Quiz Submissions - Maps and Sets Homework Quiz

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Attempt 1

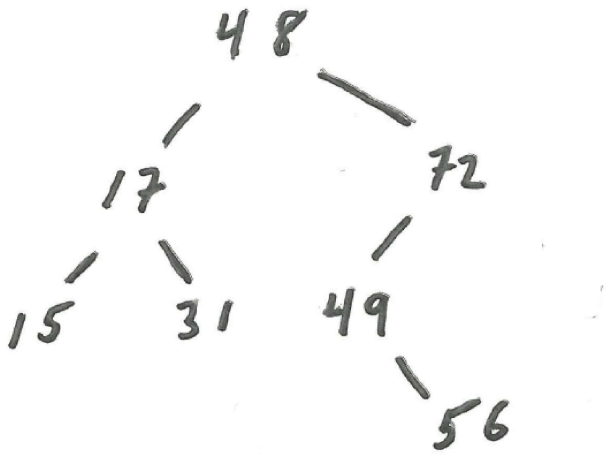
Written: Apr 12, 2022 11:34 PM - Apr 13, 2022 1:13 AM

Submission View

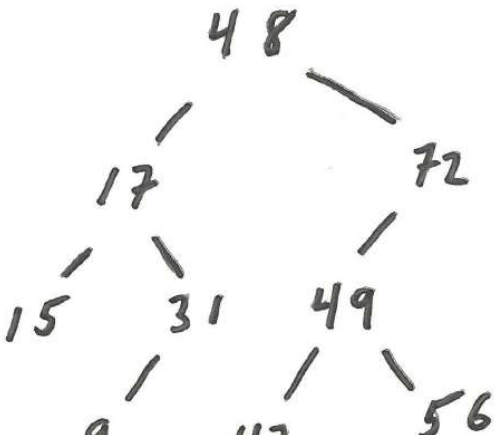
Your quiz has been submitted successfully.

Question 1 **3 / 3 points**

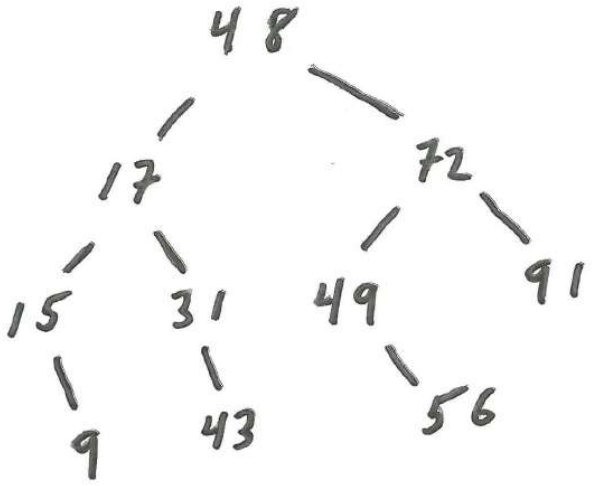
Starting with this (unbalanced) BST:

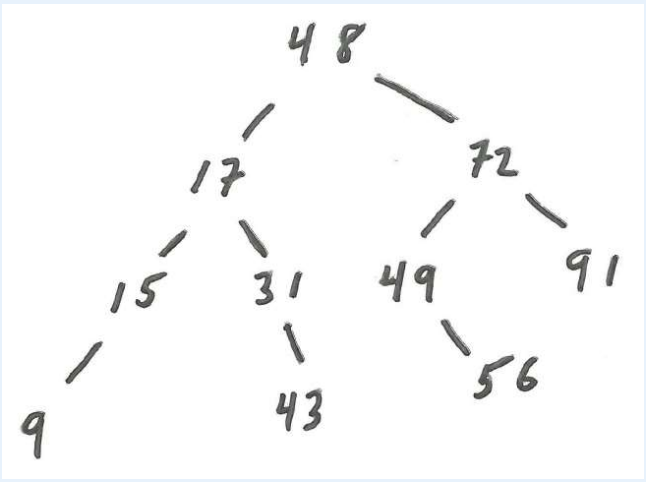


If you add the keys 9, 91, and 43 (in that order), which of these trees will be the result?




