Register for Certification exam (https://examform.nptel.ac.in/2022_04/exam_form/dashboard)

Course outline

- How does an NPTEL online course work? ()
- Week 1 : Introduction ()
- Week 1 Quiz ()
- Week 2: Basics of Python ()
- Week 2 Quiz ()
- Week 2 Programming Assignment ()

Week 7 Quiz

The due date for submitting this assignment has passed.

Due on 2022-09-14, 23:59 IST.

Score: 10/10=100%

Assignment submitted on 2022-09-14, 20:38 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 without any blank spaces between letters.

```
fjadbihgec
```

'fjadcbeghi'

Yes, the answer is correct.
Score: 2.5

Feedback:
The prefix to change is `bihgec`. This becomes `cbeghi`

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

2.5 points

2) We want to add a function `length()` to the class `Node` that implements user defined lists which will compute the length of a list. An incomplete implementation of `length()` given below. You have to provide expressions to put in place of XXX, YYY. and ZZZ. ***2.5 points***

```
def length(self):
  if self.value == None:
     return(XXX)
  elif self.next == None:
     return(YYY)
  else:
     return(ZZZ)
```

- XXX: 0, YYY: 0, ZZZ: self.next.length()
- XXX: 0, YYY: 0, ZZZ: 1 + self.next.length()
- XXX: 0, YYY: 1, ZZZ: self.next.length()
- XXX: 0, YYY: 1, ZZZ: 1 + self.next.length()

Yes, the answer is correct.
Score: 2.5

Feedback:
Inductive definition: if empty, return 0, if singleton return 1, else add 1 to the length of the list starting at self.next.

Accepted Answers:
XXX: 0, YYY: 1, ZZZ: 1 + self.next.length()

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(1 + max(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 paths in `mytree`.

Yes, the answer is correct.
Score: 2.5

Feedback:
This computes the height of the tree, which is the length of the longest root to leaf path.

Accepted Answers:
The length of the longest path from root to leaf in `mytree`.

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

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

Suppose we have a binary tree with 10 nodes labelled `a, b, c, d, e, f, g, h, i, j`, with preorder traversal `gbhecidajf` and inorder traversal `ehbicgjafd`. What is the right child of the root node?

'd'

Hint

Yes, the answer is correct.
Score: 2.5

Feedback:

From the preorder traversal, `g` is the root. The inorder traversal tells us that `jafd` lie to the right of the root. The preorder traversal of this segment says `d` is the root of this subtree, so `d` is the right child of the root.

Accepted Answers:

*(Type: Regex Match) [ ]*d[ ]**

(Type: Regex Match) [ ]"d"[ ]**

(Type: Regex Match) [ ]'d'[ ]**

2.5 points