Summer Final
Solutions to last three problems

Bryce Boe

CS24, Fall 2013

Problem 11

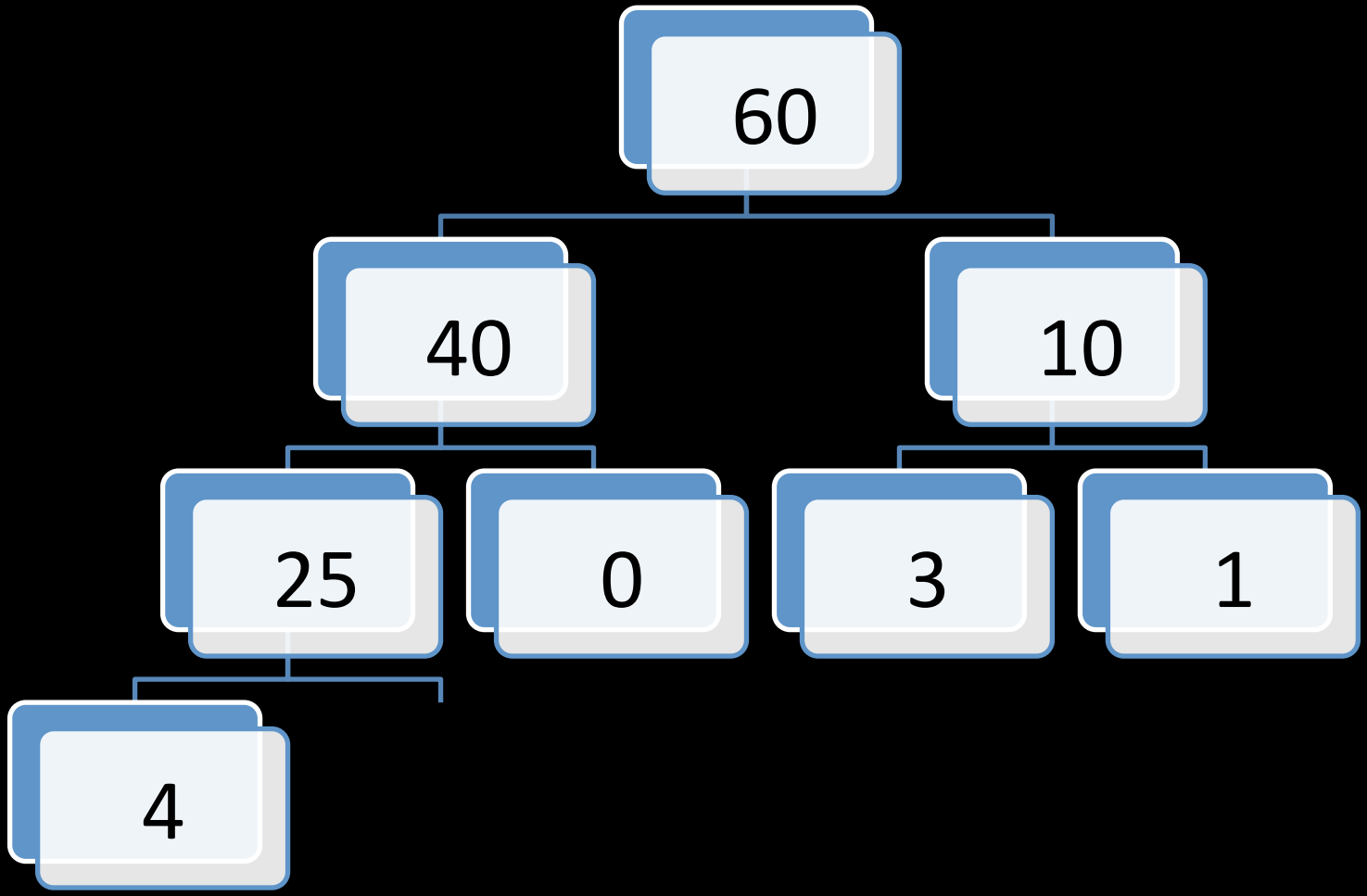
Draw the contents of the array that represents the following **max-heap** after calling **dequeue** 3 times. The following are the initial contents of the array.

