U - LAB 2

YOUTUBE VIDEO LINK: <https://youtu.be/KsDqHeQhrgE>

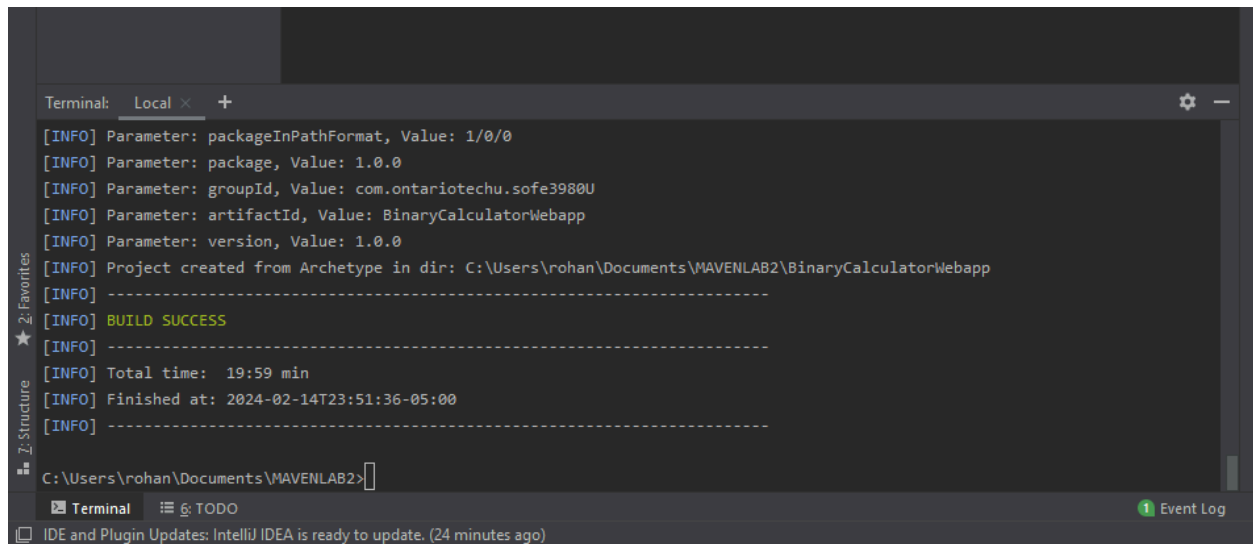
GITHUB LINK:

<https://github.com/rohanradadiya/Rohan-Radadiya-Lab-Deliverable-2---Maven-and-Web-Application>

Introduction:

The following lab was used to learn the various functionalities of the Apache Maven and Spring Boot. Implementing and testing the web application service was a vital aspect of the lab project, as they were the fundamentals in order to complete and follow the rest of the lab requirements as well. The screenshots and information followed portray the steps, directions, and testing done to the program in order to ensure that the functionalities and project were as flawless as possible.

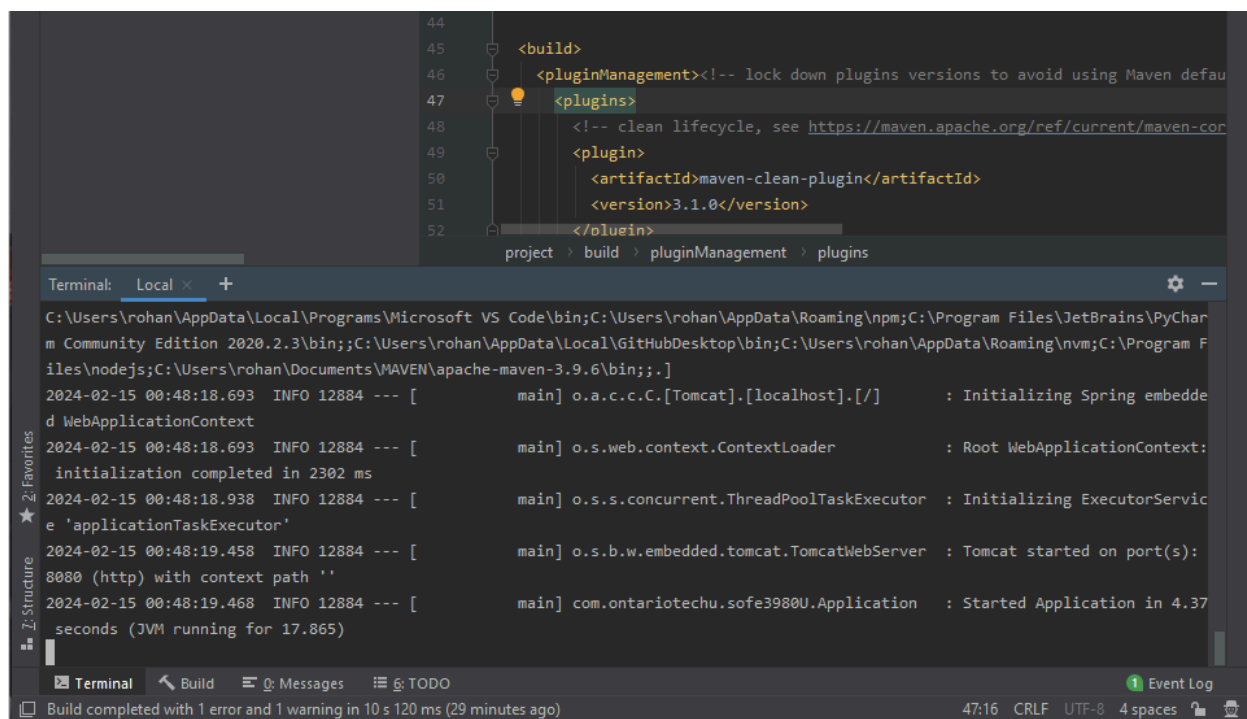
Screenshots:



```
Terminal: Local x +
[INFO] Parameter: packageInPathFormat, Value: 1/0/0
[INFO] Parameter: package, Value: 1.0.0
[INFO] Parameter: groupId, Value: com.ontariotechu.sofe3980U
[INFO] Parameter: artifactId, Value: BinaryCalculatorWebapp
[INFO] Parameter: version, Value: 1.0.0
[INFO] Project created from Archetype in dir: C:\Users\rohan\Documents\MAVENLAB2\BinaryCalculatorWebapp
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 19:59 min
[INFO] Finished at: 2024-02-14T23:51:36-05:00
[INFO] -----
C:\Users\rohan\Documents\MAVENLAB2>
```

IDE and Plugin Updates: IntelliJ IDEA is ready to update. (24 minutes ago)

