MIDTERM EXAM

AKHMEDOV YUSUFJON MAKHAMMAD UGLI

ID: 202438404

Question 1.

Explain the difference between a stack and a queue. Give one real-life example for each data structure

Answer:

A stack and queue differ operations such as insertion, deletion according to data structure.

Order of operation in a stack is Last In, First Out (LIFO), while in queue is First In, First Out (FIFO).

For example, in stack, imagine putting plates into box on top of each other, if you wanna to put new one or take out, you have to start from the top. Unlike stack, imagine people waiting for their orders or people taking bus, whenever new person came, they should join after the people, but person taking order or getting into bus is who came first like a queue in terms of Data Structure.

Question 2.

You are asked to frequently insert and delete elements from both ends of a sequence.

Which data structure would you choose and why? Analyze its time complexity for insertion and deletion operations.

Answer:

I go for deque which allows me to insert at both front and rear and delete from both front and rear.

When it comes to time complexity, insertion and deletion from both the front and rear have O(1) time complexity, meaning each operation takes constant time regardless of the number of elements.

Question 3. Coding

Write a program in Java (or any preferred language) to implement a singly linked list with the following functions: insertAtEnd(int data) deleteAtPosition(int position) display ()

Code in this GitHub Link

Thank you!