Documentation  
 Beknur Tanibergen

Assignment 2 Algoritms and Data structure  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
This project implements some basic data structures like **MyArrayList**, **MyLinkedList**, **MyStack**, **MyQueue**, and **MyMinHeap**. These are custom implementations without using Java's built-in collections except for Iterator.

1. **MyArrayList**: A dynamic array that grows when full. Supports adding, removing, and accessing elements by index.
2. **MyLinkedList**: A doubly linked list for efficient insertion and deletion.
3. **MyStack**: A stack (LIFO) based on **MyArrayList**.
4. **MyQueue**: A queue (FIFO) using **MyLinkedList**.
5. **MyMinHeap**: A min-heap that keeps the smallest element at the root, using **MyArrayList**.

Operations like adding, removing, getting elements, and checking the size are implemented for each data structure.

Time complexity for most operations:

* **MyArrayList**: O(1) for add, O(n) for remove.
* **MyLinkedList**: O(n) for add, remove, get.
* **MyStack**: O(1) for push, pop, and peek.
* **MyQueue**: O(n) for enqueue, O(1) for dequeue and peek.
* **MyMinHeap**: O(log n) for insert and extractMin, O(1) for peek.