60 40 10 25 0 3 1 4

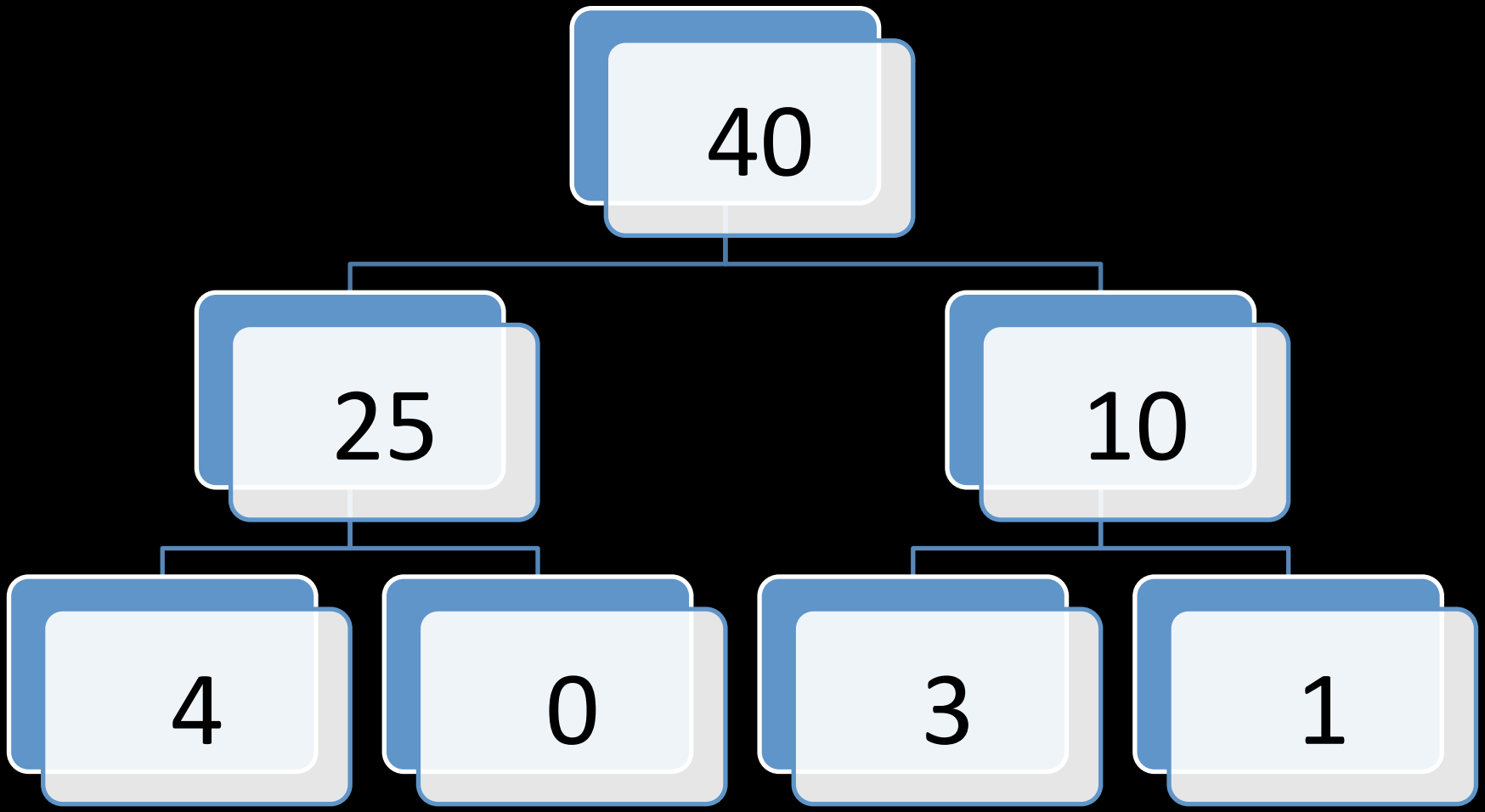
Problem 11: Suggestions

- Convert the array into a tree representation
  - No required, but makes it more likely for you to receive partial credit if you make a mistake
- Show the resulting tree after each removal
- Convert the final tree back into the array form