1 Event Log

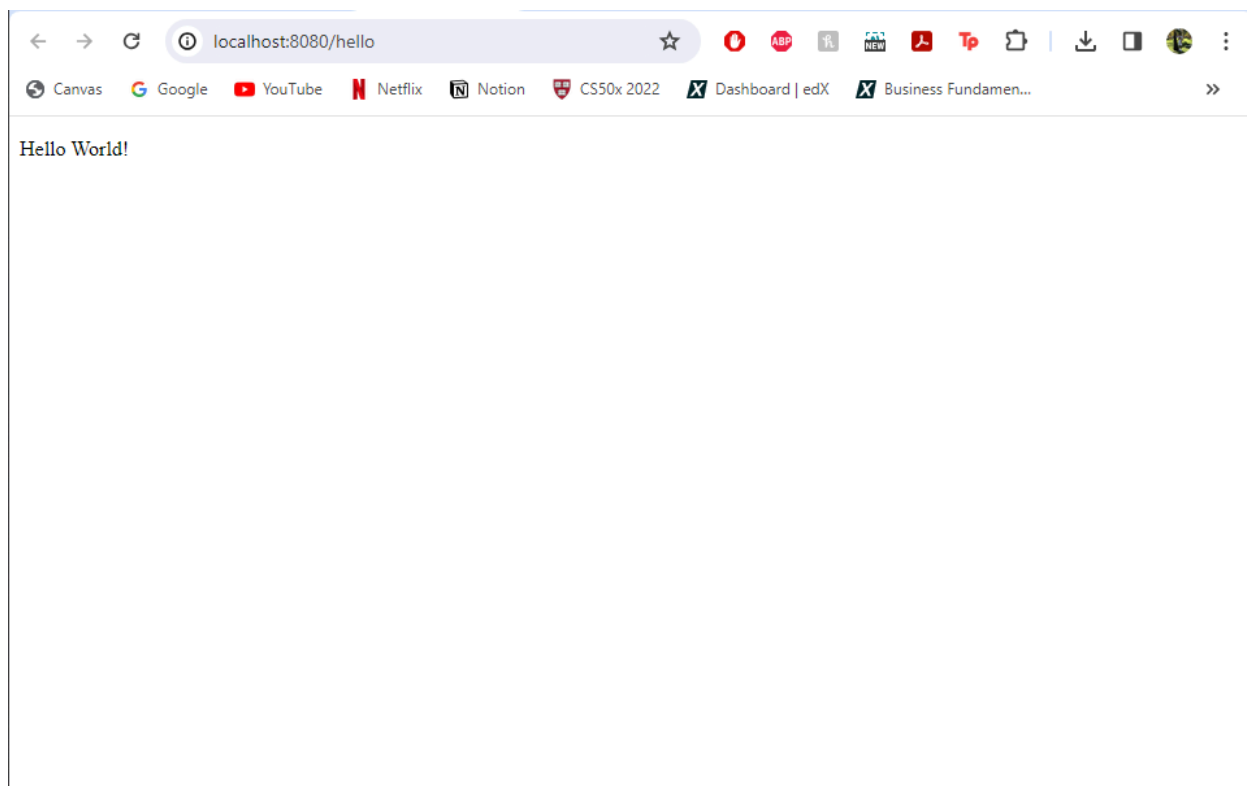


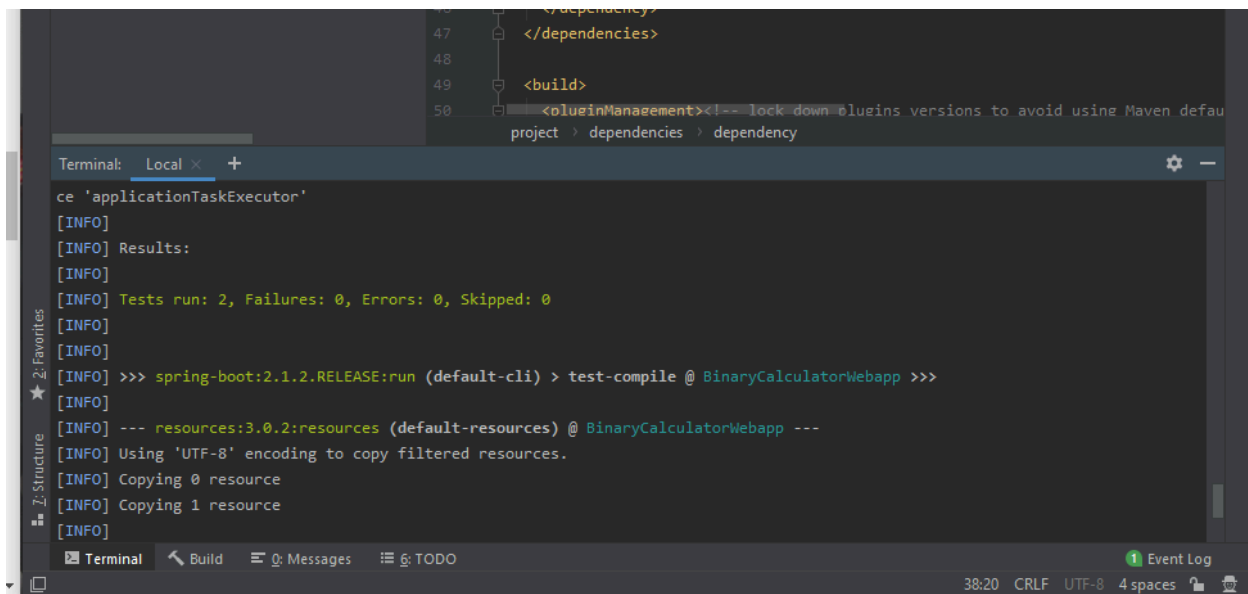
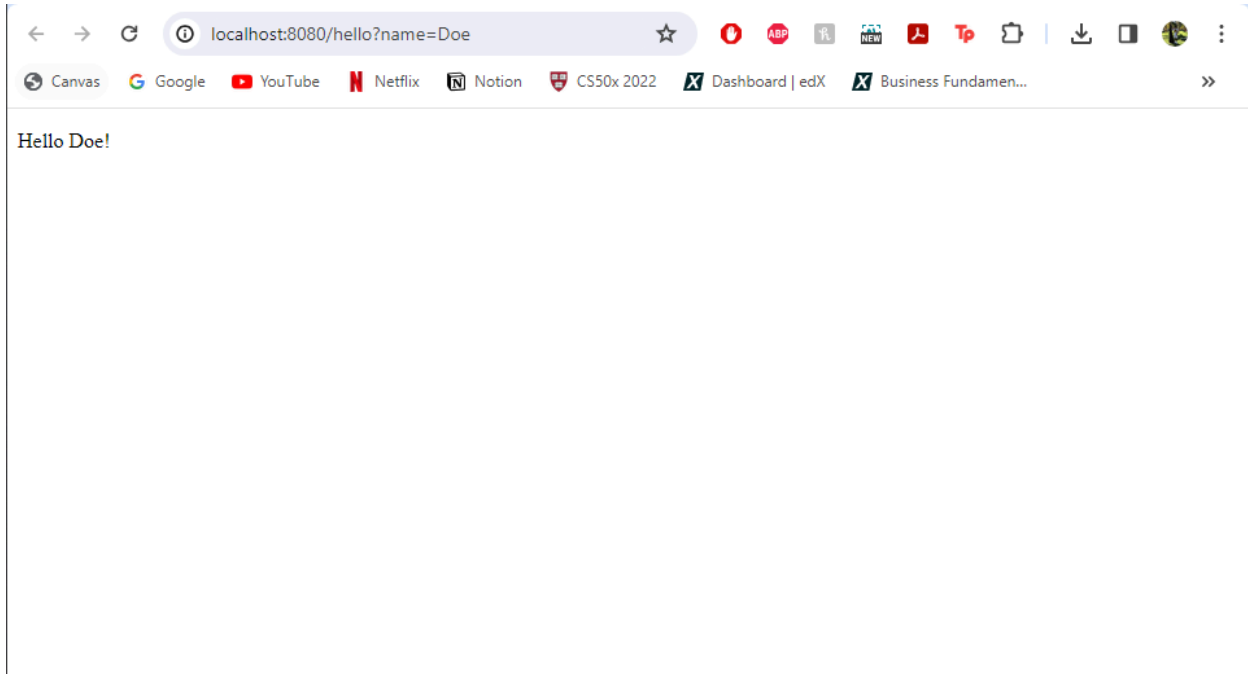
```
44
45 <build>
46 <pluginManagement><!-- lock down plugins versions to avoid using Maven default
47 <plugins>
48 <!-- clean lifecycle, see https://maven.apache.org/ref/current/maven-core
49 <plugin>
50 <artifactId>maven-clean-plugin</artifactId>
51 <version>3.1.0</version>
52 </plugin>
    project > build > pluginManagement > plugins
```

