CSE 281: Data structures and Algorithms Lab
Lab sheet VI
Queue Extra Questions

Instructions

- *Write the algorithm and java program codes for the question 1 in the lab record.*
- *Reference to java API is available at : http://192.168.0.48/javadocs/api/index.html*

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1. **Implement the following operations on Dequeue using a circular array.**

   insetFront(): Adds an item at the front of Deque.
   insertLast(): Adds an item at the rear of Deque.
   deleteFront(): Deletes an item from front of Deque.
   deleteLast(): Deletes an item from rear of Deque.
   getFront(): Gets the front item from queue.
   getRear(): Gets the last item from queue.
   isEmpty(): Checks whether Deque is empty or not.
   isFull(): Checks whether Deque is full or not.
   display(): Display queue elements starting from front to rear
   Test case:
   create a queue of size 5
   insetFront1(10):
   insertLast(20):
   insetFront(30):
   deleteFront():
   deleteLast():
   insertLast(25):
   insetFront(40):
   insetFront(50):
   getRear():
   getFront():

2. **Find the first circular tour that visits all petrol pumps:** Suppose there is a circle. There are n petrol pumps on that circle. You are given two sets of data.
   1. The amount of petrol that every petrol pump has.
   2. Distance from that petrol pump to the next petrol pump.
   Calculate the first point from where a truck will be able to complete the circle (The truck will stop at each petrol pump and it has infinite capacity). Expected time complexity is O(n). Assume for 1 litre petrol, the truck can go 1 unit of distance.

   For example, let there be 4 petrol pumps with amount of petrol and distance to next petrol pump value pairs as {4, 6}, {6, 5}, {7, 3} and {4, 5}. The first point from where truck can make a circular tour is 2nd petrol pump. Output should be "start = 1" (index of 2nd petrol pump).

3. **You are given a stack data structure with push and pop operations. Implement a queue using instances of stack data structure and operations on it.**