IE - Data Structures and Algorithms - 2020 - 2021

Quiz navigation

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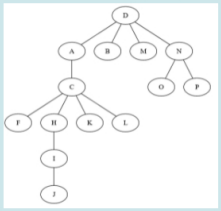
Started on	Wednesday, 19 May 2021, 8:10 PM
State	Finished
Completed on	Wednesday, 19 May 2021, 8:43 PM
Time taken	32 mins 44 secs
Marks	10.58/16.00
Grade	**6.61** out of 10.00 (**66**%)

Question **1**
Correct
Mark 1.00 out of 1.00
Flag question

In what order will be visited the nodes of the following tree if we use Depth First Traversal? Consider nodes from left to right.
Write the answer in the box, separating the nodes by a space.

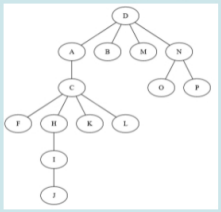


Answer: D A C F H I J K L B M N O P

Depth first traversal means to go in depth (down) as much as possible and when it is no longer possible, return and go on the next child. So the order will be: D A C F H I J K L B M N O P
The correct answer is: D A C F H I J K L B M N O P

Question **2**
Correct
Mark 1.00 out of 1.00
Flag question

In what order will be visited the nodes of the following tree if we use Breadth First (Level order) Traversal? Consider nodes from left to right.
Write the answer in the box, separating the nodes by a space.

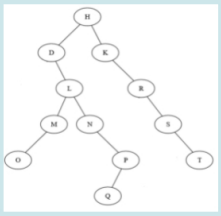


Answer: D A B M N C O P F H K L I J

Breadth first traversal means to visit all nodes on a level and then continue with the next level. So the order will be: D A B M N C O P F H K L I J
The correct answer is: D A B M N C O P F H K L I J

Question **3**
Correct
Mark 1.00 out of 1.00
Flag question

In what order will be visited the nodes of the following binary tree if we use Preorder Traversal? Write the answer in the box, separating the nodes by a space.

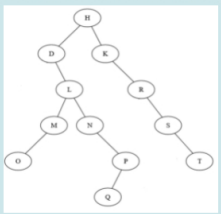


Answer: H D L M O N P Q K R S T

Preorder traversal means that we first visit the root, then everything in the left subtree, followed by everything in the right subtree. So the preorder traversal will be: H D L M O N P Q K R S T
The correct answer is: H D L M O N P Q K R S T

Question **4**
Incorrect
Mark 0.00 out of 1.00
Flag question

In what order will be visited the nodes of the following binary tree if we use Inorder Traversal? Write the answer in the box, separating the nodes by a space.

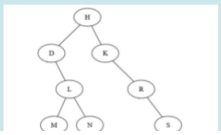


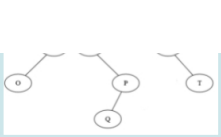
Answer: D O M L N P Q H K R S T

Inorder traversal means that we first visit everything the left subtree, then the root, then everything in the right subtree. So the inorder traversal will be: D O M L N Q P H K R S T
The correct answer is: D O M L N Q P H K R S T

Question **5**
Incorrect
Mark 0.00 out of 1.00
Flag question

In what order will be visited the nodes of the following binary tree if we use Postorder Traversal? Write the answer in the box, separating the nodes by a space.





Answer: D O M N P Q L K R S T H

Postorder traversal means that we first visit everything the left subtree, then everything in th right subtree and finally the root. So the postorder traversal will be: O M Q P N L D T S R K H

The correct answer is: O M Q P N L D T S R K H

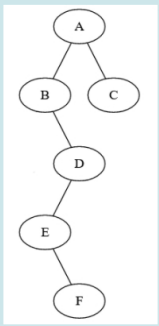
Question **6**

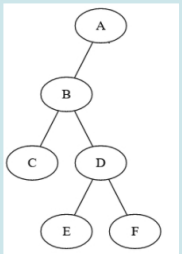
Correct

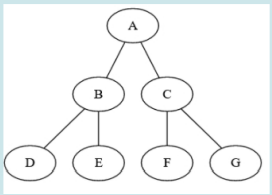
Mark 1.00 out of 1.00

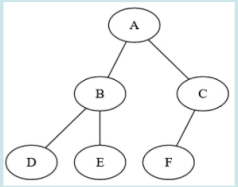
Flag question

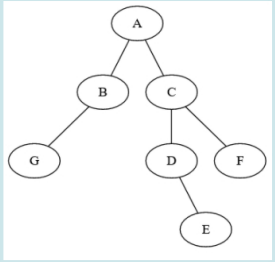
Which of the following binary trees is complete?

