

Python Programming Assignment # 2

Instructions

For each of the following problems, create an error free efficient Python program. Each program should be submitted in a separate Python file respectively that follows a particular naming convention. (E.g. The Python program for Question 1 should be in .py file with name Assign1Answer1.py. The Python program for question 2 should be in .py file with name Assign1Answer2.py. The program should execute properly either in PyCharm or in Jupyter Notebook)

Submit your assignment by Monday 15 September 2018 EoD.

Problems

Problem 1:

(10 points)

Write a Python program that uses function ***def printPattern(num_rows)*** to construct the following pattern, using a nested for loop. The function receives as input the number of rows in a pattern. E.g. `printPattern(9)` prints the following pattern:

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

Problem 2:

(10 points)

A non-empty array A consisting of N integers is given. A pair of integers (P, Q), such that $0 \leq P \leq Q < N$, is called a slice of array A. The sum of a slice (P, Q) is the total of $A[P] + A[P+1] + \dots + A[Q]$.

Write a Python program which uses function ***def maximumSlice(A)*** such that, given an array A consisting of N integers, returns the maximum sum of any slice of A.

For example, given array A such that:

$A[0] = 3$ $A[1] = 2$ $A[2] = -6$

$A[3] = 4$ $A[4] = 0$

the function should return 5 because:

(3, 4) is a slice of A that has sum 4,

(2, 2) is a slice of A that has sum -6,

(0, 1) is a slice of A that has sum 5,
no other slice of A has sum greater than (0, 1).

Problem 3:

(10 points)

You are given an array A consisting of N integers. For each number $A[i]$ such that $0 \leq i < N$, we want to count the number of elements of the array that are not the divisors of $A[i]$. We say that these elements are non-divisors. For example, consider integer $N = 5$ and array A such that:

$A[0] = 3$

$A[1] = 1$

$A[2] = 2$

$A[3] = 3$

$A[4] = 6$

For the following elements:

$A[0] = 3$, the non-divisors are: 2, 6 (total: 2)

$A[1] = 1$, the non-divisors are: 3, 2, 3, 6 (total: 4)

$A[2] = 2$, the non-divisors are: 3, 3, 6 (total: 3)

$A[3] = 3$, the non-divisors are: 2, 6 (total: 2)

$A[4] = 6$, there aren't any non-divisors. (total 0)

Write a Python program which uses function ***def nonDivisors(A)*** such that, given an array A consisting of N integers, returns a sequence of integers representing the number of non-divisors. Result array should be returned as an array of integers.

For example, given:

$A[0] = 3$

$A[1] = 1$

$A[2] = 2$

$A[3] = 3$

$A[4] = 6$

the function should return [2, 4, 3, 2, 0], as explained above.