Terminal: Local x +

```
C:\Users\rohan\AppData\Local\Programs\Microsoft VS Code\bin;C:\Users\rohan\AppData\Roaming\npm;C:\Program Files\JetBrains\PyCharm Community Edition 2020.2.3\bin;;C:\Users\rohan\AppData\Local\GitHubDesktop\bin;C:\Users\rohan\AppData\Roaming\nvm;C:\Program Files\nodejs;C:\Users\rohan\Documents\MAVEN\apache-maven-3.9.6\bin;.]
2024-02-15 00:48:18.693 INFO 12884 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2024-02-15 00:48:18.693 INFO 12884 --- [main] o.s.web.context.ContextLoader : Root WebApplicationContext: initialization completed in 2302 ms
2024-02-15 00:48:18.938 INFO 12884 --- [main] o.s.s.concurrent.ThreadPoolTaskExecutor : Initializing ExecutorService 'applicationTaskExecutor'
2024-02-15 00:48:19.458 INFO 12884 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path ''
2024-02-15 00:48:19.468 INFO 12884 --- [main] com.ontariotechu.sofe3980U.Application : Started Application in 4.37 seconds (JVM running for 17.865)
```

Build completed with 1 error and 1 warning in 10 s 120 ms (29 minutes ago) 47:16 CRLF UTF-8 4 spaces





```

47     </dependencies>
48
49     <build>
50         <pluginManagement><!-- lock down plugin versions to avoid using Maven default
project > dependencies > dependency

```

Terminal: Local x +

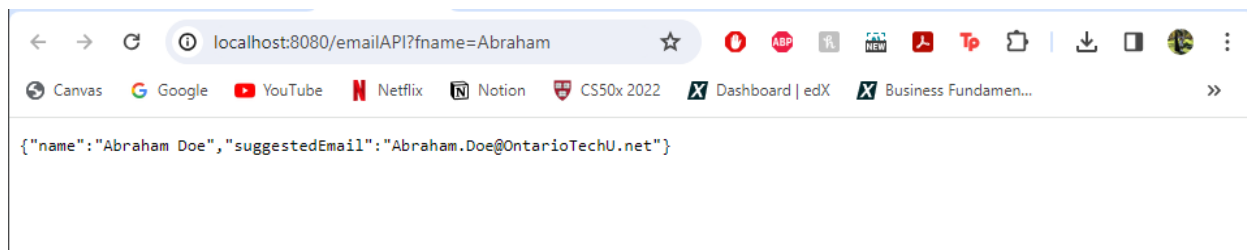
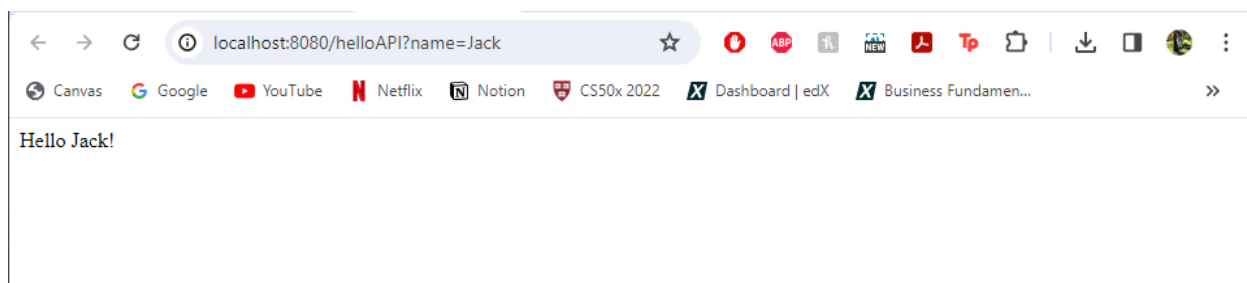
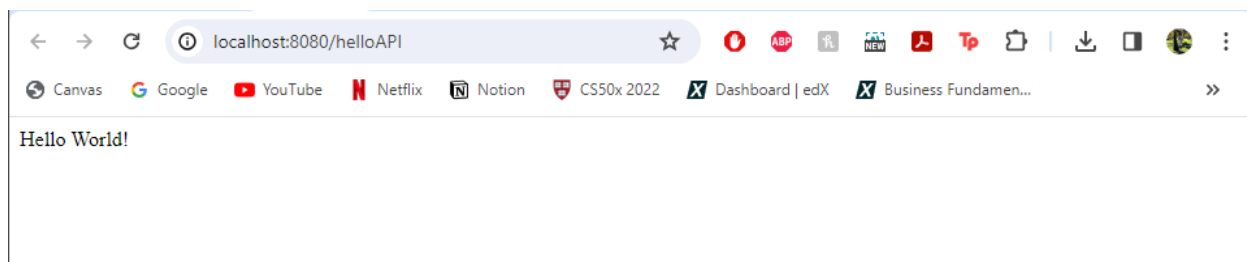
```

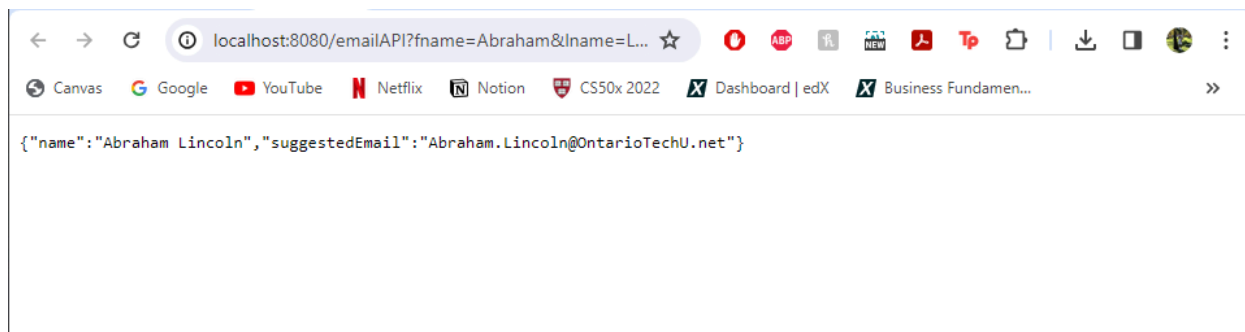
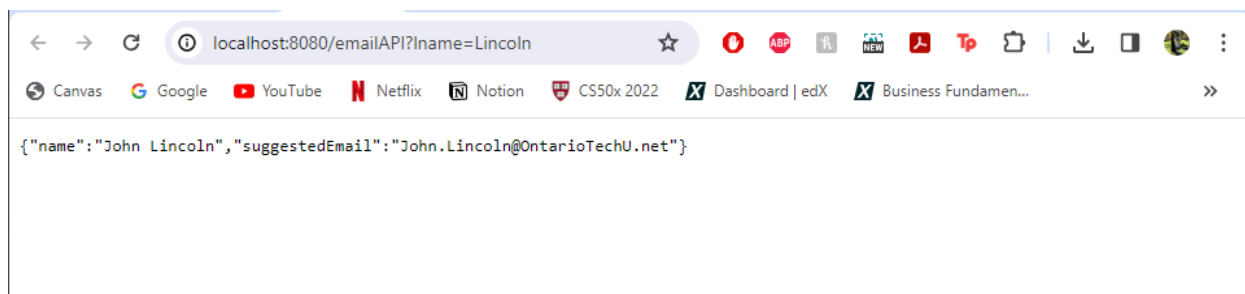
2024-02-15 00:59:18.989 INFO 4112 --- [Thread-4] o.s.s.concurrent.ThreadPoolTaskExecutor : Shutting down ExecutorService
'e 'applicationTaskExecutor'
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 8, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] >>> spring-boot:2.1.2.RELEASE:run (default-cli) > test-compile @ BinaryCalculatorWebapp >>>
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO] Copying 1 resource

