Simpler partition: \( P \) or \( SE \) (partition) \( N \) \( N \) \( N \) \( N \) \( N \)

Simplicial partition: \( P \) or \( SE \) (partition) \( N \) \( N \) \( N \) \( N \) \( N \)

Range queries & range search \( \mathcal{O}(N) \) \( \mathcal{O}(N) \) \( \mathcal{O}(N) \) \( \mathcal{O}(N) \) \( \mathcal{O}(N) \)

Simplicial partition: \( P \) or \( SE \) (partition) \( N \) \( N \) \( N \) \( N \) \( N \)

Range queries & range search \( \mathcal{O}(N) \) \( \mathcal{O}(N) \) \( \mathcal{O}(N) \) \( \mathcal{O}(N) \) \( \mathcal{O}(N) \)

Storage/query tradeoff
\[ o(\log n) = \Theta(1) \]  
\[ o(n) \text{ storage} \]  
\[ \Theta(n^4) = S \]  
\[ o(n^{1/2}) \text{ query} \]
\[
\begin{align*}
\text{partition-1:} & \quad \text{cutting 1 so prefix 2 so prefix} 3 \text{ so prefix} 4 \text{ so prefix} 5 \text{ so prefix} 6 \\
S = \sqrt{a} = r = \sigma b \text{ so prefix} 7 \text{ so prefix} 8 \text{ so prefix} 9 \text{ so prefix} 10 \text{ so prefix} 11 \text{ so prefix} 12 \text{ so prefix} 13 \text{ so prefix} 14 \text{ so prefix} 15 \\
\text{Zone Theorem) (5.2.1)} \quad \text{so prefix} 16 \text{ so prefix} 17 \text{ so prefix} 18 \text{ so prefix} 19 \text{ so prefix} 20 \text{ so prefix} 21 \\
A \quad \text{so prefix} 22 \text{ so prefix} 23 \\
\text{so prefix} 24 \text{ so prefix} 25 \text{ so prefix} 26 \text{ so prefix} 27 \text{ so prefix} 28 \text{ so prefix} 29 \text{ so prefix} 30 \text{ so prefix} 31 \text{ so prefix} 32 \\
\end{align*}
\]
\[ W_0 = m \]
\[ W_{it} = W_{it-1} \cdot \left( 1 + \frac{w_{it}}{S} \right) \]
\[ W_{it} = W_{it-1} \cdot \left( \prod_{i_1}^{i_2} \frac{w_{i_1}}{S} \right) \]
\[ W_0 \leq W_{it} \leq W_0 \left( 1 + \frac{w_{it}}{S} \right)^{i_2 - i_1} \]
\[ \frac{W_0}{S} \leq W_{it} \leq W_0 \left( 1 + \frac{w_{it}}{S} \right)^{i_2 - i_1} \]

\[ W_{final} = W_0 \left( 1 + \frac{w_{final}}{S} \right)^{t_{final} - t_0} \approx W_0 \left( 1 + \frac{w_{final}}{S} \right)^{t_{final} - t_0} \approx W_0 e^{\frac{w_{final}}{S}} \]

\[ 2^k \leq W e^{\frac{w_{final}}{S}} \]

\[ k \leq \log M + e^{\frac{w_{final}}{S}} \]

\[ k \leq 2 \log n + e^{\frac{w_{final}}{S}} \]
Spanning Tree with Low Crossing Number

\[ p \rightarrow p_1, p_2, \ldots, p_r \quad : \quad c = \text{on } P \text{ for Simplex Partition} \]

\[ \frac{n}{r} \leq 1 \quad \text{for } P \]
\[ S(n) = c \cdot n^d \cdot S \left( \frac{n}{2} \right) + o(n) \]

For all \( n \geq N \), \( S(n) = o(n^{d+\epsilon}) \) for a constant \( \epsilon > 0 \).

Theorem 3.5: For any \( n \), the partition tree has at least one node with at least \( n/2 \) children.

Proof: By induction on \( n \).

\[ t^2 \cdot \frac{n}{t} = nt = s \]

So \( t \leq \frac{s}{n} \)

\[ t = \frac{s}{n} \]

Log? query - then, etc.

\[ r^2 = \frac{n}{t} \to (cr^2)^d = c^d \cdot r^{2d} = c^d \cdot \frac{n^{2d}}{t^{2d}} = c^d \cdot \frac{n^2}{ht^2} \]

\[ c^d \cdot n^{d} \equiv c^d \cdot n^{d} \cdot \frac{n^2}{ht^2} \]

\[ \frac{n^{d+2}}{ht^2} \]

\[ \text{query} - \text{then}, etc. \]

\[ \frac{n^{d+2}}{ht^2} \]

\[ \frac{n^{d+2}}{ht^2} \]

\[ \frac{n^{d+2}}{ht^2} \]
let T be a tree of depth 1 and order k.

Let's assume that T is a tree.

Since T is a tree, it has a root and no cycles.

Given any crossing lemma, we have a tree T with a root r.

The crossing number of T is defined as the minimum number of crossings of any drawing of T.

To compute the crossing number of T, we can use the following formula:

crossing number(T) = \sum_{i=1}^{n} \frac{1}{\binom{n}{i}} \cdot \binom{n-1}{i-1}

where n is the number of vertices in T.

Note: The crossing number of a tree is equal to its order.

For any graph G, we have the following inequality:

crossing number(G) \leq \frac{1}{\binom{n}{3}} \cdot \binom{n-1}{2}

where n is the number of vertices in G.

This inequality is known as the crossing number inequality.

To prove this inequality, we can use the following observation:

Any drawing of G can be obtained by embedding the vertices of G on the plane and connecting them by straight line segments.

Then, we can compute the crossing number of G by counting the number of crossings in any drawing of G.

Finally, we can use the fact that the number of crossings in any drawing of G is at most \frac{1}{\binom{n}{3}} \cdot \binom{n-1}{2}.

This completes the proof of the crossing number inequality.

Note: The crossing number inequality is an important tool in the study of graph drawings.

For more information, please refer to the following references:

