Week 07 Quiz

Plagiarism declaration

By submitting work for this quiz I hereby declare that I understand the University's policy on **academic integrity (https://academicintegrity.unimelb.edu.au/)** and that the work submitted is original and solely my work, and that I have not been assisted by any other person (collusion) apart from where the submitted work is for a designated collaborative task, in which case the individual contributions are indicated. I also declare that I have not used any sources without proper acknowledgment (plagiarism). Where the submitted work is a computer program or code, I further declare that any copied code is declared in comments identifying the source at the start of the program or in a header file, that comments inline identify the start and end of the copied code, and that any modifications to code sources elsewhere are commented upon as to the nature of the modification.

Due Apr 30 at 23:59 **Points** 10 **Questions** 10
Available Apr 21 at 10:00 - Apr 30 at 23:59 10 days **Time Limit** None
Allowed Attempts Unlimited

Instructions

You should attempt the quiz after the lecture and your tutorial.

- The quiz is available for a period of 10 days.
- You may attempt the quiz multiple times (if you happen to get a question wrong, you can do it again)
- Your score on the quiz will be recorded in the grade book.
- The quiz might not display equations correctly in some browsers. If you experience problems, we recommend that you use Firefox.

Note: you must complete at least eight of the weekly quizzes to meet one of the hurdle requirements in this subject

This quiz was locked Apr 30 at 23:59.

Attempt History

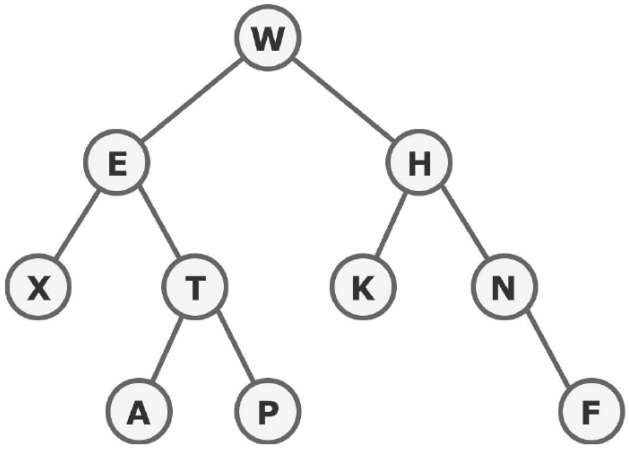
	Attempt	Time	Score
LATEST	Attempt 1	816 minutes	8.33 out of 10

Score for this attempt: **8.33** out of 10
Submitted Apr 30 at 10:23
This attempt took 816 minutes.

Question 1

1 / 1 pts

What is the order of visitation of the nodes in in-order traversal for the following tree?



- W,E,X,T,A,P,H,K,N,F
- X,E,A,T,P,W,K,H,N,F

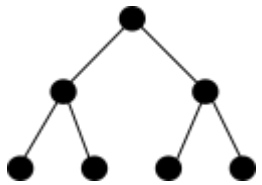
Correct!

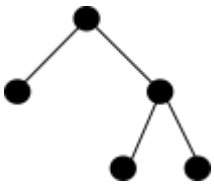
- X,A,P,T,E,K,F,N,H,W
- W,E,H,X,T,K,N,A,P,F

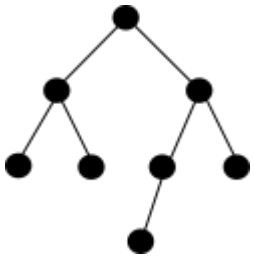
Question 2

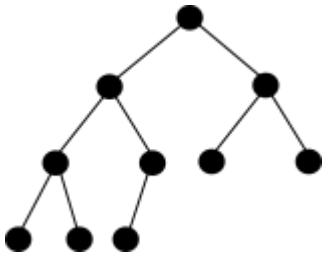
1 / 1 pts

Which of the following trees are complete binary search trees?

(a) 

(b) 

(c) 

(d) 

Correct!

- [x] (a)
- [ ] (b)
- [ ] (c)

Correct!

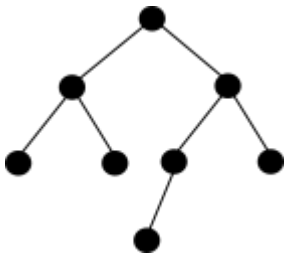
- [x] (d)

Correct. In a complete binary search tree, each level (except possibly the last) is completely filled, and all nodes are as far left as possible.

