

CSE 373 Data Structures SP13 HW4

Problem 1

(Adapted from Weiss 5.1)

Given input $\{4371, 1323, 6173, 4199, 4344, 9679, 1989\}$ and a hash function $h(x) = x \bmod 10$, show the resulting hash tables of size 10 with bins 0 through 9:

- A Separate chaining hash table (remember to add items to the beginning of lists).
- B Hash table using linear probing.
- C Hash table using quadratic probing.
- D Hash table with a second hash function $h_2(x) = 7 - (x \bmod 7)$.

Problem 2

In this problem you will practice insertion and deletion in binary heaps (default min heap).

- A Show how to insert 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13, and 2 into an initially empty binary heap. Insert each value, one at a time (not with `buildHeap`), and show each of the 15 steps as separate trees (pictorially with nodes and edges).
- B Show the results of two consecutive **deleteMin** operations on the heap above (show each).

Problem 3

(Adapted from Weiss 6.32)

Merge these two binomial queues:

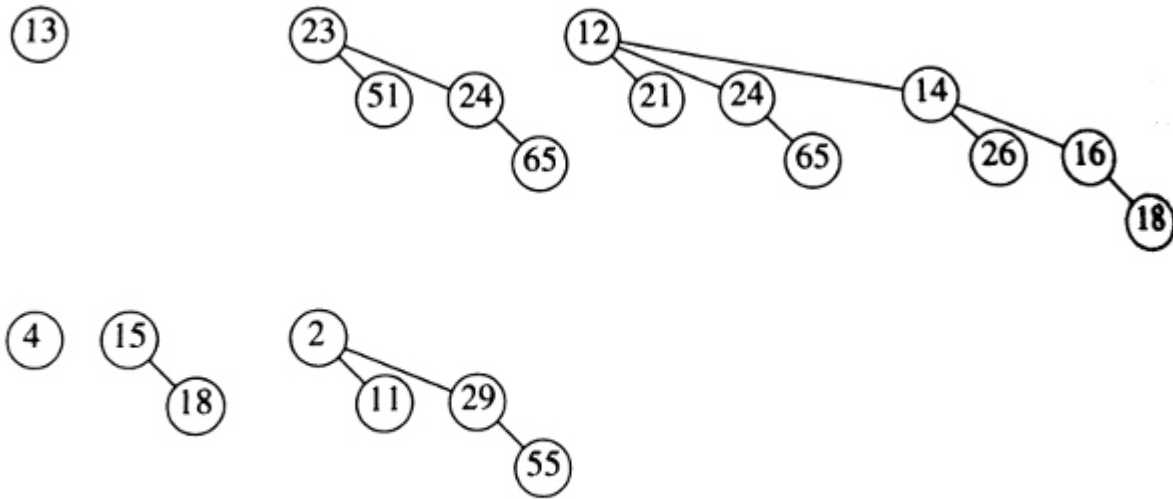


Figure 6.59

Problem 4

(Adapted from Weiss 8.1)

Show the results of the following sequence of instructions:

`union(1,2)`, `union(3,4)`, `union(3,5)`, `union(1,7)`,
`union(3,6)`, `union(8,9)`, `union(1,8)`, `union(3,10)`,
`union(3,11)`, `union(3,12)`, `union(3,13)`, `union(14,15)`,
`union(16,0)`, `union(14,16)`, `union(1,3)`, `union(1,14)`

when unions are:

- A Performed arbitrarily.
- B Performed by height.
- C Performed by size.