**EXERCISE 1**

Below is some code that uses conditional statements. Your task is to determine:

* What is the *minimum* number of times something could print when this code is run? How do you know?
* What is the *maximum* number of times something could print when this code is run? How do you know?

Draw a flowchart — as demonstrated by an instructor in lecture — of what's happening in this code in your groups, on a dry erase board.

NOTE: There is no *single* way your flowcharts can be correct, but you'll want to try to make sure you're accurately representing what this code means.

abc = input("Enter something here:")

if len(abc) > 15:

print("long")

elif len(abc) < 12:

if "a" in abc:

print("has an a")

else:

print("has no a")

if 6 > 3:

print("gorgeous day")

if len(abc)== 4:

print("four!")

if "w" in abc:

print("great")

elif len(abc) == 14:

print("fourteen again")

else:

if "G" in abc.upper():

print("capitals")

**EXERCISE 2 - Designing, planning, and solving a problem with code**

To solve the following exercise, See interactive code box for Exercise 2, go to the \*\*Textbook > In Class > Lab Exercise: Conditionals and Dictionary Mechanics\*\*

You are provided a **dictionary** of U.S. states and other areas and their populations (keys are names of states, associated values are those states' populations), in code.

states = {

"California" = 39536653,

"Texas" = 28304596,

"Florida" = 20984400,

"New York" = 19849399,

"Pennsylvania" = 12805537,

"Illinois" = 12802023,

"Ohio" = 11658609,

"Georgia" = 10429379,

"North Carolina" = 10273419,

"Michigan" = 9962311,

"New Jersey" = 9005644,

"Virginia" = 8470020,

"Washington" = 7405743,

"Arizona" = 7016270,

"Massachusetts" = 6859819,

"Tennessee" = 6715984 ,

"Indiana" = 6666818,

"Missouri" = 6113532,

"Maryland" = 6052177,

"Wisconsin" = 5795483,

"Colorado" = 5607154,

"Minnesota" = 5576606,

"South Carolina" = 5024369,

"Alabama" = 4874747,

"Louisiana" = 4684333,

"Kentucky" = 4454189,

"Oregon" = 4142776,

"Oklahoma" = 3930864,

"Connecticut" = 3588184,

"Puerto Rico" = 3337177,

"Iowa" = 3145711,

"Utah" = 3101833,

"Arkansas" = 3004279,

"Nevada" = 2998039,

"Mississippi" = 2984100,

"Kansas" = 2913123,

"New Mexico" = 2088070,

"Nebraska" = 1920076,

"West Virginia" = 1815857,

"Idaho" = 1716943,

"Hawaii" = 1427538,

"New Hampshire" = 1342795,

"Maine" = 1335907,

"Rhode Island" = 1059639,

"Montana" = 1050493,

"Delaware" = 961939,

"South Dakota" = 869666,

"North Dakota" = 755393,

"Alaska" = 739795,

"District of Columbia" = 693972,

"Vermont" = 623657,

"Wyoming" = 579315,

"Guam" = 167358,

"U.S. Virgin Islands" = 107268,

"American Samoa" = 51504,

"Northern Mariana Islands" = 52263,

"Midway Atoll" = 40,

"Johnston Atoll" = 0,

"Wake Island" = 150,

"Palmyra Atoll" = 20

}

**For your reference, here is a list of all 50 current states in the United States:** [**https://simple.wikipedia.org/wiki/List\_of\_U.S.\_states**](https://simple.wikipedia.org/wiki/List_of_U.S._states) **(this list of includes commonwealths, protectorates, and other areas part of the U.S.)  
  
Your goal is to write code to accomplish the following:**

* **Get input from a user that is a string of state names, separated by commas** (e.g. "Michigan, California, Wyoming") -- assume the user will do this correctly
* From that input, use what you know about Python string methods and indexing, variable assignment, and dictionary mechanics in order to write a program that calculates and prints out **the total sum of all the states' populations entered -- ONLY for states/areas that have populations less than 5,000,000 (5 million).** If none of those states that the user entered have a population below 5 million, your program should print "None of those states have a population < 5 million."
  + There's a lot going on here! Spend some time carefully thinking about what you need to do this!
* So, for, example, if someone entered "Michigan, California, Wyoming", they should see a printout of the number 579,315, which is the listed population of Wyoming. (Both Michigan and California have a population larger than 5 million people.)
* Note that these numbers *will* be slightly outdated, but this is a programming exercise primarily.

**In order to accomplish your goal:**

* In groups, you should talk about your overall plan for accomplishing this.
* Make a list of the structures and tools you'll need -- your "toolbox" -- e.g. for loops? What string methods? Any built in functions? Etc.
* Write an English outline of what should happen, in order, to achieve this.
* Translate that into pseudocode (looks a lot like code, but might not have quite the right names or be a little syntactically messy).
* Then, try writing code, testing a little bit at a time.
* Try out examples where you *know* what the answer should be (like above) to see if your program works the way you expect it to!

It's OK if you don't get to a point where you've completed code. The practice of planning this out and understanding what has to happen is the most important.  
  
**CHALLENGE:**

If you finish this, you can consider: how would you change your code to handle users' mistakes? What if someone types "Michigan, Calfirona, Wyoming" as input or "Michigan, California, and Wyoming"? "Calfirona" is a mis-spelling so it is not a state; "and Wyoming" is also not a state. How could you write code to tell the user to try again if they make a mistake? (This is tricky! But there are also multiple ways to achieve this.)