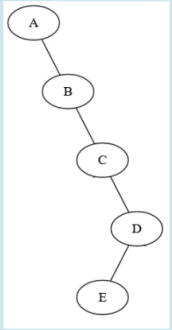








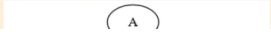


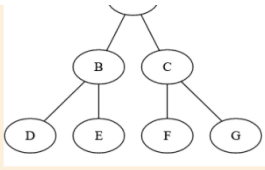


Your answer is correct.

A complete binary tree is one in which every internal node has 2 children (so basically every node has 0 or 2 children) and all leaf nodes are on the same level.

The correct answer is:





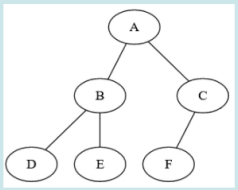
Question **7**

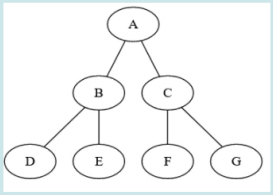
Correct

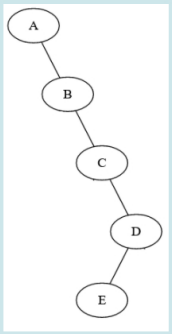
Mark 1.00 out of 1.00

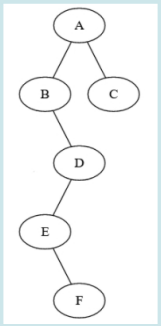
Flag question

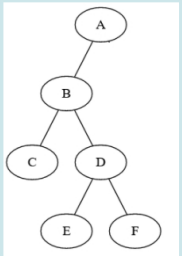
Which of the following binary trees is degenerate?

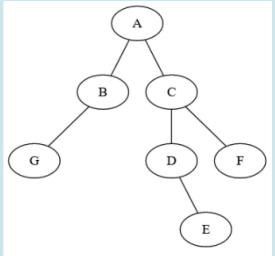








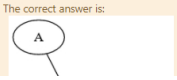


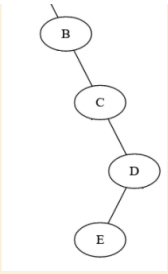


Your answer is correct.

A degenerate binary tree is a tree in which every node has 1 child.

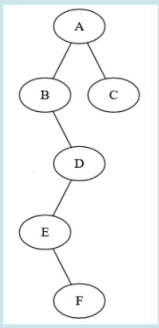
The correct answer is:

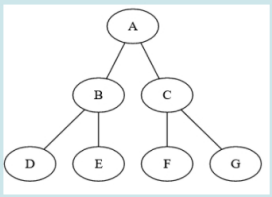


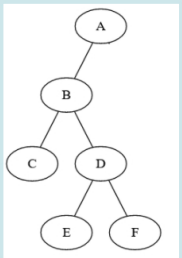


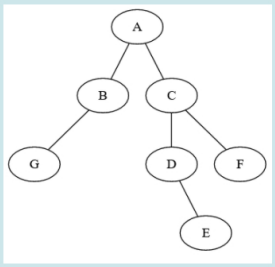
Question 8
Correct
Mark 1.00 out of 1.00
Flag question

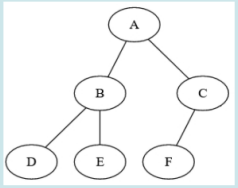
Which of the following binary trees is full?

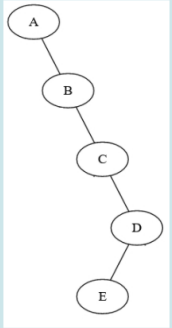








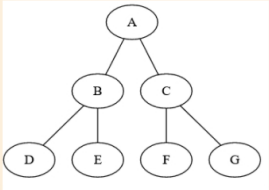




Your answer is correct.

