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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » **Programming, Data Structures And Algorithms Using Python (course)**

Announcements (announcements)   **About the Course (https://swayam.gov.in/nd1_noc19_cs40/preview)**

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Unit 17 - Week 7 Quiz

Course outline

How to access the portal

Week 1: Introduction

Week 1 Quiz

Week 2: Basics of Python

Week 2 Quiz

Week 2 Programming Assignment

Week 3: Lists, inductive function definitions, sorting

Week 3 Programming Assignment

Week 4: Sorting, Tuples,

Week 7 Quiz

The due date for submitting this assignment has passed. **Due on 2019-09-18, 23:59 IST.** As per our records you have not submitted this assignment.

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 without any blank spaces between letters.

```
eibjdhgfca
```

No, the answer is incorrect.
Score: 0
Feedback:
The suffix to change is `dhgfca`. *This becomes* `facdgh`
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   ***2.5 points***
lists such that `listmax()` computes the maximum value in a list where values are of type `int`.

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())

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No, the answer is incorrect.
Score: 0

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   ***2.5 points***
a name `mytree` with a value of type `Tree`, what would `mytree.foo()` compute?

```
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`.

No, the answer is incorrect.
Score: 0

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?

[   ]

Hint

No, the answer is incorrect.
Score: 0
Feedback:
From the post traversal, g is the root. The inorder traversal tells us that `ehbic` *lie to the left of the root. The postorder traversal of this segment says b is the root of this subtree, so b is the left child of the root.*

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

2.5 points