Question 12

Level 2

Question:

Write a program, which will find all such numbers between 1000 and 3000 (both included) such that each digit of the number is an even number.

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

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

values = []

for i in range(1000, 3001):

s = str(i)

if (int(s[0])%2==0) and (int(s[1])%2==0) and (int(s[2])%2==0) and (int(s[3])%2==0):

values.append(s)

print ",".join(values)

#----------------------------------------#

#----------------------------------------#

Question 13

Level 2

Question:

Write a program that accepts a sentence and calculate the number of letters and digits.

Suppose the following input is supplied to the program:

hello world! 123

Then, the output should be:

LETTERS 10

DIGITS 3

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

s = raw\_input()

d={"DIGITS":0, "LETTERS":0}

for c in s:

if c.isdigit():

d["DIGITS"]+=1

elif c.isalpha():

d["LETTERS"]+=1

else:

pass

print "LETTERS", d["LETTERS"]

print "DIGITS", d["DIGITS"]

#----------------------------------------#

#----------------------------------------#

Question 14

Level 2

Question:

Write a program that accepts a sentence and calculate the number of upper case letters and lower case letters.

Suppose the following input is supplied to the program:

Hello world!

Then, the output should be:

UPPER CASE 1

LOWER CASE 9

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

s = raw\_input()

d={"UPPER CASE":0, "LOWER CASE":0}

for c in s:

if c.isupper():

d["UPPER CASE"]+=1

elif c.islower():

d["LOWER CASE"]+=1

else:

pass

print "UPPER CASE", d["UPPER CASE"]

print "LOWER CASE", d["LOWER CASE"]

#----------------------------------------#

#----------------------------------------#

Question 15

Level 2

Question:

Write a program that computes the value of a+aa+aaa+aaaa with a given digit as the value of a.

Suppose the following input is supplied to the program:

9

Then, the output should be:

11106

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

a = raw\_input()

n1 = int( "%s" % a )

n2 = int( "%s%s" % (a,a) )

n3 = int( "%s%s%s" % (a,a,a) )

n4 = int( "%s%s%s%s" % (a,a,a,a) )

print n1+n2+n3+n4

#----------------------------------------#

#----------------------------------------#

Question 16

Level 2

Question:

Use a list comprehension to square each odd number in a list. The list is input by a sequence of comma-separated numbers.

Suppose the following input is supplied to the program:

1,2,3,4,5,6,7,8,9

Then, the output should be:

1,3,5,7,9

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

values = raw\_input()

numbers = [x for x in values.split(",") if int(x)%2!=0]

print ",".join(numbers)

#----------------------------------------#

Question 17

Level 2

Question:

Write a program that computes the net amount of a bank account based a transaction log from console input. The transaction log format is shown as following:

D 100

W 200

D means deposit while W means withdrawal.

Suppose the following input is supplied to the program:

D 300

D 300

W 200

D 100

Then, the output should be:

500

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

netAmount = 0

while True:

s = raw\_input()

if not s:

break

values = s.split(" ")

operation = values[0]

amount = int(values[1])

if operation=="D":

netAmount+=amount

elif operation=="W":

netAmount-=amount

else:

pass

print netAmount

#----------------------------------------#

#----------------------------------------#

Question 18

Level 3

Question:

A website requires the users to input username and password to register. Write a program to check the validity of password input by users.

Following are the criteria for checking the password:

1. At least 1 letter between [a-z]

2. At least 1 number between [0-9]

1. At least 1 letter between [A-Z]

3. At least 1 character from [$#@]

4. Minimum length of transaction password: 6

5. Maximum length of transaction password: 12

Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma.

Example

If the following passwords are given as input to the program:

ABd1234@1,a F1#,2w3E\*,2We3345

Then, the output of the program should be:

ABd1234@1

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solutions:

import re

value = []

items=[x for x in raw\_input().split(',')]

for p in items:

if len(p)<6 or len(p)>12:

continue

else:

pass

if not re.search("[a-z]",p):

continue

elif not re.search("[0-9]",p):

continue

elif not re.search("[A-Z]",p):

continue

elif not re.search("[$#@]",p):

continue

elif re.search("\s",p):

continue

else:

pass

value.append(p)

print ",".join(value)

#----------------------------------------#

#----------------------------------------#

Question 19

Level 3

Question:

You are required to write a program to sort the (name, age, height) tuples by ascending order where name is string, age and height are numbers. The tuples are input by console. The sort criteria is:

1: Sort based on name;

2: Then sort based on age;

3: Then sort by score.

The priority is that name > age > score.

