Data Structures

This is a preview of the draft version of the quiz

Questions to test your knowledge and understanding of basic data structures. For each question only the best solution will be graded as correct, and as usual grading is case sensitive. Note that you should be able to show your work to solve all of these problems, you should not just ask the internet for the answer. If you need to refresh your memory on any topics, see the following for links to resources: Data Structures and Algorithms (https://cs.indstate.edu/wiki/index.php/Algorithms_and_Data_Structures_-_Getting_Started).

Quiz Type  Practice Quiz
Points  18
Shuffle Answers  Yes
Time Limit  No Time Limit
Multiple Attempts  No
View Responses  Always
Show Correct Answers  Immediately
One Question at a Time  No
Require Respondus LockDown  No
Browser  
Required to View Quiz Results  No
Webcam Required  No

Due  For  Available from  Until
-  Everyone  -  -

https://indstate.instructure.com/courses/12565/quizzes/239028?preview=1
<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Answers</th>
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<tbody>
<tr>
<td>Question 1</td>
<td>31, 50, 29, 1</td>
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<tr>
<td>Question 2</td>
<td>12, 11, 48, 46, 30, 24, 46, 35</td>
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<td>Question 3</td>
<td>0 / 1 pts</td>
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<tr>
<td>Given the following sequence of operations to a stack, what are the final contents of the stack?</td>
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<tr>
<td>[('push', 19), ('push', 29), ('push', 18), ('push', 42), ('pop',), ('push', 50), ('push', 21), ('pop',), ('push', 42), ('push', 28)]</td>
<td></td>
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<tr>
<td>Specify your answer by separating the values by commas and with the left being the “bottom”, so that ('push', 3), ('push', 1), ('push', 10) would have correct answer: 3, 1, 10.</td>
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<tr>
<td>correct Answers</td>
<td>19, 29, 18, 50, 42, 28</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Question 4</th>
<th>0 / 1 pts</th>
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<tbody>
<tr>
<td>Given the following sequence of operations to a queue, what are the final contents of the queue?</td>
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<tr>
<td>[('enqueue', 9), ('enqueue', 13), ('enqueue', 29), ('dequeue',), ('enqueue', 11), ('enqueue', 4), ('enqueue', 36), ('enqueue', 49), ('enqueue', 37), ('dequeue',)]</td>
<td></td>
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<tr>
<td>Specify your answer by separating the values by commas and with the left being the “front”, so that ('enqueue', 3), ('enqueue', 1), ('enqueue', 10), ('dequeueuq') would have correct answer: 1, 10.</td>
<td></td>
</tr>
<tr>
<td>correct Answers</td>
<td>29, 11, 4, 36, 49, 37</td>
</tr>
</tbody>
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<tr>
<th>Question 5</th>
<th>0 / 1 pts</th>
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Given the following sequence of operations to a queue, what are the final contents of the queue?
[('enqueue', 27), ('enqueue', 10), ('enqueue', 48), ('enqueue', 41), ('dequeue',), ('dequeue',), ('enqueue', 1), ('dequeue',), ('enqueue', 27), ('dequeue',)]

Specify your answer by separating the values by commas and with the left being the “front”, so that ('enqueue', 3), ('enqueue', 1), ('enqueue', 10), ('dequeue') would have correct answer: 1, 10.

Correct Answers
1, 27

Question 6

Given the following sequence of operations to a queue, what are the final contents of the queue?
[('enqueue', 33), ('enqueue', 24), ('enqueue', 28), ('enqueue', 37), ('dequeue'), ('enqueue', 34), ('dequeue'), ('dequeue'), ('enqueue', 33), ('enqueue', 41)]

Specify your answer by separating the values by commas and with the left being the “front”, so that ('enqueue', 3), ('enqueue', 1), ('enqueue', 10), ('dequeue') would have correct answer: 1, 10.

Correct Answers
37, 34, 33, 41

Question 7
Given the following sequence of operations to a list, what are the final contents of the list?

[(‘insert’, 0, 50), (‘insert’, 1, 36), (‘insert’, 0, 36), (‘insert’, 3, 32), (‘insert’, 1, 19), (‘insert’, 4, 8), (‘insert’, 6, 24), (‘delete’, 5), (‘delete’, 2), (‘delete’, 0)]

Specify your answer by separating the values by commas and with the left being the index 0 (and the “head”), so that (‘insert’, 5, 0), (‘insert’, 10, 1), (‘insert’, 20, 0) would have correct answer: 20, 5, 10.

Correct Answers

19, 36, 8, 24

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Given the following sequence of operations to a list, what are the final contents of the list?

[(‘insert’, 0, 33), (‘insert’, 1, 50), (‘insert’, 2, 25), (‘delete’, 0), (‘insert’, 1, 32), (‘delete’, 0), (‘insert’, 1, 31), (‘delete’, 1), (‘insert’, 2, 43), (‘insert’, 0, 44)]

Specify your answer by separating the values by commas and with the left being the index 0 (and the “head”), so that (‘insert’, 5, 0), (‘insert’, 10, 1), (‘insert’, 20, 0) would have correct answer: 20, 5, 10.

