**Gebze Technical University**
**Computer Engineering**

**CSE 222 - 2018 Spring**

# HOMEWORK 3 REPORT

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# 1 INTRODUCTION

## 1.1 Problem Definition

This project consists of two parts. Part1 is counting components. A binary digital image is represented through a matrix of integers, each element of which is either 1 (white) or 0 (black). Program admits as a commandline argument the path to a ASCII text file containing a binary digital image represented through a matrix of space separated integers. Program calculates the number of white components and print that number on screen. Part2 is a calculator that infix expression. Program that first convert it to postfix and then evaluate the postfix expression with stack based algorithm.

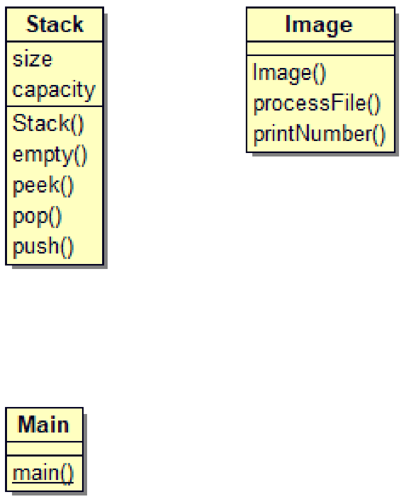
## 1.2 System Requirements

In part1, first i need to implement my own stack data structure. Because of all elements contain coordinate and own data, i need to define an inner class in stack class. I need a class, for example Image class that taken a string file name with path and process file and print on screen. I can use try catch block for exception. In part2, first i need to implement my own stack data structure for converting and calculating the expression. İt can be basic class for example calculator class that take a string file name with path and get expression that line and process the convert and calculate. StringBuilder can be useful for adding string. For convert, process and print can be written methods. I need some control methods for variables, numerics, operators and functions. Because of sin, cos, abs function, i need to written them.

