COP5536 Advanced Data Structures

Exam 2

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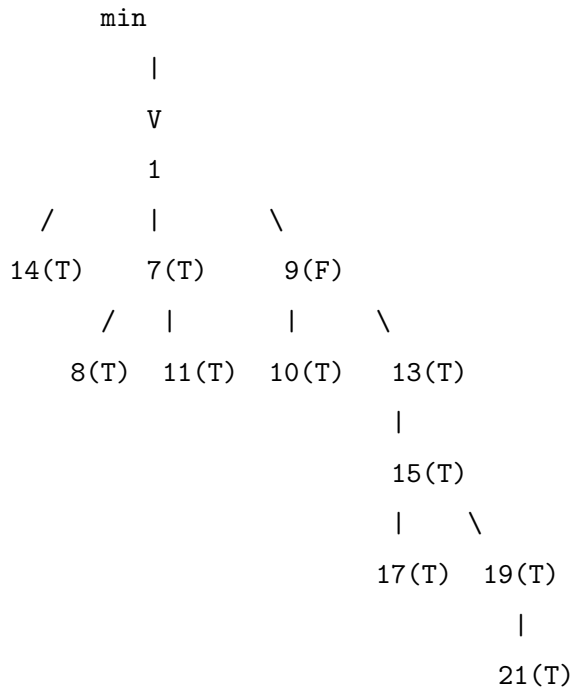
Problem 1 (12)

(a) (5) For the min Fibonacci heap of figure below, perform a *DecreaseKey* operation by changing 19 to 2. Draw the resulting *min Fibonacci* heap, clearly label *ChildCut* values. (The ChildCut field is shown in parentheses; ChildCut is undefined for the root.)

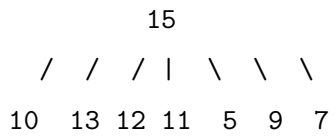


(b) (6) Perform a *DeleteMin* operation on the resulting Fibonacci heap of (a) , clearly label *ChildCut* values.

Problem 2 (12)

(a) (6) Insert the following sequence of keys: 2, 5, 8, 4, 7, 12, 3 and 9 in this order in an empty *max pairing heap*. Show each step.

(b) (6) For the *max pairing heap* given below, perform a *RemoveMax* operation using *two-pass* scheme and show each step.



Problem 3 (14)

(a) (7) Insert the keys 6,3,11,7,8,5,1,2,4,9,10 and 12, one by one in this order into an initially empty 2-3-Tree (i.e., B-tree of order 3). Show the tree after each insert.

(b) (7) Delete the keys 12,7,2,5,1 and 11, in this order, from the tree constructed in part (a). Show the tree after each delete.

Problem 4 (12)

Perform a Split operation using the split key 6 in the following bottom-up splay tree. Show each Step.