

Code No: 138AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, September - 2020

ADVANCED ALGORITHMS

(Computer Science and Engineering)

Time: 2 Hours

Max. Marks: 75

Answer any Five Questions  
All Questions Carry Equal Marks

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- 1.a) Illustrate the operation of MAX-HEAP-INSERT (A, 10) on the Heap  
A = {15, 13, 9, 5, 12, 8, 7, 4, 0, 6, 2, 1}.
- b) Describe the following:
  - i) Best-case time for Quick Sort.
  - ii) Worst-case time for Quick Sort. [8+7]
- 2.a) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is (5, 10, 3, 12, 5, 50, 6).
- b) Determine an LCS of (1,0,0,1,0,1,0,1) AND (0,1,0,1,1,0,1,1,0) [8+7]
- 3.a) What is an optimal Huffman code for the following set of frequencies, based on the first 8 Fibonacci numbers? a:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21
- b) Explain the implementation steps of Dijkstra's algorithm to find shortest path of a given graph (as shown in figure 1). [8+7]

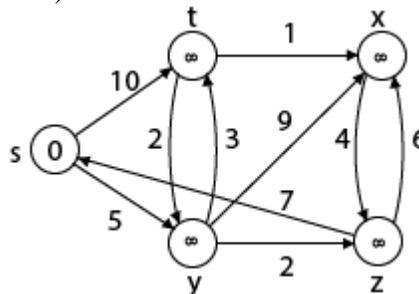


Figure 1

OR

4. Run the Floyd-Warshall algorithm on the weighted, directed graph of below figure 2.

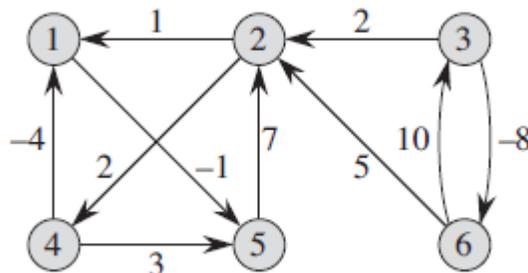


Figure 2

Show the matrix  $D^{(k)}$  that results for each iteration of the outer loop.

[15]

5. Explain in detail about Bitonic Sorting Network. [15]
6. Explain in detail the implementation of Strassen's Matrix Multiplication with an example. [15]
7. Explain the implementation of The Knuth-Morris-Pratt algorithm with an example.[15]
8. Explain in detail about the vertex-cover problem with an example. [15]

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