Advanced Balanced Search Tree

Segment Tree

Construction

08-XD7

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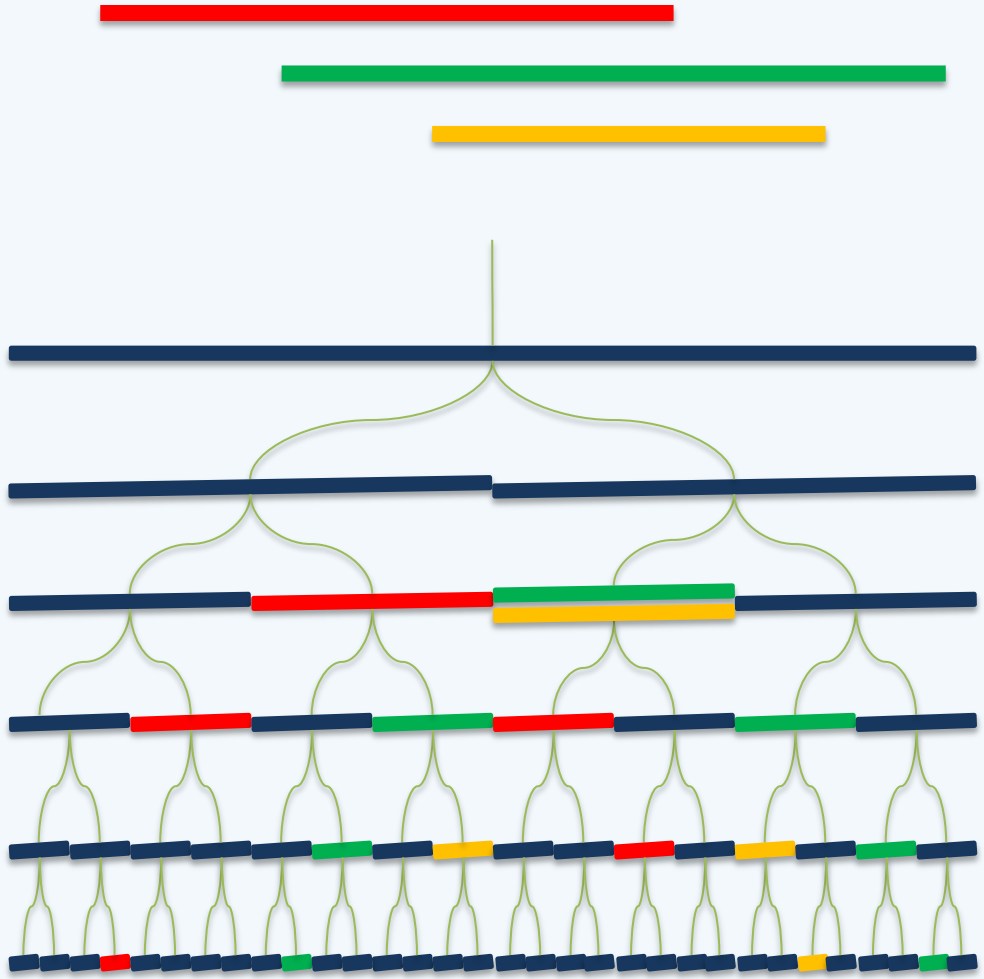
BuildSegmentTree(I)

- // Construct a segment tree on
  // a set I of n intervals
  Sort all endpoints in I before
  determining all EI's //O(nlogn)
  Create T a BBST on all the EI's //O(n)
  Determine Int(v) for each node v
  //O(n) if done in a bottom-up manner
  For each s of I
  call InsertSegmentTree(T.root , s)



InsertSegmentTree(v , s)

❖ // Insert an interval s into a segment (sub)tree rooted at v

if (Int(v) ⊆ s) store s at v and return;

if (Int(lc(v)) ∩ s ≠ ∅) //recurse

    InsertSegmentTree(lc(v), s);

if (Int(rc(v)) ∩ s ≠ ∅) //recurse

    InsertSegmentTree(rc(v), s);

👁 At each level, ≤4 nodes are visited (2 stores + 2 recursions)

∴ $O(\log n)$ time