

Data Structure



● Time Complexity :-

AVERAGE

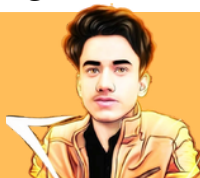
Data Structure	Access	Search	Insertion	Deletion
Array	$O(1)$	$O(n)$	$O(n)$	$O(n)$
Stack	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Singly-Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Doubly-Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Skip List	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
Hash Table	–	$O(1)$	$O(1)$	$O(1)$
Binary Search Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
Cartesian Tree	–	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
B-Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
Red-Black Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
Splay Tree	–	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
AVL Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$

● Time Complexity :-

WORST



Data Structure	Access	Search	Insertion	Deletion
Array	$O(1)$	$O(n)$	$O(n)$	$O(n)$
Stack	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Singly-Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Doubly-Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Skip List	$O(n)$	$O(n)$	$O(n)$	$O(n)$
Hash Table	–	$O(n)$	$O(n)$	$O(n)$
Binary Search Tree	$O(n)$	$O(n)$	$O(n)$	$O(n)$
Cartesian Tree	–	$O(n)$	$O(n)$	$O(n)$
B-Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
Red-Black Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
Splay Tree	–	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$
AVL Tree	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$	$O(\log(n))$



● **Space Complexity :-**



Data Structure	Space Complexity
Array	$O(n)$
Stack	$O(n)$
Singly-Linked List	$O(n)$
Doubly-Linked List	$O(n)$
Skip List	$O(n \log(n))$
Hash Table	$O(n)$
Binary Search Tree	$O(n)$
Cartesian Tree	$O(n)$
B-Tree	$O(n)$
Red-Black Tree	$O(n)$
Splay Tree	$O(n)$
AVL Tree	$O(n)$

