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



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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\ "[]*

Week 3:
Lists,
inductive
function
definitions,
sorting ()

Week 3
Programming
Assignment
()

Week 4:
Sorting,
Tuples,
Dictionaries,
Passing
Functions,
List
Comprehension
()

Week 4 Quiz
()

Week 4
Programming
Assignment
()

Week 5:
Exception
handling,
input/output,
file handling,
string
processing ()

Week 5
Programming
Assignment
()

Week 6:
Backtracking,
scope, data
structures;
stacks,
queues and
heaps ()

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:

Week 6 Quiz
()

Week 7:
Classes,
objects and
user defined
datatypes ()

Week 7 Quiz
()

● Quiz: Week 7
Quiz
(assessment?
name=130)

Week 8:
Dynamic
programming,
wrap-up ()

Week 8
Programming
Assignment
()

Text
Transcripts ()

Books ()

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Problem
Solving
Session ()

- 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?

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