If the following tuples are given as input to the program:

Tom,19,80

John,20,90

Jony,17,91

Jony,17,93

Json,21,85

Then, the output of the program should be:

[('John', '20', '90'), ('Jony', '17', '91'), ('Jony', '17', '93'), ('Json', '21', '85'), ('Tom', '19', '80')]

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

We use itemgetter to enable multiple sort keys.

Solutions:

from operator import itemgetter, attrgetter

l = []

while True:

s = raw\_input()

if not s:

break

l.append(tuple(s.split(",")))

print sorted(l, key=itemgetter(0,1,2))

#----------------------------------------#

#----------------------------------------#

Question 20

Level 3

Question:

Define a class with a generator which can iterate the numbers, which are divisible by 7, between a given range 0 and n.

Hints:

Consider use yield

Solution:

def putNumbers(n):

i = 0

while i<n:

j=i

i=i+1

if j%7==0:

yield j

for i in reverse(100):

print i

#----------------------------------------#

#----------------------------------------#

Question 21

Level 3

Question£º

A robot moves in a plane starting from the original point (0,0). The robot can move toward UP, DOWN, LEFT and RIGHT with a given steps. The trace of robot movement is shown as the following:

UP 5

DOWN 3

LEFT 3

RIGHT 2

¡­

The numbers after the direction are steps. Please write a program to compute the distance from current position after a sequence of movement and original point. If the distance is a float, then just print the nearest integer.

Example:

If the following tuples are given as input to the program:

UP 5

DOWN 3

LEFT 3

RIGHT 2

Then, the output of the program should be:

2

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

import math

pos = [0,0]

while True:

s = raw\_input()

if not s:

break

movement = s.split(" ")

direction = movement[0]

steps = int(movement[1])

if direction=="UP":

pos[0]+=steps

elif direction=="DOWN":

pos[0]-=steps

elif direction=="LEFT":

pos[1]-=steps

elif direction=="RIGHT":

pos[1]+=steps

else:

pass

print int(round(math.sqrt(pos[1]\*\*2+pos[0]\*\*2)))

#----------------------------------------#

#----------------------------------------#

Question 22

Level 3

Question:

Write a program to compute the frequency of the words from the input. The output should output after sorting the key alphanumerically.

Suppose the following input is supplied to the program:

New to Python or choosing between Python 2 and Python 3? Read Python 2 or Python 3.

Then, the output should be:

2:2

3.:1

3?:1

New:1

Python:5

Read:1

and:1

between:1

choosing:1

or:2

to:1

Hints

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

freq = {} # frequency of words in text

line = raw\_input()

for word in line.split():

freq[word] = freq.get(word,0)+1

words = freq.keys()

words.sort()

for w in words:

print "%s:%d" % (w,freq[w])

#----------------------------------------#

#----------------------------------------#

Question 23

level 1

Question:

Write a method which can calculate square value of number

Hints:

Using the \*\* operator

Solution:

def square(num):

return num \*\* 2

print square(2)

print square(3)

#----------------------------------------#

#----------------------------------------#

Question 24

Level 1

Question:

Python has many built-in functions, and if you do not know how to use it, you can read document online or find some books. But Python has a built-in document function for every built-in functions.

Please write a program to print some Python built-in functions documents, such as abs(), int(), raw\_input()

And add document for your own function

Hints:

The built-in document method is \_\_doc\_\_

Solution:

print abs.\_\_doc\_\_

print int.\_\_doc\_\_

print raw\_input.\_\_doc\_\_

def square(num):

'''Return the square value of the input number.

The input number must be integer.

'''

return num \*\* 2

print square(2)

print square.\_\_doc\_\_

#----------------------------------------#

#----------------------------------------#

Question 25

Level 1

Question:

Define a class, which have a class parameter and have a same instance parameter.

Hints:

Define a instance parameter, need add it in \_\_init\_\_ method

You can init a object with construct parameter or set the value later

Solution:

class Person:

# Define the class parameter "name"

name = "Person"

def \_\_init\_\_(self, name = None):

# self.name is the instance parameter

self.name = name

jeffrey = Person("Jeffrey")

print "%s name is %s" % (Person.name, jeffrey.name)

nico = Person()

nico.name = "Nico"

print "%s name is %s" % (Person.name, nico.name)

#----------------------------------------#

#----------------------------------------#

Question:

Define a function which can compute the sum of two numbers.

Hints:

Define a function with two numbers as arguments. You can compute the sum in the function and return the value.

Solution

def SumFunction(number1, number2):

return number1+number2

print SumFunction(1,2)

#----------------------------------------#

Question:

Define a function that can convert a integer into a string and print it in console.