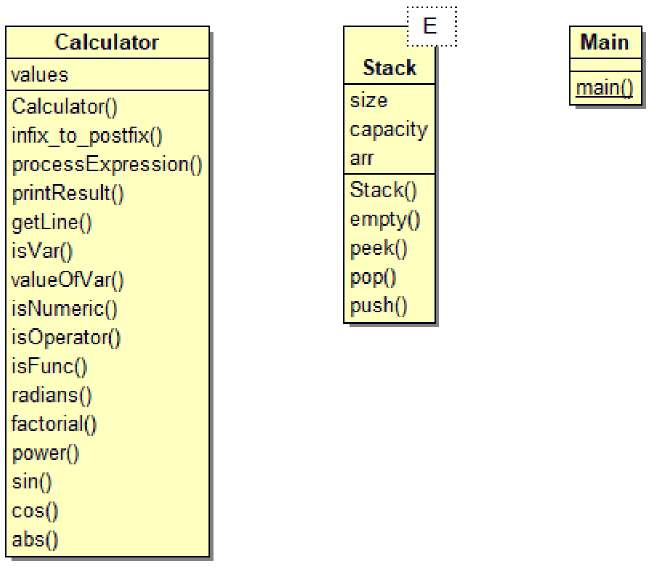
# 2 METHOD

## 2.1 Class Diagrams

### Part1



### Part2



## 2.2 Use Case Diagrams

## 2.3 Other Diagrams (optional)

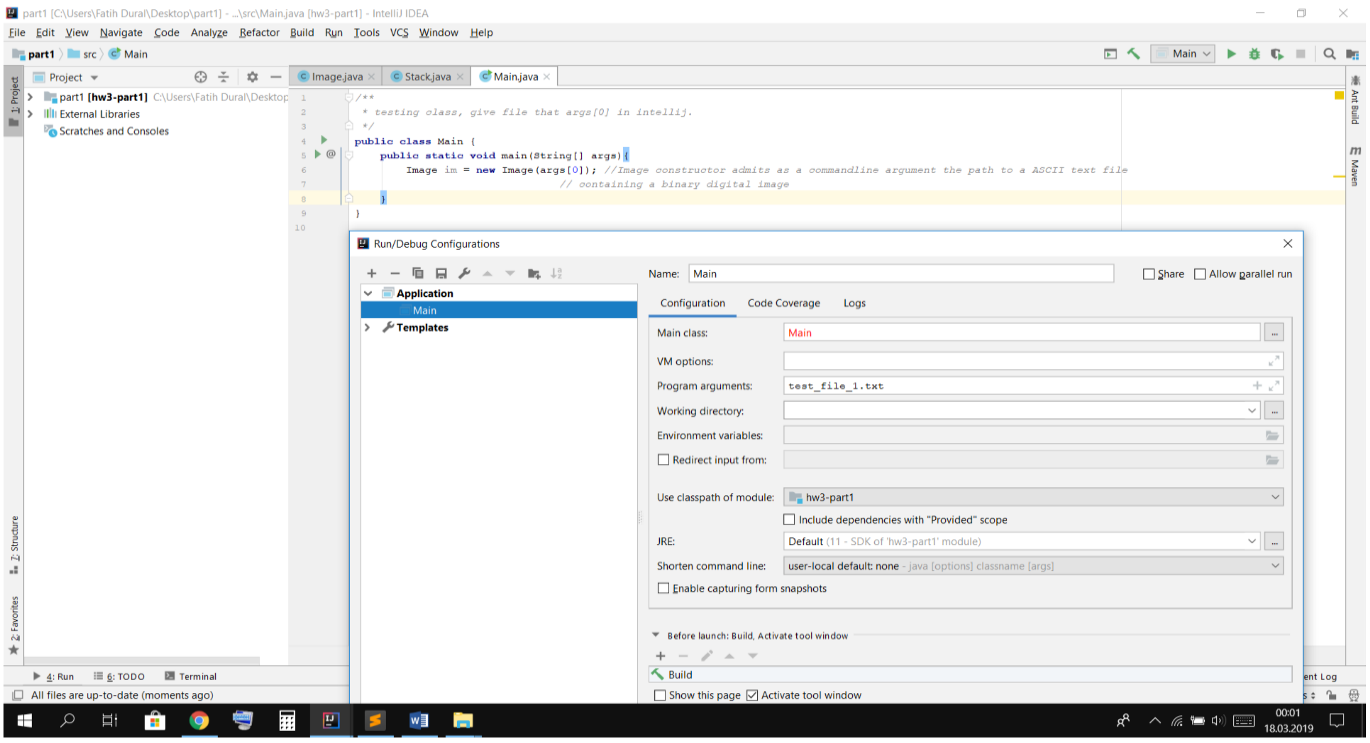
Add other diagrams if required.

## 2.4 Problem Solution Approach

In part1 and part2, i implement my own stack data structure. In part1, there is a image class that take a string a file name with path. Then, i call the processFile(filename) that read all element and put them to 2 dimensional array. This process works O(n) time. İf element is a white, i push it at the top of stack and i'm doing the element zero. İ look all direction and if element is a white, i do process again in general loop. In inner loop, i clear the stack and i look pop element and i do process again and again. In inner loop small than O(n) and general time complexity become O(n). While the process, count rises. Lastly, i print on the screen count. In part2, in addition to the generic type stack, there is a calculator class that read the line of file, look line and convert it to postfix. If line has a assignment operator, it become variable, and hold an array. Postfix expression process with processExpression(expression). This process works O(n) time. Lastly, print the result stack on screen.

# 3 RESULT

## 3.1 Test Cases


part1 [C:\Users\Fatih Dural\Desktop\part1] - ...\src\Main.java [hw3-part1] - IntelliJ IDEA
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
part1 src Main
Project
part1 [hw3-part1] C:\Users\Fatih Dural\Desktop
External Libraries
Scratches and Consoles
Image.java
Stack.java
Main.java
Run/Debug Configurations
Application
Main
Templates
4: Run
6: TODO
Terminal
All files are up-to-date (moments ago)
00:01
18.03.2019

```java
/**
 * testing class, give file that args[0] in intellij.
 */
public class Main {
    public static void main(String[] args){
        Image im = new Image(args[0]); //Image constructor admits as a commandline argument the path to a ASCII text file
                                       // containing a binary digital image
    }
}
```

