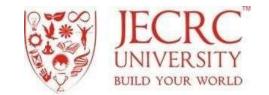
B.Tech. (Computer Science and Engineering)

Semester-III

Subject: Data Structures and Algorithms

Subject code BCO 002B

Marks: 64



CO1: Show the understanding of various data structure concepts like Arrays, Sorting, Time & Space Complexity

Assignment#1

Tutorial sheet 1

Sec-A

1.	[CO1] What is Abstract Data Type? Give example.	[2 marks]
2.	[CO1] What is space complexity? How is it different than time complexity?	[2 marks]
3.	[CO1] What is the time and space complexity of the following code?	
	int sum(int n) {	
	int sum = 0;	
	for (int $i = 1$; $i \le n$; $i++$) {	
	sum += i;	
	}	
	return sum;	
	}	[2 marks]
4.	[CO1] How are the elements of a 2D array stored in the memory? Explain with example.	[2 marks]
5.	[CO1] Given the base address of an array B[13001900] as 1020 and the size of each	
	element is 2 bytes in the memory, find the address of B[1700].	[2 marks]
	Sec-B	
1	[CO1] Write an afficient program for printing K largest elements in an array. Flaments in an array can be in	

1. [CO1] Write an efficient program for printing K largest elements in an array. Elements in an array can be in any order.

Example: Input: [1, 23, 12, 9, 30, 2, 50], K = 3

Output: 50, 30, 23 [7 marks]

2. [CO1] Explain the basic operations performed on array data structure with algorithms for each

Operation. [7 marks]

3. [CO1] What are Asymptotic Notations? Explain in detail. [7 marks]

Sec-C

1 [CO1] Implement quick sort algorithm on the below list:

97,82,450,99,45,99,101,230,23.

Write down all the implementation phases and the changed list, also write the test case that will generate the worst-case time complexity. [11 marks]

2 [CO1] Given an Integer N and a list arr. Sort the array using the bubble sort algorithm. [11 marks]

Example: Input: N = 5, arr[] = {4, 1, 3, 9, 7}

Output: 1 3 4 7 9

[CO1] Write a linear search algorithm to find the element in an array. Also analyze its behavior in the worst, best and average cases. [11 marks]