

CS-204
End Semester – 2020
Full Marks:25
(Mention Name and Roll number in answer sheet)

1. Johnson's Algorithm works fine with negative edge weights. The first step of the algorithm is called Reweighting which uses the Bellman Ford algorithm. This generates a shortest distance of each vertex from a new source vertex and new non-negative weights for each edge. Given the following edge list, Find out the
 - i. shortest distance from new source vertex to each vertex
 - ii. new non-negative edge weights in the prescribed format. (5)

a-->b : -2
c-->a : 4
b-->c : -1
c-->x : 2
c-->y : -3
z-->x : 1
z-->y : -4

Format

 - i. a : __, b : __, c : __, x : __, y : __, z : __ ,
 - ii. a-->b : __, c-->a : __, b-->c : __, c-->x : __, c-->y : __, z-->x : __, z-->y : __
2. An array consists of 200 numbers. What is the minimum number of comparisons required to find the minimum and maximum of these numbers? (2)
3. Assume a paragraph consists of A, L, G, O, C and S letter with following frequency. Please find out the code for A, L, G, O, C and S and also compute number of bits required for encoding this given paragraph. A-27; L-9; G-10; O-35; C-5; S-14. Show final tree form for assigning code. (5)
4. Suppose we have an array of 12 integers: 13, 19, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11. What will be the output by the end of the first iteration of the typical implementation of the Quick sort algorithm using the last element as pivot element? (3)
5. In a depth-first traversal of a graph G with n vertices, k edges are marked as tree edges. What will be the number of connected components in G? (2)
6. There is a set S with m elements. Elements are of size s_1, s_2, \dots, s_m . You are also given an integer B. Is there any subset T of S such that total size of T is B? Prove this problem belongs to class NPC (8)

Submit end.pdf