Hints:

Use str() to convert a number to string.

Solution

def printValue(n):

print str(n)

printValue(3)

#----------------------------------------#

Question:

Define a function that can convert a integer into a string and print it in console.

Hints:

Use str() to convert a number to string.

Solution

def printValue(n):

print str(n)

printValue(3)

#----------------------------------------#

2.10

Question:

Define a function that can receive two integral numbers in string form and compute their sum and then print it in console.

Hints:

Use int() to convert a string to integer.

Solution

def printValue(s1,s2):

print int(s1)+int(s2)

printValue("3","4") #7

#----------------------------------------#

2.10

Question:

Define a function that can accept two strings as input and concatenate them and then print it in console.

Hints:

Use + to concatenate the strings

Solution

def printValue(s1,s2):

print s1+s2

printValue("3","4") #34

#----------------------------------------#

2.10

Question:

Define a function that can accept two strings as input and print the string with maximum length in console. If two strings have the same length, then the function should print al l strings line by line.

Hints:

Use len() function to get the length of a string

Solution

def printValue(s1,s2):

len1 = len(s1)

len2 = len(s2)

if len1>len2:

print s1

elif len2>len1:

print s2

else:

print s1

print s2

printValue("one","three")

#----------------------------------------#

2.10

Question:

Define a function that can accept an integer number as input and print the "It is an even number" if the number is even, otherwise print "It is an odd number".

Hints:

Use % operator to check if a number is even or odd.

Solution

def checkValue(n):

if n%2 == 0:

print "It is an even number"

else:

print "It is an odd number"

checkValue(7)

#----------------------------------------#

2.10

Question:

Define a function which can print a dictionary where the keys are numbers between 1 and 3 (both included) and the values are square of keys.

Hints:

Use dict[key]=value pattern to put entry into a dictionary.

Use \*\* operator to get power of a number.

Solution

def printDict():

d=dict()

d[1]=1

d[2]=2\*\*2

d[3]=3\*\*2

print d

printDict()

#----------------------------------------#

2.10

Question:

Define a function which can print a dictionary where the keys are numbers between 1 and 20 (both included) and the values are square of keys.

Hints:

Use dict[key]=value pattern to put entry into a dictionary.

Use \*\* operator to get power of a number.

Use range() for loops.

Solution

def printDict():

d=dict()

for i in range(1,21):

d[i]=i\*\*2

print d

printDict()

#----------------------------------------#

2.10

Question:

Define a function which can generate a dictionary where the keys are numbers between 1 and 20 (both included) and the values are square of keys. The function should just print the values only.

Hints:

Use dict[key]=value pattern to put entry into a dictionary.

Use \*\* operator to get power of a number.

Use range() for loops.

Use keys() to iterate keys in the dictionary. Also we can use item() to get key/value pairs.

Solution

def printDict():

d=dict()

for i in range(1,21):

d[i]=i\*\*2

for (k,v) in d.items():

print v

printDict()

#----------------------------------------#

2.10

Question:

Define a function which can generate a dictionary where the keys are numbers between 1 and 20 (both included) and the values are square of keys. The function should just print the keys only.

Hints:

Use dict[key]=value pattern to put entry into a dictionary.

Use \*\* operator to get power of a number.

Use range() for loops.

Use keys() to iterate keys in the dictionary. Also we can use item() to get key/value pairs.

Solution

def printDict():

d=dict()

for i in range(1,21):

d[i]=i\*\*2

for k in d.keys():

print k

printDict()

#----------------------------------------#

2.10

Question:

Define a function which can generate and print a list where the values are square of numbers between 1 and 20 (both included).

Hints:

Use \*\* operator to get power of a number.

Use range() for loops.

Use list.append() to add values into a list.

Solution

def printList():

li=list()

for i in range(1,21):

li.append(i\*\*2)

print li

printList()

#----------------------------------------#

2.10

Question:

Define a function which can generate a list where the values are square of numbers between 1 and 20 (both included). Then the function needs to print the first 5 elements in the list.

Hints:

Use \*\* operator to get power of a number.

Use range() for loops.

Use list.append() to add values into a list.

Use [n1:n2] to slice a list

Solution

def printList():

li=list()

for i in range(1,21):

li.append(i\*\*2)

print li[:5]

printList()

#----------------------------------------#

2.10

Question:

Define a function which can generate a list where the values are square of numbers between 1 and 20 (both included). Then the function needs to print the last 5 elements in the list.

Hints:

Use \*\* operator to get power of a number.

Use range() for loops.

