Independent University, Bangladesh

CSE-211 Mid Exam, Summer-19, Full marks: 30

1. What are the asymptotic complexity of solving the following problems efficiently, give your answer in terms of Θ, Ω or O notation: [10]

a. Finding Min in an unsorted array.

b. Finding a Key in a sorted array.

c. Finding Max in a sorted array.

d. Merging two sorted array into a larger sorted array.

e. Pivoting (as in Quick sort) in an unsorted array.

f. Powering a number (xy) where the power is an integer.

g. Complexity of any comparison based sorting algorithm.

e. Complexity of Quick sort.

f. Complexity of Radix sort.

g. Complexity of Checking whether an array is sorted or not.

2. Propose an ALGORITHM to check whether a given array is sorted or not. What is the complexity of your algorithm? Explain. [7]

3. What is the complexity of the following snippet of code: [6]

a ← 1

for(int i=0; i<n; i++){

for(int j=n; j>0; j--){

for(int k=0; k<n - n; k++){

a ← a + 1

}

}

}

4. Assume Toyota Car Manufacturing Company has a Robot hand in its production line which follows a **HEAP STRUCTURE**. From the users, it takes an input, n and it chooses nth highest element from the inventory. Use **MAX HEAP** to write **int chooseMe(int n, int \*arr)** which returns the **nth highest element**. Assume methods like maxheapify(int n, int \*arr) are already created. [7]

Testcase:

assume arr[5] = {15, 12, 13, 2, 1}

chooseMe(3, arr) will return 12.