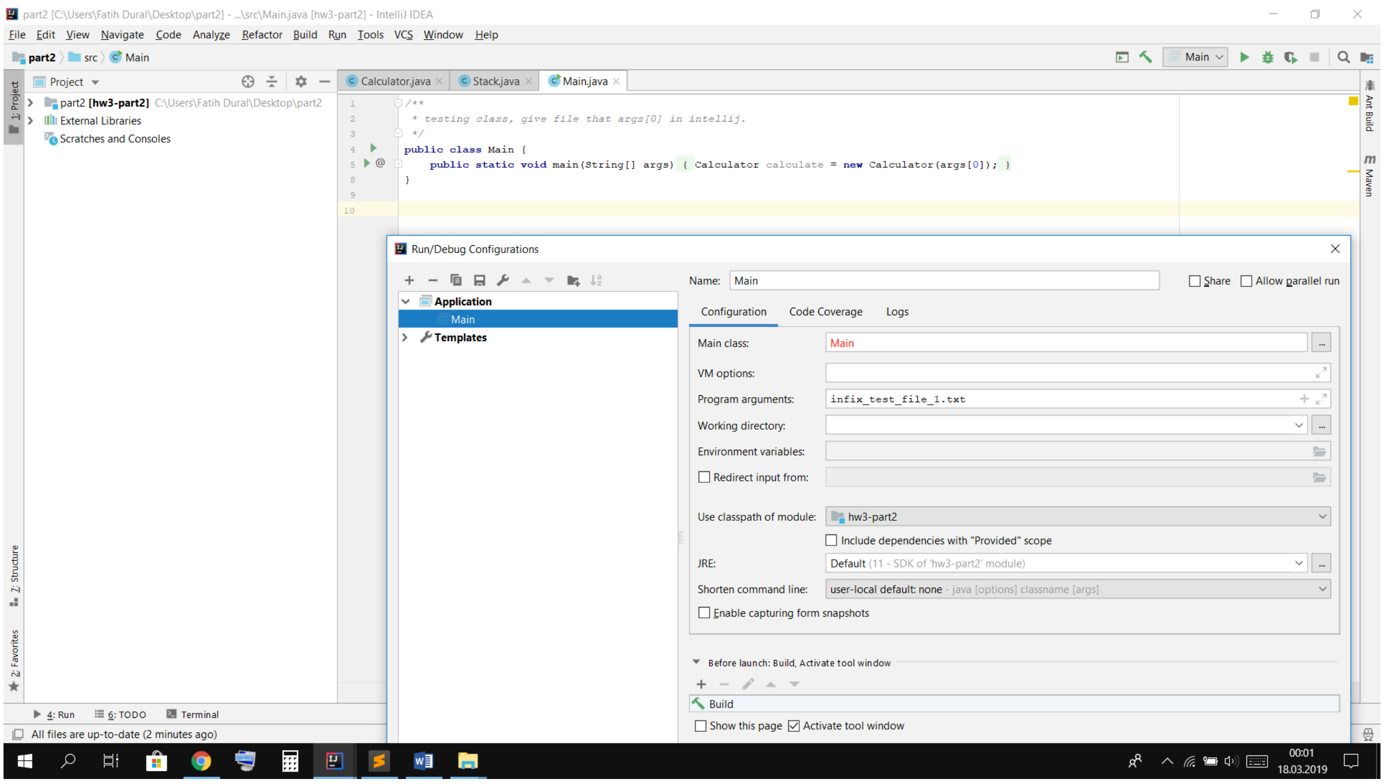
Name: Main ☐ Share ☐ Allow parallel run

Configuration | Code Coverage | Logs

Main class: Main
VM options:
Program arguments: test_file_1.txt
Working directory:
Environment variables:
☐ Redirect input from:
Use classpath of module: hw3-part1
☐ Include dependencies with "Provided" scope
JRE: Default (11 - SDK of 'hw3-part1' module)
Shorten command line: user-local default: none - java [options] classname [args]
☐ Enable capturing form snapshots

Before launch: Build, Activate tool window
Build
☐ Show this page ☑ Activate tool window

Part1



part2 [C:\Users\Fatih Dural\Desktop\part2] - ...\src\Main.java [hw3-part2] - IntelliJ IDEA

```java
/**
 * testing class, give file that args[0] in intellij.
 */
public class Main {
    public static void main(String[] args) { Calculator calculate = new Calculator(args[0]); }
}
```

