CSC 413 Project Documentation

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413-2

https://github.com/csc413-sp21/csc413-p1-tzphuang

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1 Introduction

1.1 Project Overview

The calculator project is a program where the user will have a set of buttons produced onto the screen where the user/audience will use those buttons representing numbers and common arithmetic and form mathematical strings to be processed. (For example:5+6-10^3/(9-1)) Once the string is fully pressed in the user can click the "=" (equals) sign and get the correct result from the program. This program can be cleared with the "CE" button or if you make a mistake clear a character with "C". What was going on in the background was a set of instruction that were called in specific orders to implement the calculator in the correct fashion.

1.2 Technical Overview

For the calculator project we used the java language and filled in an implementation for the calculator class with varying degrees of subclasses derived from a provided operator class where we had to modify with a static hash map and have it be accessible to the operator's extended classes. These were then tested against individual test functions to see if they worked. Once all of them passed the testing the project proceeded to the algorithm portion of the project where we had to implement an algorithm with partial code already given to us. Implementing the code had us deal with an already completed while loop and fitting in a sub algorithm to deal with parenthesis and when to pop the stack and process the current operator/operands. Once this algorithm was completed another part of the code needed a change where the code needed to be split up into 3 sections for 3 different processing cases for operators.

1. If the operator was an ending parenthesis ")" pop and process once (processing refers to taking an operator and 2 operands and evaluating the expression with the operands on either side of the operator in order of ([2nd popped operand] [operator] [1st popped operand])
2. If the operator was an opening parenthesis "(" pop the operator stack to clear the operator
3. Check if the operator at the top of the operator stack is greater than or equal to the priority of my current operator that I want to push onto the operator stack. If it is greater than or equal to, process the stack once and recheck the top of the operator's stack priority and keep processing until empty stack or operator at the top of the stack is lower priority.

After these were implemented, we returned the last operand on the operand stack holding the total value of the processes and return that integer to what function that called it.

We moved onto the GUI of the program using the given code we had to implement the button functionality which was done by switch statements for each button and an action listener to tell which button was pressed. We then updated the display text box for the calculator to show numbers/operators/processes corresponding with the button presses.

The algorithm/evaluator class previously completed is called with this section for the “=” equal sign as it is hooked it to its switch statement.

1.3 Summary of Work Completed

1. Created operator extended classes for add, subtract, multiply, divide, power, open parenthesis, closed parenthesis and filled in all abstract methods and other function calls
2. Filled out methods for operand class
3. Added static hash map to operator class
4. Implemented algorithm in the evaluator class
5. Hooked up the buttons in the EvaluatorUI class with the correct logic
6. Tested operator/operand/evaluator/evaluatorui against the reallocated tests

2 Development Environment

1. Java version 12.0.2+10
2. IntelliJ idea 2020.2.1 (ultimate version)

3 How to Build/Import your Project

1. Clone github repository into local directory with the https://github.com/csc413-sp21/csc413-p1-tzphuang link
2. Open intellij
3. Press open or import
4. Go to your local directory that contains the github project
5. Inside the folder “csc413-p1-tzphuang” is a folder called calculator, open calculator with intellj

4 How to Run your Project

1. Open intellij and open the new imported project
2. There should be a tab to the side of intellij after loading up everything that says 1:project written vertically
3. Here you will see files, press src > main > java > edu.csc413.calculator
4. Now you will see evaluatorUI, right click it
5. Go to the option “Run ‘evaluatorUI.main()’
6. Done!

5 Assumption Made

Assumptions made were

1. Code already written had to function correctly before any changes made
2. Tests written must be usable
3. Algorithm provided had to be codeable

6 Implementation Discussion

6.1 Class Diagram

7 Project Reflection

For what it was worth the project took a long time to understand and process in my mind of what was given and what needed to be done. A lot of the project was incomprehensible in my mind before watching the tutorial videos and without them I honestly would have not finished the project. This project took way longer than I expected it to be but I did get it done nearly 2 weeks after it was finished. I learned a lot and this assignment jogged my memory for java programs that was sorely needed.

8 Project Conclusion/Results

Project finished as of 3/3/2021