Use list.append() to add values into a list.

Use [n1:n2] to slice a list

Solution

def printList():

li=list()

for i in range(1,21):

li.append(i\*\*2)

print li[-5:]

printList()

#----------------------------------------#

2.10

Question:

Define a function which can generate a list where the values are square of numbers between 1 and 20 (both included). Then the function needs to print all values except the first 5 elements in the list.

Hints:

Use \*\* operator to get power of a number.

Use range() for loops.

Use list.append() to add values into a list.

Use [n1:n2] to slice a list

Solution

def printList():

li=list()

for i in range(1,21):

li.append(i\*\*2)

print li[5:]

printList()

#----------------------------------------#

2.10

Question:

Define a function which can generate and print a tuple where the value are square of numbers between 1 and 20 (both included).

Hints:

Use \*\* operator to get power of a number.

Use range() for loops.

Use list.append() to add values into a list.

Use tuple() to get a tuple from a list.

Solution

def printTuple():

li=list()

for i in range(1,21):

li.append(i\*\*2)

print tuple(li)

printTuple()

#----------------------------------------#

2.10

Question:

With a given tuple (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one line and the last half values in one line.

Hints:

Use [n1:n2] notation to get a slice from a tuple.

Solution

tp=(1,2,3,4,5,6,7,8,9,10)

tp1=tp[:5]

tp2=tp[5:]

print tp1

print tp2

#----------------------------------------#

2.10

Question:

Write a program to generate and print another tuple whose values are even numbers in the given tuple (1,2,3,4,5,6,7,8,9,10).

Hints:

Use "for" to iterate the tuple

Use tuple() to generate a tuple from a list.

Solution

tp=(1,2,3,4,5,6,7,8,9,10)

li=list()

for i in tp:

if tp[i]%2==0:

li.append(tp[i])

tp2=tuple(li)

print tp2

#----------------------------------------#

2.14

Question:

Write a program which accepts a string as input to print "Yes" if the string is "yes" or "YES" or "Yes", otherwise print "No".

Hints:

Use if statement to judge condition.

Solution

s= raw\_input()

if s=="yes" or s=="YES" or s=="Yes":

print "Yes"

else:

print "No"

#----------------------------------------#

3.4

Question:

Write a program which can filter even numbers in a list by using filter function. The list is: [1,2,3,4,5,6,7,8,9,10].

Hints:

Use filter() to filter some elements in a list.

Use lambda to define anonymous functions.

Solution

li = [1,2,3,4,5,6,7,8,9,10]

evenNumbers = filter(lambda x: x%2==0, li)

print evenNumbers

#----------------------------------------#

3.4

Question:

Write a program which can map() to make a list whose elements are square of elements in [1,2,3,4,5,6,7,8,9,10].

Hints:

Use map() to generate a list.

Use lambda to define anonymous functions.

Solution

li = [1,2,3,4,5,6,7,8,9,10]

squaredNumbers = map(lambda x: x\*\*2, li)

print squaredNumbers

#----------------------------------------#

3.5

Question:

Write a program which can map() and filter() to make a list whose elements are square of even number in [1,2,3,4,5,6,7,8,9,10].

Hints:

Use map() to generate a list.

Use filter() to filter elements of a list.

Use lambda to define anonymous functions.

Solution

li = [1,2,3,4,5,6,7,8,9,10]

evenNumbers = map(lambda x: x\*\*2, filter(lambda x: x%2==0, li))

print evenNumbers

#----------------------------------------#

3.5

Question:

Write a program which can filter() to make a list whose elements are even number between 1 and 20 (both included).

Hints:

Use filter() to filter elements of a list.

Use lambda to define anonymous functions.

Solution

evenNumbers = filter(lambda x: x%2==0, range(1,21))

print evenNumbers

#----------------------------------------#

3.5

Question:

Write a program which can map() to make a list whose elements are square of numbers between 1 and 20 (both included).

Hints:

Use map() to generate a list.

Use lambda to define anonymous functions.

Solution

squaredNumbers = map(lambda x: x\*\*2, range(1,21))

print squaredNumbers

#----------------------------------------#

7.2

Question:

Define a class named American which has a static method called printNationality.

Hints:

Use @staticmethod decorator to define class static method.

Solution

class American(object):

@staticmethod

def printNationality():

print "America"

anAmerican = American()

anAmerican.printNationality()

American.printNationality()

#----------------------------------------#

7.2

Question:

Define a class named American and its subclass NewYorker.

Hints:

Use class Subclass(ParentClass) to define a subclass.

