X

Week 7 Quiz

The due date for submitting this assignment has passed.

Due on 2021-09-15, 23:59 IST.

Score: 10/10=100%

Assignment submitted on 2021-09-14, 07:27 IST

All questions carry equal weightage. All Python code is assumed to be executed using Python3. You may submit as many times as you like within the deadline. Your final submission will be graded.
Note:

- If the question asks about a value of type `string`, remember to enclose your answer in single or double quotes.
- If the question asks about a value of type `list`, remember to enclose your answer in square brackets and use commas to separate list items.

1) Given the following permutation of `a,b,c,d,e,f,g,h,i,j`, what is the next permutation in lexicographic (dictionary) order? Write your answer as a sequence of letters without quotes and without any blank spaces between letters.

```
eibjdhgfca
```

eibjfacdgh

Yes, the answer is correct.
Score: 2.5

Accepted Answers:
*(Type: Regex Match) [ ]*eibjfacdgh[ ]**
(Type: Regex Match) [ ]\'eibjfacdgh\'[ ]**

(Type: Regex Match) [ ]\"eibjfacdgh\"[ ]**

2.5 points

2) We want to add a function `listmax()` to the class `Node` that implements user defined lists such that `listmax()` computes the maximum value in a list where values are of type `int`. ***2.5 points***

An incomplete implementation of `listmax()` given below. You have to provide expressions to put in place of `AAA`, `BBB` and `CCC`.

```
def listmax(self):
   if self.value == None:
       return(AAA)
   elif self.next == None:
       return(BBB)
   else:
       return(CCC)
```

- `AAA: 0, BBB: self.value, CCC: max(self.value, self.next.listmax())`
- `AAA: 0, BBB: self.value, CCC: max(self.value, self.next.value)`
- `AAA: None, BBB: self.value, CCC: max(self.value, self.next.listmax())`
- `AAA: None, BBB: self.value, CCC: max(self.value, self.next.value)`

Yes, the answer is correct.
Score: 2.5

Feedback:

- *`listmax` is not defined for the empty list, so `AAA` is `None`.*
- *If the list has only one value, that value is the maximum, so `BBB` is `self.value`.*
- *If there are two or more elements, inductively compute the maximum of the rest of the list and take the max with respect to the current values, so `CCC` is `max(self.value,self.next.listmax())`*

Accepted Answers:
`AAA: None, BBB: self.value, CCC: max(self.value, self.next.listmax())`

3) Suppose we add this function `foo()` to the class `Tree` that implements search trees. For a name `mytree` with a value of type `Tree`, what would `mytree.foo()` compute? ***2.5 points***

```
def foo(self):
    if self.isempty():
        return(0)
    elif self.isleaf():
        return(1)
    else:
        return(self.left.foo() + self.right.foo()))
```

- The number of nodes in `mytree`
- The largest value in `mytree`.
- The length of the longest path from root to leaf in `mytree`.
- The number of leaves in `mytree`.

Week 8 Programming Assignment

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Online Programming Test - Sample

Online Programming Test 1, 19 Sep 2021, 10:00-12:00

Online Programming Test 2, 19 Sep 2021, 20:00-22:00

Yes, the answer is correct.
Score: 2.5

Feedback:
This computes the number of leaves in the tree. An empty tree has no leaves. A tree with just one node has a single leaf. Otherwise, compute the number of leaves in left and right subtrees and add them.

This does not compute the number of nodes in the tree. For that, we need to add 1 in the inductive case, to account for the current node. So the `else:` expression would be `return(1 + self.left.foo() + self.right.foo()))`.

Accepted Answers:
The number of leaves in `mytree`.

4) Inorder traversal of a binary tree has been defined in the lectures. A postorder traversal lists the vertices of a binary tree (not necessarily a search tree) as follows:

- Print the left subtree in postorder.
- Print the right subtree in postorder.
- Print the root.

Suppose we have a binary tree with 10 nodes labelled `a, b, c, d, e, f, g, h, i, j`, with postorder traversal `ehicbjfadg` and inorder traversal `ehbicgjafd`. What is the left child of the root node? (Write your answer as a single letter, without quotes.)

b

Hint

Yes, the answer is correct.
Score: 2.5

Accepted Answers:
*(Type: Regex Match) [ ]*b[ ]**
(Type: Regex Match) [ ]\'b\'[ ]**
(Type: Regex Match) [ ]\"b\"[ ]**

2.5 points