

## Python Workshop 9 Course Work

Answer the questions given below and submit your work to the Canvas portal provided by the end of **next week's** workshop session.

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1. Write and test a function `letterCounts(text)` that calculates how many times each letter of the alphabet occurs in `text` and returns a list of these 26 counts. For example, `letterCounts('the fat cat')` should return  
`[2,0,1,0,1,0,0,1,0,0,0,0,0,1,0,0,0,0,0,3,0,0,0,0,0,0]`.
2. Write and test two functions, `encode(text, key)` and `decode(code, key)`, that implement a substitution cipher with a key. `text`, `code`, and `key` are strings, and each of the functions returns a string.
3. Find on the Internet a description of the Vigenere cipher. Write and test `encode(text, key)` and `decode(code, key)` that use that cipher.
4. Write and test a function `getDigits(s)` that returns a string of all digits found in `s` (in the same order). For example, `getDigits('**1.23a-42')` should return `'12342'`.
5. Recall that a valid name in Python can have letters, digits, and underscore characters and cannot start with a digit. Write a function `isValidName(s)` that returns `True` if `s` represents a valid name in Python; otherwise your function should return `False`. Test your function on the following strings:

Valid:	Invalid:
'bDay'	'1a'
'A0'	'#A'
'_a_1'	'1_a'
'_1amt'	'[a]'
'__'	' ABC'
'_'	' '
	'A#'
	'A-2'
	'a_5+'

6. Write a new function `getDigitsR(s)` in answer to question 4, but this time as recursive function. For example, `getDigitsR('+2.93x**4.2')` should return `'29342'`.