

PROJECT #5: 70 points, CSE 274 – Fall 2019

Queue and Priority Queue

Outcomes:

- Implement an array-based ADT (queue).
- Implement a linked nodes-based ADT (priority queue).

Description:

Part 1: No Duplicates Queue

Consider a new kind of queue that allows only a single copy of an object in the queue. If an object is added to the queue, but it is already there, leave the queue unchanged. Now create an interface `NoDuplicatesQueueInterface` that extends `QueueInterface`. Then write an array-based (resizable) implementation (`NoDuplicatesQueueArray.java`) of `NoDuplicatesQueueInterface`. Finally, write a program (`NoDuplicatesQueueArrayDriver.java`) that adequately demonstrate your new class.

Part 2: No Duplicates Priority Queue

In part 1 you created a queue that does not allow duplicates. In this part you will create a priority queue that does not allow duplicates. Now create an interface `NoDuplicatesPriorityQueueInterface` that extends `PriorityQueueInterface`. Then write a sorted (in descending order) linked implementation (singly linked list with just the head reference) (`NoDuplicatesPriorityQueueLinkedNodes.java`) of `NoDuplicatesPriorityQueueInterface`. Finally, write a program (`NoDuplicatesPriorityQueueLinkedNodesDriver.java`) that adequately demonstrates your new class.

Important instruction:

Please use the following class definitions when you implement the classes in part 1 and part 2:

```
public final class NoDuplicatesQueueArray<T> implements NoDuplicatesQueueInterface<T>
```

```
public final class NoDuplicatesPriorityQueueLinkedNodes<T> extends Comparable<? super  
T>> implements NoDuplicatesPriorityQueueInterface<T>
```

Naming requirements:

You have been provided two source code files that you must download and put in your project:

1. `QueueInterface.java`, which should not be changed in ANY WAY.
2. `PriorityQueueInterface.java`, which should not be changed in ANY WAY.
3. `EmptyQueueException.java`, which should not be changed in ANY WAY.

Submission:

You must submit the following java files:

1. `QueueInterface.java`
2. `PriorityQueueInterface.java`
3. `EmptyQueueException.java`
4. `NoDuplicatesQueueInterface.java`
5. `NoDuplicatesQueueArray.java`
6. `NoDuplicatesQueueArrayDriver.java`
7. `NoDuplicatesPriorityQueueInterface.java`
8. `NoDuplicatesPriorityQueueLinkedNodes.java`
9. `NoDuplicatesPriorityQueueLinkedNodesDriver.java`

Grading Rubric:

Total 70 points (part-1 35 points and part-2 35 points). For each part, each method has an equal weight (35 points/ number of methods you need to complete).