**Lab Mid Term Exam**

**Marks**

1. Write a program to reverse an array. 10

| **Sample input** | **Sample output** |
| --- | --- |
| 5  6 2 3 3 5 | 5 3 3 2 6 |

1. Write a program to remove duplicate numbers from an array and print the remaining elements in sorted order. You have to do this in O(nlogn). 15

| **Sample input** | **Sample output** |
| --- | --- |
| 5  6 3 2 3 5 | 2 3 5 6 |

1. Write a program to sort the numbers in non-increasing order using quick sort. You have to take random index as a pivot element. 15

| **Sample input** | **Sample output** |
| --- | --- |
| 5  6 3 2 3 5 | 6 5 3 3 2 |

1. Write a recursive function to check if a given word is a palindrome. 15

| **Sample input** | **Sample output** |
| --- | --- |
| abcba | Yes |
| abcaa | No |

A palindrome is a word which reads the same forward and backward.

1. Write a recursive function to find the maximum element in an array. 15

| **Sample input** | **Sample output** |
| --- | --- |
| 5  1 3 5 2 4 | 5 |

1. Take the Singly linked-list class from Github. 15  
   Link: <https://github.com/phitronio/Data-Structure-Batch2/blob/main/Week%204/Module%2013/1.cpp>

Add the following functions to the class.

* **int getLast()** -> This function will return the last node of the linked list. If the linked list is empty then return -1.

Sample Input: [3, 2, 6, 4, 5]

Sample Output: 5

* **double getAverage()** -> This function will return the average of all elements in the linked list.

Sample Input: [3, 2, 6, 4, 7]

Sample Output: 4.4

1. Take the Doubly linked-list class from Github. 15  
   Link: <https://github.com/phitronio/Data-Structure-Batch2/blob/main/Week%204/Module%2014/1.cpp>

Add the following functions to the class.

* **void swap(i , j)** -> This function will swap the i-th index and j-th index.

Sample Input: [3, 2, 6, 4, 7], i = 1, j = 4

Sample Output: Doubly Linked list containing the elements [3,7,6,4,2]

* **void deleteZero()** -> This function will delete all the nodes that have data=0.

Sample Input: [0, 2, 0, 0, 5]

Sample Output: Doubly linked list containing the elements [2, 5]