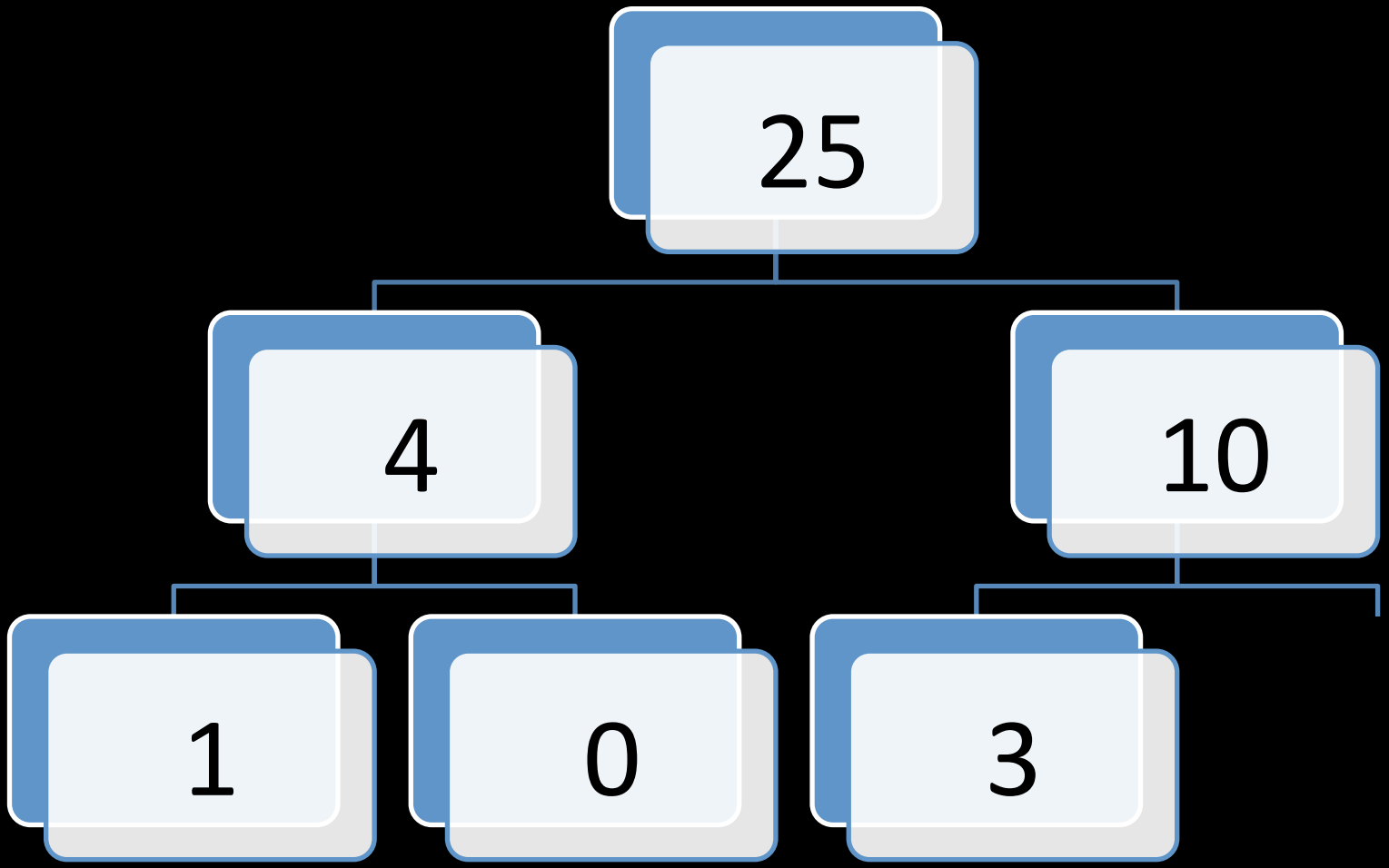
Problem 11: Initial Heap



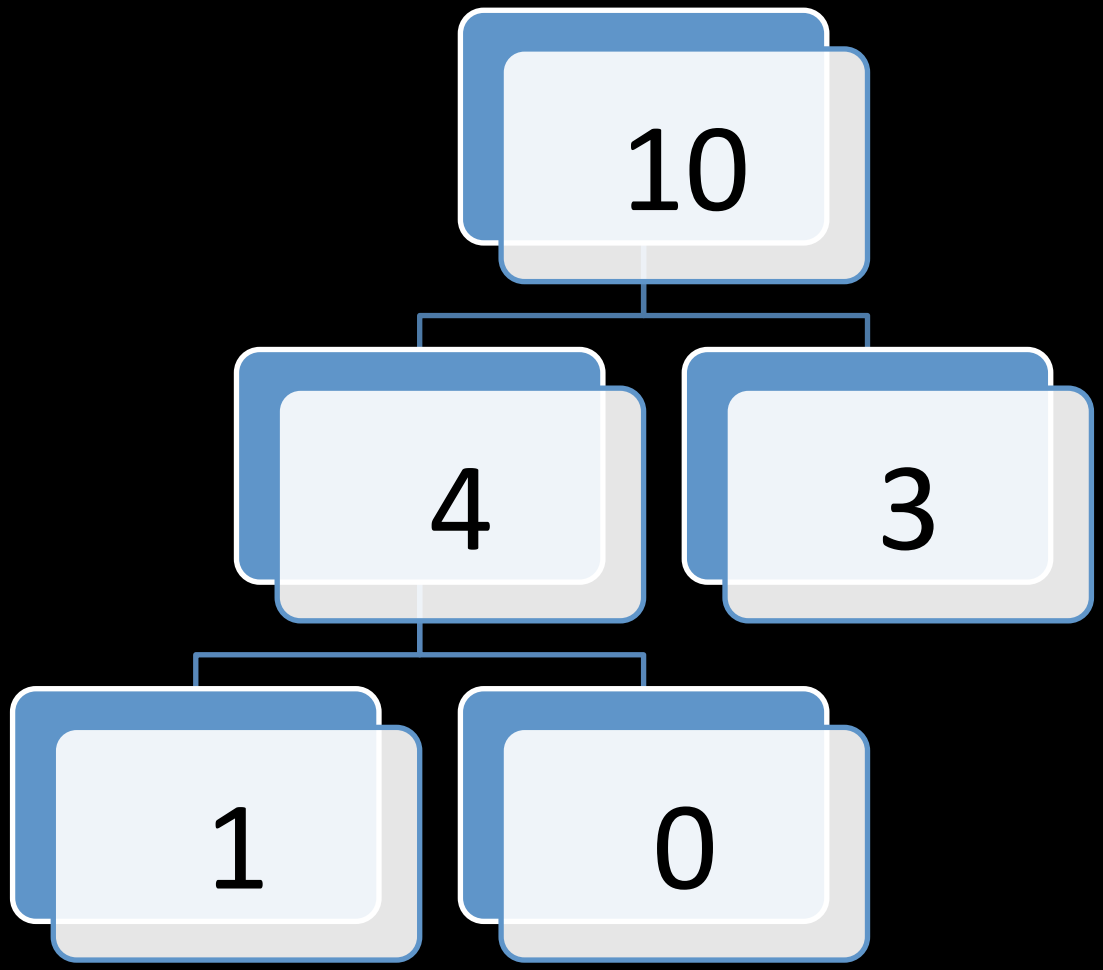
Problem 11: First Dequeue



Problem 11: Second Dequeue



Problem 11: Third Dequeue



Problem 11: Solution

Problem 12

Draw the contents of a **hash table** of size 8 with a