15-110 - Quiz2 - 10/06/2021

Name: _____ andrewID: _____

- This quiz tests material from weeks 1-4 of the course (primarily weeks 3-4).
- You have **20 minutes** to take the quiz.
- If you have a clarification question, raise your hand and a proctor will come help you.
- You must complete the quiz **individually**. You may refer to paper notes during the quiz, but do not communicate with anyone else.

1. Control Structures - Code Writing [35pts]

Write a function `threeFactors(x)` that takes an integer `x` as a parameter and returns a string that organizes all the factors of 3 and all the non-factors of 3 from 1 up to the number `x` (including `x`) into two groups. The factors and non-factors in the string should follow a specific format that is separated by commas, as shown in the example below.

For example, calling `threeFactors(21)` should return the string:
`"F:3,6,9,12,15,18,21,_NF:1,2,4,5,7,8,10,11,13,14,16,17,19,20,"`

Whereas calling `threeFactors(10)` should return the string:
`"F:3,6,9,_NF:1,2,4,5,7,8,10,"`

You are guaranteed that the function will only be called on positive integers.

2. Loops - Code Reading [32pts]

Consider the following Python function, which is called on a pair of integers:

```
def f(a, b):
    for i in range(1, 10):
        if a % i == 0:
            print("a:", a, i)
        elif b % i == 0:
            print("b:", b, i)

    print("---")

    x = 0
    while x < b:
        x = x + a
        print(x)
```

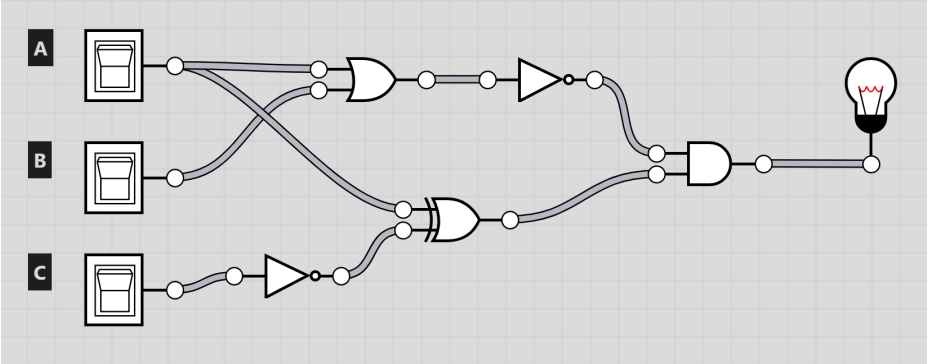
What is printed when you call **`f(3, 6)`**?

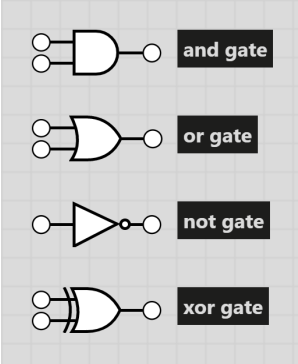
Is it possible to call `f` on a pair of valid arguments such that it prints nothing to the console? If yes, give an example pair of arguments. If no, explain why not.

Is it possible to call `f` on a pair of valid arguments such that the call gets stuck in an infinite loop? If yes, give an example pair of arguments. If no, explain why not.

3. Circuits and Gates - Short Answer [18pts]

Given the following circuit, what is the corresponding **Boolean expression**? Note that a key mapping gates to their names has been provided for you on the right.





Boolean expression:

4. Indexing and Slicing - Short Answer [15pts]

Given the following variable assignment, what will each of the provided expressions evaluate to?

```
s = "You_can_do_it!!"
```

`s[5]`	
`s[2:len(s)-1:2]`	
`s[:6]`	