```

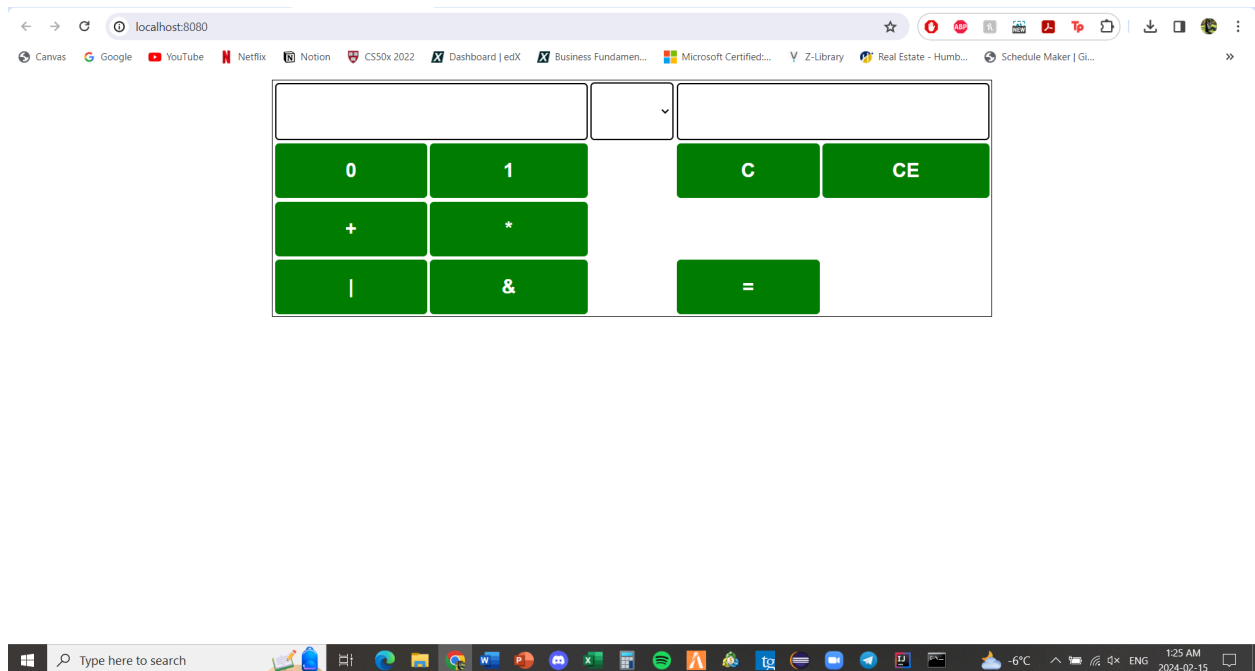
33:20 CRLF UTF-8 4 spaces

Trying the URLs: API Controller Using Spring Boot

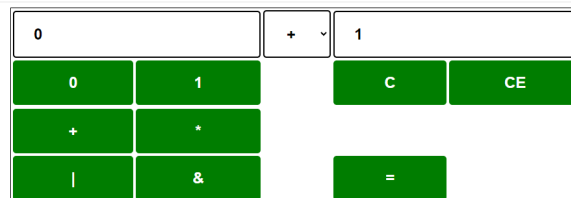




The Web Application of Binary Calculator



Testing the calculator:



0 + 1=1

[New operation](#) [Continue calculation](#)

00 * 0111=0

[New operation](#) [Continue calculation](#)

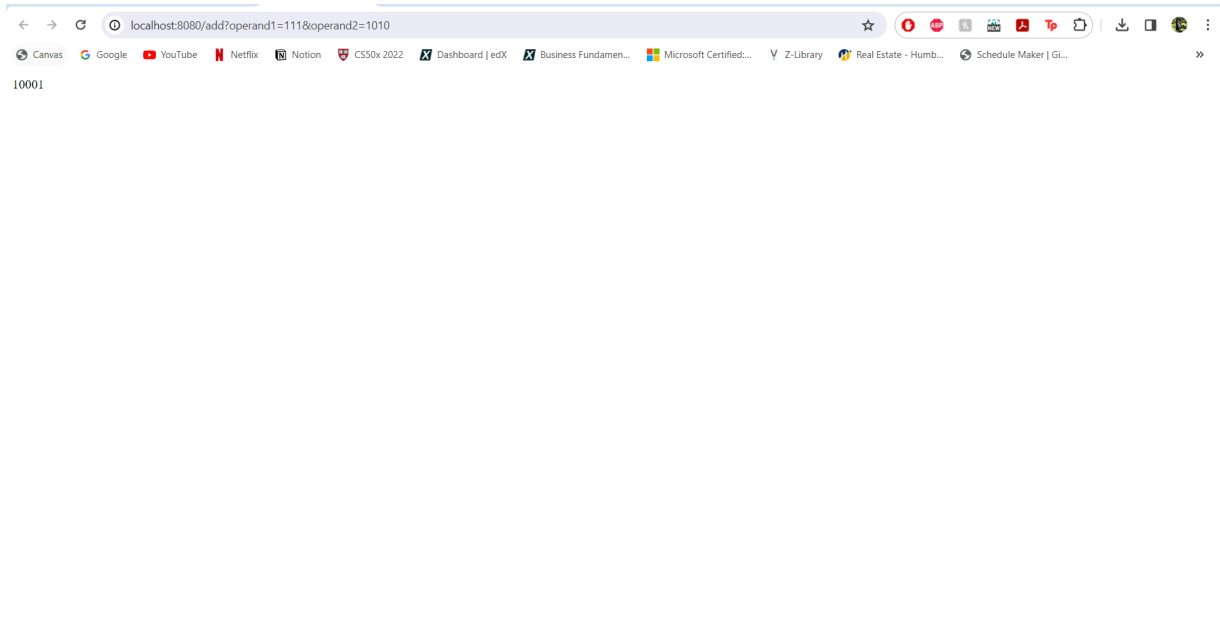
111 | 11101=11111

[New operation](#) [Continue calculation](#)

