



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Synoptic Re-Examination

June 2018

Max. Marks: 100

Class: S.E.

Course Code: CE31/ IT31

Name of the Course: Advanced Data Structures

Duration: 3 hr

Semester: III

Branch: Computer / I.T.

Instructions:

- (1) All Questions are Compulsory
- (2) Draw neat diagrams
- (3) Assume suitable data if necessary

Question No.	
Q 1 (a)	<p>Inorder Traversal: Void inOrder(BinaryTreeNode t)</p> <pre>{ if (t != null) { inOrder(t.leftChild); visit(t); inOrder(t.rightChild); } }</pre> <p>Postorder traversal Void postOrder(BinaryTreeNode t)</p> <pre>{ if (t != null) { postOrder(t.leftChild); postOrder(t.rightChild); visit(t); } }</pre> <p>Preorder Traversal Void preOrder(BinaryTreeNode t)</p>



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	<pre> { if (t != null) { visit(t); preOrder(t.leftChild); preOrder(t.rightChild); } } </pre> <p>Marks Distribution: What is Binary Tree? ----- 01mk Traverse Function ----- 02mks for each correct traverse function Solved problem correctly----- 01 mk for each traverse.</p>
Q 1 (b)	<p>Marks Distribution: [5 marks insert, 5 marks for delete]</p> <p style="text-align: center;">OR</p> <p>Marks Distribution: [5 marks insert, 5 marks for search]</p>
Q2 (a)	



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	Marks Distribution: Correct AVL Tree Construction shown with all steps ----- 08 mks Correct Rotation mentioned ----- 02 mks
Q2 (b)	Marks Distribution: Insert/Delete Operation with example ----- 05mks for each operation Insert/Delete Operation without example ----- 03mks for each operation OR Insert/Delete Operation with example ----- 05mks for each operation Insert/Delete Operation without example ----- 03mks for each operation
Q3 (a)	Marks Distribution: Hash Collision----- 01mk Explained correctly all three open addressing techniques(Linear, Quadratic and Double Hashing) with an example----- 03 mks for each Explained correctly all three open addressing techniques(Linear, Quadratic and Double Hashing) without an example----- 02 mks for each OR Solution: Keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted in hash table as: For key 12, $h(12)$ is $12\%10 = 2$. Therefore, 12 is placed at 2nd index in the hash table. For key 18, $h(18)$ is $18\%10 = 8$. Therefore, 18 is placed at 8th index in the hash table. For key 13, $h(13)$ is $13\%10 = 3$. Therefore, 13 is placed at 3rd index in the hash table. For key 2, $h(2)$ is $2\%10 = 2$. However, index 2 is already occupied with 12. Therefore, using linear probing, 2 will be placed at index 4 as index 2 and 3 are already occupied. For key 3, $h(3)$ is $3\%10 = 3$. However, index 3 is already occupied with 13. Therefore, using linear probing, 3 will be placed at index 5 as index 3 and 4 are already occupied. Similarly, 23, 5 and 15 will be placed at index 6, 7, 9 respectively. Marks Distribution: Hashed all values correctly with all calculation and Hash Table shown----- 10 mks Hashed all values correctly with all calculation shown and without Hash Table ----- 08 mks
Q3 (b)	Steps to construct Expression tree: a. Read next input symbol b. If the symbol is a numeric value or a variable, create a new expression tree with a single node representing the value/variable and push it into the stack.

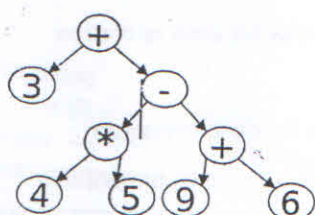


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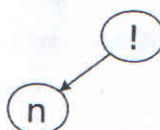
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- If the symbol is an operator, pop out two trees (T1 and T2) from the stack. Create a new tree with the operator as the root and T1 and T2 as two children. Push this new tree back into the stack.
- Repeat this procedure until the whole input is read.
- At the end, the stack will contain a single tree which would be the output.

i)



ii)



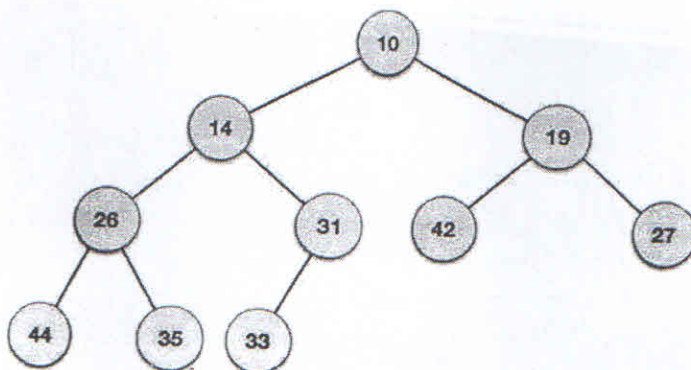
Marks Distribution:

Explain the step of expression tree construction----- 06mks

Constructed the given expression correctly----- 02mks for each

Q4 (a)

Min-Heap - Where the value of the root node is less than or equal to either of its children.



Marks Distribution:

Constructed correctly the Min Heap with all steps shown----- 10mks

Constructed correctly the Min Heap without steps ----- 04mks

OR

What is Fibonacci Heap? ----- 02mks

Delete operation with example ----- 08mks

Delete operation without example ----- 04mks



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Q4 (b)	Marks Distribution: [4 marks insert, 4 marks for delete, 1 mark for structure and 1 mark for main()]
Q5 (a)	Marks Distribution: 05 mks for each correct answer
Q5 (b)	<p>DFS: 5 1 0 3 2 7 6 4</p> <p>BFS: 5 1 2 0 4 3 7 6</p> <p>Marks Distribution: Explained correctly both DFS and BFS Graph traversal Techniques----- 03mks for each technique</p> <p>Solved given problem correctly with the state of Data Structures(DFS-Stack / BFS-Queue) shown----- 04mks</p> <p>Solved given problem correctly without the state of Data Structures(DFS-Stack / BFS-Queue) shown----- 01mks</p>