Solution:

class American(object):

pass

class NewYorker(American):

pass

anAmerican = American()

aNewYorker = NewYorker()

print anAmerican

print aNewYorker

#----------------------------------------#

7.2

Question:

Define a class named Circle which can be constructed by a radius. The Circle class has a method which can compute the area.

Hints:

Use def methodName(self) to define a method.

Solution:

class Circle(object):

def \_\_init\_\_(self, r):

self.radius = r

def area(self):

return self.radius\*\*2\*3.14

aCircle = Circle(2)

print aCircle.area()

#----------------------------------------#

7.2

Define a class named Rectangle which can be constructed by a length and width. The Rectangle class has a method which can compute the area.

Hints:

Use def methodName(self) to define a method.

Solution:

class Rectangle(object):

def \_\_init\_\_(self, l, w):

self.length = l

self.width = w

def area(self):

return self.length\*self.width

aRectangle = Rectangle(2,10)

print aRectangle.area()

#----------------------------------------#

7.2

Define a class named Shape and its subclass Square. The Square class has an init function which takes a length as argument. Both classes have a area function which can print the area of the shape where Shape's area is 0 by default.

Hints:

To override a method in super class, we can define a method with the same name in the super class.

Solution:

class Shape(object):

def \_\_init\_\_(self):

pass

def area(self):

return 0

class Square(Shape):

def \_\_init\_\_(self, l):

Shape.\_\_init\_\_(self)

self.length = l

def area(self):

return self.length\*self.length

aSquare= Square(3)

print aSquare.area()

#----------------------------------------#

Please raise a RuntimeError exception.

Hints:

Use raise() to raise an exception.

Solution:

raise RuntimeError('something wrong')

#----------------------------------------#

Write a function to compute 5/0 and use try/except to catch the exceptions.

Hints:

Use try/except to catch exceptions.

Solution:

def throws():

return 5/0

try:

throws()

except ZeroDivisionError:

print "division by zero!"

except Exception, err:

print 'Caught an exception'

finally:

print 'In finally block for cleanup'

#----------------------------------------#

Define a custom exception class which takes a string message as attribute.

Hints:

To define a custom exception, we need to define a class inherited from Exception.

Solution:

class MyError(Exception):

"""My own exception class

Attributes:

msg -- explanation of the error

"""

def \_\_init\_\_(self, msg):

self.msg = msg

error = MyError("something wrong")

#----------------------------------------#

Question:

Assuming that we have some email addresses in the "username@companyname.com" format, please write program to print the user name of a given email address. Both user names and company names are composed of letters only.

Example:

If the following email address is given as input to the program:

john@google.com

Then, the output of the program should be:

john

In case of input data being supplied to the question, it should be assumed to be a console input.

Hints:

Use \w to match letters.

Solution:

import re

emailAddress = raw\_input()

pat2 = "(\w+)@((\w+\.)+(com))"

r2 = re.match(pat2,emailAddress)

print r2.group(1)

#----------------------------------------#

Question:

Assuming that we have some email addresses in the "username@companyname.com" format, please write program to print the company name of a given email address. Both user names and company names are composed of letters only.

Example:

If the following email address is given as input to the program:

john@google.com

Then, the output of the program should be:

google

In case of input data being supplied to the question, it should be assumed to be a console input.

Hints:

Use \w to match letters.

Solution:

import re

emailAddress = raw\_input()

pat2 = "(\w+)@(\w+)\.(com)"

r2 = re.match(pat2,emailAddress)

print r2.group(2)

#----------------------------------------#

Question:

Write a program which accepts a sequence of words separated by whitespace as input to print the words composed of digits only.

Example:

If the following words is given as input to the program:

2 cats and 3 dogs.

Then, the output of the program should be:

['2', '3']

In case of input data being supplied to the question, it should be assumed to be a console input.

Hints:

Use re.findall() to find all substring using regex.

Solution:

import re

s = raw\_input()

print re.findall("\d+",s)

#----------------------------------------#

Question:

Print a unicode string "hello world".

Hints:

Use u'strings' format to define unicode string.

Solution:

unicodeString = u"hello world!"

print unicodeString

#----------------------------------------#

Write a program to read an ASCII string and to convert it to a unicode string encoded by utf-8.

Hints:

Use unicode() function to convert.

Solution:

s = raw\_input()

u = unicode( s ,"utf-8")

print u

#----------------------------------------#

Question:

Write a special comment to indicate a Python source code file is in unicode.

Hints:

Solution:

# -\*- coding: utf-8 -\*-

#----------------------------------------#

Question:

Write a program to compute 1/2+2/3+3/4+...+n/n+1 with a given n input by console (n>0).

