

Section A contains ten Multiple Choice Questions and all are compulsory carrying 1.5 Marks each. Sections B contain ten short answer questions and attempt any five selecting at least one from each unit. Each question carries 8 Marks

Section C contains five long answer questions out of which any three are to be attempted. Each question carries 15 marks.

SECTION-A

1) Runtime of Naive String matching Algorithm and Knuth Morris Pratt Algorithm

- a) b)
- c) d)

2) The maximum and minimum number of permissible keys for the node of a B-tree of order m

- a) (b)
- c) d)

3)) Stack is useful for implementation of

- a) radix sort b) breadth first search
- c) recursion d) none of these

4) Which of the following is not the property of Randomized Algorithms?

- a) very efficient b) associated with the probability of error
- c) deterministic output d) none of the above

5) Two main measures for the efficiency of an algorithm are

- a) Processor and memory b) Complexity and capacity
- c) Time and space d) Data and space

6) The load factor of the hash table should be below

- a) -1 b) 0
- c) 1 d) none of the above

7) Primary Clustering is the limitation of:

- a) Linear Probing b) Quadratic Probing
- c) Separate Chaining d) Double Hashing

8) The computational Complexity of Longest Common Subsequence problem using Dynamic Programming

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- a) b)
 - c) d)

9) In Red Black trees if the node is red, then both its children are

- a) red b) black
- c) either red or black d) none of these

10) The postfix equivalent of the prefix

- a) b)
- c) d)

SECTION- B

Unit I

- Q2 a) Define Load Factor in Hashing.
 b) Demonstrate the insertion of keys 73,45,37,65,77,88,100,121 into a hash table with 11 slots using open address hash table using Linear Probing.

OR

Consider the Extendible hashing given in Figure 1. Each leaf has upto $M=4$ elements. Explain the Extendible hashing after the insertion of 100100 and 000000

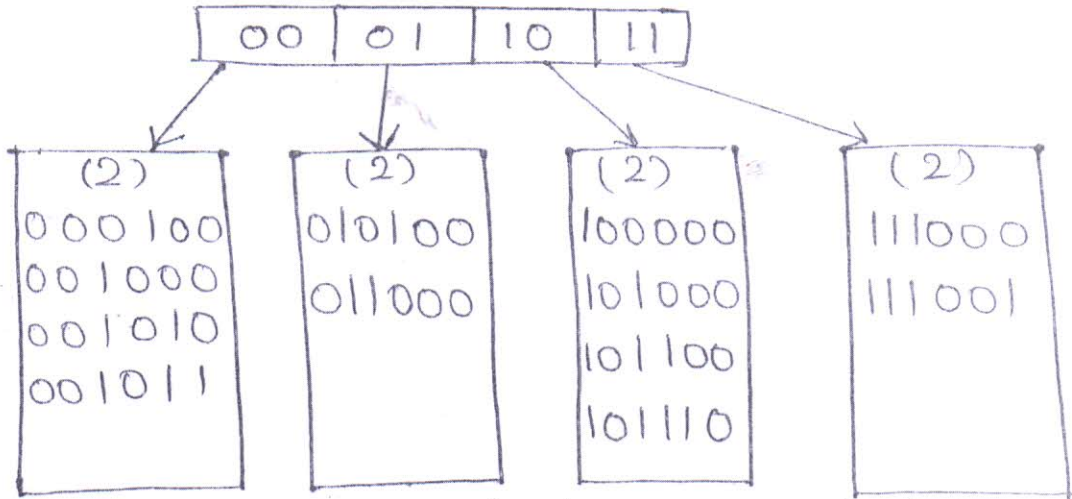


Figure 1: Extendible hashing (original data)

Unit II

- Q3 Explain the need of Randomized Algorithms. Explain the following two randomized algorithms
 a) Las Vegas b) Monte Carlo

OR

What do you mean by Skip Lists? Explain Deterministic Skip Lists in detail.

Unit III

- Q4. Consider the Splay Trees given in fig 2(a), 1(b), 1(c), 1(d). Show the appropriate rotations considering splay node as 3, 12 17 and 4 respectively. (4*2)

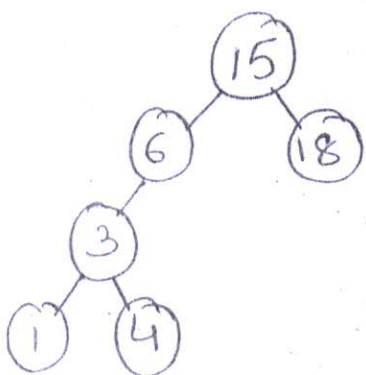


Fig 2(a)

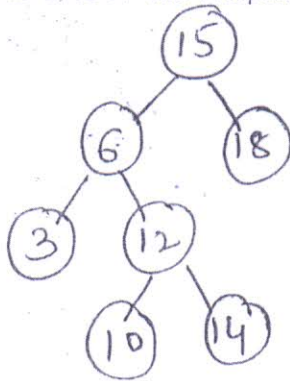


Fig 2(b)

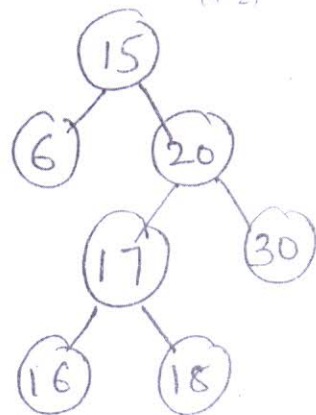
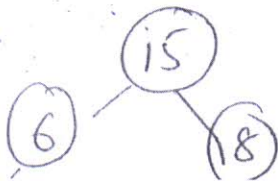


Fig 2(c)



OR

a) The preorder and inorder traversals of binary tree T are

Preorder: A B L M K N P Q Inorder: L B M A N Q P. Draw the corresponding binary tree T.

b) Differentiate between Strictly Binary Tree and Complete Binary Tree with the help of an example. (5,3)

Unit IV

- Q5 a) Generate the KMP failure function $f(j)$ for the following pattern $P = \text{abcdabeabf}$.
b) Explain the Preprocessing Time and Match Time of the KMP Algorithm.
c) Form a prefix computation for the pattern $P = \text{"aab"}$ and match it with the string "aadbaaba" using the KMP Procedure. (2,1.5)

OR

Consider the following pattern $P = \text{TEAMMAST}$ and text $T = \text{WELCOMETOTEAMMAST}$. Construct the Suitable Bad Match Table and apply the Horspool algorithm to show the presence of pattern P in text T

Unit V

- Q6 Explain a) One Dimensional Range Searching b) Two Dimensional Range Searching

OR

Explain K-D Trees with a suitable example.

SECTION-C

- Q7 What are the various operations possible on stacks? Write an algorithm to implement various Operations on stack.

- Q8 Construct a Skip List by using the elements 12, 17, 20, 25, 31, 38, 39, 44, 50. Explain the Search Operation and Insert Operation on the given skip List by writing a suitable algorithm.

- Q9 a) Explain the important properties of 2-3 tree
b) Construct the B-tree of order 3.
11, 33, 28, 17, 40, 15, 35, 38, 26, 60, 39, 45, 78, 8, 90, 19, 22, 37 (2,13)

- Q10 a) Explain the computational complexity of above LCS by using dynamic programming and by Using Brute Force Approach. (3,12)
b) Find the LCS between the sequences AGGTAB and GXTXAYB using dynamic Programming.

- Q11 Define a) Hashing b) Rehashing.
Explain the following recent trends in Hashing: CUCKOO HASHING, UNIVERSAL HASHING (3,12)