

6.046
PROBLEM SET 6

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1. PROBLEM 7-1

1.1. Problem A.

Problem 1.1. Write pseudocode implementations of the Bib-Insert, Bib-Delete, and Bib-Min functions for the Bib Tree.

Solution

Let us say that the function $high(x) = a$ and $low(x) = b$ where $x = a\sqrt{x} + b$.

```
def BibInsert(tree, x):
    if tree is empty:
        tree.min = tree.max = x
        return
    if x < tree.min:
        x, tree.min = tree.min, x
    if x > tree.max:
        x, tree.max = tree.max, x
    if v.summary[high(x)] == 0:
        BibInsert(v.summary, high(x))
    BibInsert(v.blocks[high(x)], low(x))

def BibMin(tree):
    return tree.min

def BibDelete(tree, x):
    if tree is empty or x < tree.min or x > tree.max:
        return null
    if x == tree.min
        s = tree.summary.min
        if s == null:
            tree.min = tree.max
        else:
            tree.min = tree.boxes[s].min
            BibDelete(tree.boxes[s], tree.min)
            if tree.boxes[s].min == null:
                BibDelete(tree.summary, s)
    elif x == tree.max:
        do the same but opposite
    else:
        BibDelete(s.boxes[high(x)], low(x))
        if S.blocks[high(x)].min == null:
            BibDelete(tree.summary, high(x))
        BibDelete(tree.blocks, low(x))
```

□

1.2. Problem B.

Problem 1.2. Write the recurrences for the run-times of the operations in the revised data structure and solve the recurrences.

Solution

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