1. Circular queues are used quite a bit in operating systems and high performance systems, especially when performance matters. Do a little outside research, and edit this section of the readme answering specifically: Why is a ring buffer useful and/or when should it be used?

A ring buffer utilizes a pre-allocated fixed-size array that allows for an efficient memory access pattern. It is implemented as a fixed-size array with a head and tail pointer, which continuously wraps around the buffer as elements are added and removed. All the buffer operations are constant time O(1).

Ring buffer can be applied for real-time systems such as audio or video playback and event-driven systems such as operating systems where data needs to be processed promptly.

Additionally, the circular queue is also useful for implementing communication protocols where data needs to be transmitted and received efficiently.

References:

Srivastava, Priyank. “Implementing a Ring Buffer in Java.” *Baeldung*, 24 Nov. 2022, https://www.baeldung.com/java-ring-buffer.

2. We are going to talk about stacks quite a lot in this course, so it will be important to understand them. Do a little outside research, and edit this section of the README answering specifically: Why is a stack useful and/or when should it be used?

It is a LIFO (Last-In-First-Out) data structure because of the aforementioned property. In this case, the last-inserted piece is accessed first. In the language of stacks, insertion operations are referred to as PUSH and removal operations as POP.

For all the standard stack operations (push, pop, isEmpty, size), the worst-case run-time complexity can be O(1). Because these operations take constant time.

There are some common problems that can be solved by using a stack. Which is backtracking, reversing a word, and the back button in a browser(saves all the URLs you have visited previously in a stack).

References:

Sandeepa, Pulsara. “When to Use Stack Data Structure.” *Medium*, Javarevisited, 17 Mar. 2021, https://medium.com/javarevisited/when-to-use-stack-data-structure-9ac3dfa4d10.