

**Gebze Technical University
Computer Engineering**

CSE 222 - 2019 Spring

HOMEWORK 5 REPORT

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Course Assistant:

1 INTRODUCTION

1.1 Problem Definition

Problem was reading a jpf or png file from console and store this image pixels different Queues. We have had to use one Binary heap implementation for this Queues and we have had to use 3 different comparison method named LEX, EUC and BMX. Also, we should have to use threads. There were 4 different threads and these threads task were different. First threads was has to read pixels and add they into 3 different Queues. Another threads have had to remove pixels from these Queues

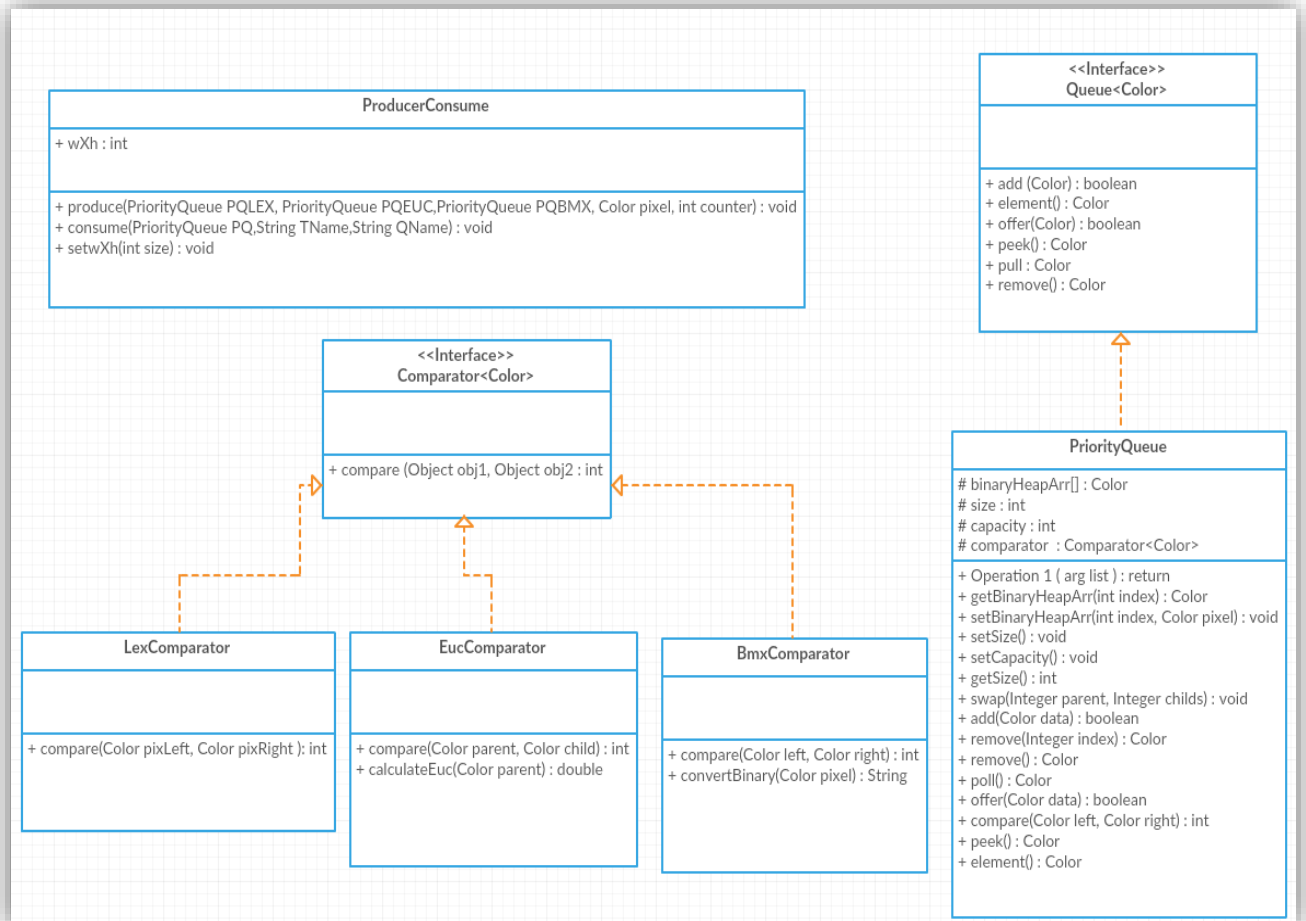
1.2 System Requirements

This program run on IntelliJ IDE. I mean, Project file will be IntelliJ file. So, for run this program there must be IntelliJ IDE. So, you can just run this program on computer or laptop. Also you have enter a text file path via command line (it must be full path from root). This file should have contain a jpg or png file.

