

Total No. of Questions—8]

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[4957]-1072**S.E. (Computer) (First Semester) EXAMINATION, 2016****DATA STRUCTURES AND PROBLEM SOLVING****(2012 PATTERN)****Time : Two Hours****Maximum Marks : 50**

- N.B. :—**
- (i) Neat diagrams must be drawn wherever necessary.
 - (ii) Figures to the right indicate full marks.
 - (iii) Use of calculator is allowed.
 - (iv) Assume suitable data, if necessary.

1. (a) Find upper bound for [4]

$$F(n) = 3n + 8$$

and lower bound for

$$F(n) = 5n^2.$$

- (b) Show the operation of bucket sort on the array : [4]

$$A = (0.36, 0.15, 0.20, 0.89, 0.53, 0.71, 0.32).$$

- (c) What is ADT ? Write ADT for priority queue. [4]

Or

2. (a) What are the difficulties in problem solving ? Explain any *four* steps in problem solving with suitable example. [4]

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(b) Write an algorithm for reversing string, also mentioned time and space complexity for the same. [4]

(c) Explain the following terms with respect to hight balanced tree : [4]

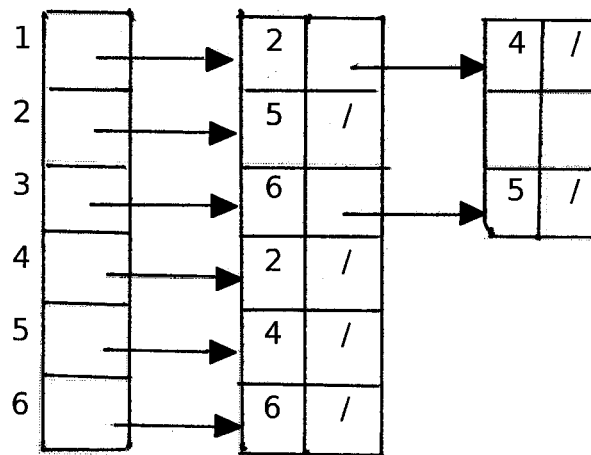
(i) L L

(ii) R R

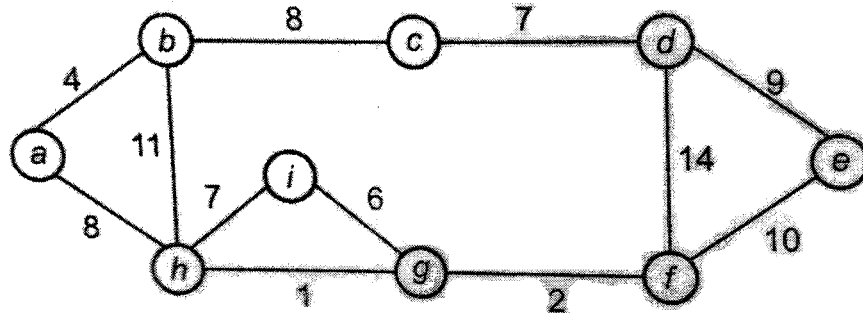
(iii) L R

(iv) R L.

3. (a) Consider the following graph representation using adjacency matrix and mention the difference between BFS and DFS : [4]



- (b) Find the minimum spanning tree of the following graph using Kruskals algorithm. [4]



- (c) Write are the characteristics of good hash function. [4]

Or

4. (a) With suitable example explain topological sorting. Also enlist application of topological sorting. [4]
- (b) Create an AVL search tree from the given set of values : [4]
H I J B A E C F D G K L.
- (c) What is collision with respect to hash function ? What are different collision resolution techniques ? [4]

5. (a) Write an algorithm to search an elements in B tree. [6]
- (b) Insert 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13 and 2 into binary heap. After creating heap delete the element 8 from heap and reconstruct it. [7]

Or

- 6.** (a) Explain random and sequential file in detail. [6]
(b) Write a pseudo C/C++ code to sort the data using heap sort in ascending order. [7]
- 7.** (a) Write an algorithm for odd-even merge sort and explain it with suitable example. [6]
(b) What is prefix computation problem ? Explain in brief. [7]

Or

- 8.** (a) State and explain pointer doubling problem with an example. [6]
(b) Write in brief about parallel computational model. [7]