

Clare DuVal

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Lab 5

## Lab Report

### Requirements Analysis

#### Functional Requirements

- As a user I can choose the option to initiate the program to call array or list implementation by responding with 1 or 2, respectively.
- As a user I can view the queue to see the integers added into the queue in first in, first out order.
- As a user I can add a number to the end of the queue by responding with 1.
- As a user I can type in a number to add to the end of the queue.
- As a user I can get the next number to the queue by responding with 2.
- As a user I can peek at the beginning of the queue by responding with 3 to see the first number in the queue.
- As a user I can peek at the end of the queue by responding with 4 to see the last number in the queue.
- As a user I can insert a number into a position to insert a number into the current queue responding with 5.
- As a user I can insert a number x into a certain position by responding with an integer.
- As a user I can specify which position I would like to add a number into by responding with an integer.

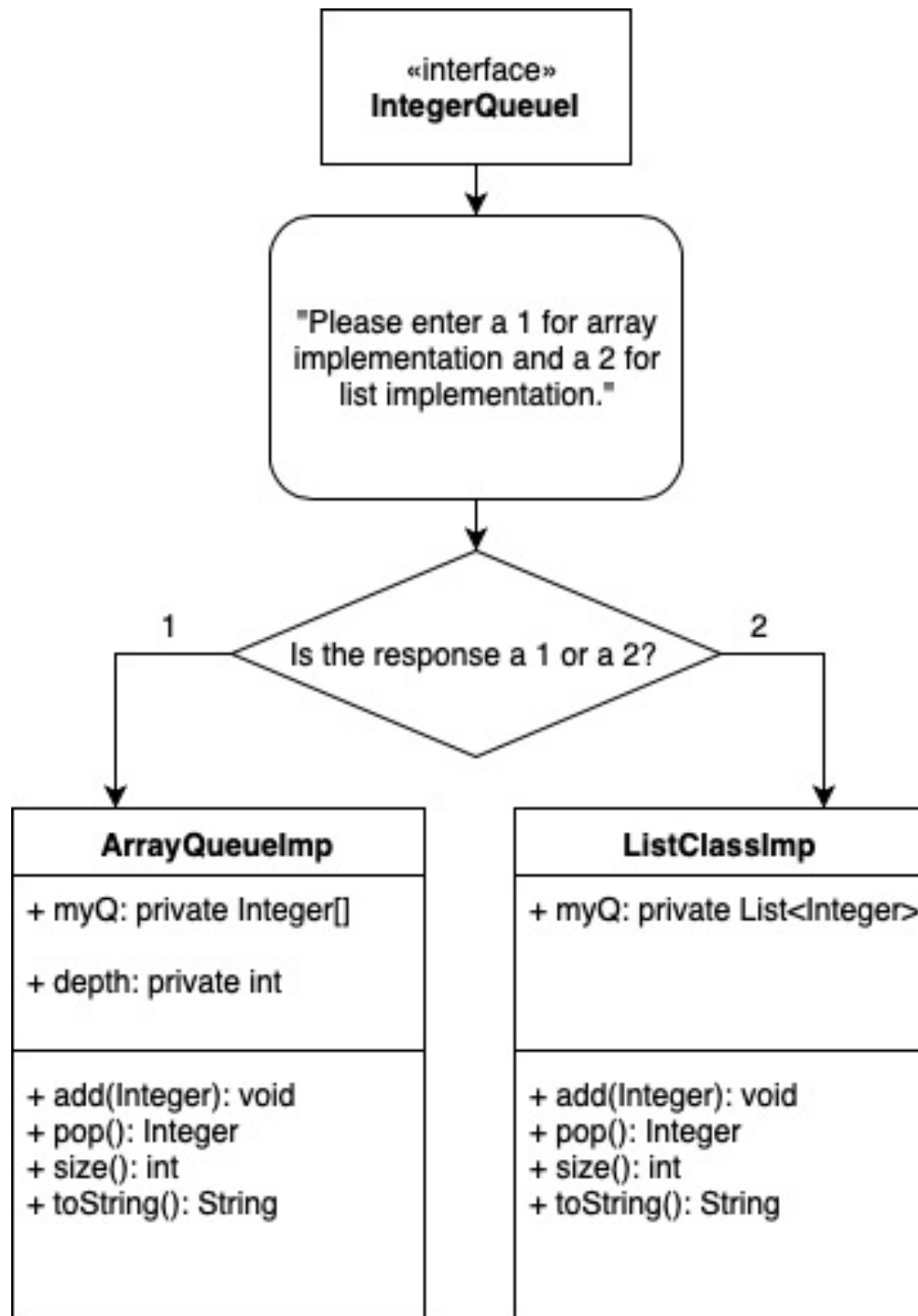
- As a user I can get a number from a certain position in the queue by responding with 6.
- As a user I can specify which position I would like to get a number from by responding with an integer.
- As a user I can remove a number from a certain position in the queue by responding with 7.
- As a user I can specify which position I would like to remove a number from by responding with an integer.
- As a user I can exit the application by responding with 8.