A full binary tree is one in which every internal node has 2 children (so basically every node has 0 or 2 children).

The correct answer is:



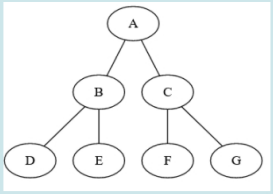
Question **9**

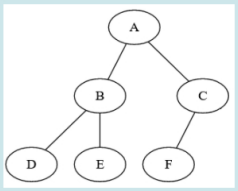
Correct

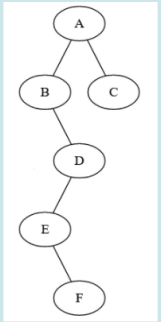
Mark 1.00 out of 1.00

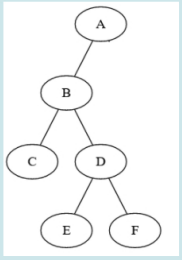
Flag question

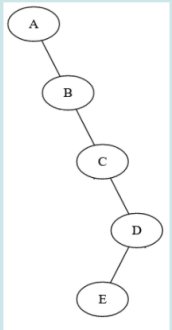
Which of the following binary trees is almost complete (but not complete)?

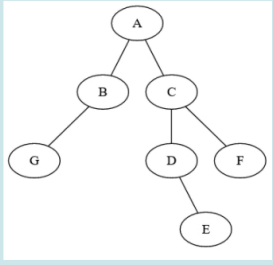








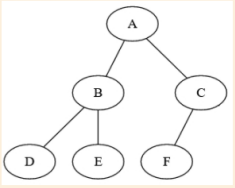




Your answer is correct.

An almost complete binary tree is a tree which is complete except for the last level, but that is complete from left to right.

The correct answer is:



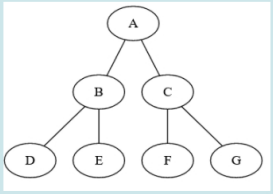
Question **10**

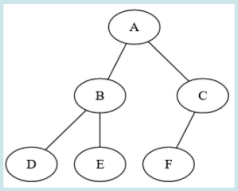
Partially correct

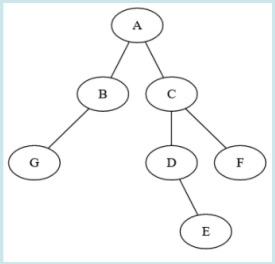
Mark 0.33 out of 1.00

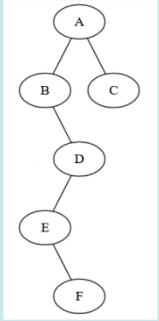
Flag question

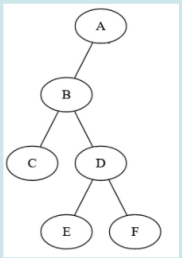
Which of the following binary trees is balanced?

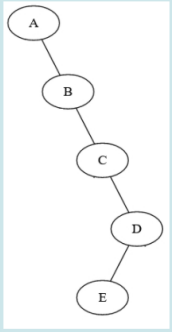










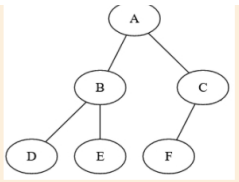


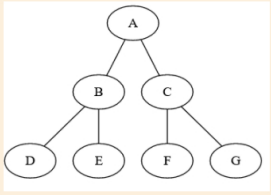
Your answer is partially correct.

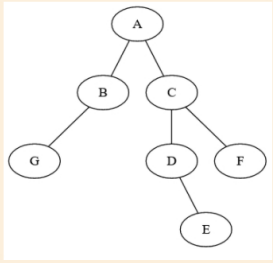
You have correctly selected 1.

A balanced binary tree is one in which the difference between the height of the left and right subtree is -1, 0 or 1 for every node.

The correct answers are:







Question **11**
Correct
Mark 1.00 out of 1.00
Flag question

We have a binary tree with 10 nodes. What is the maximum height of the tree?