linear probing constant of 3 after inserting the following items. Hash function: h(x) = x % 8

7 2 15 5 12 4

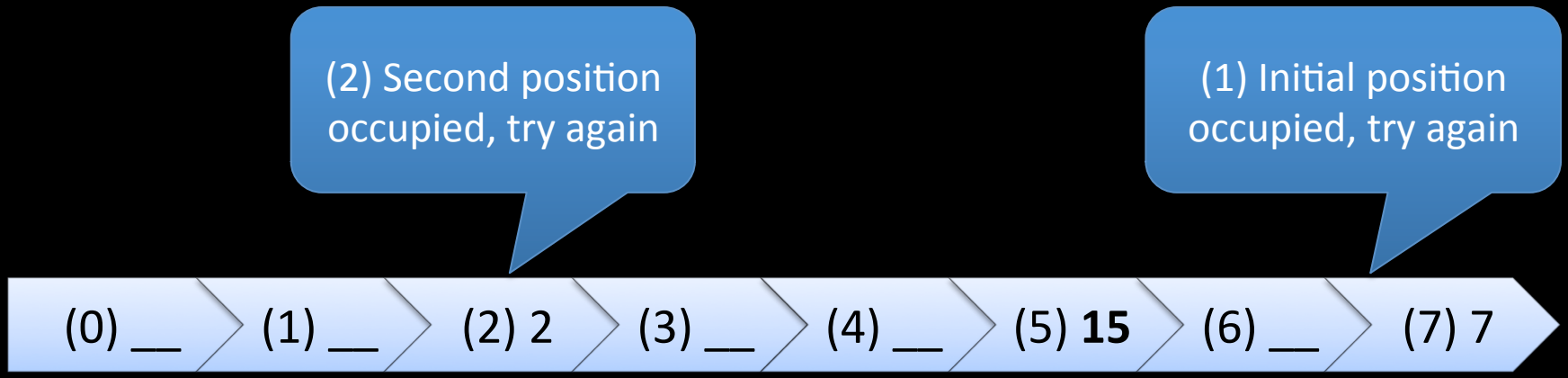
Problem 12: Suggestions

- Again it might be useful to show the complete contents after each insertion in the event you make a mistake.

