

**Gebze Technical University
Computer Engineering**

CSE 222 - 2018 Spring

HOMEWORK 3 REPORT

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1 INTRODUCTION

1.1 Problem Definition

Part-1

The Island Problem - In a map, how many islands will be separate at the same time?

Part-2

The Calculator – Calculates equation with postfix expression. Because inner equations have parentheses and are more complex than postfix equations.

1.2 System Requirements

I used IntelliJ IDEA 2018.3.5 (Community Edition) with

Build #IC-183.5912.21, built on February 26, 2019

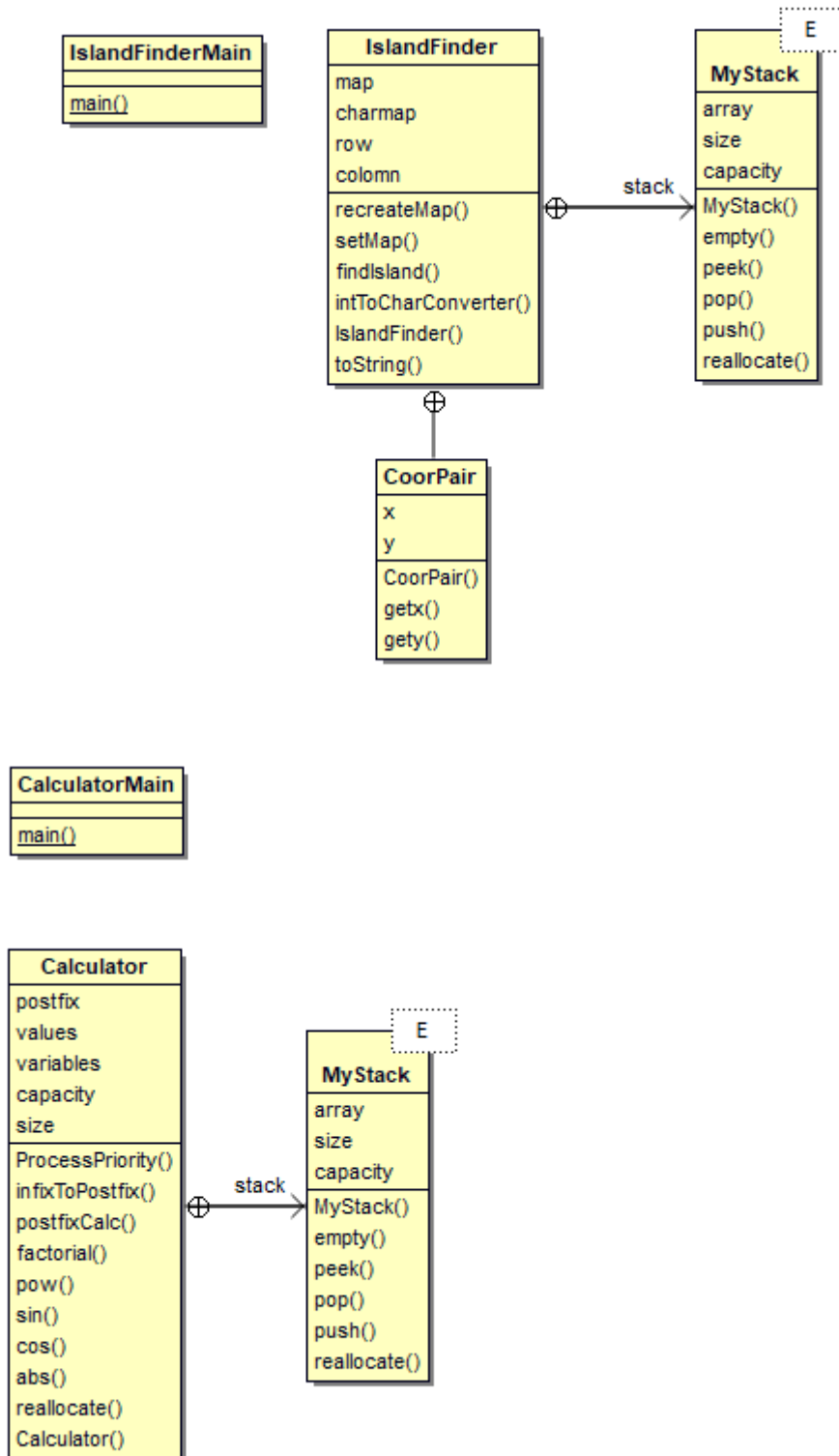
JRE: 1.8.0_152-release-1343-b28 amd64

JVM: OpenJDK 64-Bit Server VM by JetBrains s.r.o

Windows 10 10.0

2 METHOD

2.1 Class Diagrams



2.2 Problem Solution Approach

Part 1

In first part, the program reads the file and converts a two dimensional integer array. Then, converts it a character array. The counter travels the array one-by-one. When the counter hits the white component, the component adds into the stack and has an identity characters. Then, the neighbors of component add into the stack. When there is no white component, the stack will pop. When it becomes empty the counter starts moving and travels the complete array.

The time complexity is $O(nxm)$ (n row, m columns)

Part 2

The program starts reading the file. In first part, the program separates the inner expression. If there is an opening bracket or value, it pushes the stack. If the index shows an operator, it pushes stack with priority. If the index shows a closing bracket, then pops the stack until it becomes empty. In second part, the program calculates the postfix expression. Firstly, reads the expression one-by-one and pushes the operators and numbers. When pushes the two numbers consecutively, the two numbers and an operator pops outside the stack. The numbers and operator calculates and push into stack again. When the stack becomes empty the result will be the last popped item on the stack.

The time complexity is $O(n^2)$ (travels the string $n \times n$ times)

3 RESULT

3.1 Test Cases

Part 1: I tested the program with the example from moodle. Then I tested again with my own example.

Part 2: I tested the program with the examples from moodle. Then I tested again with my own inner expression.

3.2 Running Results

Part 1:

```
"C:\Program Files\Java\jdk-11.0.2\bin\java.exe" "-javaagent:C:\Pro
The size of islands is:9

Process finished with exit code 0
```

Part 2:

```
"C:\Program Files\Java\jdk-11.0.2\bin\java.exe" "-javaagent:C:
5=w
6=x

w 4 + x 77.9 - *
The result is:-1444.2000000000003

Process finished with exit code 0
```