Answer: 9 ✔

The maximum height for a tree can be achieved if the tree is degenerate, so you have one node per level. This means that for 10 nodes you have a height of 9.
The correct answer is: 9

Question **12**
Correct
Mark 1.00 out of 1.00
Flag question

We have a binary tree with 10 nodes. What is the minimum height of the tree?

Answer: 3 ✔

The minimum height for a tree can be achieved if we have as many nodes on every level as possible (similar to a binary heap structure). In this example this means 1 node on the first level, 2 nodes on the next level, 4 nodes on the next one and 3 more nodes on last level. This means a height of 3 (Obs. there are be many ways for arranging the nodes so that the height is 3, not just the binary heap structure)
The correct answer is: 3

Question **13**
Partially correct
Mark 0.50 out of 1.00
Flag question

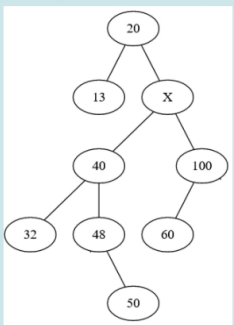
We have a binary tree with 20 nodes. Which of the following statements is true?

- ☐ There is at least one level in the tree with one single node
- ☐ The tree could have 11 leaf nodes.
- ☐ The height of the tree can be 3.
- ☑ The tree cannot be full. ✔ Every full tree has an odd number of nodes (root + two children for every node)
- ☐ The tree has at least 4 leaf nodes.

Your answer is partially correct.
You have correctly selected 1.
The correct answers are:
There is at least one level in the tree with one single node.
The tree cannot be full.

Question **14**
Partially correct
Mark 0.25 out of 1.00
Flag question

Consider the BST below. What value can be in the node marked with X?



- ☑ 43 ✖
- ☑ 52 ✔
- ☑ 45 ✖
- ☑ 70 ✖
- ☐ 22
- ☑ 55 ✔

Your answer is partially correct.

You have selected too many options.
Main rule of the BST is that for every node all elements on the left have to be less than and all elements on the right have to be greater than. So X has to be between the maximum on the left (50) and minimum on the right (60)

The correct answers are:
52,

55

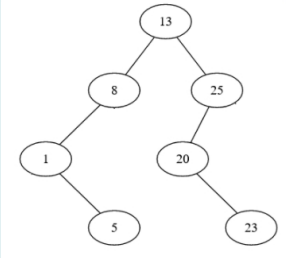
Question **15**

Partially correct

Mark 0.50 out of 1.00

Flag question

In what order could the elements of the following BST have been inserted?



- 13 8 5 1 25 20 23
- 13 25 20 8 23 1 5
- 13 25 8 20 23 1 5 ✔
- 13 8 1 5 20 23 25
- 1 5 8 13 20 23 25

Your answer is partially correct.

You have correctly selected 1.
When inserting the elements you never change the existing nodes, you always add a leaf node. So no node could have been inserted before any of its parents.

The correct answers are:
13 25 8 20 23 1 5,

13 25 20 8 23 1 5

Question **16**

Incorrect

Mark 0.00 out of 1.00

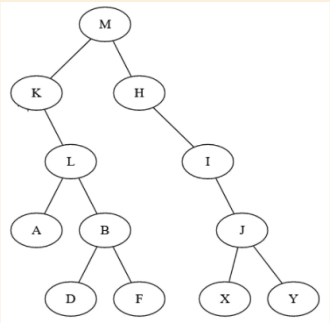
Flag question

The postorder traversal of a binary tree is: A D F B L K X Y J I H M while the inorder traversal is: K A L D B F M H I X J Y. Which nodes are leaves in the tree?

- X
- L
- H ✖
- M
- I
- D
- B
- K ✖
- Y
- F
- A ✔
- J

Your answer is incorrect.

From postorder we can identify the root (the last element). And since root is between left and right in inorder, we can use the inorder traversal to determine which nodes are on the left and which are on the right. So you can identify the root and the have the inorder and postorder traversal for the left subtree and for the right subtree. So the problem was split in two smaller instances of the same problem. If you repeat the process you can determine how the tree looks like:



The correct answers are:
A,

D,

F,

X,

Y

Finish review

Lecture 11 Quiz

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