Point Location

Performance Of Trapezoidal Map - Expectation

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❖ Let $S_i = \{ s_1, s_2, \ldots, s_i \}$,

$TM_i = TM(S_i)$ and

$SS_i = SS(S_i)$

❖ Let k(i) = # new trapezoids (leaves) created, when s_i is inserted

K(i) = # vertical rays being trimmed due to insertion of s_i

t(i) = the time that it takes to

locate a query point in a subdivision of size i-1,

using the structure SS_{i-1}

T(i) = the time that it takes

to insert s_i and update TM_{i-1} to TM_i

❖ Thus,

the expected time for constructing SS(S) = SS_n

is given by

$E[T(1)] + E[T(2)] + \ldots + E[T(n)]$

❖ Claim:

ignoring the time for point location,

it takes $\boxed{O(k(i))}$ time to insert s_i

// i.e. $T(i) - t(i) = O(k(i))$