# SNS COLLEGE OF TECHNOLOGY
## Coimbatore-37.
## An Autonomous Institution

**COURSE NAME : 23CAT602 - DATA STRUCTURES & ALGORITHMS**

**I YEAR/ I SEMESTER**

**UNIT – III  SORTING & SEARCHING**

**Topic: Tree Sort**

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**Tree sort** is a sorting algorithm that is based on Binary Search Tree data structure. It first creates a binary search tree from the elements of the input list or array and then performs an in-order traversal on the created binary search tree to get the elements in sorted order.

**Algorithm:**

**Step 1:** Take the elements input in an array.
**Step 2:** Create a Binary search tree by inserting data items from the array into the binary search tree.
**Step 3:** Perform in-order traversal on the tree to get the elements in sorted order.

## Applications of Tree sort:

✓Its most common use is to edit the elements online: after each installation, a set of objects seen so far is available in a structured program.

✓If you use a splay tree as a binary search tree, the resulting algorithm (called splay sort) has an additional property that it is an adaptive sort, which means its working time is faster than O (n log n) for virtual inputs.

**Complexity Analysis:**

**Average Case Time Complexity:** O(n log n) Adding one item to a Binary Search tree on average takes O(log n) time. Therefore, adding n items will take O(n log n) time

**Worst Case Time Complexity:** $O(n^2)$. The worst case time complexity of Tree Sort can be improved by using a self-balancing binary search tree like Red Black Tree, AVL Tree. Using self-balancing binary tree Tree Sort will take O(n log n) time to sort the array in worst case.

**Auxiliary Space:** O(n)

# THANK YOU