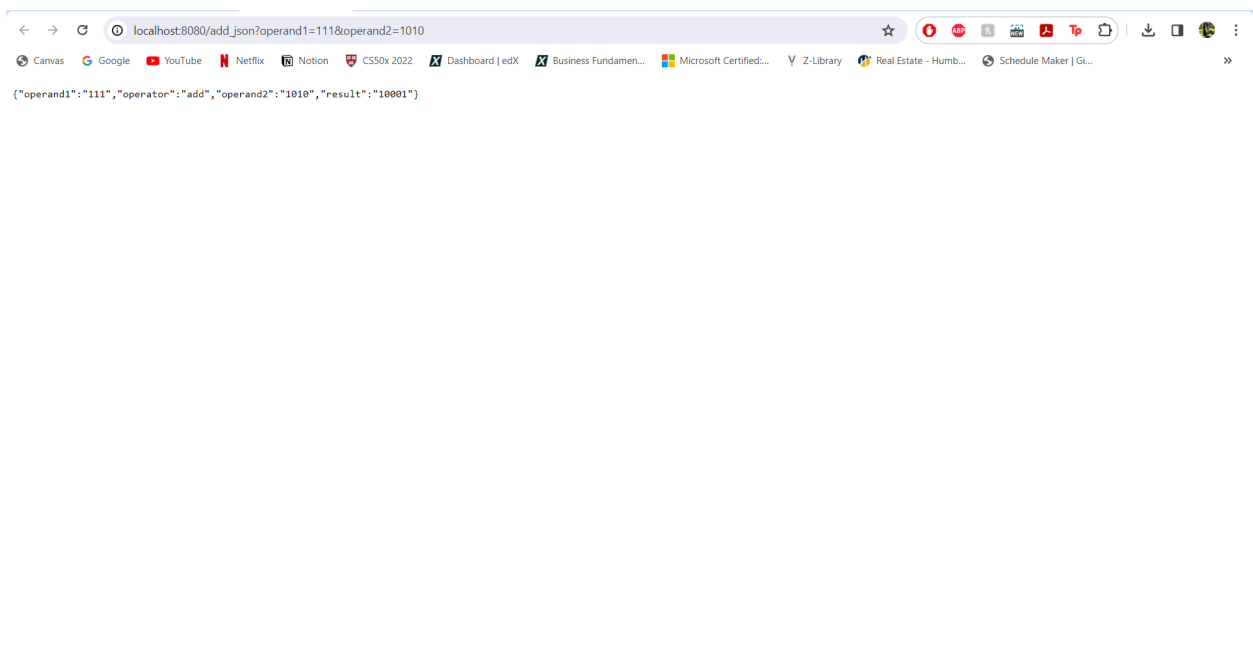
1010101 & 1111=101

[New operation](#) [Continue calculation](#)

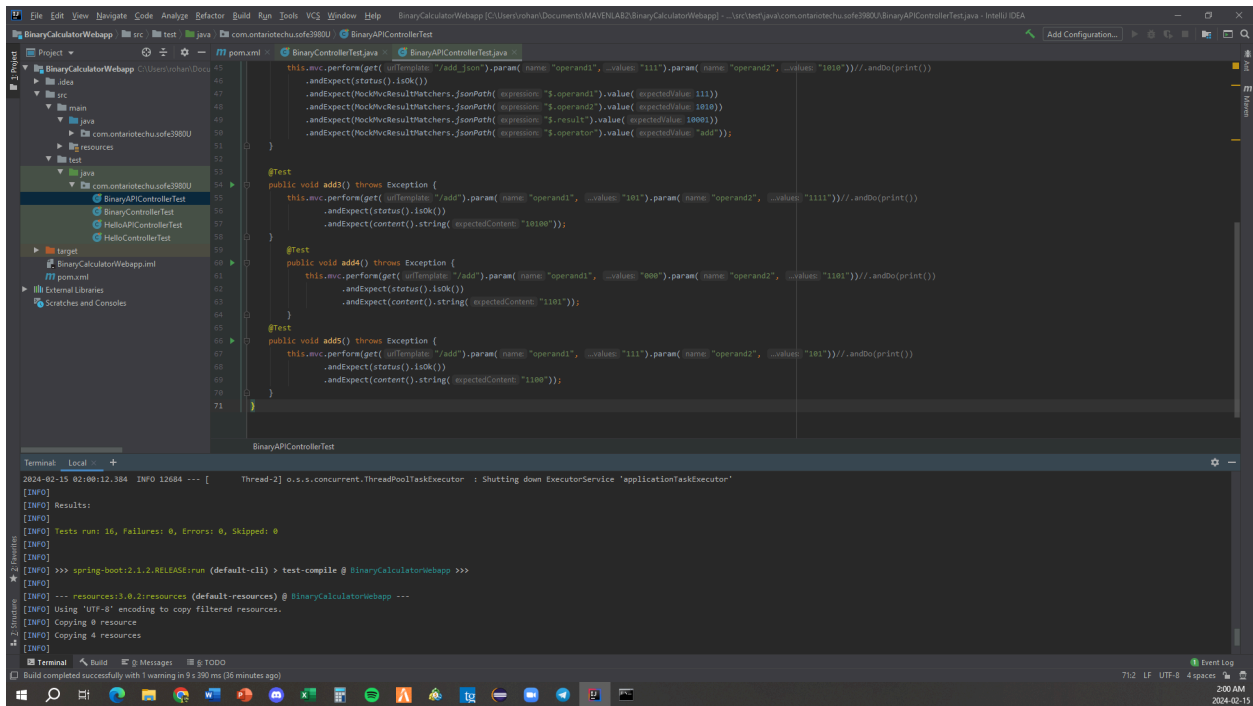
Other operators used in the calculator - fully functional as seen in images



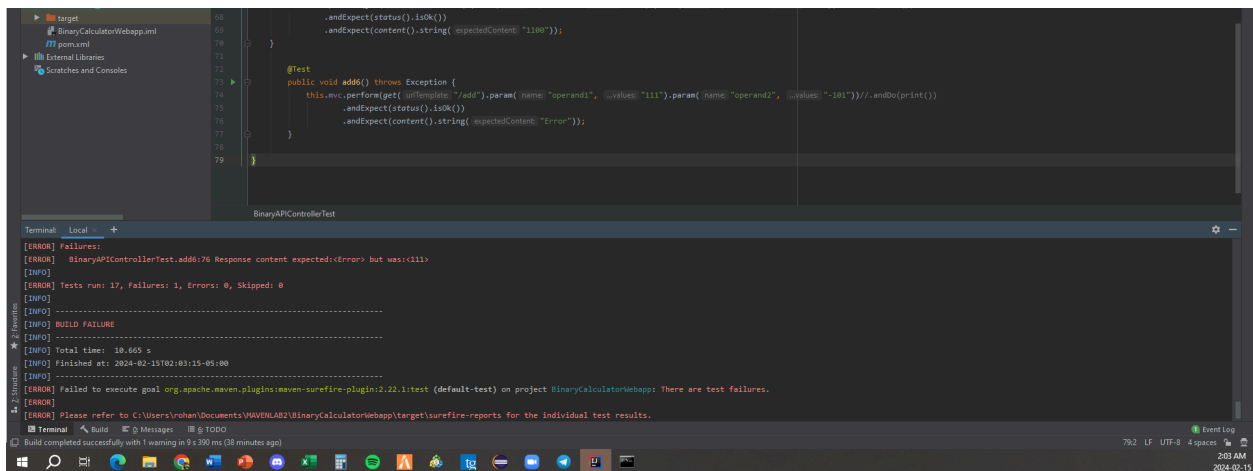
View after clicking link 1:



View after clicking link 2:

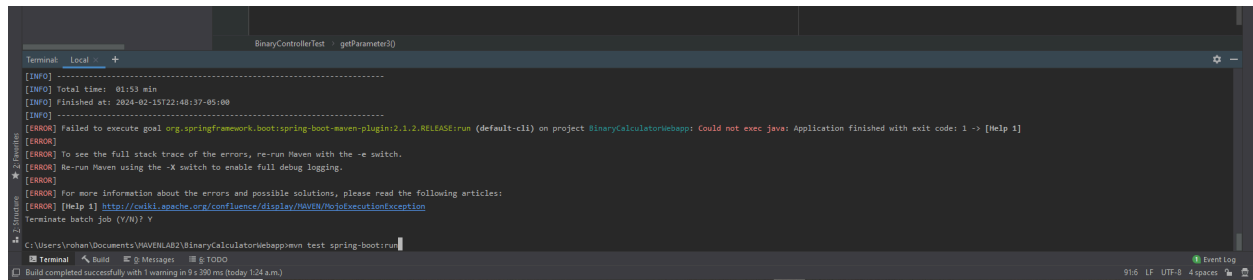


Running the tests without any negative conditions:



1 Test failure when applying the `@Test` with the negative condition (gives an error, can't add a negative binary value)

Designing and Running Test Cases:

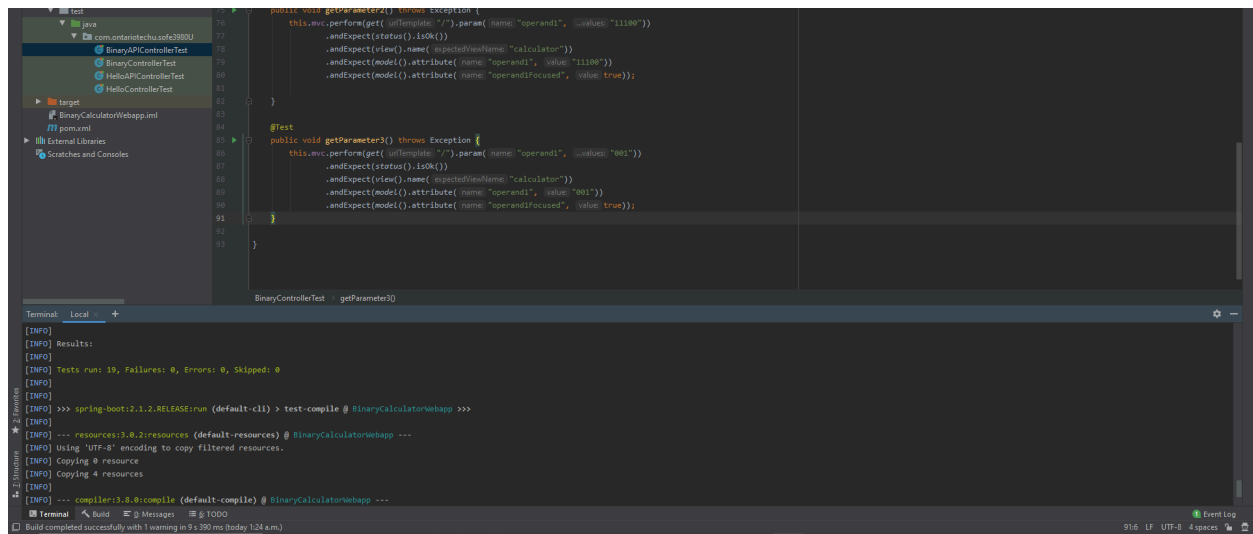


```

Terminal: Local ...
[INFO] -----
[INFO] Total time: 01:53 min
[INFO] Finished at: 2024-02-15T22:48:37-05:00
[INFO] -----
[ERROR] Failed to execute goal org.springframework.boot:spring-boot-maven-plugin:2.1.2.RELEASE:run (default-cli) on project BinaryCalculatorWebapp: Could not exec java: Application finished with exit code: 1 -> [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://wiki.apache.org/confluence/display/MAVEN/NoStacktraceException
Terminate batch job (Y/N)? Y

C:\Users\rohan\Documents\MAVENLAB2\BinaryCalculatorWebapp>mvn test spring-boot:run
[INFO] Build completed successfully with 1 warning in 9 s 390 ms (today 1:24 a.m.)

```



```

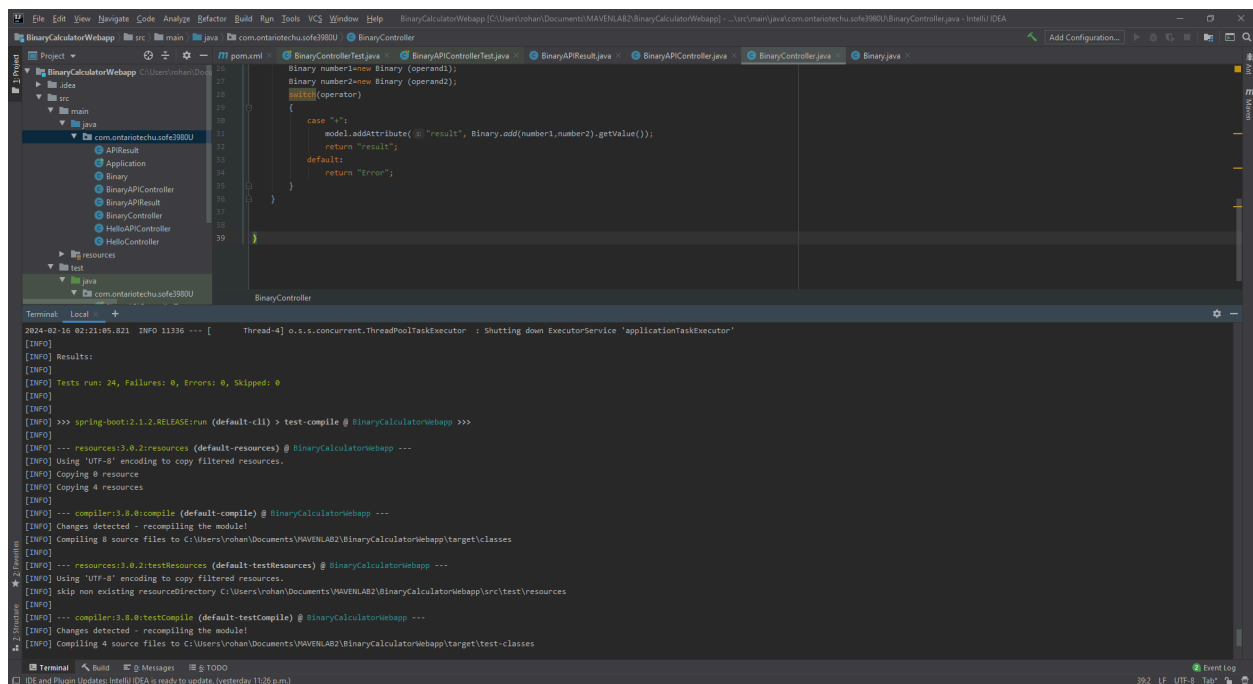
// test
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
}

@Test
public void getParameter3() throws Exception {
    this.mvc.perform(get("/").param("name", "operand1", "value", "11180"))
        .andExpect(status().isOk())
        .andExpect(view().name("expectedViewName: Calculator"))
        .andExpect(model().attribute("name", "operand1", "value", "11180"))
        .andExpect(model().attribute("name", "operandFocused", "value", true));
}

@Test
public void getParameter3() throws Exception {
    this.mvc.perform(get("/").param("name", "operand1", "value", "001"))
        .andExpect(status().isOk())
        .andExpect(view().name("expectedViewName: Calculator"))
        .andExpect(model().attribute("name", "operand1", "value", "001"))
        .andExpect(model().attribute("name", "operandFocused", "value", true));
}
}

Terminal: Local ...
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 19, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] >>> spring-boot:2.1.2.RELEASE:run (default-cli) > test-compile @ BinaryCalculatorWebapp >>>
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO] Copying 4 resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ BinaryCalculatorWebapp ---
[INFO] Build completed successfully with 1 warning in 9 s 390 ms (today 1:24 a.m.)