Example:

If the following n is given as input to the program:

5

Then, the output of the program should be:

3.55

In case of input data being supplied to the question, it should be assumed to be a console input.

Hints:

Use float() to convert an integer to a float

Solution:

n=int(raw\_input())

sum=0.0

for i in range(1,n+1):

sum += float(float(i)/(i+1))

print sum

#----------------------------------------#

Question:

Write a program to compute:

f(n)=f(n-1)+100 when n>0

and f(0)=1

with a given n input by console (n>0).

Example:

If the following n is given as input to the program:

5

Then, the output of the program should be:

500

In case of input data being supplied to the question, it should be assumed to be a console input.

Hints:

We can define recursive function in Python.

Solution:

def f(n):

if n==0:

return 0

else:

return f(n-1)+100

n=int(raw\_input())

print f(n)

#----------------------------------------#

Question:

The Fibonacci Sequence is computed based on the following formula:

f(n)=0 if n=0

f(n)=1 if n=1

f(n)=f(n-1)+f(n-2) if n>1

Please write a program to compute the value of f(n) with a given n input by console.

Example:

If the following n is given as input to the program:

7

Then, the output of the program should be:

13

In case of input data being supplied to the question, it should be assumed to be a console input.

Hints:

We can define recursive function in Python.

Solution:

def f(n):

if n == 0: return 0

elif n == 1: return 1

else: return f(n-1)+f(n-2)

n=int(raw\_input())

print f(n)

#----------------------------------------#

#----------------------------------------#

Question:

The Fibonacci Sequence is computed based on the following formula:

f(n)=0 if n=0

f(n)=1 if n=1

f(n)=f(n-1)+f(n-2) if n>1

Please write a program using list comprehension to print the Fibonacci Sequence in comma separated form with a given n input by console.

Example:

If the following n is given as input to the program:

7

Then, the output of the program should be:

0,1,1,2,3,5,8,13

Hints:

We can define recursive function in Python.

Use list comprehension to generate a list from an existing list.

Use string.join() to join a list of strings.

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

def f(n):

if n == 0: return 0

elif n == 1: return 1

else: return f(n-1)+f(n-2)

n=int(raw\_input())

values = [str(f(x)) for x in range(0, n+1)]

print ",".join(values)

#----------------------------------------#

Question:

Please write a program using generator to print the even numbers between 0 and n in comma separated form while n is input by console.

Example:

If the following n is given as input to the program:

10

Then, the output of the program should be:

0,2,4,6,8,10

Hints:

Use yield to produce the next value in generator.

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

def EvenGenerator(n):

i=0

while i<=n:

if i%2==0:

yield i

i+=1

n=int(raw\_input())

values = []

for i in EvenGenerator(n):

values.append(str(i))

print ",".join(values)

#----------------------------------------#

Question:

Please write a program using generator to print the numbers which can be divisible by 5 and 7 between 0 and n in comma separated form while n is input by console.

Example:

If the following n is given as input to the program:

100

Then, the output of the program should be:

0,35,70

Hints:

Use yield to produce the next value in generator.

In case of input data being supplied to the question, it should be assumed to be a console input.

Solution:

def NumGenerator(n):

for i in range(n+1):

if i%5==0 and i%7==0:

yield i

n=int(raw\_input())

values = []

for i in NumGenerator(n):

values.append(str(i))

print ",".join(values)

#----------------------------------------#

Question:

Please write assert statements to verify that every number in the list [2,4,6,8] is even.

Hints:

Use "assert expression" to make assertion.

Solution:

li = [2,4,6,8]

for i in li:

assert i%2==0

#----------------------------------------#

Question:

Please write a program which accepts basic mathematic expression from console and print the evaluation result.

Example:

If the following string is given as input to the program:

35+3

Then, the output of the program should be:

38

Hints:

Use eval() to evaluate an expression.

Solution:

expression = raw\_input()

print eval(expression)

#----------------------------------------#

Question:

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.

Hints:

Use if/elif to deal with conditions.

Solution:

import math

def bin\_search(li, element):

bottom = 0

top = len(li)-1

index = -1

while top>=bottom and index==-1:

mid = int(math.floor((top+bottom)/2.0))

if li[mid]==element:

index = mid

elif li[mid]>element:

top = mid-1

else:

bottom = mid+1

return index

li=[2,5,7,9,11,17,222]

print bin\_search(li,11)

print bin\_search(li,12)

#----------------------------------------#

Question:

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.

Hints:

Use if/elif to deal with conditions.