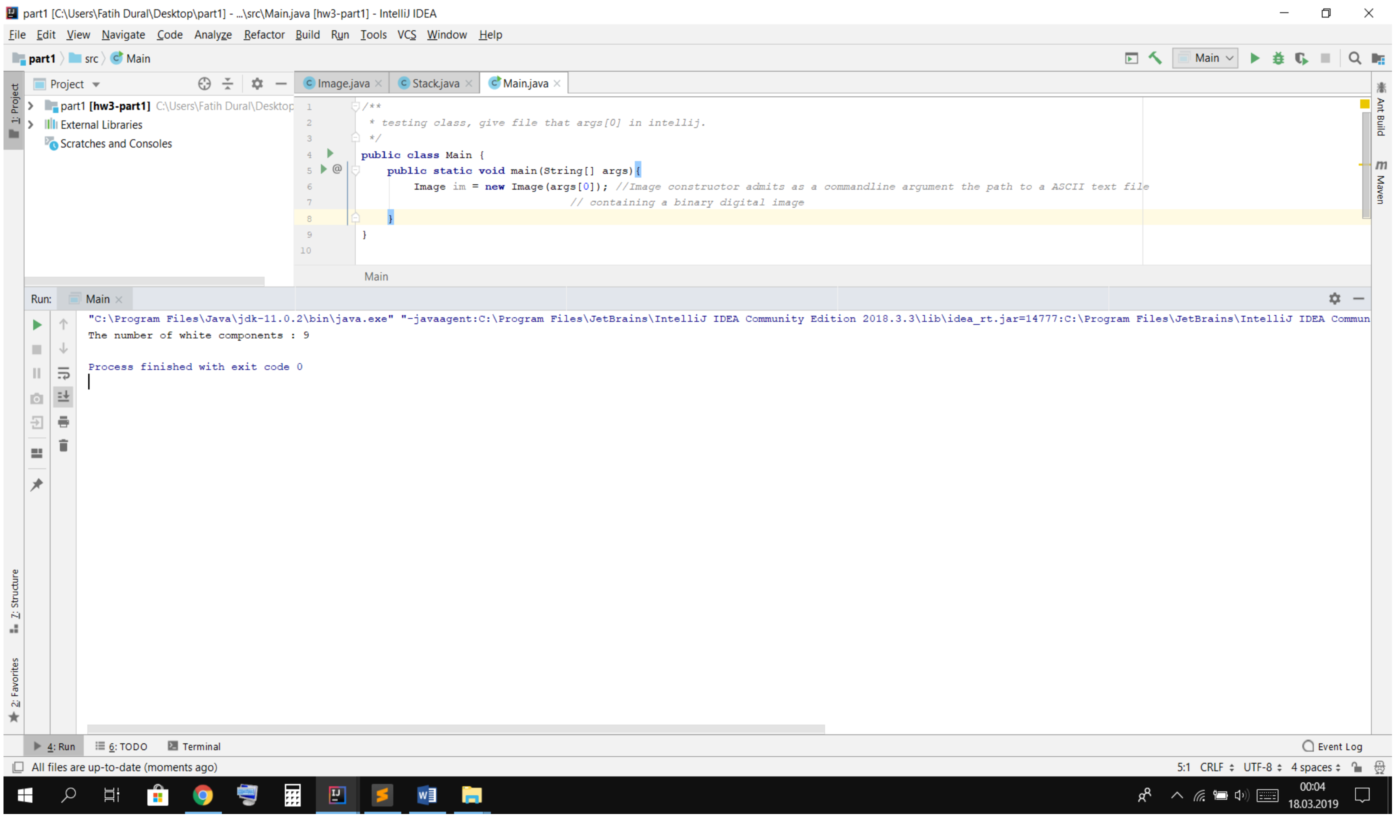
Run/Debug Configurations

- Name: Main
- Application > Main
- Main class: Main
- VM options:
- Program arguments: infix_test_file_1.txt
- Working directory:
- Environment variables:
- Redirect input from:
- Use classpath of module: hw3-part2
- Include dependencies with "Provided" scope
- JRE: Default (11 - SDK of 'hw3-part2' module)
- Shorten command line: user-local default: none - java [options] classname [args]
- Enable capturing form snapshots
- Before launch: Build, Activate tool window
- Build
- Show this page [✓ Activate tool window]

All files are up-to-date (2 minutes ago)

Part2

## 3.2 Running Results



part1 [C:\Users\Fatih Dural\Desktop\part1] - ...\src\Main.java [hw3-part1] - IntelliJ IDEA

