CIS 122 Summer 2019
Challenge Problems – Set 1

Welcome to the first set of challenge problems! Challenge problems will not be guaranteed to follow our material exactly – meaning that solutions to these problems may involve concepts or techniques that we haven't seen yet. They won't be too far off… but feel free to do some independent exploring in order to make them work.

1) Password Checker

Let's say that a valid password is one that is:

- at least 8 characters long
- contains at least 3 numbers
- contains at least one special character (non-alpha-numeric)
- contains at least one capital letter

Take a password as input from the user, and then determine whether or not it is valid. The specifics of the output are up to you – your program may simply print an informative message, or perhaps you can figure out how to set it up to continually prompt the user for a new password until they create a valid one.

Things we haven't covered: string methods, while loops.

2) Shift Cipher

A very simplistic way of encrypting a string might simply involve substituting each letter in the original string with a new letter that is a certain number of "spaces" away from the original letter. For example, if we shift all letters by 2, then the string "abc" would become "cde".
Write a program that takes a string from the user, as well as a number by which to shift the letters. The number can be positive, negative, and ANY magnitude. Your program should encrypt the string by substituting the letters with their shifted counterparts. It is up to you how to handle capital v.s. lowercase letters. The program should output the encrypted string.

Hint: use the % (modulo) operator to handle shift values that may be larger than the length of the alphabet. Remember that negative indexing is ok too.

3) SwApCaSe

Write a program that takes a string as input from the user. Output the original string, but with lower- and upper-case characters swapped. For example, “My name is Amie” becomes “mY NAME IS aMIE”.
Don’t use the following string methods: swapcase(), upper(), lower(). You can, however, use the isupper() and islower() methods.

Hint: try using the built-in function ord(), an ASCII table, and some arithmetic, and see if you can complete it like this.