Solution:

import math

def bin\_search(li, element):

bottom = 0

top = len(li)-1

index = -1

while top>=bottom and index==-1:

mid = int(math.floor((top+bottom)/2.0))

if li[mid]==element:

index = mid

elif li[mid]>element:

top = mid-1

else:

bottom = mid+1

return index

li=[2,5,7,9,11,17,222]

print bin\_search(li,11)

print bin\_search(li,12)

#----------------------------------------#

Question:

Please generate a random float where the value is between 10 and 100 using Python math module.

Hints:

Use random.random() to generate a random float in [0,1].

Solution:

import random

print random.random()\*100

#----------------------------------------#

Question:

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

Hints:

Use random.random() to generate a random float in [0,1].

Solution:

import random

print random.random()\*100-5

#----------------------------------------#

Question:

Please write a program to output a random even number between 0 and 10 inclusive using random module and list comprehension.

Hints:

Use random.choice() to a random element from a list.

Solution:

import random

print random.choice([i for i in range(11) if i%2==0])

#----------------------------------------#

Question:

Please write a program to output a random number, which is divisible by 5 and 7, between 0 and 10 inclusive using random module and list comprehension.

Hints:

Use random.choice() to a random element from a list.

Solution:

import random

print random.choice([i for i in range(201) if i%5==0 and i%7==0])

#----------------------------------------#

Question:

Please write a program to generate a list with 5 random numbers between 100 and 200 inclusive.

Hints:

Use random.sample() to generate a list of random values.

Solution:

import random

print random.sample(range(100), 5)

#----------------------------------------#

Question:

Please write a program to randomly generate a list with 5 even numbers between 100 and 200 inclusive.

Hints:

Use random.sample() to generate a list of random values.

Solution:

import random

print random.sample([i for i in range(100,201) if i%2==0], 5)

#----------------------------------------#

Question:

Please write a program to randomly generate a list with 5 numbers, which are divisible by 5 and 7 , between 1 and 1000 inclusive.

Hints:

Use random.sample() to generate a list of random values.

Solution:

import random

print random.sample([i for i in range(1,1001) if i%5==0 and i%7==0], 5)

#----------------------------------------#

Question:

Please write a program to randomly print a integer number between 7 and 15 inclusive.

Hints:

Use random.randrange() to a random integer in a given range.

Solution:

import random

print random.randrange(7,16)

#----------------------------------------#

Question:

Please write a program to compress and decompress the string "hello world!hello world!hello world!hello world!".

Hints:

Use zlib.compress() and zlib.decompress() to compress and decompress a string.

Solution:

import zlib

s = 'hello world!hello world!hello world!hello world!'

t = zlib.compress(s)

print t

print zlib.decompress(t)

#----------------------------------------#

Question:

Please write a program to print the running time of execution of "1+1" for 100 times.

Hints:

Use timeit() function to measure the running time.

Solution:

from timeit import Timer

t = Timer("for i in range(100):1+1")

print t.timeit()

#----------------------------------------#

Question:

Please write a program to shuffle and print the list [3,6,7,8].

Hints:

Use shuffle() function to shuffle a list.

Solution:

from random import shuffle

li = [3,6,7,8]

shuffle(li)

print li

#----------------------------------------#

Question:

Please write a program to shuffle and print the list [3,6,7,8].

Hints:

Use shuffle() function to shuffle a list.

Solution:

from random import shuffle

li = [3,6,7,8]

shuffle(li)

print li

#----------------------------------------#

Question:

Please write a program to generate all sentences where subject is in ["I", "You"] and verb is in ["Play", "Love"] and the object is in ["Hockey","Football"].

Hints:

Use list[index] notation to get a element from a list.

Solution:

subjects=["I", "You"]

verbs=["Play", "Love"]

objects=["Hockey","Football"]

for i in range(len(subjects)):

for j in range(len(verbs)):

for k in range(len(objects)):

sentence = "%s %s %s." % (subjects[i], verbs[j], objects[k])

print sentence

#----------------------------------------#

Please write a program to print the list after removing delete even numbers in [5,6,77,45,22,12,24].

Hints:

Use list comprehension to delete a bunch of element from a list.

Solution:

li = [5,6,77,45,22,12,24]

li = [x for x in li if x%2!=0]

print li

#----------------------------------------#

Question:

By using list comprehension, please write a program to print the list after removing delete numbers which are divisible by 5 and 7 in [12,24,35,70,88,120,155].

Hints:

Use list comprehension to delete a bunch of element from a list.

