

CS 261 Data Structures

Assignment 3 -- Linked List Variations

Problem 1: Linked List Deque and Bag implementation

First, complete the linked list implementation of the deque (as in Worksheet 19) and bag ADTs (Worksheet 22). To do this, implement all functions with the `// FIXME...` comments in `linkedList.c`.

Grading (30 pts):

- `init` -- 2 pts
 - `addLinkBefore` -- 4 pts
 - `removeLink` -- 4 pts
 - `linkedListAddFront` -- 2 pts
 - `linkedListAddBack` -- 2 pts
 - `linkedListFront` -- 2 pts
 - `linkedListBack` -- 2 pts
 - `linkedListRemoveFront` -- 2 pts
 - `linkedListRemoveBack` -- 2 pts
 - `linkedListIsEmpty` -- 2 pts
 - `linkedListPrint` -- 2 pts
 - `linkedListContains` -- 2 pts
 - `linkedListRemove` -- 2 pts
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Problem 2: Circularly Linked List Deque implementation

For this problem, you will implement the Deque ADT with a Circularly-Doubly-Linked List with a Sentinel. As you know, the sentinel is a special link, does not contain a meaningful value, and should not be removed. Using a sentinel makes some linked list operations easier and cleaner in implementation. This list is circular, meaning the end points back to the beginning, thus one sentinel suffices. Implement all functions with the

`// FIXME...` comments in `circularList.c`.

Grading (50pts):

- `init` -- 4 pts
- `createLink` -- 4 pts
- `addLinkAfter` -- 4 pts
- `removeLink` -- 4 pts
- `circularListAddBack` -- 3 pts
- `circularListAddFront` -- 3 pts
- `circularListFront` -- 3 pts
- `circularListBack` -- 3 pts
- `circularListRemoveFront` -- 3 pts
- `circularListRemoveBack` -- 3 pts
- `circularListDestroy` -- 4 pts
- `circularListIsEmpty` -- 2 pts
- `circularListPrint` -- 4 pts
- `circularListReverse` -- 6 pts

Submission

As usual do not make any modifications to the header files or include any additional headers, and make sure everything compiles and runs on flip. Submit the following files:

- `linkedList.c` -- your linked list deque and bag implementation.
- `circularList.c` -- your circularly linked list deque implementation.