Code No: 156EH **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, March - 2024
ADVANCED DATA STRUCTURES
(Computer Science and Business Systems)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) What is the fundamental operation of the leftist tree? [2]
b) What are the properties of Binomial heap? [3]
c) Is linear probing and open addressing the same? Justify your answer. [2]
d) Calculate the hash value for keys 1234 and 5642 using the mid-square method. The hash table has 100 memory locations. [3]
e) What are the properties of Red-Black tree? [2]
f) What are the drawbacks of AVL tree? [3]
g) What is the height of compressed trie? [2]
h) Illustrate the possible conditions to be considered when deleting key from trie? [3]
i) Define the Rabin-Karp string matching algorithm. [2]
j) Explain the flow chart of KMP. [3]

PART – B

(50 Marks)

2.a) Show the result of inserting 10, 12, 1, 14, 6, 5, 8, 15, 3 and 9, one at a time into an initially empty min–max heap.
b) "Heaps are excellent data structures to implement priority queues". Justify this statement. [5+5]

OR

3.a) What is the procedure to extract the node with the minimum value from a Fibonacci heap? Give the algorithm and analyze its complexity.
b) Form a binary max-heap and a min-heap from the following sequence of data: 50, 40, 35, 25, 20, 27, 33. [5+5]

4.a) Consider a hash table of size 10. Using linear probing, insert the keys 72, 27, 36, 24, 63, 81, 92, and 101 into the table.
b) Discuss real world applications of Hashing. [5+5]

OR

5.a) Explain about:
i) Rehashing
ii) Extendible hashing.
b) Consider a hash table of size 10. Using quadratic probing, to insert the keys 72, 27, 36, 24, 63, 81, and 101 into the table. Take c1 = 1 and c2 = 3. [5+5]

6.a) Write an algorithm of single rotation and double rotation of an AVL tree.

b) Construct a Red-Black tree with the following elements 41, 15, 36, 54, 20, 7, 45, 5. Delete element 20 and add element 72. [5+5]

OR

7. Explain the operations of splay tree with an example. [10]

8.a) Explain in brief about tries with examples.

b) Write an algorithm of Patricia. [5+5]

OR

9.a) Describe the Binary trie with an example.

b) Write an algorithm of Standard Trie. [5+5]

10.a) Illustrate the Brute force algorithm.

b) Explain the features that distinguish between Boyer-Moore algorithm from the conventional algorithms. [5+5]

OR

11.a) Solve the Knuth Morris-Pratt algorithm for the following Example:

Text: HEREISASIMPLEEXAMPLE

Pattern: EXAMPLE

b) Explain Naïve string matching algorithm with an example. [5+5]

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