#### Non-Functional Requirements

- The system must be written in Java for it to be run on Unix.
- The system must be able to compile on Clemson University's computers for the user to be able to run it.
- The system initializes the IntegerQueueI interface from the main function and has an array implementation as well as a list implementation.

## Design

### IntegerQueue Interface and Implementations



## Testing

To test this program, I first would make sure that when a number other than 1-8 was entered, an error was produced.

When 1 was input, a array implementation was initiated. From there, I made sure that when a number was entered during the 1<sup>st</sup> option, the number was added to the end of the queue. I made sure the 2<sup>nd</sup> option took out the first in the queue and moved everything down. I made sure the 3<sup>rd</sup> option only accessed the first element in the queue and that the 4<sup>th</sup> only accessed the last. The 5<sup>th</sup> insert was tricky, but I made it so a number entered can be entered in the queue in positions 1 – (size + 1), as to add it anywhere from the beginning to end of the queue. When the 6<sup>th</sup> option is chosen, it returned the integer in the desired position. For the 7<sup>th</sup>, it took out an integer from the desired position and moved all elements afterwards down. For 5, 6, and 7, an error was produced when the position was outside the size +1 of the queue.

When 2 was input, a list implementation was initiated. Since they share the same interface, I made sure it followed the same rules of the aforementioned array implementation.

All output was expected output.

Enter 1 for array implementation or 2 for List implementation

1

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

1

What number to add to the Queue?

1

Queue is:

1

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue

6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

1

What number to add to the Queue?

3

Queue is:

1

3

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

5

What number to add to the Queue?

2

What position to input in?

2

Queue is:

1

2

3

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

5

What number to add to the Queue?

4

What position to input in?

4

Queue is:

1

2

3

4

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue

5. Insert in the Queue

6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

3

Peek: 1

Queue is:

1

2

3

4

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue

5. Insert in the Queue

6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

4

Peek at end: 4

Queue is:

1

2

3

4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

6

What position to get from the Queue?

2

2 is at position 2 in the Queue.

Queue is:

1

2

3

4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

7

What position to get from the Queue?

2

2 was at position 2 in the Queue.

Queue is:

1

3

4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue

5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

7

What position to get from the Queue?

3

4 was at position 3 in the Queue.

Queue is:

1

3

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

7

What position to get from the Queue?

1

1 was at position 1 in the Queue.

Queue is:

3

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

7

What position to get from the Queue?

1

3 was at position 1 in the Queue.

Queue is:



Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit
- 9

Not a valid option!

Queue is:

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit
- 8

Enter 1 for array implementation or 2 for List implementation

2

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

1

What number to add to the Queue?

1

Queue is:

1

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

1

What number to add to the Queue?

3

Queue is:

1

3

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

5

What number to add to the Queue?

2

What position to input in?

2

Queue is:

1

2

3

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue

5. Insert in the Queue

6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

5

What number to add to the Queue?

4

What position to input in?

4

Queue is:

1

2

3

4

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue

5. Insert in the Queue

6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

3

Peek: 1

Queue is:

- 1
- 2
- 3
- 4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

4

Peek at end: 4

Queue is:

- 1
- 2
- 3
- 4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

6

What position to get from the Queue?

2

2 is at position 2 in the Queue.

Queue is:

- 1
- 2
- 3
- 4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

7

What position to get from the Queue?

2

2 was at position 2 in the Queue.

Queue is:

1

3

4

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue
7. Remove from a position in the Queue
8. Quit

7

What position to get from the Queue?

3

4 was at position 3 in the Queue.

Queue is:

1

3

Select an option:

1. Add to the Queue
2. Get next number from the Queue
3. Peek at the front of the Queue
4. Peek at the end of the Queue
5. Insert in the Queue
6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

7

What position to get from the Queue?

1

1 was at position 1 in the Queue.

Queue is:

3

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue

5. Insert in the Queue

6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

7

What position to get from the Queue?

1

3 was at position 1 in the Queue.

Queue is:

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue

5. Insert in the Queue

6. Get a position in the Queue

7. Remove from a position in the Queue

8. Quit

9

Not a valid option!

Queue is:

Select an option:

1. Add to the Queue

2. Get next number from the Queue

3. Peek at the front of the Queue

4. Peek at the end of the Queue
  5. Insert in the Queue
  6. Get a position in the Queue
  7. Remove from a position in the Queue
  8. Quit
- 8

Process finished with exit code 0

## Deployment

The user must navigate to the directory before the one stated in the package. From the command line when the user types "ls" the terminal displays the cpssc2150 directory and the makefile. This makefile compiles when "make" is written on the command line. It runs the program when the user types "run make". The program commences and will ask the user for "array" if they want to run with array implementation. When they input anything other than "array" it commences with list implementation. The program displays the outputs mentioned in Testing of this lab report. And when the user types "make clean" it removes all .class files in cpssc2150/MyQueue/ directory.