Correct Answers

44, 32, 25, 43

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Given the following sequence of operations to a list, what are the final contents of the list?
Given the following sequence of operations to a binary search tree, what are the final contents of the tree?

([('insert', 0, 16), ('insert', 1, 5), ('insert', 0, 2), ('insert', 2, 10), ('delete', 2), ('delete', 0), ('insert', 2, 48), ('insert', 3, 23), ('delete', 0), ('delete', 1)]

Specify your answer by separating the values by commas and with the left being the index 0 (and the “head”), so that ('insert', 5, 0), ('insert', 10, 1), ('insert', 20, 0) would have correct answer: 20, 5, 10.

Question 10

Given the following sequence of operations to a binary search tree, what are the final contents of the tree?


Specify your answer by separating the values by giving the contents of the tree by level, so that a full BST with 3 levels containing the numbers 1 to 7 would be listed like this: 4; 2, 6; 1, 3, 5, 7. For the delete operation, you should do the following: if the node is a leaf just remove it, else if the node only has one child then redirect its parent to its child, else replace the node’s value with the next larger value in the tree (its left-most descendent on its right)

Question 11
Given the following sequence of operations to a binary search tree, what are the final contents of the tree?

$[(\text{`add'}, 30), (\text{`add'}, 1), (\text{`add'}, 25), (\text{`add'}, 44), (\text{`add'}, 8), (\text{`add'}, 16), (\text{`add'}, 17), (\text{`add'}, 0), (\text{`delete'}, 30), (\text{`delete'}, 25)]$

Specify your answer by separating the values by giving the contents of the tree by level, so that a full BST with 3 levels containing the numbers 1 to 7 would be listed like this: 4; 2, 6; 1, 3, 5, 7. For the delete operation, you should do the following: if the node is a leaf just remove it, else if the node only has one child then redirect its parent to its child, else replace the node’s value with the next larger value in the tree (its left-most descendent on its right)

44; 1; 0, 8; 16; 17
Given the following sequence of operations to a hash table with linear probing, what are the final contents of the table?

[('add', 14), ('add', 11), ('add', 16), ('add', 1), ('add', 15), ('delete', 14), ('add', 6), ('delete', 16), ('add', 16), ('add', 8)]

Give the contents of the array starting from index 0 and using “-” for empty cells. For delete, when an item is deleted put “del” in that cell (inserts/adds can put into an empty or “del” spot). So the answer might look like this: 5, 7, 3, -, 4, del

Use an initial hash table size of 10, hash function \( h(\text{value}, \text{table}\_\text{size}) = \text{value} \times 3 \mod \text{table}\_\text{size} \), and only grow the table if it is completely full.

Correct Answers

- 10, 20, del, -, -, 5, 15, del, 16, 6
### Question 15

Given the following sequence of operations to a hash table with linear probing, what are the final contents of the table?

\[
[('add', 12), ('add', 3), ('add', 20), ('add', 4), ('delete', 12), ('add', 6),
('delete', 20), ('add', 0), ('delete', 4), ('add', 15)]
\]

Give the contents of the array starting from index 0 and using "-" for empty cells. For delete, when an item is deleted put "del" in that cell (inserts/adds can put into an empty or "del" spot). So the answer might look like this: 5, 7, 3, -, 4, del

Use an initial hash table size of 10, hash function \(h(value, table\_size) = value \times 3 \mod table\_size\), and only grow the table if it is completely full.

**Correct Answers**

| 0, -, del, -, -, 15, del, -, 6, 3 |

### Question 16

Given the following sequence of operations to a max heap, what are the final contents of the heap?

\[
[('insert', 1), ('insert', 49), ('insert', 38), ('insert', 47), ('insert', 48), ('remove max'),
('insert', 18), ('remove max'), ('remove max'), ('insert', 25)]
\]

Specify your answer by giving the heap in order from top to bottom and left to right, separated by commas. A heap with 3 levels containing the numbers 1 to 7 would be listed like this: 7, 5, 6, 1, 2, 4, 3 (assuming that is what the heap ended up looking like after the operations).

**Correct Answers**

| 38, 25, 1, 18 |
Question 17

Given the following sequence of operations to a max heap, what are the final contents of the heap?
['insert', 11], ['insert', 48], ['insert', 3], ['insert', 12], ['insert', 2], ['insert', 13], ['insert', 27], ['remove max'], ['insert', 50], ['insert', 13]

Specify your answer by giving the heap in order from top to bottom and left to right, separated by commas. A heap with 3 levels containing the numbers 1 to 7 would be listed like this: 7, 5, 6, 1, 2, 4, 3 (assuming that is what the heap ended up looking like after the operations).

Correct Answers

50, 13, 27, 12, 2, 3, 13, 11

Question 18

Given the following sequence of operations to a max heap, what are the final contents of the heap?
['insert', 8], ['insert', 3], ['insert', 25], ['insert', 43], ['remove max'], ['insert', 18], ['insert', 26], ['insert', 38], ['remove max'], ['remove max']

Specify your answer by giving the heap in order from top to bottom and left to right, separated by commas. A heap with 3 levels containing the numbers 1 to 7 would be listed like this: 7, 5, 6, 1, 2, 4, 3 (assuming that is what the heap ended up looking like after the operations).

Correct Answers

25, 18, 8, 3