QUESTION 1 — 1 points — Save Answer

On my machine, a certain $O(n^2)$ sorting algorithm takes one second to sort 1000 random items. Sorting 100,000 random items can be expected to take:

a. 1-2 minutes
b. 10-15 minutes
c. 2-3 hours
d. about one day
e. almost one year

QUESTION 2 — 1 points — Save Answer

Which of the following claims about growth rate are correct:

a. $(2n \log_2 n)^2 \in O(n^2)$
b. $\sqrt{n} \in O(\log_{10} n)$
c. $\log_2 n \in O(1/\sqrt{n})$
d. $3n^3 + n\sqrt{n} \in O(n^3)$
e. $\sqrt{n} \in O(\sqrt[3]{n})$

QUESTION 3 — 1 points — Save Answer

Which of the following claims are correct:

$n^{2n} \in \Theta(n^n)$
$(\log_{10} n)^2 \in \Theta(\log_2 n)$
$\log_{10} n \in \Theta(\log_2 \sqrt{n})$
$(n+2)^2 \in \Theta(n^2)$
$2^{n+1} \in \Theta(2^n)$

QUESTION 4 — 1 points — Save Answer

Which of the following claims are correct:

$\sum_{i=1}^{n} 3^i \in \Theta(3^{n+1})$
$\sum_{i=1}^{n} 3^i \in \Theta(3^{n-1})$
$\sum_{i=1}^{n} 2^i \in \Theta(3^n)$
$\sum_{i=1}^{n} 3^i \in \Theta(3^n)$

QUESTION 5 — 1 points — Save Answer

Order these seven functions, from smallest rate of growth to largest:

- $3^n + n^2 \log n$
- $\left(\frac{5}{2}\right)^n + \left(\frac{7}{3}\right) n^2$
- $1000000\, n$
- $(3n-1)!$
- $n^2 + n^3 \log n$
- $n^3 + n^2 \log n$
- $\left(\frac{7}{3}\right)^n + \left(\frac{5}{2}\right) n^2$

QUESTION 1

One of my books has 589 pages, numbered consecutively. Every page has a page number, the first being 1. How many decimal digits were used to type the 589 page numbers?

a. 1659 b. 1657 c. 1660 d. 1661 e. 1667

QUESTION 2

This function uses a curious mix of iteration and recursion:

```
function F(n)
    if n < 1
        return 1
    t <- 0
    for i <- 0 to n
        for j <- i to n
            t <- t + j
    return t + F(n-1)
```

The number of basic operations (additions and subtractions) performed is:

- a. $\Theta(n)$
- b. $\Theta(n^4)$
- c. $\Theta(n^3)$
- d. $\Theta(n^2 \log n)$
- e. $\Theta(n^2)$

QUESTION 3

In Lecture 5 we discussed the brute-force approach to string search. How many character comparisons will the algorithm make when searching for 'lido' in the string

'supercalifragilisticexpialidocious' ?

33

QUESTION 4

In Lecture 6 we gave a recursive algorithm for solving the Tower of Hanoi puzzle. Assume we have a tower of 24 disks to move, and each move (moving one disk from one peg to another) takes one minute. The total time taken will be:

- a. Approximately 32 years
- b. Approximately six days
- c. Approximately two months
- d. Approximately ten years
- e. Approximately one year

527984880@

QUESTION 5

Consider this instance of the Assignment Problem (introduced in tutorial exercise 22).

	Job 1	Job 2	Job 3	Job 4
Contractor 1	13	16	12	11
Contractor 2	15	17	12	12
Contractor 3	14	14	13	13
Contractor 4	13	10	10	11

Match each contractor to a job so as to minimise the cost.

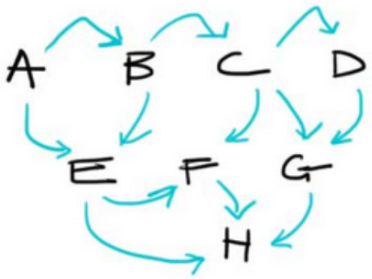
a. ▾ Contractor 1
b. ▾ Contractor 2
c. ▾ Contractor 3
d. ▾ Contractor 4

a. Job 4
b. Job 3
c. Job 1
d. Job 2

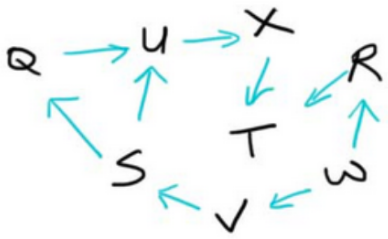
QUESTION 1

1 points

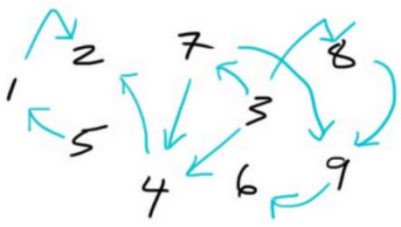
One of the directed graphs below **cannot** be topologically sorted. Click on that graph.



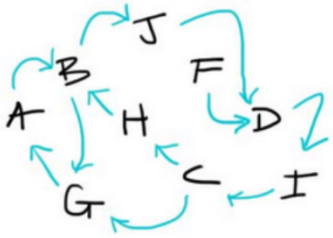
A



B



C



D

Selected Coordinates

Clear

QUESTION 2

1

Consider the dag with set of nodes V = {V1, V2, V3, V4, V5, V6, V7} and set of edges {(V1,V2), (V1,V3), (V1,V4), (V2,V5), (V3,V5), (V3,V6), (V4,V6), (V5,V7), (V6,V7)}. Which of the following node sequences are topologically sorted?

- a. V1, V3, V4, V5, V2, V6, V7
- b. V1, V4, V3, V2, V6, V5, V7
- c. V1, V2, V5, V3, V4, V6, V7
- d. V1, V3, V2, V6, V4, V5, V7
- e. V1, V3, V4, V6, V2, V5, V7

QUESTION 3

Find the time complexity for the following function (the basic operation is the innermost loop body's assignment).

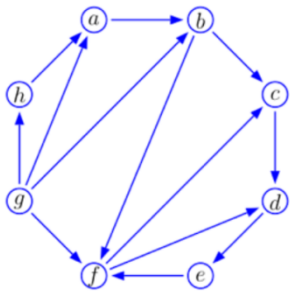
```
function f(n)
  r ← 0
  m ← 1
  for i ← 1 to n do
    m ← 3 × m
    for j ← 1 to m do
      r ← r + j
  return r
```

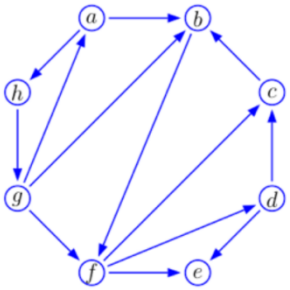
- a. $\Theta(n^2)$
- b. $\Theta(n^3)$
- c. $\Theta(n)$
- d. $\Theta(n \log n)$
- e. $\Theta(3^n)$

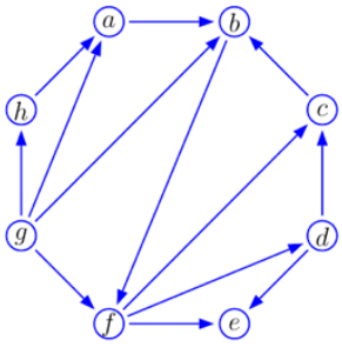
QUESTION 4

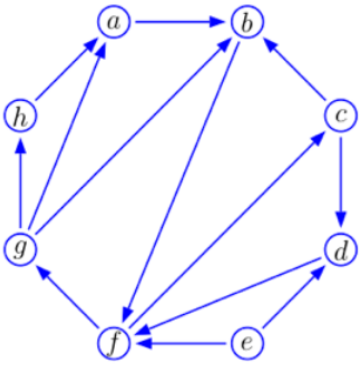
1

For one of these four directed graphs, the 8 nodes will be visited in the same order by BFS and DFS (given the usual assumption that ties are resolved by using alphabetical order). Click on that graph.









Selected Coordinates

Clear

Click Save and Submit to save and submit. Click Save All Answers to save all answers.

Question 3

Find the time complexity for the following function (the basic operation is the innermost loop body's assignment).

```
function f(n)
    r ← 0
    m ← 1
    for i ← 1 to n do
        m ← 3 × m
        for j ← 1 to m do
            r ← r + j
    return r
```

Response Feedback: Yes, this requires a formula for the geometric series $3 + 3^2 + 3^3 + \ldots + 3^n$. (Actually it is easy enough to find $x = 3 + 3^2 + 3^3 + \ldots + 3^n$, by observing that we get back to x if we multiply the sum by 3, then add 3, and subtract 3^{n+1}. So just solve the equation $x = 3 + 3x - 3^{n+1}$.)

Week5

A e d 25 b

QUESTION 1 — 1 points — Save Answer

Assume we want to sort integers into ascending order. To sort a small array that contains 42, 17, selection sort will perform one swap, or three assignments. How many assignments will it perform to sort an array that contains these 10 elements: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ?

a. 15
b. 18
c. 24
d. 55
e. 63

QUESTION 2 — 1 points — Save Answer

Assume we want to sort integers into ascending order. To sort a small array that contains 42, 17, insertion sort will perform three assignments. How many assignments will insertion sort perform to sort an array that contains these 10 elements: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ?

a. 15
b. 18
c. 24
d. 55
e. 63

QUESTION 3

Assume we want to use shellsort to sort integers into ascending order. We want to apply 4-sorting, followed by 1-sorting, to an array that contains 9, 8, 7, 6, 5, 4, 3, 2, 1, 0. Just before the last round of sorting (which is insertion sort), what does the array look like?

a. 0, 2, 4, 6, 1, 3, 5, 7, 8, 9

b. 6, 7, 8, 9, 2, 3, 4, 5, 0, 1

c. 4, 3, 9, 8, 2, 1, 7, 6, 0, 5

d. 1, 0, 3, 2, 5, 4, 7, 6, 9, 8

e. 1, 5, 0, 4, 3, 7, 2, 6, 8, 9

QUESTION 4

Suppose we have an array A with 33,554,431 elements. We want to apply binary search to look for some element k. A test of the form "is k = A[i]?" is a probe. How many probes will be performed in the worst case?

QUESTION 5

We wish to apply interpolation search as presented in Lecture 10. Suppose we have a large array of size n containing only one key k (repeated n times), and we are looking for a different key, k'. Which statement is correct?

a. Interpolation search will take a long time, since this is a worst-case instance for interpolation search.

b. Interpolation search will finish immediately, because of a division-by-zero error.

c. Interpolation search will finish immediately, since k' is not in the array.

d. Interpolation search will finish quickly, since this is a best-case instance for interpolation search.

webapps/assessment/take/launch.jsp?

Question 1

Assume we want to sort integers into ascending order. To sort a small array that contains 42, 17, selection sort will perform one swap, or three assignments. How many assignments will it perform to sort an array that contains these 10 elements: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ?

Response Feedback: Yes, that's right. Just five swaps altogether. Selection sort does very little data movement.

Question 2

Assume we want to sort integers into ascending order. To sort a small array that contains 42, 17, insertion sort will perform three assignments. How many assignments will insertion sort perform to sort an array that contains these 10 elements: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ?

Response Feedback: No, better go and study how insertion sort works.

Question 3

Assume we want to use shellsort to sort integers into ascending order. We want to apply 4-sorting, followed by 1-sorting, to an array that contains 9, 8, 7, 6, 5, 4, 3, 2, 1, 0. Just before the last round of sorting (which is insertion sort), what does the array look like?

Response Feedback: Yes, well done. Before the last round, the array is "almost-sorted".

Question 4

Suppose we have an array A with 33,554,431 elements. We want to apply binary search to look for some element k. A test of the form "is k = A[i]?" is a probe. How many probes will be performed in the worst case?

Response Feedback: Yes, the number of elements is $2^{25} - 1$. We have a worst-case instance if k is not in the array.

Question 5

We wish to apply interpolation search as presented in Lecture 10. Suppose we have a large array of size *n* containing only one key *k* (repeated *n* times), and we are looking for a different key, *k'*. Which statement is correct?

Response Feedback: No, look at how indices are calculated.

Sunday, 26 August 2018 8:47:26 PM AEST

OK

Question 1

Assume we want to sort integers into ascending order. To sort a small array that contains 42, 17, selection sort will perform one swap, or three assignments. How many assignments will it perform to sort an array that contains these 10 elements: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ?

Response Feedback: Yes, that's right. Just five swaps altogether. Selection sort does very little data movement.

Question 2

Assume we want to sort integers into ascending order. To sort a small array that contains 42, 17, insertion sort will perform three assignments. How many assignments will insertion sort perform to sort an array that contains these 10 elements: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ?

Response Feedback: Yes, that's right. The number of assignments is 3 + 4 + ... + 11 = 63.

Question 3

Assume we want to use shellsort to sort integers into ascending order. We want to apply 4-sorting, followed by 1-sorting, to an array that contains 9, 8, 7, 6, 5, 4, 3, 2, 1, 0. Just before the last round of sorting (which is insertion sort), what does the array look like?

Response Feedback: Yes, well done. Before the last round, the array is "almost-sorted".

Question 4

Suppose we have an array A with 33,554,431 elements. We want to apply binary search to look for some element k. A test of the form "is k = A[i]?" is a probe. How many probes will be performed in the worst case?

Response Feedback: Yes, the number of elements is 2^{25} - 1. We have a worst-case instance if k is not in the array.

Question 5

We wish to apply interpolation search as presented in Lecture 10. Suppose we have a large array of size *n* containing only one key *k* (repeated *n* times), and we are looking for a different key, *k'*. Which statement is correct?

Response Feedback: No, look at how indices are calculated.

Sunday, 26 August 2018 8:51:37 PM AEST

OK

Question 5

We wish to apply interpolation search as presented in Lecture 10. Suppose we have a large array of size *n* containing only one key *k* (repeated *n* times), and we are looking for a different key, *k'*. Which statement is correct?

Response Feedback: Yes, this goes to show that care is needed when implementing interpolation search. If duplicate keys are possible, we need to include a check for whether we ever have A[lo] = A[hi].

Sunday, 26 August 2018 8:52:44 PM AEST

OK

Week6

Question 1

Consider this recurrence relation:

$T(1) = 1$
$T(n) = 2\,T(n/3) + 2n + 1 \quad \text{for } n>1$

The Master Theorem says that

Response Feedback: That's right. In this case we have a=2, b=3, and d=1. And indeed 2 < 3.

Question 2

Consider this recurrence relation:

$T(1) = 1$
$T(2) = 1$
$T(n) = 4\,T(n-2) + 2n^2 \quad \text{for } n>2$

The Master Theorem tells us

Response Feedback: No, have a closer look at the recurrence and the theorem.

Question 3

Quicksort uses Hoare partitioning. Assume an array contains ten keys: 6 3 1 7 9 5 8 2 4 0. After a first round of simple Hoare partitioning (not median-of-three), the array looks like so:

Response Feedback: Well done!

Question 4

A complete binary tree has this inorder traversal sequence: 7, 4, 1, 0, 8, 5, 6, 3, 9, 2. What is the key at its root?

Response Feedback: No, that's not right. Did you make use of all the information available in the question?

Sunday, 26 August 2018 9:02:05 PM AEST

OK

Question 1

Consider this recurrence relation:

$T(1) = 1$
$T(n) = 2\,T(n/3) + 2n + 1 \quad \text{for } n>1$

The Master Theorem says that

Response Feedback: That's right. In this case we have a=2, b=3, and d=1. And indeed 2 < 3.

Question 2

Consider this recurrence relation:

$T(1) = 1$
$T(2) = 1$
$T(n) = 4\,T(n-2) + 2n^2 \quad \text{for } n>2$

The Master Theorem tells us

Response Feedback: That's right, the Master Theorem does not help here, as the recurrence is not of the required form.

Week7

QUESTION 1

What is the postorder traversal sequence for a binary tree whose preorder traversal sequence is A, B, C, D, E, F, G, H, I and whose inorder sequence is C, B, E, D, F, A, G, I, H ?

- a. C, E, F, D, B, H, I, G, A
- b. C, E, F, D, B, H, G, I, A
- c. C, E, F, B, D, I, H, G, A
- d. C, E, F, B, D, H, I, G, A
- e. None of the above

QUESTION 2

A complete binary tree containing 100 nodes has height 6, that is, a longest path from the root to a leaf has length 6.

How many of its nodes are at the maximal distance from the root?

37

QUESTION 3

Each line below gives the contents of an array that represents a complete binary tree. Identify all the cases in which that binary tree is a max-heap.

- a. 9 8 2 5 7 1 0 4 3 6
- b. 9 8 6 5 4 7 3 2 1 0
- c. 9 8 6 5 7 1 4 3 2 0
- d. 9 8 6 4 7 1 0 3 2 5
- e. 9 8 7 6 5 4 3 2 1 0

QUESTION 4

We wish to turn an array into a max-heap, using the bottom-up heap construction algorithm. From the outset, the array contains 0 1 2 3 4 5 6 7 8 9. When the algorithm terminates, the array contains

- a. 9 8 5 6 7 1 4 0 3 2
- b. 9 8 5 6 7 2 4 0 3 1
- c. 9 8 6 7 4 5 2 0 3 1
- d. 9 8 6 4 7 5 2 0 3 1
- e. 9 8 6 7 5 4 2 0 3 1

Question 1

What is the postorder traversal sequence for a binary tree whose preorder traversal sequence is A, B, C, D, E, F, G, H, I and whose inorder sequence is C, B, E, D, F, A, G, I, H ?

Response Feedback: That's correct. In fact the postorder sequence is C, E, F, D, B, I, H, G, A.

Question 2

A complete binary tree containing 100 nodes has height 6, that is, a longest path from the root to a leaf has length 6.

How many of its nodes are at the maximal distance from the root?

Response Feedback: Yes, too easy!

Question 3

Each line below gives the contents of an array that represents a complete binary tree. Identify all the cases in which that binary tree is a max-heap.

Response Feedback: Yes, indeed. All but one.

Question 4

We wish to turn an array into a max-heap, using the bottom-up heap construction algorithm. From the outset, the array contains 0 1 2 3 4 5 6 7 8 9. When the algorithm terminates, the array contains

Response Feedback: Yes, well done.

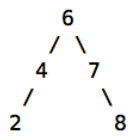
Wednesday, 5 September 2018 8:14:32 PM AEST

← OK

Week8

QUESTION 1 — 1 points — Save Answer

The keys 2, 4, 6, 7, and 8 have been inserted, one by one, in some unknown order, into an initially empty BST. The result is this BST:



There are 120 different permutations of the five keys, but not all of these would lead to this particular BST being built. How many of the permutations will generate this particular BST?

QUESTION 2 — 1 points — Save Answer

How many different binary search trees (BSTs) with elements {1,2,3,4} are there? And how many with elements {1,2,3,4,5}?

a. 24 and 120, respectively

b. 14 and 42, respectively

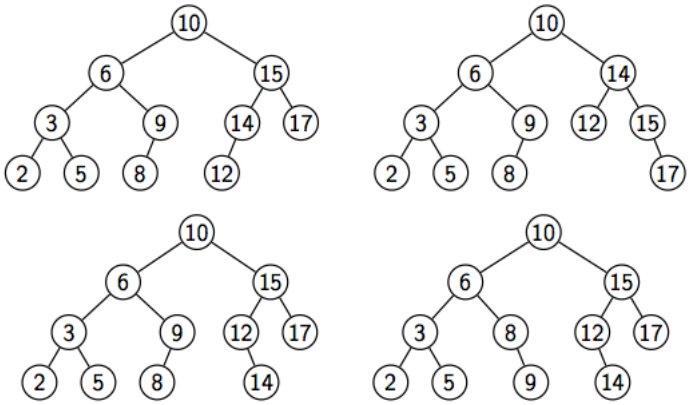
c. 16 and 25, respectively

d. 14 and 72, respectively

e. 10 and 24, respectively

QUESTION 3

Click the AVL tree that results when 5, 3, 2, 6, 8, 9, 10, 17, 15, 14, 12 are inserted, in that order, into an initially empty tree.



Selected Coordinates

Clear

QUESTION 4

An AVL tree is constructed by inserting the following numbers in this order: 1, 7, 2, 6, 3, 5, 4. The in-, pre- and post-order traversals of the resulting tree are:

a. In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 4, 2, 1, 3, 6, 5, 7
Post-order: 1, 3, 2, 5, 7, 6, 4

b. In-order: 5, 1, 3, 4, 6, 7, 2
Pre-order: 6, 1, 5, 3, 4, 7, 2
Post-order: 5, 4, 3, 1, 2, 7, 6

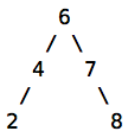
c. In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 3, 2, 1, 6, 5, 4, 7
Post-order: 1, 2, 4, 5, 7, 6, 3

d. In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 2, 1, 6, 3, 4, 5, 7
Post-order: 1, 4, 5, 3, 7, 6, 2

e. None of the above

Question 1

The keys 2, 4, 6, 7, and 8 have been inserted, one by one, in some unknown order, into an initially empty BST. The result is this BST:



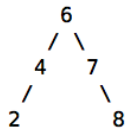
There are 120 different permutations of the five keys, but not all of these would lead to this particular BST being built. How many of the permutations will generate this particular BST?

Selected Answer: 6

Response Feedback: Yes, there are six permutations, namely 6 2 8 4 7, 6 2 8 7 4, 6 8 2 4 7, 6 8 2 7 4, 6 2 4 8 7, and 6 8 7 2 4.

Question 1

The keys 2, 4, 6, 7, and 8 have been inserted, one by one, in some unknown order, into an initially empty BST. The result is this BST:



There are 120 different permutations of the five keys, but not all of these would lead to this particular BST being built. How many of the permutations will generate this particular BST?

Selected Answer: 6

Response Feedback: Yes, there are six permutations, namely 6 2 8 4 7, 6 2 8 7 4, 6 8 2 4 7, 6 8 2 7 4, 6 2 4 8 7, and 6 8 7 2 4.

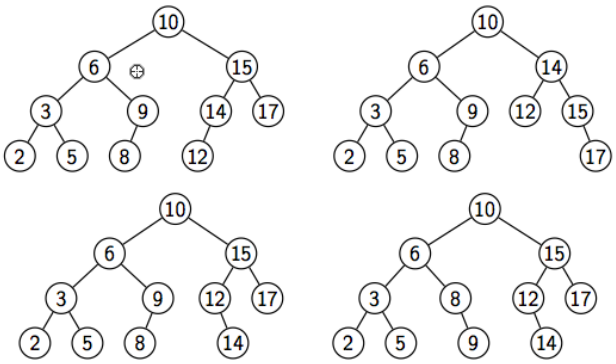
Question 3

Click the AVL tree that results when 5, 3, 2, 6, 8, 9, 10, 17, 15, 14, 12 are inserted, in that order, into an initially empty tree.

Selected Answer: 124, 77

Answers:

Student Response



Response Feedback: Yes, that's the right one. Note that all four options are valid AVL trees.

http://blog.51cto.com/wait0804/1839051

Question 4

An AVL tree is constructed by inserting the following numbers in this order: 1, 7, 2, 6, 3, 5, 4. The in-, pre- and post-order traversals of the resulting tree are:

Selected Answer: In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 3, 2, 1, 6, 5, 4, 7
c. Post-order: 1, 2, 4, 5, 7, 6, 3

Answers:

In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 4, 2, 1, 3, 6, 5, 7
a. Post-order: 1, 3, 2, 5, 7, 6, 4

In-order: 5, 1, 3, 4, 6, 7, 2
Pre-order: 6, 1, 5, 3, 4, 7, 2
b. Post-order: 5, 4, 3, 1, 2, 7, 6

In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 3, 2, 1, 6, 5, 4, 7
c. Post-order: 1, 2, 4, 5, 7, 6, 3

In-order: 1, 2, 3, 4, 5, 6, 7
Pre-order: 2, 1, 6, 3, 4, 5, 7
d. Post-order: 1, 4, 5, 3, 7, 6, 2

e. None of the above

Response Feedback: Yes, well done.

Sunday, 16 September 2018 12:48:59 AM AEST

OK

Week9

QUESTION 1

1 points Saved

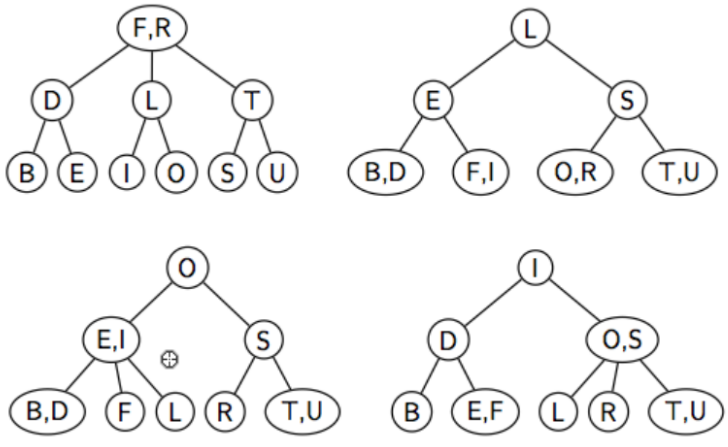
If a binary tree is both a max-heap and an AVL tree, what is its largest possible number of nodes, assuming all keys are different?

2

QUESTION 2

A 2-3 tree is constructed by inserting, into an initially empty tree, the following keys, in the given order:
F, O, R, E, S, T, B, U, I, L, D
Click on the resulting 2-3 tree:

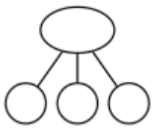
132, 281



Selected Coordinates

QUESTION 3

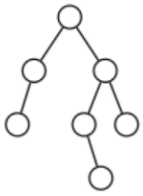
A 2-3 tree has the shape shown here, and it contains the keys 1-5. Which of the following sequences (giving the order in which the keys are inserted) could have generated that shape? (There could be more than one.)



- [x] a. 1, 2, 3, 4, 5
- [ ] b. 1, 3, 5, 2, 4
- [x] c. 1, 4, 2, 3, 5
- [x] d. 4, 3, 5, 2, 1
- [ ] e. 5, 2, 3, 1, 4

QUESTION 4

The AVL tree shown below was constructed by inserting the seven keys in a particular order. Identify which of the four insertion sequences below would generate an AVL tree of this shape.



- ( ) a. A, B, C, D, E, F, G
- ( ) b. B, C, D, E, F, G, A
- ( ) c. C, E, G, B, D, F, A
- (•) d. F, B, C, D, A, G, E

Question 1

If a binary tree is both a max-heap and an AVL tree, what is its largest possible number of nodes, assuming all keys are different?

Selected Answer: 2

Response Feedback: That's right. Too easy.

A 2-3 tree is constructed by inserting, into an initially empty tree, the following keys, in the given order:

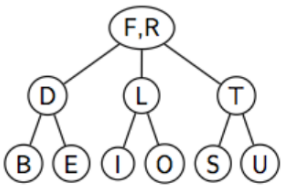
F, O, R, E, S, T, B, U, I, L, D

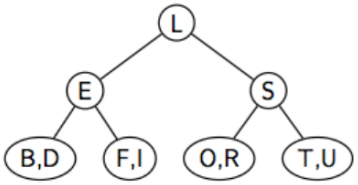
Click on the resulting 2-3 tree:

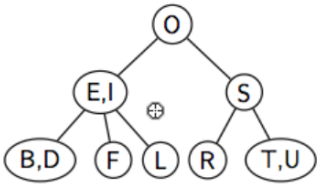
Selected Answer: 132, 281

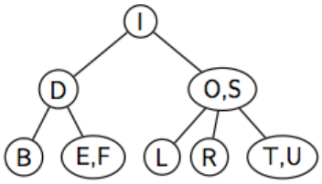
Answers:

Student Response





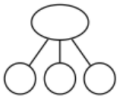




Response Feedback: Yes, an excellent choice.

Question 3

A 2-3 tree has the shape shown here, and it contains the keys 1-5. Which of the following sequences (giving the order in which the keys are inserted) could have generated that shape? (There could be more than one.)



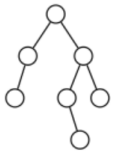
Selected Answers: a. 1, 2, 3, 4, 5
c. 1, 4, 2, 3, 5
d. 4, 3, 5, 2, 1

Answers: a. 1, 2, 3, 4, 5
b. 1, 3, 5, 2, 4
c. 1, 4, 2, 3, 5
d. 4, 3, 5, 2, 1
e. 5, 2, 3, 1, 4

Response Feedback: Yes, well done.

Question 4

The AVL tree shown below was constructed by inserting the seven keys in a particular order. Identify which of the four insertion sequences below would generate an AVL tree of this shape.



Selected Answer: d. F, B, C, D, A, G, E

Answers:
a. A, B, C, D, E, F, G
b. B, C, D, E, F, G, A
c. C, E, G, B, D, F, A
d. F, B, C, D, A, G, E

Response Feedback: Yes, that's right.

Monday, 24 September 2018 12:13:56 PM AEST

Week10

QUESTION 1

1 points Save Answer

Given the string 001001001001 we wish to use some string search algorithm to see if the string contains the substring 111. The candidates are the brute-force method and Horspool's. The number of character comparisons the two will make are, respectively:

a. 13 and 4
b. 13 and 5
c. 12 and 5
d. 12 and 6
e. 13 and 6
f. 13 and 8

QUESTION 2

1 points Save Answer

Edsger Dijkstra studied the following problem which he called theProblem of the Dutch National Flag. We are given an array of pebbles, some blue, some red, some white. We want to rearrange them in the order of the Dutch flag, that is, first come the red, then the white, and finally the blue pebbles. Which sorting method is best suited for this task, that is, most efficient?

a. Heapsort
b. Insertion sort
c. Mergesort
d. Quicksort
e. Selection sort
f. Shellsort
g. Sorting by counting

QUESTION 3 1 points Save Answer

A hash table with 5003 entries is used with linear probing (that is, in an open-addressing manner). It currently holds 4000 keys/records. How many probes should we expect during a lookup for some key that is in fact present (that is, in a successful search)?

- a. 2
- b. 3
- c. 4
- d. 5
- e. 6
- f. At least 7

QUESTION 4

Run the dynamic-programming algorithm for the coin-row problem on this instance: 100 5 20 50 100 100 10 5 20 20. Which amount (in cents) does it produce?

275

Question 1

Given the string 001001001001 we wish to use some string search algorithm to see if the string contains the substring 111. The candidates are the brute-force method and Horspool's. The number of character comparisons the two will make are, respectively:

Selected Answer: b. 13 and 5

Answers:
a. 13 and 4
b. 13 and 5
c. 12 and 5
d. 12 and 6
e. 13 and 6
f. 13 and 8

Response Feedback: Yes, that's good.

Question 2

Edsger Dijkstra studied the following problem which he called theProblem of the Dutch National Flag. We are given an array of pebbles, some blue, some red, some white. We want to rearrange them in the order of the Dutch flag, that is, first come the red, then the white, and finally the blue pebbles. Which sorting method is best suited for this task, that is, most efficient?

Selected Answer: g. Sorting by counting

Answers:
a. Heapsort
b. Insertion sort
c. Mergesort
d. Quicksort
e. Selection sort
f. Shellsort
g. Sorting by counting

Response Feedback: That's right. There are only three different keys, so this is an ideal setting for sorting by counting.

Question 3

A hash table with 5003 entries is used with linear probing (that is, in an open-addressing manner). It currently holds 4000 keys/records. How many probes should we expect during a lookup for some key that is in fact present (that is, in a successful search)?

Selected Answer: b. 3

Answers:
a. 2
b. 3
c. 4
d. 5
e. 6
f. At least 7

Response Feedback: Yes, you have earned another badge.

Question 4

Run the dynamic-programming algorithm for the coin-row problem on this instance: 100 5 20 50 100 100 10 5 20 20. Which amount (in cents) does it produce?

Selected Answer: 275

Response Feedback: Yes, that's right. Nifty linear-time algorithm, isn't it?

Sunday, 7 October 2018 10:48:21 PM AEDT

OK