CS352 – Data Structures and Algorithms

Time: 80 Minutes | Midterm Exam – December 8, 2020 | Total Marks: 50

Important! Read all the instructions.

- Be honest! Do the exam yourself! Plagiarism in any part of the paper will result in cancellation of the paper.
- Share your live location on WhatsApp with me, now.
- Solve and submit the paper in the given time, late submissions will not be accepted.
- The paper must be solved on clean sheets.
- On top of each answer sheet, put your ID, name, signature, and page number (1, 2, 3, …).
- If you have read the instructions, draw a triangle at the top right corner of the first sheet. You'll get 1 mark for it.
- Submit your solution through WhatsApp only.

Part 1 (10 Minutes – 13:00 – 13:10)

Q1: In this question, a sequence of numbers is given in front of your name. You will use these numbers in the given order for solving the whole paper. Write down the sum of first three numbers written in front of your name. {1}

ID	Name	Numbers
01071911002	Nadia Bano	3,93,14,60,78
01071911003	Shaista	98,39,25,10,41
01071911020	Shafaq Sabeen	81,23,13,37,56
01071911025	Adeeba Naveed	25,79,84,58,49
01071911026	Adila Amin	4,49,21,8,65
01072011001	M. Husnain	78,84,67,36,54
01072011002	Ayesha Batool	48,50,58,57,63
01072011003	Sohail Mushtaq	5,85,89,46,34
01072011004	Areej Amjad	78,89,60,36,76
01072011006	M. Salman Ashraf	35,93,55,56,71
01072011007	M. Abdul Wahab	33,41,61,5,93
01072011008	Laraib Fatima	8,9,63,32,78
01072011009	M. Sohail	83,31,66,55,18

ID	Name	Numbers
01072011010	Zainab Iqbal	20,45,11,49,40
01072011015	Sana Gul	44,78,14,92,87
01072011016	Asad Ejaz	90,48,77,98,52
01072011017	Ch Abubakar	65,4,9,74,53
01072011018	M Ahmad Nawaz	84,12,22,35,89
01072011019	Sumbal Mir Dar	90,96,30,3,95
01072011020	Farheen Fatima	95,80,100,42,37
01072011021	Khansa Khalil	88,17,51,58,62
01072011024	Daniyal Ahmed	39,15,34,31,63
01072011026	M. Shahid Aslam	69,86,40,90,5
01072011028	Aiza Noor	4,53,83,12,49
01072011029	Sabeeha Batool	61,63,79,5,48
01072011030	Sumbal Batool	61,6,12,69,64

Part 2 (30 Minutes – 13:10 – 13:40)

Q2: You will not use any arrays or loops for solving this question, except for part c. {3+5+10+5}

a. Write code to allocate memory for each number given to you in Q1. Allocate memory for each number in the given order. Store the address of memory for each number in a different variable. Do not link the nodes. Do not use any loop or array.
b. Write code to link allocated memories in ascending order, e.g., the smallest value should be connected to the second smallest value and so on. Do not use any loop or array.
c. Assume that you have address of only the first node of the linked allocated memories of part b. Use a while loop to insert the value 47, such that all the values remain sorted.
d. Draw the linked allocated memories of part c on a paper.

Part 3 (40 minutes – 13:40 – 14:20)

Q3: {5+5+10+5}

a. Explain how can you receive the numbers given in Q1 in your program as command line arguments?

b. Assume that you have received the numbers using command line arguments, write code to check if the numbers form a palindrome using STL based stacks and queues. You may receive more than five numbers.
(Example: 1 12 3 12 1 form a palindrome, whereas 1 12 13 21 1 do not form a palindrome)

c. Write code to store the numbers received through command line arguments in an STL based list in such a way that odd numbers are stored at the beginning of the list and even numbers at the end of the list.

d. Write code to display all the numbers stored in the list in part c.