UCR - CS 14

Assignment 2

Deliverables: Create a single pdf file that contains your answers and your C++ code. Then create a zip file that contains this pdf file along with all your code source files. Submit this zip file in iLearn.

Deadline: 10/17/2019 11:59 pm.

Exercise 1

If the elements of a list are sorted, is an array-based or a linked-list-based implementation of the list more efficient for binary search? Explain.

Answer:

Exercise 2

a. Write C++ code to implement an integer queue class using linked-list, where the nodes are stored sorted by ascending value of the integer they store. We call this a priority queue. Specifically, implement enqueue and dequeue methods.
b. What is the average asymptotic cost per call to enqueue and to dequeue?
c. What if for each node, in addition to a pointer to the next node, you add a pointer to the 10^{th} next node. Modify your code to take advantage of this.
d. Can the modification in (c) improve the cost (not asymptotic but just execution time) of enqueue? Does it improve the asymptotic cost?
e. Is there any disadvantage that modification (c) incurs?

Answers:

Exercise 3

Write a C++ class that implement two stacks using a single C++ array. That is, it should have functions popFirst(…), popSecond(…), pushFirst(…), pushSecond(…),… When out of space, double the size of the array (similarly to what vector is doing).

Answer:

Throughout the exercises, make any assumptions necessary.