

CS1005: Assignment #3

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1 Problem 1

Generate input randomly in your array and filled just 2/3 of the array.

1. Insert a new item at the beginning (count the step)
2. Insert an item at the end (count the step)
3. Traverse and print the position, value and address of the array
4. Take the input (the element) from the user and find the (a)Position in the array, (b) Address of the value in array (c) Print how many comparison is required to find the element.
5. Delete an item from the end. (count the step)
6. Delete an item from the beginning. (count the step)

2 Problem 2

Consider an array $A[0, \dots, n-1]$ of n integers. Define a peak of A to be an index i with $0 \leq i < n$ such that $A[i-1] < A[i]$ and $A[i] > A[i+1]$, where we imagine $A[-1] = A[n] = \text{inf}$. In other words, a peak x is greater than or equal to its neighbors in A , where we treat the first and last elements as having only one neighbor. Note that A might have multiple peaks. For example, if $A = [10, 6, 4, 3, 12, 19, 18]$, then A has two peaks, 10 and 19. Note that the absolute maximum of A is always a peak, but it requires (n) time to compute. Develop an $O(\log n)$ algorithm to find a peak and also the position in the array.

3 Problem 3

Consider a sorted array $A[0, \dots, n-1]$. Take input from user (r) and rotate either left or right (where r represent the number of rotation). After rotation, find the minimum element in it. Assume all elements are distinct. Write recursive program and also the complexity of your program.

Important Points:-

- Implement it using C language.
- Total Marks: 15 (5 each)