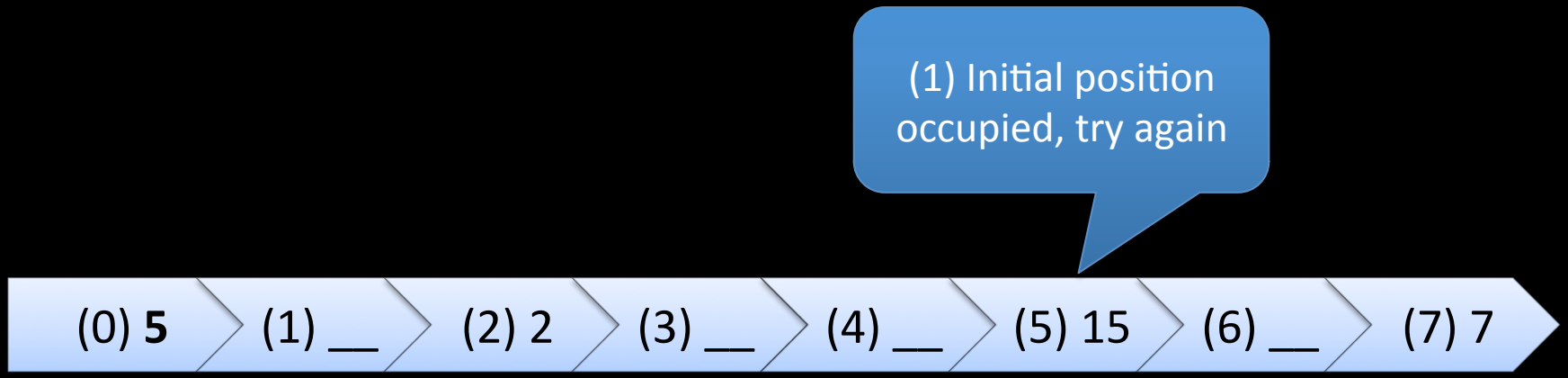
Problem 12: Insert 7

Problem 12: Insert 2

Problem 12: Insert 15

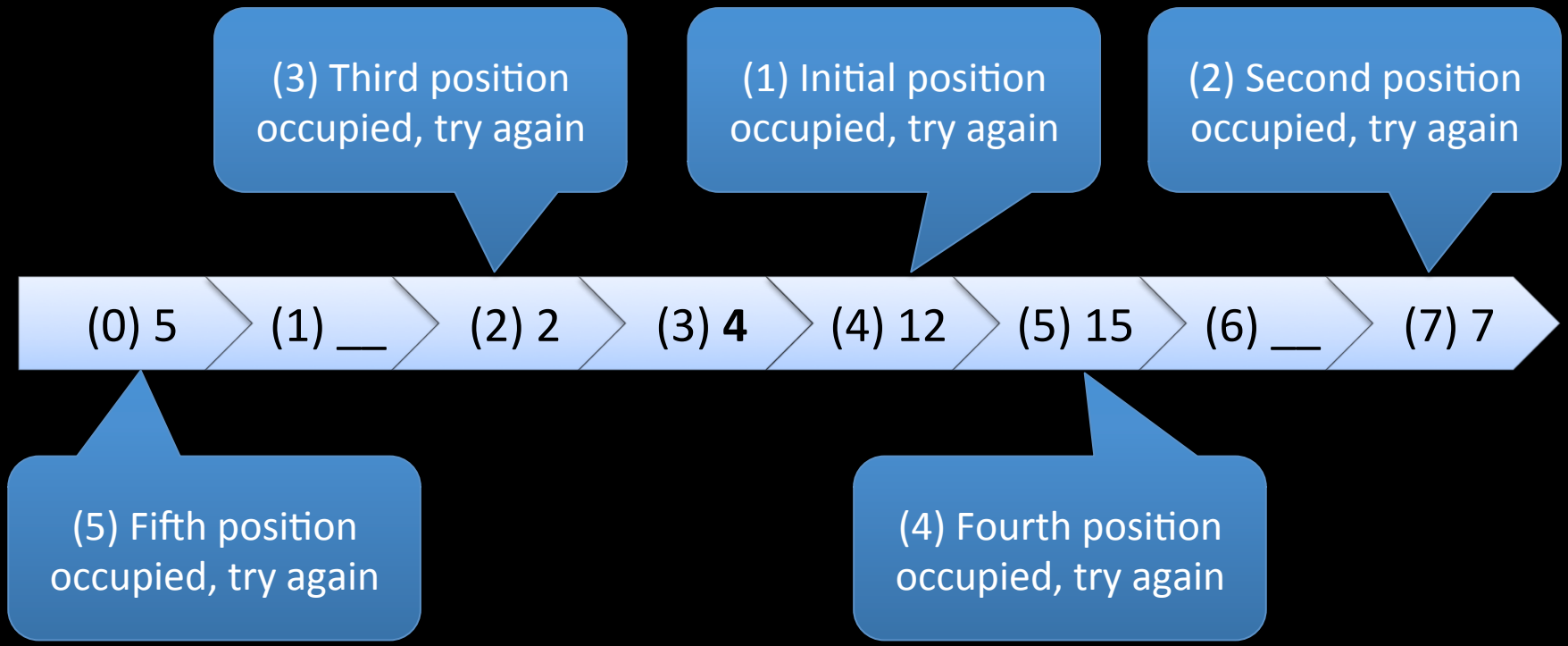


Problem 12: Insert 5



Problem 12: Insert 12

Problem 12: Insert 4



Problem 12: Solution

Problem 13

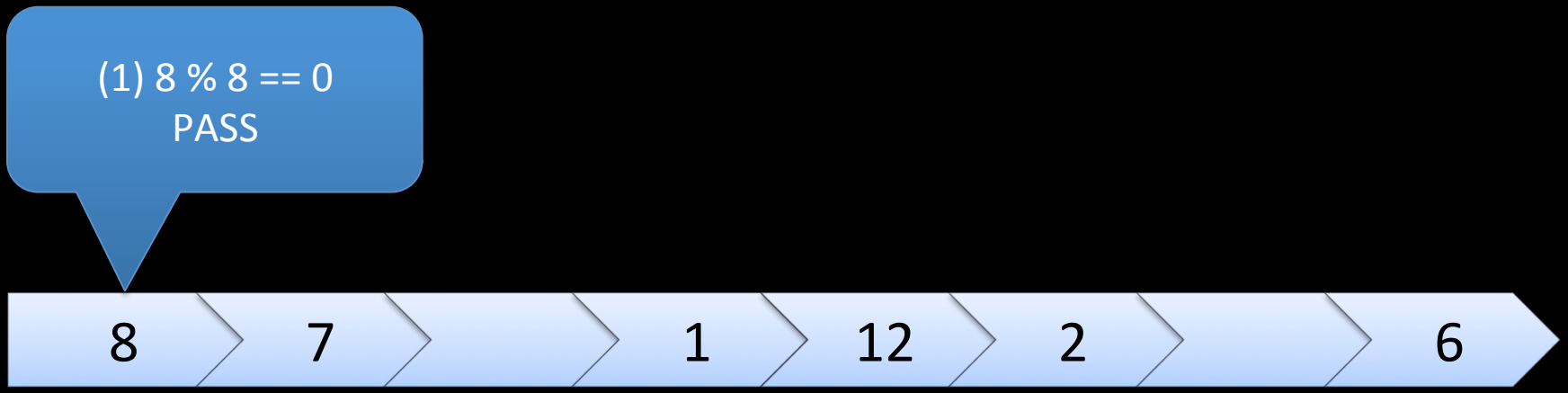
Assume we have a poorly implemented **hash table** of size 8 with a