CS5001: Lab 5. Due on Friday, Oct-13-2023.

Name(s): Xujia Qin

Email(s): qin.xuj@northeastern.edu

You can work on this lab either individually or in small group of two or three students. If working in a group, include names of all the students in the submission PDF.

Getting credit for this lab. This lab handout has several empty boxes that prompt you to answer a question. As part of the lab, you are to write the answers to these questions inside the boxes/blanks. When you are finished, you should create a PDF and upload it on Canvas. If you don't finish, you have until 11:59 PM on Friday, Oct-13-2023 to submit.

What computer to use? If your primary computer is a laptop, bring it to the lab to work on, as lab is an excellent opportunity to get started with Python on your machine. You should follow the instructions on the course website. Ask a TA for help if you have problems with your installation. If you prefer, you could also use one of the machines in the lab room to work on this lab assignment.

Lab Materials. Lab materials can always be found on Canvas under the appropriate lab posting.

For today's lab, you need this handout (which is also online).

1 String methods

Assume that s = 'February 16, 2016'. Fill in the blank boxes below. Notes column is optional. (**32 points** = 4 points each box. No credit shall be given for empty boxes.)

	Expression	I Think the Value Is	Python Says	Notes
1	`s.count('1')`	2	2	s.find() returns the index the first occurrence of the string occurs, or -1 if string is not found.
2	`s.find('f')`	-1	-1	
3	`s.replace(' ','/')`	'February/16,/2016'	'February/16,/2016'	s.find("16") = 9 s[9] = 1
5	`s[s.find('16')]`	1	1	

2 Boolean entities

2.1 Suppose s1 and s2 are non-empty strings. Why is the Boolean expression

s1.find(s2)>0 and s2.find(s1)>=0

always False? **(14 points)**

The first expression:
s1.find(s2)>0 means we can find one or more occurrence of s2 in s1, which means the length of s1 > s2 (s1 includes s2)

The second expression:
s2.find(s1)>=0 means we can find one or more occurrence of s1 in s2, and the first occurrence index of s1 is possibly be 0.
It implies the length of s2 >= s1 (s2 includes s1, or they are equal)

The contradiction occurs, thereby, s1.find(s2)>0 and s2.find(s1)>=0 is always False.

2.2 Rewrite the following function so that it does exactly the same thing but has just one return statement. You may assume that B1, B2, and B3 are Boolean-valued. **(15 points)**

```
def f(B1,B2,B3):
        if B1:
            return 1
        elif B2:
            return 2
        elif B3:
            return 3
        else:
            return 4
```

```
def f(B1, B2, B3):
    if B1:
        result = 1
    elif B2:
        result = 2
    elif B3:
        result = 3
    else:
        result = 4
    return result
```

3 Loops of the form for c in s

3.1 Without using the computer, what would be the output if the following script is run? **(13 points)**

```
s = 'abcd'
t = ''
for c in s:
        t = c + t + c
print(t)
```

dcbaabcd

3.2 Correct the implementation of this function so that it lives up to its specification. Do this without using the computer and it is <u>not fair</u> using the string method count in this question! **(13 points)**

```
def MyCount(x,S):
        """Returns an int that is the number of times x occurs in S

        PreC: x is a character and S is a string
        """
        for c in S:
            if x==S:
            N  =  N+1
            return N
```

```
def MyCount(x,S):
    """Returns an int that is the number of times x occurs in S
    PreC: x is a character and S is a string
    """
    N = 0  #initialize the counter variable = 0
    for c in S:
        if x==c: # c is the char looping in the S string, so we should set the if condition as if x ==c
            N = N+1 #indentation
        return N
```

3.3 Assume that S is a string. Describe (in English) what the following script prints if it is run. **Hint**: Hand execute with some simple examples like S = ’a’ and S = ’abcde’. **(13 points)**

```
k  =  0
T = ’’        # The empty string
for c in S:
            if k%2==0:
                  T  =  c  +  T
            k  =  k+1
print(T)
```

The scripts will print the reverse order of the characters which are at an even-indexed position (0,2,4,6,…)