

Name:

Enrolment No:



MANIPAL UNIVERSITY
JAIPUR

Odd Semester Re-Sessional Examination, November 2025

Faculty of Science, Technology, and Architecture

School of Computer Science and Engineering

Department of Computer Science and Engineering

B.Tech – CSE

Course Code: CSE3144

Course: Advanced Data Structure

Semester: V

Time: 1.5 hrs.

Max. Marks: 30

Instructions: All questions are compulsory.

Missing data, if any, may be assumed suitably.

Calculator is allowed.

SECTION A

S.No		Marks	CO
1-A	Explain the need of paring heap.	2	CO1
1-B	Demonstrate the requirement of Persistent Data Structures.	2	CO3
1-C	Illustrate the concept of Splay tree.	2	CO4

SECTION B

2-A	Person A wanted to send a message to Person B. Person A has used some Huffman encoding mechanisms and message is given as below:	4	CO2
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Character Frequency

a	5
b	9
c	12
d	13
e	16
f	45

Create the Huffman tree. Assume Left Edge : 0 and Right Edge : 1

Collision priorities are in this order,

- 1- First priority to newly form node then the character.
- 2- In case of collision between the nodes. Give priority to newly formed node.
- 3- In case of collision between the character, priority to 'a' character is highest.
- 4- In case of collision for position (for same frequency) , highest priority value will be placed at left side.

2- B	Construct a Segment tree for 1,5,6,2,4 and 3. Return the Min query for {0,4} and show the overlapping condition as well.	4	CO4
2-C	Consider following points in a 2-D plane and construct K-D tree.	4	CO5

P1(2, 5), P2(16, 14), P3(12, 14), P4(5, 11), P5(8, 1), P6(1, 6), and P(9, 18). (Hint- take initial cutting dimension is X axis)

SECTION-C

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| 3-A | Given a list of elements 10, 12, 3, 9, 6, 8, 7 and 23. Build the Red-Black tree. | 6 | CO4 |
| 3-B | Create a Quad tree for the points P1 (4,11), P2(9,2), P3(7,10), P4(3,11), P5(2,8), P6(11,7) and P7 (6,10). Display the resulting tree structure.
(Note:-
1-Take child in this order- NE,SE,SW and NW.
2- Use Manhattan distance to assign points in quadrant if a point lie in more than one quadrant.
3- In case of same value of Manhattan distance, priority to Point P1 is highest. So assign point to a quadrant according to priority. | 6 | CO5 |