Software Engineering Process **Amit Sachdeva**

Topic: **Deliverable 3 Code Review Question 5** **40084627**

Prof. P. Kamthan Due Date: 02/August/2019

My github Id: `https://github.com/amitsachdeva45/SEPPersonal/tree/master/Documentation/Deliverable3`

1 Code Review of Function 6 ab^x for Team I

Peer Details:

Name: Mahshad Saghaleini
Github Id: `https://github.com/MahshadS/Soen-6011`

1.1 Introduction and Objective

This project is about making a calculator for a function of ab^x. It should take a input from user and retrieve the result as accurate as possible. It must have exception as well as error handling keeping in mind the domain of the function. Users of this function are mostly mathematicians and even scientists, so it should also keep in mind the proper user interaction.
Objective of this review to check if the developer had used proper coding standards, proper quality tools. Addition to this, he/she had written every function from scratch without using any inbuilt function. The most important thing is to check the efficiency and maintainability of code.

1.2 Code review Approach

I have used manual style for code review without using any inbuilt tool. I have checked whether the peer is following proper coding standards, and is peer used any code quality tools to improve the coding style. Apart from this, I am checking whether she has used proper constraints and proper documentation to improve the readability of other developers. I have used a eclipse debugger for checking working of project.

1.3 Coding Style

1.3.1 Functions/Methods

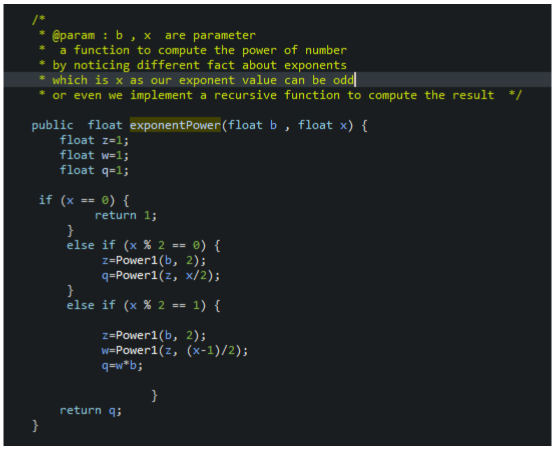
Coding Standards is properly used for writing Methods for example lowerCamelCase is used for declaring methods name with proper using access modifiers where needed as shown in figure 1. Along with that, naming of each method is properly clarifying its functionality and each method is handling only one task according to the defined coding standards.
Suggested Improvements: Two things can be improved in only main method by reducing the length of method as it is exceeding the defined number of lines of code i.e. approximately 25-40 lines per each method, and other thing is writing public methods before private methods.

1.3.2 Local Variables, Class Variables

All local variables are properly lowerCamelCase, and class variables are named properly defining its meaning with proper access modifiers i.e private and specifiers i.e. static, and final.
Suggested Improvements: All constant variables should be in **capital case** which can help in differentiating them for other class variables but few constant variables are written in lower case.

1.3.3 Documentation, Class declaration

Java docs is used properly by giving proper description of every public method, explaining about every parameter passed in function and return type as shown in figure 1. Class is declared properly according to the coding standards.



```java
/*
 * @param : b , x  are parameter
 *  a function to compute the power of number
 * by noticing different fact about exponents
 * which is x as our exponent value can be odd
 * or even we implement a recursive function to compute the result  */

public  float exponentPower(float b , float x) {
    float z=1;
    float w=1;
    float q=1;

 if (x == 0) {
         return 1;
     }
     else if (x % 2 == 0) {
          z=Power1(b, 2);
          q=Power1(z, x/2);
     }
     else if (x % 2 == 1) {

          z=Power1(b, 2);
          w=Power1(z, (x-1)/2);
          q=w*b;

                 }
    return q;
}
```

Figure 1: Proper declaration of methods names and Java docs

1.3.4 Error Handling/Robust

Error handling is done by using try-catch block for example: For real number input, try catch is used to check so that user will only enter real number.

1.4 Code quality Tool

At some part of code, few useless spaces are present which can be removed by using coding quality tools like checkstyle. In addition to this, whole package is imported which can be avoided as we need only few functions from that package. Otherwise, everything is perfect.
Suggested Improvements: Checkstyle can be used to avoid this small things which indirectly increase burden on the code.

1.5 User Interface/Usability and Functionality

Textual User interface (TUI) is used for working of the project, and user can select one of the option out of 5 options on command line for example addition, subtraction, multiplication, division and exponential. User can do any operation only once, after that it need to be restart.
Functionality testing is done by running several test cases to check working and accuracy of results, which are equal to online calculator.

1.6 Maintainability

To increase the maintainability, she has used separate methods for each functionality which enhance the ease to **maintain and understand** the code.