7
43
91


48
17
72
15
31
49
91
9
43
56


48
17
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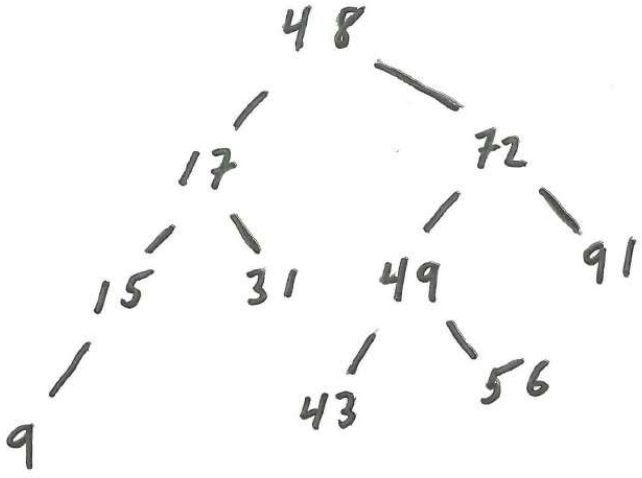
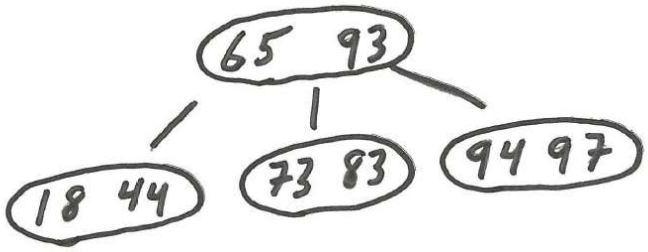
43
56

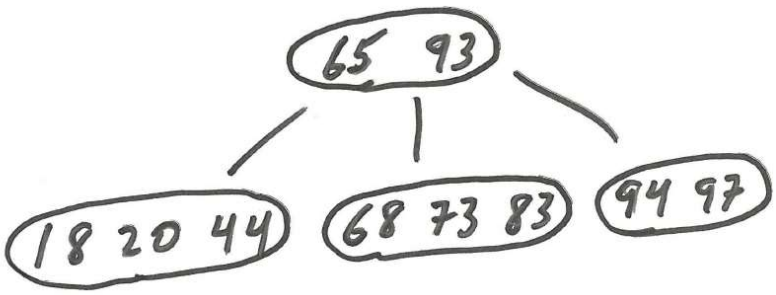

48
17
72
15
31
49
91
9
43
56

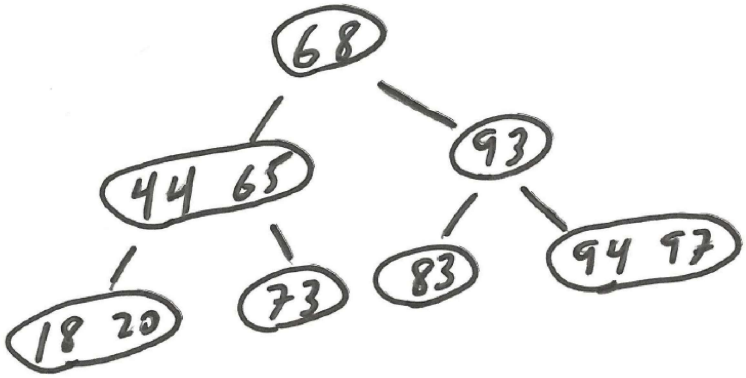
Question 2 **3 / 3 points**

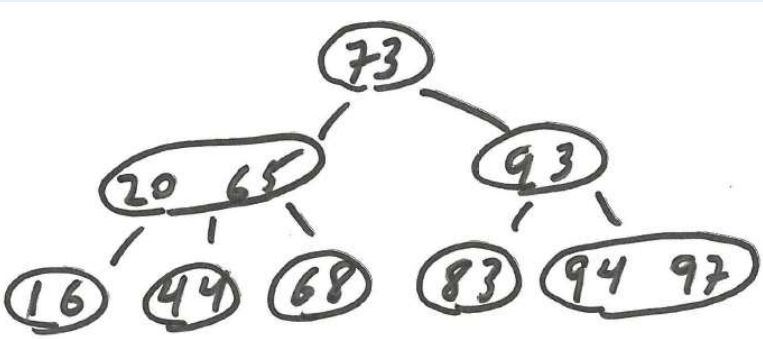
Starting with this 2-3 tree:

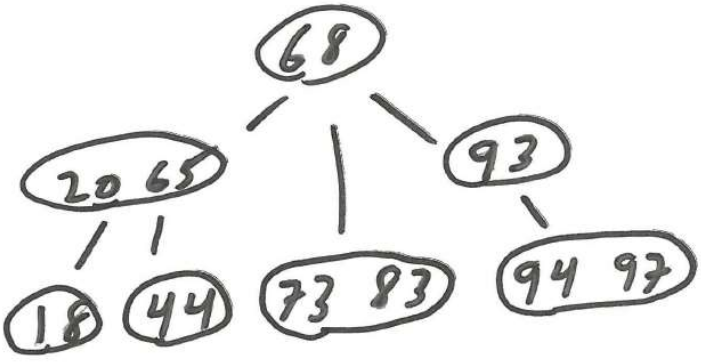


If you add the keys 68 and 20 (in that order), which of these trees will be the result?



