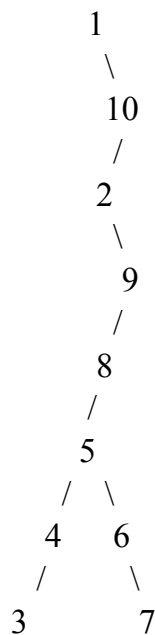


Advanced Data Structures (COP5536)

Exam 3, Sample 1

Note. All answers will be graded on correctness, efficiency, clarity, elegance and other normal criteria that determine quality. The points assigned to each question are provided in parentheses.

1. (10) Following the algorithm in the lecture/text book.
 - (a) (5) *Construct* an arbitrary B-tree of order 5 with height 3, using minimum number of elements.
 - (b) (5) From the constructed B-tree, *delete* the smallest element in the left-most child of the root. Show each step.
2. (8) For the following *splay tree*, perform *Delete(5)*. Show each step.



3. (8) Insert the following keys into an initially empty *compressed 10-way trie* (I.e. branching is by decimal digits) in sequence:

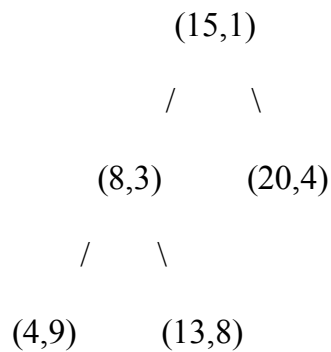
12345, 12374, 13344, 13574

Show each step.

4. (10) For the min radix priority search tree (RPST) with the range $[0, 32)$,

(a) (6) Perform *insert* operations into an initially empty RPST in sequence with the following keys: $(23, 15)$, $(20, 8)$, $(21, 10)$, $(1, 4)$. Show each step.

(b) (4) Delete $(15, 1)$ from the following RPST, explaining briefly:



5. (14) *Describe* the 3-dimensional *range tree* structure. *Derive* the formulas for the preprocessing time P , the space required S , and the query time Q .

[Solutions](#)