Question 3

1 / 1 pts

Consider the following binary search tree.



The height of the above tree is:

- 2
- 3 (Correct!)
- 4
- 8

Correct. The height of a binary search tree is the number of edges between the root node and the deepest leaf node.

Question 4

1 / 1 pts

The height of a complete binary search tree with n nodes is *at most*:

- O(n)
- $O(n\log_2 n)$
- $O(\log_2 n)$ (Correct!)
- $O(n^{0.5})$

The height of a complete binary search tree of n nodes is at most $O(\log_2 n)$. This is an important property of complete binary search trees, and we make use of it in analysing the complexity of various operations on these trees (such as finding the smallest or largest item).

Question 5

0 / 1 pts

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 ?

ou Answered

- (●) C, E, F, D, B, H, I, G, A

- ( ) C, E, F, D, B, H, G, I, A
- ( ) C, E, F, B, D, I, H, G, A
- ( ) C, E, F, B, D, H, I, G, A

orrect Answer

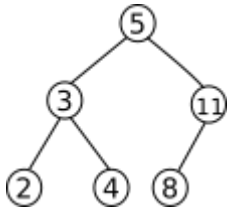
- ( ) None of the above

No, try again, but first think carefully about you could construct the postorder sequence from the other two.

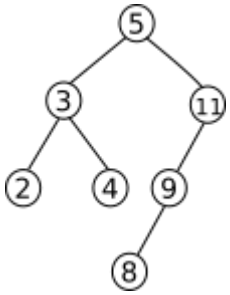
Question 6

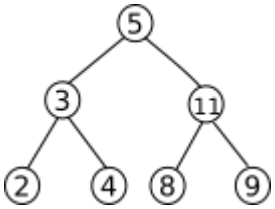
1 / 1 pts

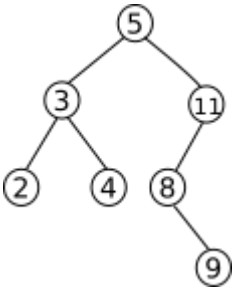
Consider the following binary search tree:

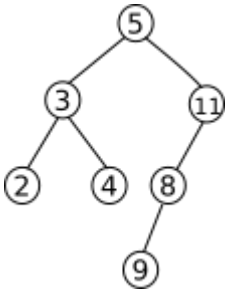


Which of the following trees is produced when key 9 is inserted into the above tree?

(a)


(b)


(c)


(d)


- (a)
- (b)

Correct!

- (c)
- (d)

To insert key 9, we search through the tree, trying to find the location where 9 would reside if it were in the tree. Key 9 is greater than 5, and so we head down its right subtree. Similarly, key 9 is less than 11 and so we head down the left subtree of key 11. Key 9 is greater than 8, but key 8 has no children. Once we reach a node n with no children, we insert the key in the left subtree (if it is less than 8) and in the right subtree (if it is greater than 8). As 9 is greater than 8, we insert 9 as its right child.

Question 7

0.33 / 1 pts

Let h be an arbitrary natural number with $h > 4$. Which of the following statements are true?

orrect Answer

- [ ] It is possible that a binary tree of height h has $h + 1$ nodes

orrect Answer

- [ ] It is possible that a binary tree of height h has h^2 nodes.

Correct!

- [x] It is possible that a binary tree of height h has 2^h nodes

- [ ] It is possible that a binary tree of height h has 2^{h+1} nodes

Question 8

1 / 1 pts

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.

Correct!

- [x] 9 8 2 5 7 1 0 4 3 6

- [ ] 9 8 6 5 4 7 3 2 1 0

Correct! ☑ 9 8 6 5 7 1 4 3 2 0

Correct! ☑ 9 8 6 4 7 1 0 3 2 5

Correct! ☑ 9 8 7 6 5 4 3 2 1 0

Yes, indeed. All but one.

Question 9

1 / 1 pts

A max-heap and binary search tree that have exactly the same topology are:

Correct! ☑ a tree with root only

Correct! ☑ a tree with root and a left child

☐ a tree with root and a right child

☐ a tree of height 2^h

Question 10

1 / 1 pts

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

○ 9 8 5 6 7 1 4 0 3 2

○ 9 8 5 6 7 2 4 0 3 1

Correct!

- (●) 9 8 6 7 4 5 2 0 3 1
- ( ) 9 8 6 4 7 5 2 0 3 1
- ( ) 9 8 6 7 5 4 2 0 3 1

Yes, well done.

Quiz Score: **8.33** out of 10