linear probing constant of 1 that does not properly record deletions. Beginning with the following filled hash table, which elements (numbers) are no longer *accessible* after removing both 10 and 14? Hash function: h(x) = x % 8

Problem 13: Suggestions

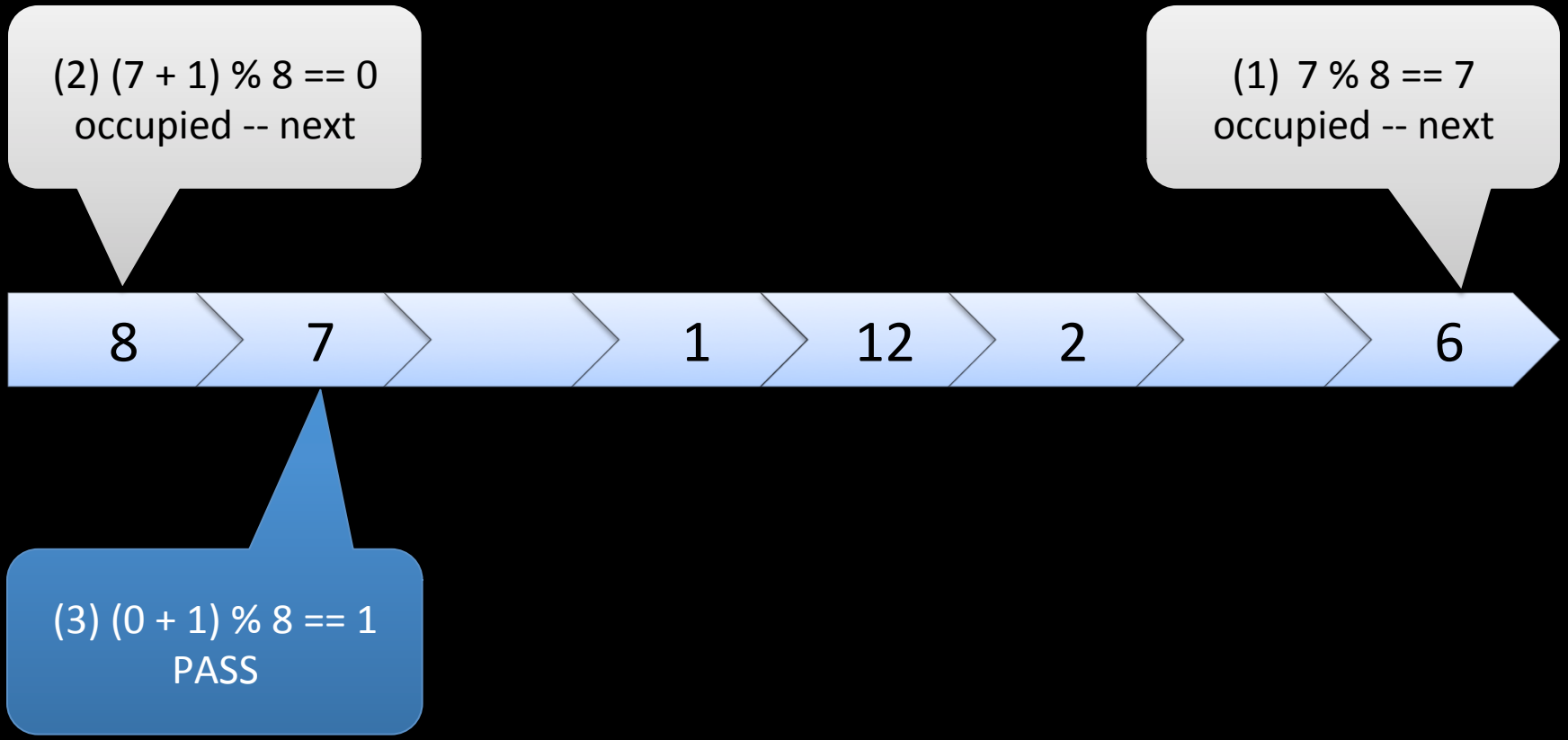
- Remove elements 10 and 14
- For each element test if it's reachable

