Assignment #1: Python

Submitted Date: 20 February 2017

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Batch: Django-1

**Question 1:**

Write a recursive function to reverse a list.

**def reverslist**(List):  
 list\_len = len(List)  
 **if** list\_len == 1:  
 **return** List  
 **return** [List[-1]] + reverslist(List[:-1])  
  
  
list = [2, 3, 4, 5, 6, 7]  
**print** reverslist(list)

**Question 2:**

Write a program which can compute the factorial of a given numbers.

The results should be printed in a comma-separated sequence on a single line.

*Suppose the following input is supplied to the program:*

8

*Then, the output should be:*

40320

n = int(raw\_input("Enter a Number: "))  
factorial = 1

**for** i **in** range(1,n+1):  
 factorial = factorial \* i  
  
**print** factorial

**Question 3:**

Implement a solution to the Tower of Hanoi using three stacks to keep track of the disks.

**def TowerHanoi**(n, start, middle, end):  
  
 **if** n>=1:  
 TowerHanoi(n-1, start, end, middle)  
 **print** "Move From %s-->%s"%(start,end)  
 TowerHanoi(n-1, middle, start, end)  
  
  
num\_of\_disk = int(raw\_input("Enter the number of disk: "))  
start = raw\_input("Enter the Start Point: ")  
end = raw\_input("Enter the ending Point: ")  
Middle = raw\_input("Enter the Middle Point: ")  
  
TowerHanoi(num\_of\_disk, start, Middle, end)

**Question 4:**

With a given integral number n, write a program to generate a dictionary that contains (i, i\*i) such that is an integral number between 1 and n (both included). and then the program should print the dictionary.

*Suppose the following input is supplied to the program:*

8

*Then, the output should be:*

{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64}

num = int(raw\_input("Enter a Number: "))  
dictionary = {}  
**for** i **in** range(1,num+1):  
 dictionary[i] = i\*i  
  
**print** "Print the Output: ",dictionary

**Question 5:**

Create an implementation of a queue that would have an average performance of O(1) for enqueue and dequeue operations.

**from** collections **import** deque  
queue = deque("123456789")  
**print** "Printed Main Queue: ",queue  
  
queue.append("0")  
**print** "Printed After append '0' :",queue  
  
queue.popleft()  
**print** "Printer after Pop from Left: ",queue  
  
queue.append("Number")  
**print** "Printed After append a 'Number'",queue  
  
queue.pop()  
**print** "Printed After Pop from Right:" ,queue

**Question 6:**

Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.

*Suppose the following input is supplied to the program:*

34,67,55,33,12,98

*Then, the output should be:*

['34', '67', '55', '33', '12', '98']

('34', '67', '55', '33', '12', '98')

input = raw\_input()  
list = input.split(',')  
tuple = tuple(list)  
**print** list  
**print** tuple

**Question 7:**

Please write a binary search function which searches an item in a sorted list. The function should return the index of element to be searched in the list.

**def BinarySearch**(list, key):  
 start = 0  
 end=len(list)-1  
 index = -1  
 **while** start <= end **and** index== -1:  
 mid =int((start + end)/2)  
 **if** list[mid] == key:  
 index = mid  
 **elif** list[mid] > key:  
 end = mid-1  
 **else**:  
 start = mid+1  
  
  
 **if** start > end:  
 **print** "Faild"  
  
 **return** index  
  
**print** "Enter the numbers in increasing order"  
  
List = [int(x) **for** x **in** raw\_input().split()]  
**print** List  
Key = int(raw\_input("Enter your wanted element: "))  
**print** BinarySearch(List, Key)

**Question 8:**

With a given list [12,24,35,24,88,120,155,88,120,155], write a program to print this list after removing all duplicate values with original order reserved.

**def withoutDuplicate**(list):  
 new\_list = []  
 temp = set()  
 **for** element **in** list:  
 **if** element **not in** temp:  
 temp.add(element)  
 new\_list.append(element)  
  
 new\_list.reverse()  
 **return** new\_list  
  
  
List = [12,24,35,24,88,120,155,88,120,155]  
**print** withoutDuplicate(List)

**Question 9:**

Write a program to solve a classic ancient Chinese puzzle:

We count 35 heads and 94 legs among the chickens and rabbits in a farm. How many rabbits and how many chickens do we have?

**def num\_of\_cknANDrbt**(head,leg):  
 i=0  
 **for** ckn **in** range(head+1):  
 rbt=head-ckn  
 **if** 2\*ckn+4\*rbt == leg:  
 i=1  
 **print** ckn,rbt  
  
 **if** i==0:  
 **print** "No solution"  
  
Head = int(raw\_input("Enter Number Of Heads: "))  
Leg = int(raw\_input("Enter Number of Legs: "))  
**print** "Number of chickens and rabbits:"  
num\_of\_cknANDrbt(Head,Leg)

**Question 10:**

Write a program that calculates and prints the value according to the given formula:

Q = Square root of [(2 \* C \* D)/H]

Following are the fixed values of C and H:

C is 50. H is 30.

D is the variable whose values should be input to your program in a comma-separated sequence.

*Example*

*Let us assume the following comma separated input sequence is given to the program:*

100,150,180

*The output of the program should be:*

18,22,24

**import** math  
C, H = 50, 30  
result = []  
input = [int(x) **for** x **in** raw\_input().split(',')]  
**for** D **in** input:  
 result.append(str(int(math.sqrt((2 \* C \* D) / H))))  
  
**print** ','.join(result)

**Question 11:**

Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be i\*j.

Note: i=0,1.., X-1; j=0,1,¡­Y-1.

*Example*

*Suppose the following inputs are given to the program:*

3,5

*Then, the output of the program should be:*

[[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8]]

input\_dim = [int(x) **for** x **in** raw\_input().split(',')]  
x = input\_dim[0]  
y = input\_dim[1]  
matrix = [[0 **for** col **in** range(y)] **for** row **in** range(x)]  
**for** i **in** range(x):  
 **for** j **in** range(y):  
 matrix[i][j] = i\*j  
  
**print** matrix

**Question 12:**

Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically.

*Suppose the following input is supplied to the program:*

without,hello,bag,world

*Then, the output should be:*

bag,hello,without,world

input = [x **for** x **in** raw\_input().split(',')]  
input.sort()  
**print** ','.join(input)

**Question 13:**

Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically.

*Suppose the following input is supplied to the program:*

hello world and practice makes perfect and hello world again

*Then, the output should be:*

again and hello makes perfect practice world

input = [x **for** x **in** raw\_input().split(' ')]  
without\_duplicate = set(input)  
**print** ' '.join(sorted(without\_duplicate))

**Question 14:**

Using the find\_successor method, write a non-recursive inorder traversal for a binary search tree.

**Question 15:**

Please generate a random float where the value is between 5 and 95 using Python math module.

**import** random  
**print** random.uniform(5,95)