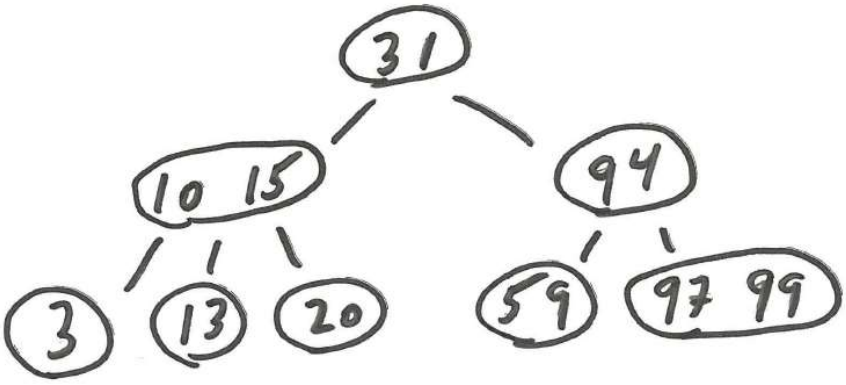


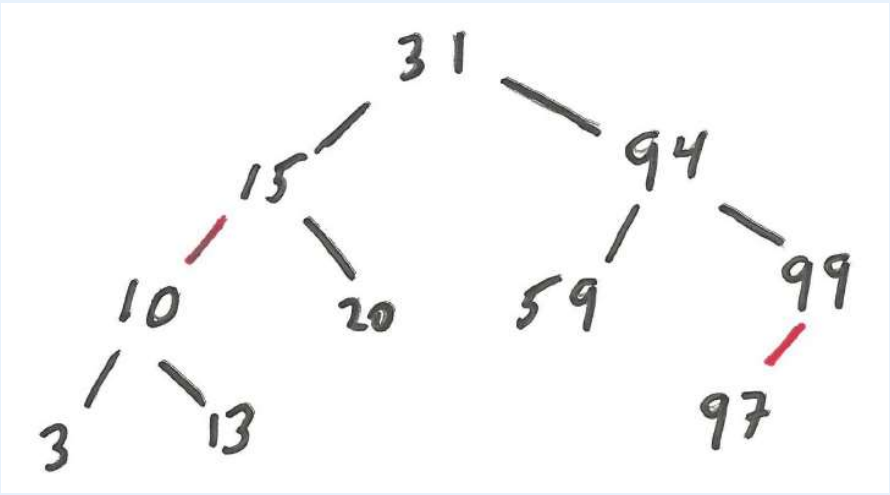


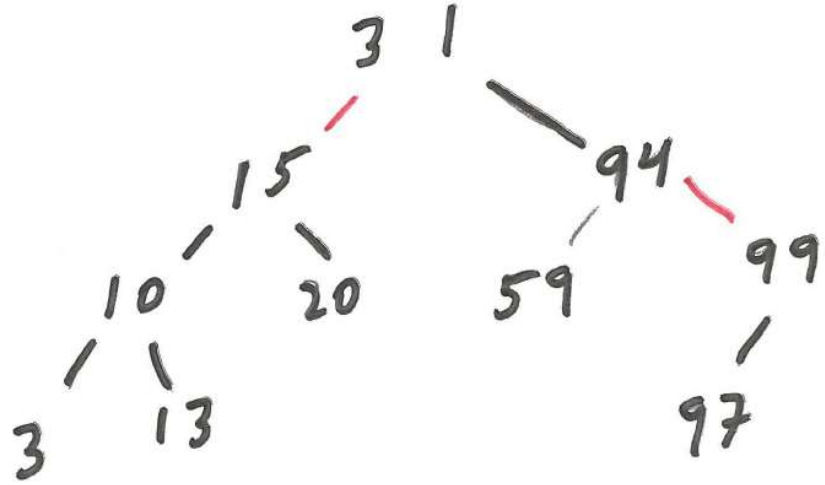


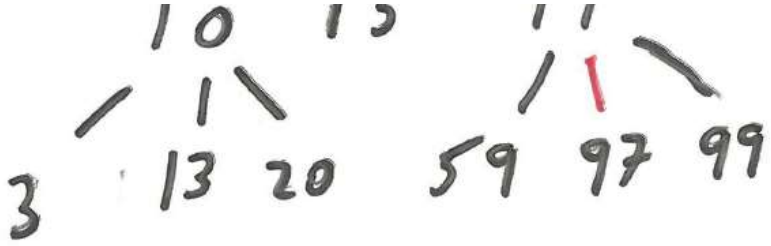
Question 3 **3 / 3 points**

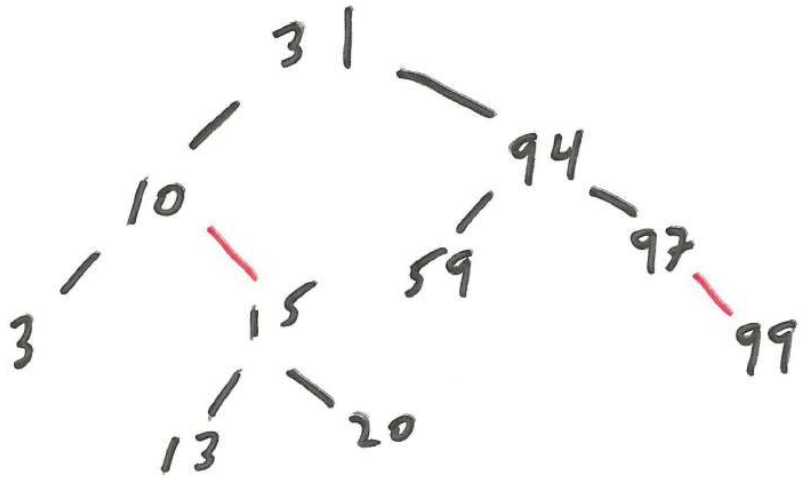
What is the corresponding left-leaning red-black tree for this 2-3 tree:











Question 4 — 2 / 2 points

What will be the output of this program?

```
public static void main(String[] args) {
    TreeMap<String,Integer> words = new TreeMap<>();
    words.put("I", 1);
    words.put("scream", 2);
    words.put("you", 3);
    words.put("scream", 4);
    words.put("we all", 5);
    words.put("scream", 6);
    words.put("for", 7);
    words.put("ice cream", 8);

    System.out.println(words.size());
}
```

- ○ 8
- ◉ 6
- ○ 10

Question 5 **3 / 3 points**

What will be the output of this program?

```
public static void main(String[] args) {
    TreeMap<String,Integer> words = new TreeMap<>();
    words.put("I", 1);
    words.put("scream", 2);
    words.put("you", 3);
    words.put("scream", 4);
    words.put("we all", 5);
    words.put("scream", 6);
    words.put("for", 7);
    words.put("ice cream", 8);

    System.out.println(words.get("scream"));

}
```

- ○ 3
- ○ 2
- ◉ 6
- ○ 2 4 6

Question 6 **2 / 2 points**

What will be the output of this program?

```
public static void main(String[] args) {
    TreeMap<String,Integer> words = new TreeMap<>();