Solution:

li = [12,24,35,70,88,120,155]

li = [x for x in li if x%5!=0 and x%7!=0]

print li

#----------------------------------------#

Question:

By using list comprehension, please write a program to print the list after removing the 0th, 2nd, 4th,6th numbers in [12,24,35,70,88,120,155].

Hints:

Use list comprehension to delete a bunch of element from a list.

Use enumerate() to get (index, value) tuple.

Solution:

li = [12,24,35,70,88,120,155]

li = [x for (i,x) in enumerate(li) if i%2!=0]

print li

#----------------------------------------#

Question:

By using list comprehension, please write a program generate a 3\*5\*8 3D array whose each element is 0.

Hints:

Use list comprehension to make an array.

Solution:

array = [[ [0 for col in range(8)] for col in range(5)] for row in range(3)]

print array

#----------------------------------------#

Question:

By using list comprehension, please write a program to print the list after removing the 0th,4th,5th numbers in [12,24,35,70,88,120,155].

Hints:

Use list comprehension to delete a bunch of element from a list.

Use enumerate() to get (index, value) tuple.

Solution:

li = [12,24,35,70,88,120,155]

li = [x for (i,x) in enumerate(li) if i not in (0,4,5)]

print li

#----------------------------------------#

Question:

By using list comprehension, please write a program to print the list after removing the value 24 in [12,24,35,24,88,120,155].

Hints:

Use list's remove method to delete a value.

Solution:

li = [12,24,35,24,88,120,155]

li = [x for x in li if x!=24]

print li

#----------------------------------------#

Question:

With two given lists [1,3,6,78,35,55] and [12,24,35,24,88,120,155], write a program to make a list whose elements are intersection of the above given lists.

Hints:

Use set() and "&=" to do set intersection operation.

Solution:

set1=set([1,3,6,78,35,55])

set2=set([12,24,35,24,88,120,155])

set1 &= set2

li=list(set1)

print li

#----------------------------------------#

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.

Hints:

Use set() to store a number of values without duplicate.

Solution:

def removeDuplicate( li ):

newli=[]

seen = set()

for item in li:

if item not in seen:

seen.add( item )

newli.append(item)

return newli

li=[12,24,35,24,88,120,155,88,120,155]

print removeDuplicate(li)

#----------------------------------------#

Question:

Define a class Person and its two child classes: Male and Female. All classes have a method "getGender" which can print "Male" for Male class and "Female" for Female class.

Hints:

Use Subclass(Parentclass) to define a child class.

Solution:

class Person(object):

def getGender( self ):

return "Unknown"

class Male( Person ):

def getGender( self ):

return "Male"

class Female( Person ):

def getGender( self ):

return "Female"

aMale = Male()

aFemale= Female()

print aMale.getGender()

print aFemale.getGender()

#----------------------------------------#

Question:

Please write a program which count and print the numbers of each character in a string input by console.

Example:

If the following string is given as input to the program:

abcdefgabc

Then, the output of the program should be:

a,2

c,2

b,2

e,1

d,1

g,1

f,1

Hints:

Use dict to store key/value pairs.

Use dict.get() method to lookup a key with default value.

Solution:

dic = {}

s=raw\_input()

for s in s:

dic[s] = dic.get(s,0)+1

print '\n'.join(['%s,%s' % (k, v) for k, v in dic.items()])

#----------------------------------------#

Question:

Please write a program which accepts a string from console and print it in reverse order.

Example:

If the following string is given as input to the program:

rise to vote sir

Then, the output of the program should be:

ris etov ot esir

Hints:

Use list[::-1] to iterate a list in a reverse order.

Solution:

s=raw\_input()

s = s[::-1]

print s

#----------------------------------------#

Question:

Please write a program which accepts a string from console and print the characters that have even indexes.

Example:

If the following string is given as input to the program:

H1e2l3l4o5w6o7r8l9d

Then, the output of the program should be:

Helloworld

Hints:

Use list[::2] to iterate a list by step 2.

Solution:

s=raw\_input()

s = s[::2]

print s

#----------------------------------------#

Question:

Please write a program which prints all permutations of [1,2,3]

Hints:

Use itertools.permutations() to get permutations of list.

Solution:

import itertools

print list(itertools.permutations([1,2,3]))

#----------------------------------------#

Question:

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?

Hint:

Use for loop to iterate all possible solutions.

Solution:

def solve(numheads,numlegs):

ns='No solutions!'

for i in range(numheads+1):

j=numheads-i

if 2\*i+4\*j==numlegs:

return i,j

return ns,ns

numheads=35

numlegs=94

solutions=solve(numheads,numlegs)

print solutions

#----------------------------------------#