

COEP TECHNOLOGICAL UNIVERSITY, PUNE

Wellesly Road, Shivajinagar, Pune - 411005

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-	Assignment-12
1	Assignment-12 Binary search trees
1.	Algorithm to insert in a Binary search tree.
	Algorithm Insert-BST (root, key)
	1. If root = = NULL :
	create a new Node and return.
	2. Else find the correct position of the node to
	2. Else find the correct position of the node to be inserted in the B.S.T. using traverse().
	0
	position = traverse (roof, key).
	3. If position -> data > item.
	position - left = new Node.
	d if paition - data < item.
	4. if position - data < item. position - night = newNode
	0
	2.
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	, Herry
	Algorithm traverse (root, data)
	1. if root - data = = item.
	return root.
	2. if root - data < item.
	· p mat - signi ests -
	then recursively call traversel 1 for right subtree of root
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if (root -> data < item) if (root - right)
return traveuse (root - right, & item) else

return noot.

3. if root todata > item if (root - left) return traverse (noot - uft, item) else return root.

- Algorithm to delete from B.S.T. 2. 1. Find position to delete using traverse().
 - ii. If position == NULL point message saying Item not found in B.S.T.
 - iii. If item at position has no child node. - free node memory 2 return.
 - iv. if node at position has one child then make the new-position pointing to the child node & delete the original node.

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- 1. Node * child = position -> lete? position -> left posi 2. position - child free (position)
- 3. free (child position = child.
- 1. if node to be deleted has 2 children.
 - 1. Find inorder successor (minimum in right subtree)
 - 2. Copy inorder successor data into root.
 - 3. Delete the inorder successor
- Algorithm to print leaf 2 non-leaf nodes.
 - i. Declare 2 arrays of node pointers.

Node* + erminals [20];

Node * non-terminals [20];

- 11. Traverse through the tree.
- iii. If a node has no child: Add it to 'terminals' array.

Add it to I non-terminals' avray. Else.



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1. Algorithm to print nodes at each Level.

J. Initialise queue of node pointers.

Node * queue [100];

front = reax = 0;

J. Add root to the queue.

queue [front + +] = root.

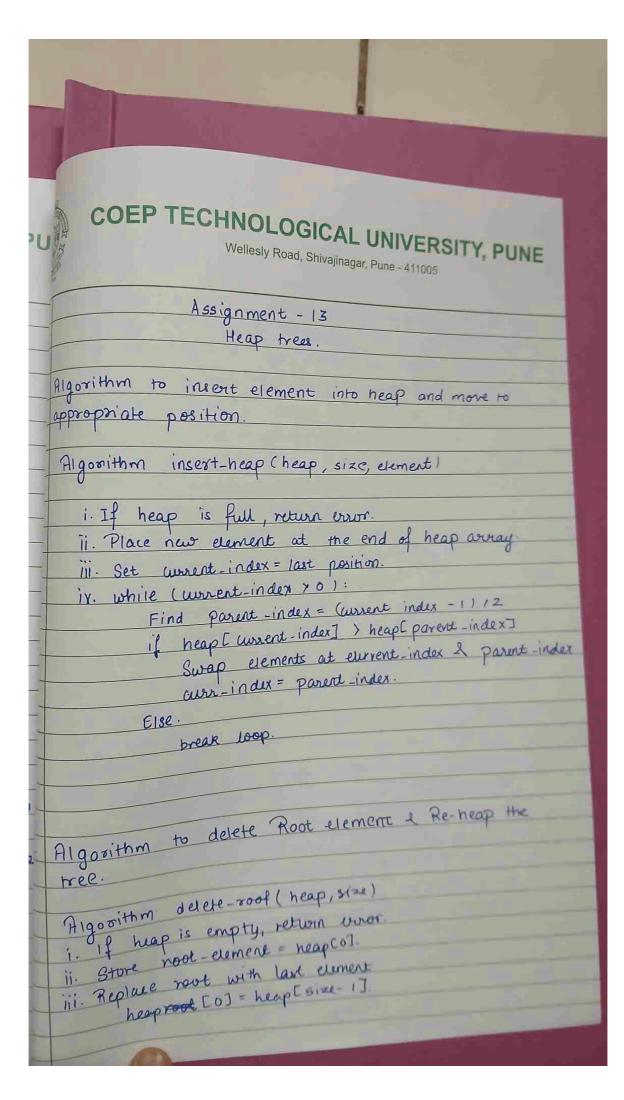
III. while (front < rear)

1. dequeue first gement current = queue [front++]

2. If 'current' has child nodes enqueue them.

5. Conclusion:

B.S.T. provide efficient searching, insestion and deletion aperations while maintaining sorted order the implement algorithms successfully demonstrate hierarchial data organisation and recursive tree processing.





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iv. set war_index = 0. Y. While urr-index has children: find left-child = 2 * curr-index + 1 find night-child = 2* curr-index +2. Set largest = curr-index. if (left-unild exists and is greater than (urr-index) → largest = left-child. if (right-child exists & is greater than wor - largest = right-child. if (largest # wre-index) Swap heap Curr-index] & largest? currindex = largest. break loop 3. CONCLUSION: Heap operations efficiently manage/maintain the heap property using butble-up? trickee-down techniques. The algorithms ensure optimal perform on for priority queue operations.