1.7 Final conclusion

All in all, she has consider all the factors which can be lead to go project structure by following proper norms, error handling, documentation which are key things to make a good project but few things can be done for example checkstyle can be used for improve code quality and remove useless code. Apart from this, Graphical user interface (GUI) and design pattern can be used to make the methods more independent and clear. So in the end, everything is perfect but few improvements can be plus point in the project.

2 Testing of Function 7 a^{b^x} for Team I

<u>**Peer Details:**</u>

<u>Name:</u> Mahy Salama
<u>Github Id:</u> `https://github.com/MahySalama/MahyF7CalculatorTeamI`

2.1 Objective

The objective of this review is to check whether test cases is covering all the requirements and following the proper standards.

2.2 Code Test Review Approach

I have tested the all test cases by checking all the requirements and assumptions mentioned in problem 2 and comparing all that things with written test cases. For this, I have used eclipse debugger and JUnit5 testing.

2.3 Written Test Case

There are total 6 test cases is written by her in 6 different files.

2.3.1 Test Case 1

This test case is checking absolute function of her by converting negative value to positive value inside AbsoluteValueOfTest Class

2.3.2 Test Case 2

This test case is testing pow function made manually by her by passing value $0.2^{0.9}$ which is working perfectly in DecimalPowerOfTest class

2.3.3 Test Case 3

This test case is actually testing the function by passing decimal value $0.2^{0.9^{-099}}$ which is returning exact result in Function7Test Class

2.3.4 Test Case 4

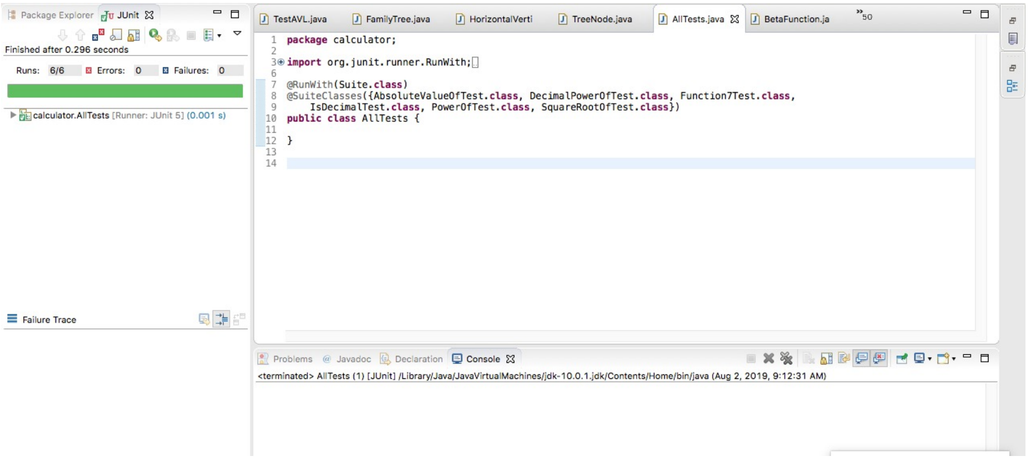
This test case is just testing whether value is decimal or not in isDecimalTest Class

2.3.5 Test Case 5 and 6

This test cases are test of power function and square root respectively.

2.4 Relevance of Test Cases with requirements

Relevancy of test cases means how much test cases are written according to given requirements. Not all test cases are relevant to given requirements like no test case is related to error handling. One test function i.e. Test case 3 is written according to method for testing a^{b^x}, other all functions are checking of internal functionality of the project.
<u>**Suggested Improvements**</u> More test cases can be written to test each requirements and assumptions.



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Runs: 6/6 Errors: 0 Failures: 0

calculator.AllTests [Runner: JUnit 5] (0.001 s)

```
package calculator;

import org.junit.runner.RunWith;

@RunWith(Suite.class)
@SuiteClasses({AbsoluteValueOfTest.class, DecimalPowerOfTest.class, Function7Test.class,
    IsDecimalTest.class, PowerOfTest.class, SquareRootOfTest.class})
public class AllTests {

}
```

```
<terminated> AllTests (1) [JUnit] /Library/Java/JavaVirtualMachines/jdk-10.0.1.jdk/Contents/Home/bin/java (Aug 2, 2019, 9:12:31 AM)
```

Figure 2: Test cases run on my system

2.5 Final Conclusion

Undoubtedly, function is giving accurate results, and there is proper error handling inside the code and covering all the requirements while writing code. But by adding more test cases can help other developers to just go through the test cases for checking functionality of project rather than going inside each source code.

3 References

- https://www.owasp.org/index.php/How_to_Write_an_Application_Code_Review_Finding
- https://smartbear.com/learn/code-review/best-practices-for-peer-code-review/
- https://searchsoftwarequality.techtarget.com/definition/code-review