IntelliJ IDE Requirements : Minimum 2GB Ram, At least 2 GB harddisk space, Windows operating System.

2 METHOD

2.1 Class Diagrams



2.2 Problem Solution Approach

For read image file I use **BufferedImage** class object. I used **Binary Heap** implementation for hold pixels. Because we have to hold max element in the root and binary heap hold elements decreasing order. So, its **complexity is $O(\log n)$** . I used 3 different comparison methods named **LEX**, **EUC** and **BMX**. LEX comparison method compare 2 Color objects r,g,b values according to lower or bigger each other. EUC method compare objects according to r,g,b colors values power sum and square. Finally BMX method, convert integer values into binary and create an object order **r1g2b1r2g2b2... r24g24b24** and compare two object according to this object. I used 3 comparator class named **LexComparator**, **EucComparator** and **BmxComparator**. These classes implements **Comparator interface** and compare methods. These compare methods above methods (LEX, EUC, BMX).

I implement **PriorityQueue** class, this class have binary heap implementation with just hold array named **binaryHeapArr**. This array's 0. Element always max element (**root**). Childs indexes start (last item) size -1 and parent index is always (size-1) / 2.

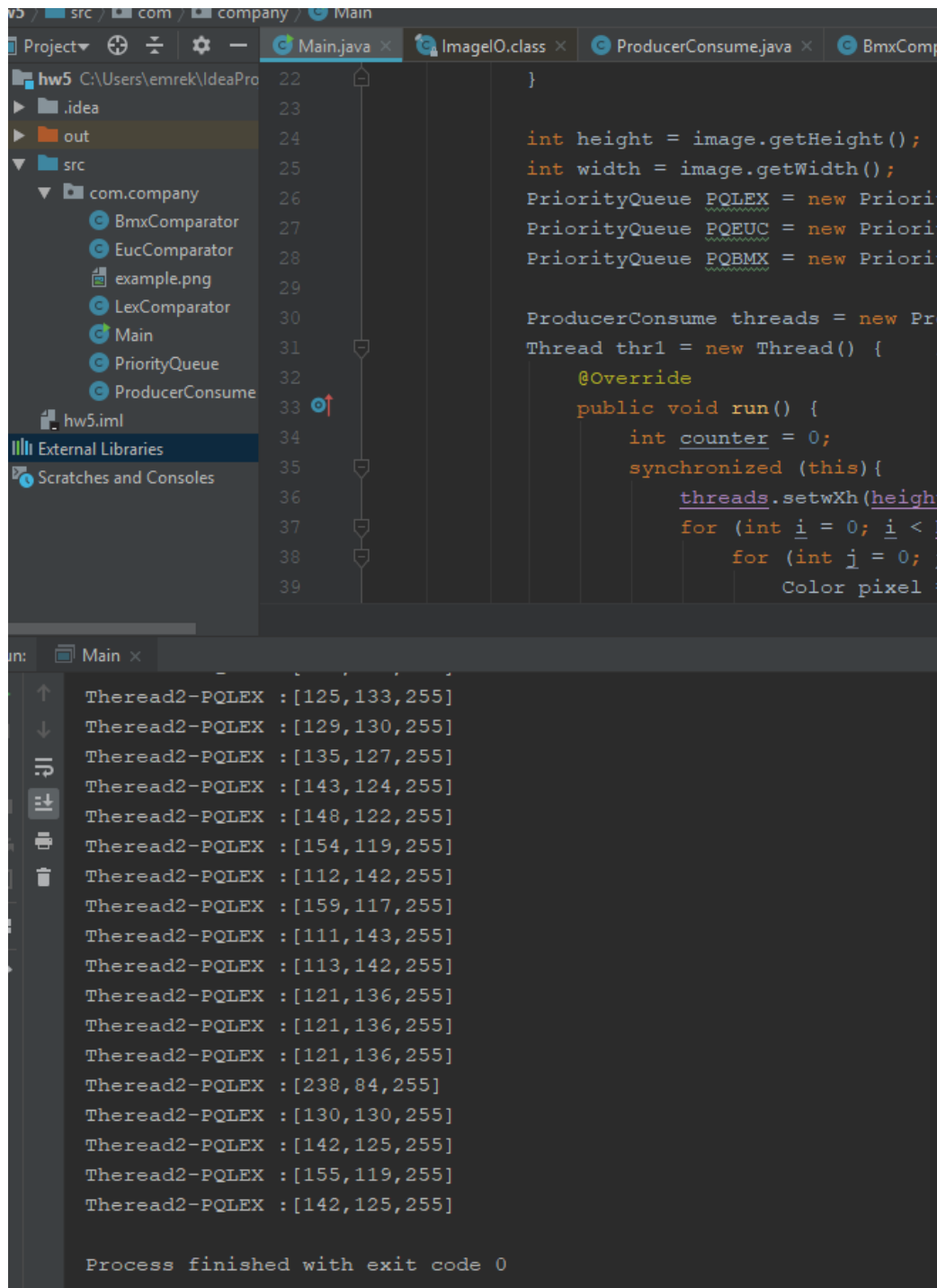
I used 4 different **thread**. For use Producer and consumer methods, I created **ProducerConsume** class. This class have 2 methods named **Producer** and **consume**. I used just one object this class named **threads** and when I start **thread1**, this thread use **threads** object producer method and I send 3 **PriorityQueue** object named **PQLEX**, **PQEUC** and **PQBMX**. This object just and **PriorityQueue** object. **PriorityQueue** class constructor parameter have an comparator object parameter. I create comparator class objects (**LexComparator**, **EucComparator**, **BmxComparator**) and I send it with **PriorityQueue** objects parameter. When I did it, **PriorityQueue** object compare objects according to comparator. When producer method reach 100 pixel saved, I notify() another threads and these threads remove elements from 3 different Queue and print they until reach Width * height.

