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| --- |
| Question 1 |
|  | Level 1 |
|  |  |
|  | Question: |
|  | Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, |
|  | between 2000 and 3200 (both included). |
|  | The numbers obtained should be printed in a comma-separated sequence on a single line. |
|  |  |
|  | Hints: |
|  | Consider use range(#begin, #end) method |
|  |  |
|  | Solution: |
|  | l=[] |
|  | for i in range(2000, 3201): |
|  | if (i%7==0) and (i%5!=0): |
|  | l.append(str(i)) |
|  |  |
|  | print ','.join(l) |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 2 |
|  | Level 1 |
|  |  |
|  | Question: |
|  | 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 |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  |  |
|  | Solution: |
|  | def fact(x): |
|  | if x == 0: |
|  | return 1 |
|  | return x \* fact(x - 1) |
|  |  |
|  | x=int(raw\_input()) |
|  | print fact(x) |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 3 |
|  | Level 1 |
|  |  |
|  | Question: |
|  | 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} |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  | Consider use dict() |
|  |  |
|  | Solution: |
|  | n=int(raw\_input()) |
|  | d=dict() |
|  | for i in range(1,n+1): |
|  | d[i]=i\*i |
|  |  |
|  | print d |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 4 |
|  | Level 1 |
|  |  |
|  | Question: |
|  | 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') |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  | tuple() method can convert list to tuple |
|  |  |
|  | Solution: |
|  | values=raw\_input() |
|  | l=values.split(",") |
|  | t=tuple(l) |
|  | print l |
|  | print t |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 5 |
|  | Level 1 |
|  |  |
|  | Question: |
|  | Define a class which has at least two methods: |
|  | getString: to get a string from console input |
|  | printString: to print the string in upper case. |
|  | Also please include simple test function to test the class methods. |
|  |  |
|  | Hints: |
|  | Use \_\_init\_\_ method to construct some parameters |
|  |  |
|  | Solution: |
|  | class InputOutString(object): |
|  | def \_\_init\_\_(self): |
|  | self.s = "" |
|  |  |
|  | def getString(self): |
|  | self.s = raw\_input() |
|  |  |
|  | def printString(self): |
|  | print self.s.upper() |
|  |  |
|  | strObj = InputOutString() |
|  | strObj.getString() |
|  | strObj.printString() |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 6 |
|  | Level 2 |
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|  | Question: |
|  | 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 |
|  |  |
|  | Hints: |
|  | If the output received is in decimal form, it should be rounded off to its nearest value (for example, if the output received is 26.0, it should be printed as 26) |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  |  |
|  | Solution: |
|  | #!/usr/bin/env python |
|  | import math |
|  | c=50 |
|  | h=30 |
|  | value = [] |
|  | items=[x for x in raw\_input().split(',')] |
|  | for d in items: |
|  | value.append(str(int(round(math.sqrt(2\*c\*float(d)/h))))) |
|  |  |
|  | print ','.join(value) |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 7 |
|  | Level 2 |
|  |  |
|  | Question: |
|  | 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]] |
|  |  |
|  | Hints: |
|  | Note: In case of input data being supplied to the question, it should be assumed to be a console input in a comma-separated form. |
|  |  |
|  | Solution: |
|  | input\_str = raw\_input() |
|  | dimensions=[int(x) for x in input\_str.split(',')] |
|  | rowNum=dimensions[0] |
|  | colNum=dimensions[1] |
|  | multilist = [[0 for col in range(colNum)] for row in range(rowNum)] |
|  |  |
|  | for row in range(rowNum): |
|  | for col in range(colNum): |
|  | multilist[row][col]= row\*col |
|  |  |
|  | print multilist |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 8 |
|  | Level 2 |
|  |  |
|  | Question: |
|  | 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 |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  |  |
|  | Solution: |
|  | items=[x for x in raw\_input().split(',')] |
|  | items.sort() |
|  | print ','.join(items) |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 9 |
|  | Level 2 |
|  |  |
|  | Question£º |
|  | Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized. |
|  | Suppose the following input is supplied to the program: |
|  | Hello world |
|  | Practice makes perfect |
|  | Then, the output should be: |
|  | HELLO WORLD |
|  | PRACTICE MAKES PERFECT |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  |  |
|  | Solution: |
|  | lines = [] |
|  | while True: |
|  | s = raw\_input() |
|  | if s: |
|  | lines.append(s.upper()) |
|  | else: |
|  | break; |
|  |  |
|  | for sentence in lines: |
|  | print sentence |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 10 |
|  | Level 2 |
|  |  |
|  | Question: |
|  | 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 |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  | We use set container to remove duplicated data automatically and then use sorted() to sort the data. |
|  |  |
|  | Solution: |
|  | s = raw\_input() |
|  | words = [word for word in s.split(" ")] |
|  | print " ".join(sorted(list(set(words)))) |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | Question 11 |
|  | Level 2 |
|  |  |
|  | Question: |
|  | Write a program which accepts a sequence of comma separated 4 digit binary numbers as its input and then check whether they are divisible by 5 or not. The numbers that are divisible by 5 are to be printed in a comma separated sequence. |
|  | Example: |
|  | 0100,0011,1010,1001 |
|  | Then the output should be: |
|  | 1010 |
|  | Notes: Assume the data is input by console. |
|  |  |
|  | Hints: |
|  | In case of input data being supplied to the question, it should be assumed to be a console input. |
|  |  |
|  | Solution: |
|  | value = [] |
|  | items=[x for x in raw\_input().split(',')] |
|  | for p in items: |
|  | intp = int(p, 2) |
|  | if not intp%5: |
|  | value.append(p) |
|  |  |
|  | print ','.join(value) |
|  | #----------------------------------------# |
|  |  |
|  | #----------------------------------------# |
|  | 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 |
|  |  |
|  | #----------------------------------------# |
|  |  |
|  |  |