    words.put("I", 1);
    words.put("scream", 2);
    words.put("you", 3);
    words.put("scream", 4);
    words.put("we all", 5);
    words.put("scream", 6);
    words.put("for", 7);
    words.put("ice cream", 8);

    System.out.println(words.containsKey("ice"));

}
```

- true
- 8
- false

Question 7 **2 / 2 points**

What will be the output of this program? (The keySet() method returns an iterable list of the keys in the TreeMap.)

```
public static void main(String[] args) {
    TreeMap<String,Integer> words = new TreeMap<>();
    words.put("I", 1);
    words.put("scream", 2);
    words.put("you", 3);
    words.put("scream", 4);
    words.put("we all", 5);
    words.put("scream", 6);
    words.put("for", 7);
    words.put("ice cream", 8);

    for (String key : words.keySet())
        System.out.printf("'%s' ", key);

}
```

- (●) 'I' 'for' 'ice cream' 'scream' 'we all' 'you'
- ( ) 'I' 'scream' 'you' 'we all' 'for' 'ice cream'
- ( ) 'I' 'scream' 'you' 'scream' 'we all' 'scream' 'for' 'ice cream'
- ( ) 'I' 'for' 'ice cream' 'scream' 'scream' 'scream' 'we all' 'you'

Question 8 **7 / 7 points**

Take the first ten unique letters of your name, and draw an unbalanced binary search by starting with an empty tree, and inserting those ten letters into the tree, in the order in which they appear in your name. For example, I would use the letters RICHADWELS in that order.

