**BST** & **AVL** TREES

|  |  |  |
| --- | --- | --- |
|  | **BST** | **AVL** |
| **Who** | P.F. Windly, A.D. Booth, A.J.T Colin, T.N. Hibbard  Attributed to Conway Berners-Lee, David Wheeler | Georgy Adelson-Velsky, Evgenii Landis |
| **When** | 1960 | 1962 |
| **What** | also called an ordered or sorted binary tree, is a rooted binary tree data structure with the key of each internal node being greater than all the keys in the respective node's left subtree and less than the ones in its right subtree. | is a self-balancing binary search tree (BST). It was the first such data structure to be invented. In an AVL tree, the heights of the two child subtrees of any node differ by at most one; if at any time they differ by more than one, rebalancing is done to restore this property. |
| **Properties** | * Sorted | * Self-balancing |

**TIME AND SPACE COMPLEXITY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Time Complexity** | | | | |
|  | **BST** | | **AVL** | |
|  | **Average** | **Worst** | **Average** | **Worst** |
| **Access** | O(log n) | O(n) | O(log n) | O(log n) |
| **Search** | O(log n) | O(n) | O(log n) | O(log n) |
| **Insertion** | O(log n) | O(n) | O(log n) | O(log n) |
| **Deletion** | O(log n) | O(n) | O(log n) | O(log n) |

|  |  |  |
| --- | --- | --- |
| **Space Complexity** | | |
|  | **BST** | **AVL** |
| **Worst** | O(n) | O(n) |

**AVL ROTATIONS**