```



```

BinaryController
26
27
28
29
30
31
32
33
34
35
36
37
38
39
}

Binary number1=new Binary (operand1);
Binary number2=new Binary (operand2);
public void calculate() {
    case "1":
        model.addAttribute("@result", Binary.add(number1,number2).getValue());
        return "result";
    default:
        return "error";
}
}

Terminal: Local ...
2024-02-16 02:21:05.821 INFO 11336 --- [ Thread-4] o.s.s.concurrent.ThreadPoolTaskExecutor : Shutting down ExecutorService 'applicationTaskExecutor'
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 24, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] >>> spring-boot:2.1.2.RELEASE:run (default-cli) > test-compile @ BinaryCalculatorWebapp >>>
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO] Copying 4 resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ BinaryCalculatorWebapp ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 8 source files to C:\Users\rohan\Documents\MAVENLAB2\BinaryCalculatorWebapp\target\classes
[INFO]
[INFO] --- resources:3.0.2:testResources (default-testResources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\rohan\Documents\MAVENLAB2\BinaryCalculatorWebapp\src\test\resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ BinaryCalculatorWebapp ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 4 source files to C:\Users\rohan\Documents\MAVENLAB2\BinaryCalculatorWebapp\target\test-classes
[INFO]
[INFO]
[INFO] IDE and Plugin Updates: IntelliJ IDEA is ready to update, (yesterday 11:26 p.m.)

```

The screenshot displays an IDE with a project structure on the left and a code editor on the right. The project structure shows a package hierarchy for 'com.ontariotechu.sofc2980U', including 'APIResult', 'Application', 'Binary', 'BinaryAPIController', 'BinaryAPIResult', 'BinaryController', 'HelloAPIController', and 'HelloController'. The 'test' package contains 'BinaryAPIControllerTest', 'BinaryControllerTest', 'HelloAPIControllerTest', and 'HelloControllerTest'. The code editor shows the 'BinaryControllerTest' class with three test methods: 'getParameter()', 'postParameter()', and 'postParameter2()', each using Mockito and AssertJ for assertions.

```

41     .andExpect(model().attribute(name="operand1focused", value=false));
42
43 }
44
45 @Test
46 public void getParameter() throws Exception {
47     this.wvc.perform(get("/").param(name="operand1", value="111"))
48         .andExpect(status().isOk())
49         .andExpect(view().name(expectedViewName="calculator"))
50         .andExpect(model().attribute(name="operand1", value="111"))
51         .andExpect(model().attribute(name="operand1focused", value=true));
52 }
53
54 @Test
55 public void postParameter() throws Exception {
56     this.wvc.perform(post("/").param(name="operand1", value="111").param(name="operator", value="+").param(name="operand2", value="111"))//.andDo(print())
57         .andExpect(status().isOk())
58         .andExpect(view().name(expectedViewName="result"))
59         .andExpect(model().attribute(name="result", value="1118"))
60         .andExpect(model().attribute(name="operand1", value="111"));
61 }
62
63 @Test
64 public void postParameter2() throws Exception {
65     this.wvc.perform(post("/").param(name="operand1", value="11").param(name="operator", value="+").param(name="operand2", value="11"))//.andDo(print())
66         .andExpect(status().isOk())
67         .andExpect(view().name(expectedViewName="result"))
68         .andExpect(model().attribute(name="result", value="118"))
69         .andExpect(model().attribute(name="operand1", value="11"));
70 }
71
72 public void postParameter3() throws Exception {
73     this.wvc.perform(post("/").param(name="operand1", value="1000").param(name="operator", value="+").param(name="operand2", value="10"))//.andDo(print())
74         .andExpect(status().isOk())
75         .andExpect(view().name(expectedViewName="result"))

```



```

43
44 @Test
45 public void add2() throws Exception {
46     this.mvc.perform(get(uriTemplate: "/add_json").param(name: "operand1", value: "111").param(name: "operand2", value: "1010"))//.andDo(print())
47         .andExpect(status().isOk())
48         .andExpect(MockMvcResultMatchers.jsonPath(expression: "$.operand1").value(expectedValue: 111))
49         .andExpect(MockMvcResultMatchers.jsonPath(expression: "$.operand2").value(expectedValue: 1010))
50         .andExpect(MockMvcResultMatchers.jsonPath(expression: "$.result").value(expectedValue: 10001))
51         .andExpect(MockMvcResultMatchers.jsonPath(expression: "$.operator").value(expectedValue: "add"));
52 }
53
54 @Test
55 public void add3() throws Exception {
56     this.mvc.perform(get(uriTemplate: "/add").param(name: "operand1", value: "101").param(name: "operand2", value: "1111"))//.andDo(print())
57         .andExpect(status().isOk())
58         .andExpect(content().string(expectedContent: "10100"));
59 }
60
61 @Test
62 public void add4() throws Exception {
63     this.mvc.perform(get(uriTemplate: "/add").param(name: "operand1", value: "000").param(name: "operand2", value: "1101"))//.andDo(print())
64         .andExpect(status().isOk())
65         .andExpect(content().string(expectedContent: "1101"));
66 }
67 //Test cases written for the add operator
68 @Test
69 public void add5() throws Exception {
70     this.mvc.perform(get(uriTemplate: "/add").param(name: "operand1", value: "111").param(name: "operand2", value: "101"))//.andDo(print())
71         .andExpect(status().isOk())
72         .andExpect(content().string(expectedContent: "1100"));
73 }
74
75 @Test
76 public void multiply2() throws Exception {
77     this.mvc.perform(get(uriTemplate: "/multiply2").param(name: "operand1", value: "1010").param(name: "operand2", value: "0010"))//.andDo(print())
78         .andExpect(status().isOk())
79         .andExpect(content().string(expectedContent: "10100"));
80 }
81 //Set of test cases written for the negative values, it is another feature added
82 // to Binary
83
84 BinaryAPIControllerTest

```

```

1 package com.ontariotechu.sofe3980U;
2
3 public class BinaryAPIResult {
4     private String operand1;
5     private String operator;
6     private String operand2;
7     private String result;
8     @public BinaryAPIResult(Binary operand1, String operator, Binary operand2, Binary result)
9     {
10         this.operand1=operand1.getValue();
11         this.operator=new String(operator);
12         this.operand2=operand2.getValue();
13         this.result=result.getValue();
14     }
15     public String getOperand1() { return operand1; }
16     public String getOperator() { return operator; }
17     public String getOperand2() { return operand2; }
18     public String getResult() { return result; }
19 }