You may submit your drawing as a Word document, a PDF, or a picture. Above the drawing of your tree, please list the letters you added, in order. See the quiz description for a sample answer that uses my name.

If your name does not contain 10 unique letters, fill in the remaining letters from this list:

Z J Q X K V B P G W Y F M C U L D H R S N I O A T E

In other words, if you need 3 more letters, you would use Z, J, and Q.

These same 10 letters will also be used for the next two questions on this quiz.

- No text entered -

Apr 12, 23 55.pdf (276.1 KB)

Question 9 **1 / 7 points**

Take the same ten unique letters you used for the previous question, and draw a 2-3 tree by starting with an empty tree, and inserting those ten letters into the tree.

You may submit your drawing as a Word document, a PDF, or a picture.

My ability to give partial credit for a wrong answer will depend on the number of intermediate steps you show in the creation of the tree.

- No text entered -

Apr 13, 00 12.pdf (314.12 KB)

Hide Feedback

You forgot that for a 2-3 tree you always add a new entry to a leaf node. This caused a lot of your intermediate trees to be very unbalanced.

Also, remember that a node with 1 key (a 2 node) has 2 children, and a node with 2 keys (a 3-node) has 3 children.

Question 10 — 1 / 2 points

Draw the left-leaning red-black tree that corresponds to your 2-3 tree from the previous question.

You may submit your drawing as a Word document, a PDF, or a picture.

- No text entered -

Apr 13, 00_21.pdf (286.93 KB)

View Feedback

Question 11 — 2 / 7 points

Given the following keys and their hash codes:

four	3149094
score	109264530
and	96727
seven	109330445
years	114851798
ago	96521

Add these keys to a seven-element hash table using separate chaining to resolve collisions. Use the division method to compute the array indices from the hash codes. In each answer blank, write the list of keys which end up in the list for the corresponding table entry, starting with index 0 in the first blank, index 1 in the next, etc. If two keys end up in the same index, separate the words with one space. If no keys hash to a given index, enter "null"" (without the quotes) for that answer blank.

For example, if "four" and "score" both hash to 1, then blank #2 would contain

four score

Note that the blank numbers and the hash table indices are off by one; e.g. the keys (if any) which go in the list for index 3 are in blank #4.

Answer for blank # 1: ago

Answer for blank # 2: and

Answer for blank # 3: four

Answer for blank # 4: score

Answer for blank # 5: seven

Answer for blank # 6: years

Answer for blank # 7: null

Question 12 **2 / 2 points**

What is the load factor for the hash table in the previous question? Express your answer as a fraction, e.g. 11/7.

Answer: 6/7

Question 13 **5 / 11 points**

Given the following keys and their hash codes:

when	3648314
in	3365
the	114801
course	792911899
of	3543
human	99639597
events	856154393

Add these keys to a 11-element hash table using linear probing to resolve collisions. Use the division method to compute the array indices from the hash codes. In each answer blank, write the key (if any) which ends up at the corresponding table entry, starting with index 0 in the first blank, index 1 in the next, etc. If no keys hash to a given index, enter "null"" (without the quotes) for that answer blank.

Note that the blank numbers and the hash table indices are off by one; e.g. the key (if any) which goes in the list for index 3 are in blank #4.

NOTE: Lots of collisions here!

Answer for blank # 1: in

Answer for blank # 2: human events

Answer for blank # 3: of

Answer for blank # 4: course

Answer for blank # 5: null

Answer for blank # 6: null

Answer for blank # 7: the

Answer for blank # 8: null

Answer for blank # 9: when

Answer for blank # 10: null

Answer for blank # 11: null

Question 14 **2 / 2 points**

What is the load factor for the hash table in the previous question? Express your answer as a fraction, e.g. 5/4.

Answer: 7/11

Question 15 **4 / 4 points**

Using the formulas on page 473 of the text, if the load factor for a hash table is limited to 3/5, what are the expected numbers of probes for a search hit and a search miss? Enter the average probes for a search hit in the first blank, and the average probes for a search miss in the second, expressed as a fraction (e.g. 3/2).

Answer for blank # 1: 7/4

Answer for blank # 2: 29/8

Attempt Score: 42 / 60 - 70 %

Overall Grade (highest attempt): 42 / 60 - 70 %

Done