Auxiliary trees

6.897
L4.5
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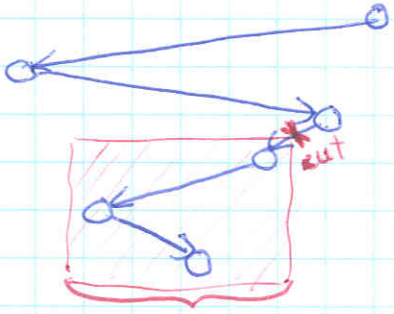
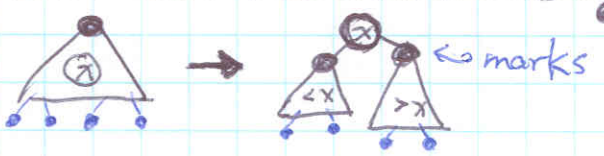
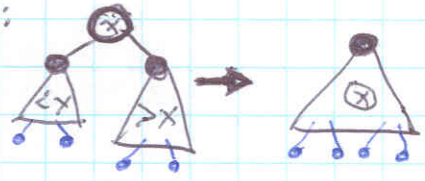
- change in preferred paths from traversing a nonpreferred edge:

  - one edge deleted
  - one edge added

- operations on paths:
  - cut path into nodes with depth $\leq d$ & $> d$ (in P)
  - join two paths where leaf of one is adj. to root of other
- aux. trees must store nodes in rank order
  - depth $> d$ translates to interval of ranks



- extraction/insertion of an interval of keys can be implemented by $O(1)$ splits & concatenates of BSTs.
  $\Rightarrow O(\lg(\text{size of aux. tree})) = O(\lg \lg n)$
- but in BST model not allowed a forest of BSTs.
  - simulate with "tree of trees" (internal tree)
  - mark root of each aux. tree & boundaries
  - use BST split:



& BST concatenate: