

# COL100: Lab 5

February 5, 2017

## Part 1: Functions, Variable Scoping, Dictionaries

1. Calling a Function
2. The Anonymous Functions: lambda functions
3. The return Statement
4. Global vs. Local variables
5. Accessing Values in Dictionary
6. Updating and Deleting Dictionary Elements
7. Iterating over elements in a Dictionary

References:

Functions: [https://www.tutorialspoint.com/python/python\\_functions.htm](https://www.tutorialspoint.com/python/python_functions.htm)

Dictionary: [https://www.tutorialspoint.com/python/python\\_dictionary.htm](https://www.tutorialspoint.com/python/python_dictionary.htm)

## Part 2: Sorting, Map

1. Write a Python function to sort a list of integers using Bubble Sort.
2. Write a Python function, `checkPrime(a)` to check if the given number is prime or not. Take an integer as input from the user, and use this function (`checkPrime(int a)`) to express the integer as a sum of two prime numbers. Choose the numbers in such a way that the first number is the smallest possible prime number. If it is not possible to do so, the program should print 0. For example,  $22 = 3 + 19$  or  $5 + 17$ , but the program should print "3 19". For 27, it should print "0".
3. Write a python program to count the frequency of each character in an input string using dictionary.
4. Write a Python function which takes as input a list of tuples (RollID, CollegeName) and returns a dictionary with CollegeName as key and list of RollIDs as value. **Note:** RollIDs are unique for a particular college.

## Part2: Practice Questions

1. Write a Python function to sort a list of integers using Selection Sort.
2. Write a Python function to check whether the given string contains the correct pair of parenthesis. Your program should return 'true' if the string contains nesting of zero or more pairs of parenthesis, like "`((()))`" or "`((()))`" otherwise return 'false'.

3. Write a Python function `encrypt(str,k)` to encrypt a string using Caesar's cipher, and print it. If  $p$  is some plaintext (i.e., an unencrypted message),  $p_i$  is the  $i$ th character in  $p$ , and  $k$  is a secret key (i.e., a non-negative integer), then each letter,  $c_i$ , in the ciphertext (i.e the encrypted message),  $c$ , is computed as:  $c_i = (p_i + k) \% 26$ . The user has to enter the string to be encrypted, and the key. Then each letter in the plaintext is 'shifted' by a certain number of places. For example, if the string is "Hello!", and the key is 3, the encrypted text becomes "Khoor!".
4. Write another function `decrypt(str,k)` to decrypt a string using Caesar's cipher, and print it.