Building a segment tree

1. $\{[a_1, b_1] \cdots [a_n, b_n]\} = I$
2. $\{a_1, \cdots, a_n, b_1, \cdots, b_n\} = X$
3. Sort elements in X., say sorted X is $\{p_1, \cdots, p_m\} = Y$
4. Create elementary intervals using Y:
   $(-\infty, p_1)\ [p_1, p_1]\ (p_1, p_2) \cdots [p_m, p_m]\ (p_m, +\infty)$
   ↳ Count: $1 + 2m = 1 + 2 \times (2n) = 4n + 1$.
5. Build a tree [balanced], and call it T.
   two ways of building: 1. ~~one-by-one~~ 2. all at once.
6. Assign intervals in I to nodes in T. and T_I.

Add a new point to T.

$(p_k, p_{k+1}) \rightarrow (p_k, x)[x, x](x, p_{k+1})$

1. Replace (p_k, p_{k+1}) with $[x, x]$
2. Insert (p_k, x).
3. Insert (x, p_{k+1}).

$(p_k, x)[x, x](x, p_{k+1}) \rightarrow (p_k, p_{k+1})$

1. Remove (p_k, x)
2. Remove (x, p_{k+1})
3. Replace $[x, x]$ with (p_k, p_{k+1})