

N-Way Splay Tree Search Complexity Proof

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1 Theorem: N-Way Splay Tree Search Complexity

Statement: Searching in an N-way splay tree with n nodes takes $O(\log n)$ amortized time.

2 Proof

1. Find node: $O(\log n)$ worst case (tree height)
2. Splay to root: $O(\log n)$ amortized (from Theorem 6)
3. Total: $O(\log n)$ amortized

Conclusion: N-way splay tree search has $O(\log n)$ amortized time complexity.