Queues

Overview

- A linear data structure that models real-world queues with enqueue and dequeue
  - Enqueue - adding from the back (also adding or offering)
  - Dequeue - removing from the front (also removing or polling)
  - FIFO

Why Use It?

- Used to model real-world queues
- Can be used to efficiently track the x most recently added elements
- FCFS for web server requests
- Breadth-first search (BFS) graph traversal

Big O Analysis

Operation	Big O Notation	Explanation
Enqueue	O(1)	
Dequeue	O(1)	
Peeking	O(1)	
Contains	O(n)	
Removal	O(n)	
Is Empty	O(1)	

Code Implementation

- Can be implemented using linked lists or arrays

- https://www.geeksforgeeks.org/queue-set-1introduction-and-array-implementation/

Techniques

- Used for BFS

```
// Let Q be a Queue
Q.enqueue(starting_node)
starting_node.visited = True

while (!Q.isEmpty()):
  node = Q.dequeue()

  for neighbour in neighbours(node):
    if (neighbour.visited == False):
      neighbour.visited = True
      Q.enqueue(neighbour)
```