Problem 13: Remove elements

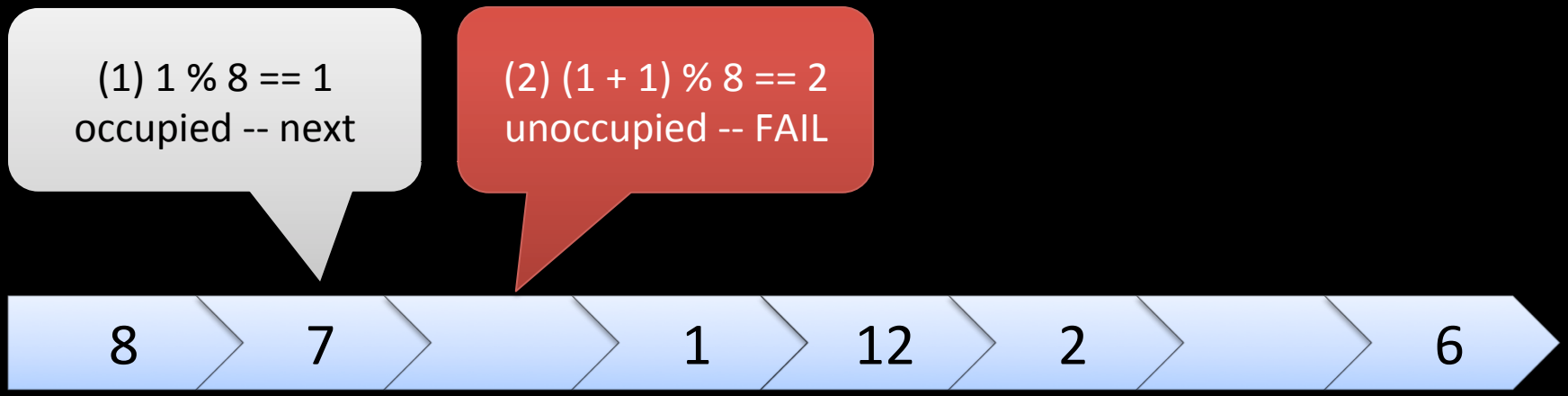
Problem 13: contains(8)?



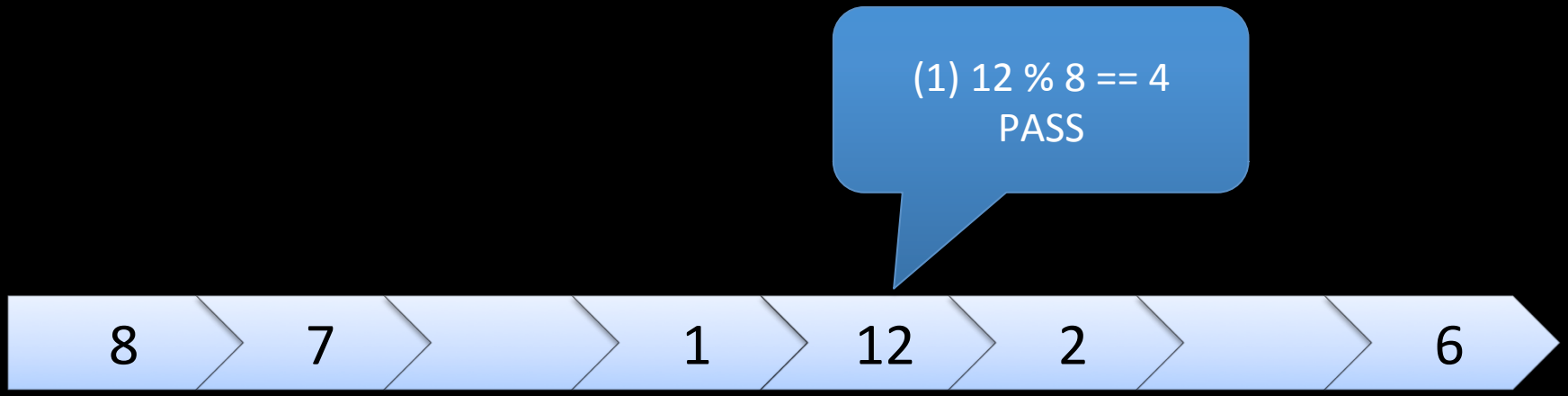
Problem 13: contains(7)?



