Lab 4: Infinite Loops!
June 28, 2022

Description: The following problems below are small examples of the things that we have learned in the last week. Whenever you finish one of the problems, raise your hand or call me to your computer so we can check the problems together. Using techniques and functions/methods we have learned in class, try to do them in as few lines of code as possible. If at any point you have questions, please raise your hand.

1. Last week, we learned about while loops which were loops that continued running as long as a given condition was met. Look below for a refresher on a while loop. Keep in mind, the condition is underlined. If this condition solves to **True,** the loop will continue infinitely. That is why on line 5, we increment our variable "number" by 1 so that eventually, the loop will terminate. Copy and paste this code into your repl and remove the code on line 5 to notice the behavior. Note: To terminate the loop, click STOP at the top of the screen.

```
1      number = 5

2      while number < 5:
3      |
4      |       print(f"The current number is {number})
5      |       number += 1
```

2. Write a function called **microwave()** that accepts an argument called **time**. The time should be a string in the format MM:SS. Your function should start counting down from the time entered until the timer gets to 00:00 and print every value in between. Look for a sample output below.

```
02:20
02:19
02:18
.
.
.
02:01
02:00
01:59
01:17
01:16
01:15
.
.
.
```

01:01
01:00
00:59
00:58
.
.
.
00:02
00:01
00:00
Done!

3. Once you get to this point, raise your hand so I can check your progress.

_____

4. Another time of loop we learned about was a **for-loop**. A for loop iterates through each item in a given collection. A few examples of collections are lists, tuples, strings, and many more! You can find many reasons to use a for-loop.

5. In your repl, create 5 variables by copy and pasting the code below.

rangee = range(5)

_____

listt= [0,1,2,3]

_____

mixed_list = [True, "hello", 9.1, [0,1], 3, 'a']

_____

class = "Mathematics"

_____

6. Create a for loop and replace the {   } in the for loop with each one of the variables created above. Once you have seen the output printed to your console on the right, write the output on the line in question 4.

```
for i in {     }:
        print(i)
```

7. Once you get to this point, raise your hand so I can check your progress.

_____

8. A very useful and standard collection is the **list** datatype. Those are created by encompassing your values in brackets []. For example, grades = [90, 99, 88]. We created a list called grades and have the grades 90, 99, 88 in our list. They are separate values and we know this because of the comma in between them.
   Let's say we had a list called **phonebook** that stores our friends name and number.

   phonebook = [["Ashley", "214-555-9812"],["Thomas", "469-285-9332"],["Darnell", "817-214-9895"], ["Julio", "214-559-4567"] , ["Yanea", "817-232-7777"]]

   Notice that in our list, we have another list! This is called a "list of lists" since in our list phonebook, we have another list that holds [Name, Phone #].

9. Similar to question 6, replace the {   } with the variable phonebook from question 7. What does it print? Why do you think it prints what it does? Write down your thoughts below.

   _____

   _____

10. Your parents decided to buy you a new phone but, in the process, deleted most of your contact except your "close friends" list. Your teacher wants you to list out your close friends for a class activity and lucky for you, your phonebook has your five closest friends. Write a program called **close_friends()** that takes a list of lists variable called **phonebook** (like in question 7) and prints out **ONLY** the names the the console for your teacher.

11. Once you get to this point, raise your hand so I can check your progress.

12. Now that you are experienced in while loops, for-loops, and lists, you can push the limits on code you can write! These are very powerful tools for many projects moving forward. In the meantime, keep playing around with these three things and try and discover something that you didn't know. Try as many of these that you can. If you cannot code them, then write how you would approach solving them.

a. How could you iterate through a list and print out both the value and the index of that value in only **2 lines of code**.

b. How would you use a loop to find if a word is a palindrome? For example, the string "tacocat" is "tacocat" backwards such as "racecar" is "racecar" backwards.

c. How could you use a loop and conditional statement to determine if a list of numbers is increasing? For example, [3, 6, 9, 11] would have the output True while [3, 9, 80, 50] would be False.

d. How could you iterate through a list and **ONLY** print out the items whose index is an even number?

e. How could you use a list and loop to remove duplicates from a list? For example, the list c should be [4, 1, 7, 3, 61, 9, 0]

13. Once you get to this point, raise your hand so I can check your progress!