3 RESULT

3.1 Test Cases

I used pictures and read it and print its pixels values

3.2 Running Results



The screenshot displays an IDE with a project named 'hw5'. The left sidebar shows the project structure with folders like 'src' and 'out', and files like 'Main.java', 'ImageIO.class', 'ProducerConsume.java', and 'BmxComparator'. The main editor window shows the code for 'Main.java', which includes imports for 'java.awt.image', 'java.io', 'java.util.concurrent', and 'java.util.concurrent.locks'. The code defines three priority queues: 'POLEX', 'POEUC', and 'POBMX', and a 'ProducerConsume' thread. The 'run' method of 'ProducerConsume' is overridden to print pixel values from an image. The bottom console window shows the output of the program, displaying 16 lines of pixel coordinates and values, followed by the message 'Process finished with exit code 0'.

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Thread2-PQLEX : [129,130,255]
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Thread2-PQLEX : [148,122,255]
Thread2-PQLEX : [154,119,255]
Thread2-PQLEX : [112,142,255]
Thread2-PQLEX : [159,117,255]
Thread2-PQLEX : [111,143,255]
Thread2-PQLEX : [113,142,255]
Thread2-PQLEX : [121,136,255]
Thread2-PQLEX : [121,136,255]
Thread2-PQLEX : [121,136,255]
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Thread2-PQLEX : [155,119,255]
Thread2-PQLEX : [142,125,255]

Process finished with exit code 0
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hw5 / src / com / company / Main

Project ▾ ⊕ ⊖ ⚙ -

hw5 C:\Users\emrek\IdeaPro

.idea

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src

com.company

BmxComparator

EucComparator

example.png

LexComparator

Main

PriorityQueue

ProducerConsume

hw5.iml

External Libraries

Scratches and Consoles

Main.java x

ImageIO.class x

ProducerConsume.java x

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22 }
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24 int height = image.getH
25 int width = image.getWi
26 PriorityQueue PQLEX = n
27 PriorityQueue PQEUC = n
28 PriorityQueue PQBMX = n
29
30 ProducerConsume threads
31 Thread thr1 = new Threa
32
33 @Override
34 public void run() {
35     int counter = 0
36     synchronized (t
37         threads.set
38         for (int i
39         for (in
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un: Main x

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