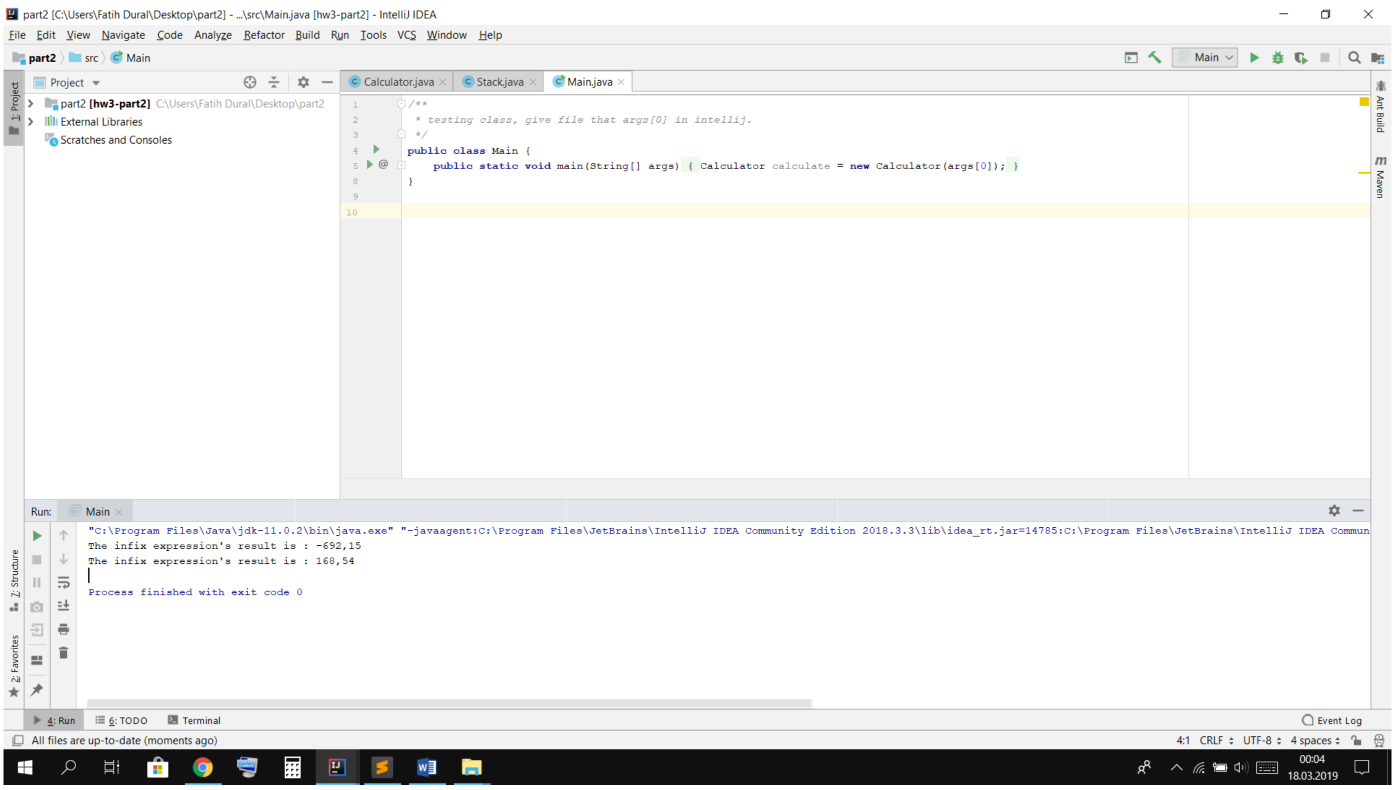
```java
/**
 * testing class, give file that args[0] in intellij.
 */
public class Main {
    public static void main(String[] args){
        Image im = new Image(args[0]); //Image constructor admits as a commandline argument the path to a ASCII text file
                                        // containing a binary digital image
    }
}
```

```
"C:\Program Files\Java\jdk-11.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2018.3.3\lib\idea_rt.jar=14777:C:\Program Files\JetBrains\IntelliJ IDEA Commun
The number of white components : 9

Process finished with exit code 0
```

All files are up-to-date (moments ago)

Part1


part2 [C:\Users\Fatih Dural\Desktop\part2] - ...\src\Main.java [hw3-part2] - IntelliJ IDEA
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
part2 › src › Main
Project
part2 [hw3-part2] C:\Users\Fatih Dural\Desktop\part2
External Libraries
Scratches and Consoles
Calculator.java
Stack.java
Main.java
Run: Main
4: Run
6: TODO
Terminal
Event Log
All files are up-to-date (moments ago)
4:1 CRLF UTF-8 4 spaces
00:04
18.03.2019

```java
/**
 * testing class, give file that args[0] in intellij.
 */
public class Main {
    public static void main(String[] args) { Calculator calculate = new Calculator(args[0]); }
}
```

```
"C:\Program Files\Java\jdk-11.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2018.3.3\lib\idea_rt.jar=14785:C:\Program Files\JetBrains\IntelliJ IDEA Commun
The infix expression's result is : -692,15
The infix expression's result is : 168,54

Process finished with exit code 0
```

## Part2

- Main titles -> 16pt , 2 line break
- Subtitles -> 14pt, 1.5 line break
- Paragraph -> 12pt, 1.5 line break