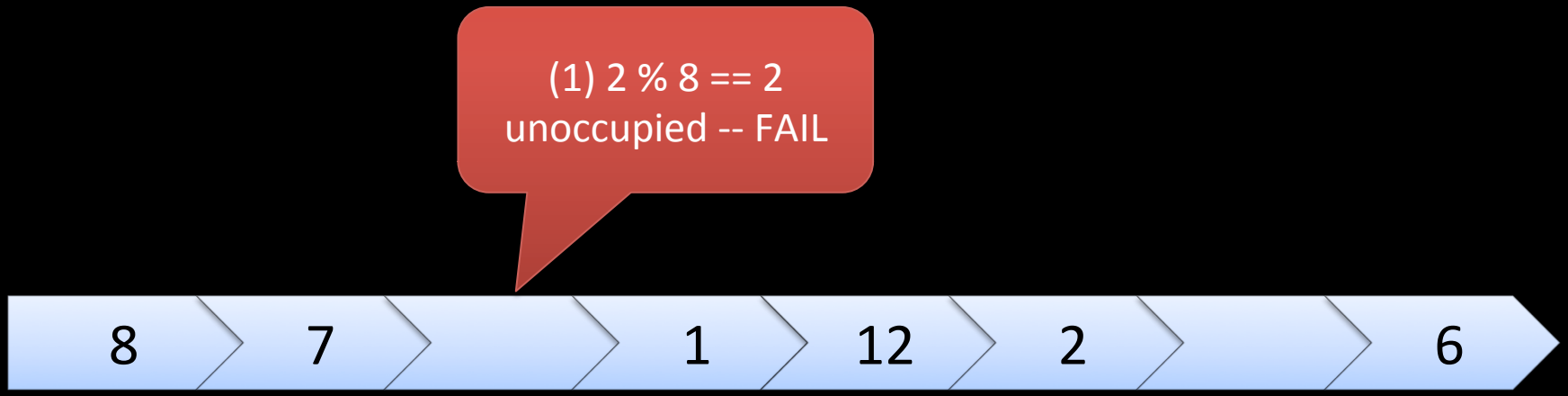
Problem 13: contains(1)?



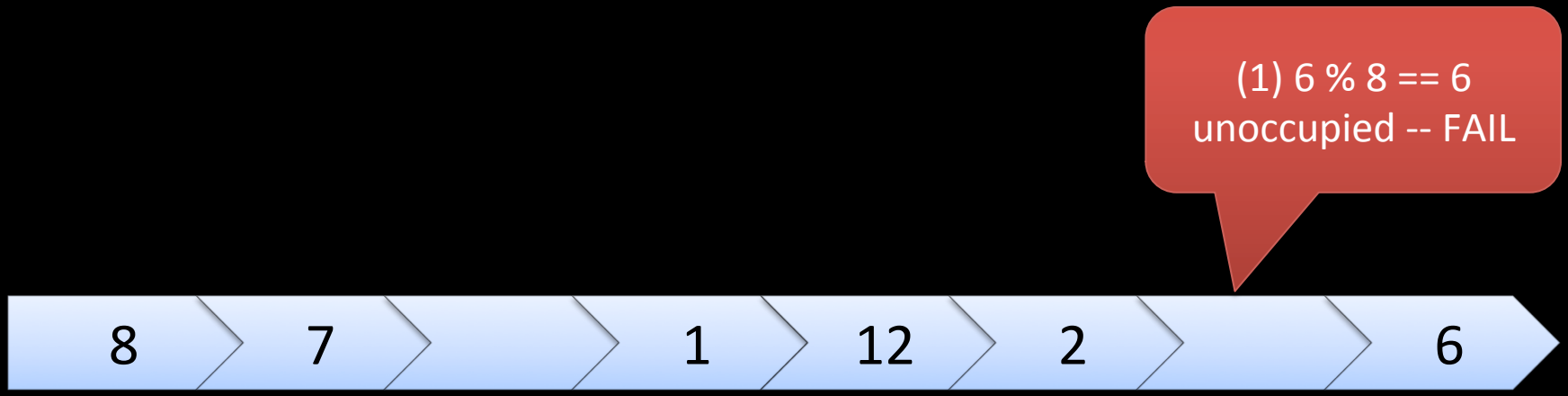
Problem 13: contains(12)?



Problem 13: contains(2)?



Problem 13: contains(6)?



Problem 13: Solution

- Items 1, 2, and 6 are no longer reachble