

Total No. of Questions—8]

[Total No. of Printed Pages—4+1

Seat No.	
---------------------	--

[4657]-572

S.E. (Computer) (First Semester) EXAMINATION, 2014

DATA STRUCTURES AND PROBLEM SOLVING

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :- (i) Answer *four* questions in all.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Assume suitable data if necessary.

1. (a) Construct a logical expression for allowing purchasing using credit card if the following rules are satisfied.

The card may be used if the

(i) Balance plus sales amount is less than the maximum allowable amount

(ii) Last payment was less than 45 days ago

(iii) Credit card has not expired. [3]

(b) Sort the following data using Quick Sort Algorithm.

65, 70, 75, 80, 85, 60, 55, 50, 45.

Show the output after every pass. [4]

P.T.O.

- (c) Draw the threaded binary tree equivalent for the tree represented by the following array assuming root node of tree starts with index 1 in array : [5]

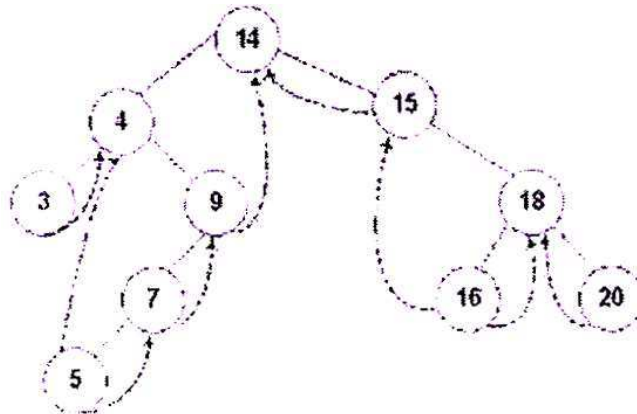
0	1	2	3	4	5	6	7	8	9	10	11
	10	-	20	-	-	30	-	-	-	-	-
12	13	14	15	16	17	18	19	20	21	22	23
-	40	-	-	-	-	-	-	-	-	-	-
24	25	26	27	28	29	30	31				
-	-	50	-	-	-	-	-				

Or

2. (a) Find the frequency count of the following code : [3]

```
sum = 0;
for(i = 0; i < = n; i++)
for(j = 0; j < = n; j++)
sum = sum + i + j.
```

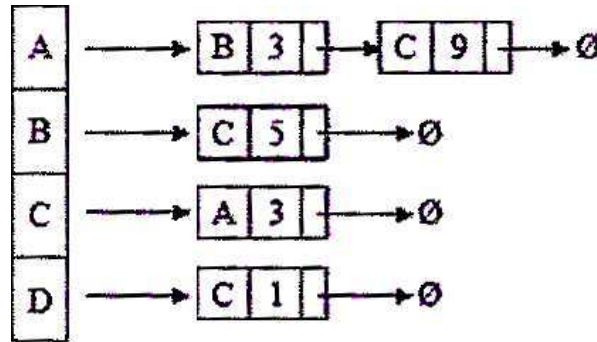
- (b) Consider the following threaded binary search tree. [4]



Delete the root node of the tree and redraw the tree again with threading by maintaining the property of binary search tree.

(c) Write a non-recursive pseudo C/C++ code for any DFS traversal of binary tree. [5]

3. (a) Consider the following graph represented using Adjacency List. [4]



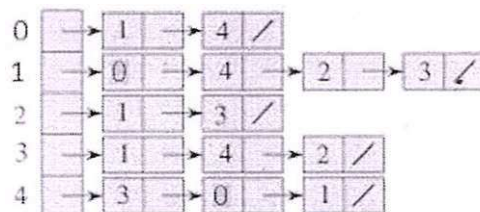
Find the minimum spanning tree for the above graph by using Prim's Algorithm.

(b) Write a pseudo C/C++ code for LR and RL rotations in AVL Trees. [6]

(c) Enlist various collision resolution techniques. [2]

Or

4. (a) Draw the BFS traversal of the following graph represented using adjacency list. [4]

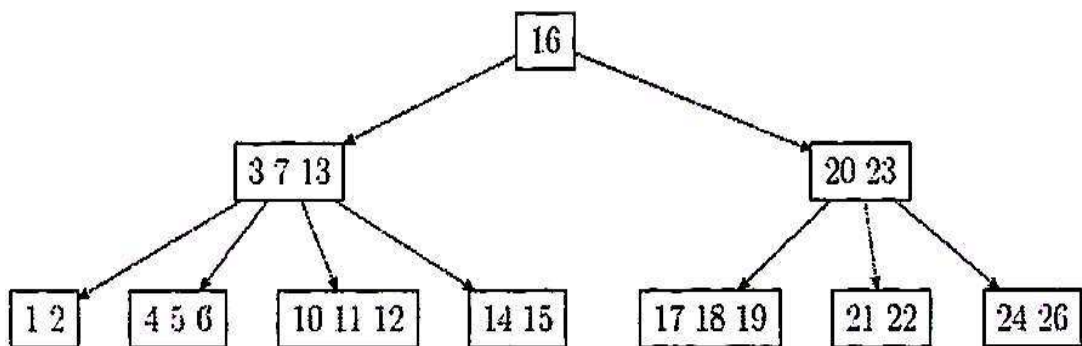


- (b) Construct the AVL tree for the following data by inserting each of the following data item one at a time : [5]

10, 20, 15, 12, 25, 30, 14, 22, 35, 40.

- (c) Enlist hash functions to calculate the hash values of the data. [3]

5. (a) Consider the following 5 Way B Tree : [6]



Delete root node i.e. a node with key value 16 from the above tree and redraw the tree by maintaining its B Tree property.

- (b) Build the Min-Heap for the following data : [4]

25, 12, 27, 30, 5, 10, 17, 29, 40, 35.

- (c) Explain any *three* operations performed on sequential files. [3]

Or

6. (a) Write a pseudo C/C++ code to sort the data using heap sort in ascending order. [7]

- (b) Create a 3 way B tree by inserting the following data one at a time : [6]

5, 3, 21, 9, 1, 13, 2, 7, 10, 12, 4, 8.

7. (a) Explain how parallel prefix computation algorithm can be applied to the following example :

5, 3, -6, 2, 7, 10, -2, 8.

Assume the prefix operation as addition. [6]

- (b) Write a parallel algorithm for odd-even merge sort. Explain the algorithm with suitable example. [7]

Or

8. (a) Explain parallel pointer doubling algorithm with suitable example. [7]

- (b) Write a parallel algorithm to perform the addition of the given numbers using complete binary tree method. [6]