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**INSTITUTE OF INFORMATION TECHNOLOGY**

**Jahangirnagar University**

**2nd Year 1st Semester Final Examination-2020 [Written]**

**Course Title: Data Structure Course Code: ICT 2101**

**Time: 45 Minutes, Plus Extra 15 Minutes for Submission Marks: 10**

**Instructions:**

1. There are Three Questions here. Answer **any TWO** (**02**) of them.
2. Marks carrying by each question are shown in the margin.
3. Upload the **pdf answer script** in the **Google Class Room**.

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| --- | --- | --- | --- |
| 1. | a. | You’re given a sequence of numbers as input. The numbers will be increasing at first, and then decreasing. You have to use a queue and a stack to sort the complete sequence.  The first input will be an integer **n** which specifies the length of the input sequence. Next n integers will be your input sequence.  Example input:  How many numbers: 9  Numbers are: 1 3 8 12 14 13 9 5 2  Output: 1 2 3 5 8 9 12 13 14 | 2 |
|  | b. | Suppose you are making a phonebook application for a cellphone company. Which data structure would you use and why? Justify your answer. | 2 |
|  | c. | Consider the following linked list.    Give the values of the following expressions:   1. Ptr1->info 2. Ptr2->next->info 3. listData->next->next->info | 1 |
| 2. | a. | Consider the postfix expression given below. How this expression can be evaluated using stack?  7 5 3 \* 2 4 6 + / ‒ \* | 3 |
|  | b. | You have an unsorted list called ***ICT*** and a stack called ***CSE***. Now put those elements of the list in the stack in such a manner that when you pop the elements from the stack, they come out in ascending order. For simplicity consider the size of the list and stack **10**. | 2 |
| 3. | a. | Consider the following list of integers:  2, 3, 1, 2, 6, 4, 6, 6  Perform a count sort on the above list.  **What is the asymptotic running time for a count sort on *n* numbers?** | 2 |
|  | b. | Consider the following sorted linear array ***EEE***. Write down the steps to find the value 25 using binary search algorithm.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 2 | 4 | 5 | 8 | 12 | 14 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 18 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | 1 |
|  | c. | Insert the values 23, 45, 85, 97, 107, 136, 158 in a hash table of size **7** using division method. Resolve the collision if occurred. | 2 |