```

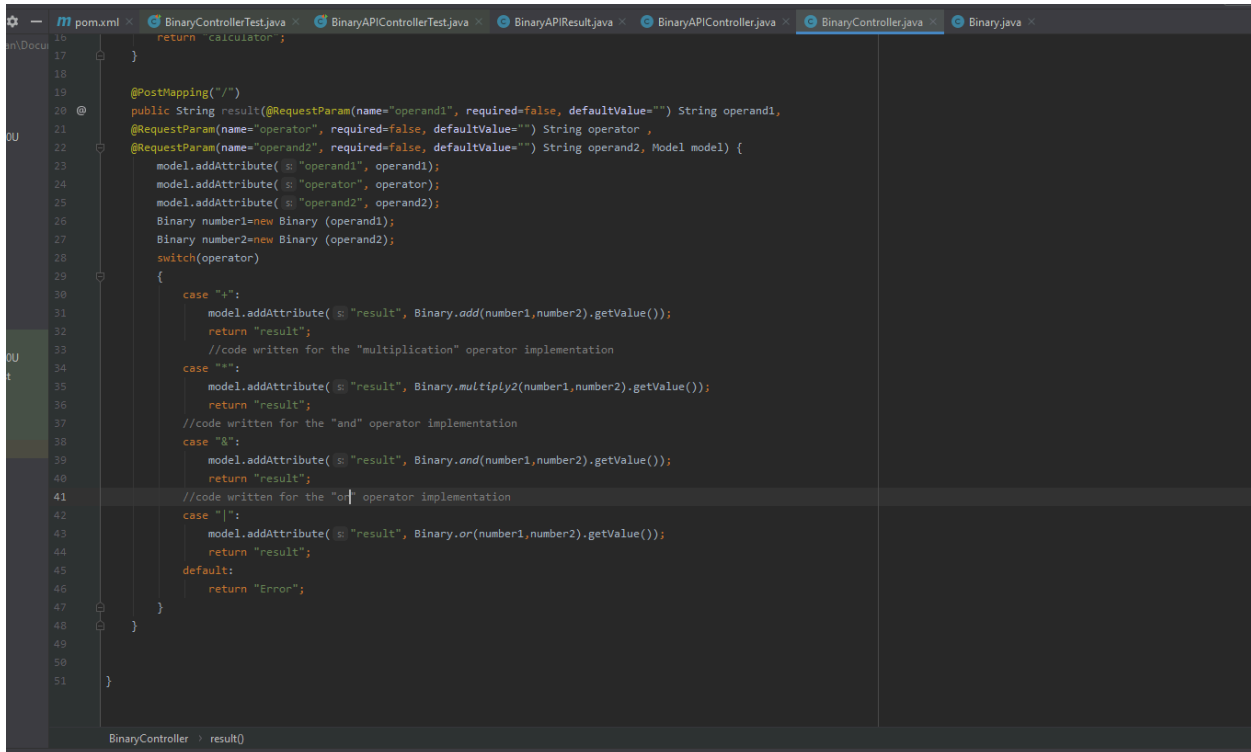
BinaryAPIResult.java

```

java / com.ontariotechu.sofe3980U / BinaryAPIController
pom.xml x BinaryControllerTest.java x BinaryAPIControllerTest.java x BinaryAPIResult.java x BinaryAPIController.java x BinaryController.java x Binary.java x
//Code added additionally after the already existing add operator code
46
47 @GetMapping("/and")
48 public String andString(@RequestParam(name="operand1", required=false, defaultValue="") String operand1,
49                         @RequestParam(name="operand2", required=false, defaultValue="") String operand2) {
50     Binary number1=new Binary (operand1);
51     Binary number2=new Binary (operand2);
52     return Binary.and(number1,number2).getValue();
53     // http://localhost:8880/add?operand1=111&operand2=1010
54 }
55
56 @GetMapping("/and_json")
57 public BinaryAPIResult andJSON(@RequestParam(name="operand1", required=false, defaultValue="") String operand1,
58                               @RequestParam(name="operand2", required=false, defaultValue="") String operand2) {
59     Binary number1=new Binary (operand1);
60     Binary number2=new Binary (operand2);
61     return new BinaryAPIResult(number1, operator: "and",number2,Binary.and(number1,number2));
62     // http://localhost:8880/add?operand1=111&operand2=1010
63 }
64 //Code added additionally after the already existing add operator code
65 @GetMapping("/or")
66 public String orString(@RequestParam(name="operand1", required=false, defaultValue="") String operand1,
67                       @RequestParam(name="operand2", required=false, defaultValue="") String operand2) {
68     Binary number1=new Binary (operand1);
69     Binary number2=new Binary (operand2);
70     return Binary.or(number1,number2).getValue();
71     // http://localhost:8880/or?operand1=111&operand2=1010
72 }
73
74 @GetMapping("/or_json")
75 public BinaryAPIResult orJSON(@RequestParam(name="operand1", required=false, defaultValue="") String operand1,
76                              @RequestParam(name="operand2", required=false, defaultValue="") String operand2) {
77     Binary number1=new Binary (operand1);
78     Binary number2=new Binary (operand2);
79     return new BinaryAPIResult(number1, operator: "or",number2,Binary.or(number1,number2));
80     // http://localhost:8880/or?operand1=111&operand2=1010
81 }
82
83 }
BinaryAPIController -> orString()

```

BinaryAPIController.java

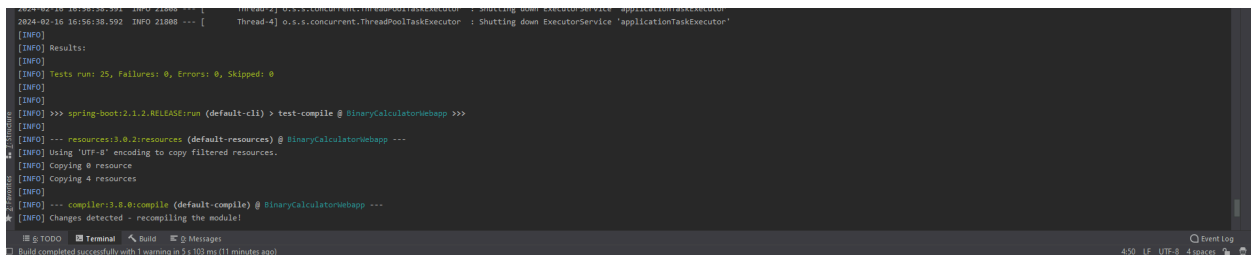


```

16     return calculator;
17 }
18
19 @PostMapping("/")
20 public String result(@RequestParam(name="operand1", required=false, defaultValue="") String operand1,
21 @RequestParam(name="operator", required=false, defaultValue="") String operator,
22 @RequestParam(name="operand2", required=false, defaultValue="") String operand2, Model model) {
23     model.addAttribute("operand1", operand1);
24     model.addAttribute("operator", operator);
25     model.addAttribute("operand2", operand2);
26     Binary number1=new Binary (operand1);
27     Binary number2=new Binary (operand2);
28     switch(operator)
29     {
30         case "+":
31             model.addAttribute("result", Binary.add(number1,number2).getValue());
32             return "result";
33             //code written for the "multiplication" operator implementation
34         case "*":
35             model.addAttribute("result", Binary.multiply2(number1,number2).getValue());
36             return "result";
37             //code written for the "and" operator implementation
38         case "&":
39             model.addAttribute("result", Binary.and(number1,number2).getValue());
40             return "result";
41             //code written for the "or" operator implementation
42         case "|":
43             model.addAttribute("result", Binary.or(number1,number2).getValue());
44             return "result";
45         default:
46             return "Error";
47     }
48 }
49
50
51 }

```

BinaryController.java file - additional switch cases were written here in order for the other operators in the calculator to function correctly (“multiply”, “and”, “or”)



```

2024-02-16 16:56:38.592 INFO 21888 --- [ Thread-4] o.s.s.concurrent.ThreadPoolExecutor : Shutting down ExecutorService 'applicationTaskExecutor'
[INFO] Results:
[INFO]
[INFO] Tests run: 25, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] >>> spring-boot:1.2.RELEASE:run (default-cli) > test-compile @ BinaryCalculatorWebapp >>>
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO] Copying 4 resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ BinaryCalculatorWebapp ---
[INFO] Changes detected - recompiling the module!
[INFO]
[INFO] Build completed successfully with 1 warning in 51.103 ms (11 minutes ago)

```

Overall tests ran, all passed, no fails, no misses

Conclusion:

Overall, the lab 2 deliverable for the Maven and Web Application assignment was a very crucial lab assignment in order to understand the various functionalities and allowing them to function with the use of a web application as well. By utilizing the various files given and modifying specific sections of the codes, it was a great tool to understand some coding fundamentals with the use of testing as well. The use of test cases as an additional requirement allowed the code to run with the required functionality while placing the needed restrictions for the operators.