**Module 5: Critical Thinking Assignment**

Chioma Chance

CSC500

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# Introduction

For this assignment we were given two parts. In part one I explored the challenges that came with developing code that would iterate over different intervals. The outer loop iterates once for the number of years and then the inner loop iterating twelve times (once per each month). For part two, we are prompted to build a code that follows the CSU bookstore points criteria. Using if-else to build a code that printed a certain statement when a certain input triggered a line. This is how each part was set up.

## Part 1: Average Rainfall

**Pseudocode:**

START

// Initialize Variables:

Set total\_rainfall to 0

Create a list, *months*, containing the name of all 12 months

// Input Gathering:

Prompt user to ‘Enter the number of years’ stored in the variable, *years*

// Data Collection and Setting Boundaries:

For each year from 1 to *years*:

Print the current year

For each *month* in *months*:

Prompt user to enter inches of *rainfall* for current month

Add imputed *rainfall* to *total\_rainfall*

// Calculate Totals and Averages

Calculate *total\_months* as years \* 12

if *total\_months* is greater than 0:

*avg\_rainfall* is determined by *total\_rainfall* / *total\_months*

else:

*avg\_rainfall* is 0

// Print statements:

Print total months

Print total inches of rainfall

Print average rainfall per month

// Plural and Singular printing:

If *years* is 1:

Print ‘Data was collected for 1 year.

Else:

Print ‘Data was collected for X years.’

(X = *years*)

END

**Source code:**

'using nested loops to collect data and calculate avg rainfall'

# input gathering

years = int(input('Enter number of years:\n'))

months = ['January', 'February', 'March', 'April',

          'May', 'June', 'July', 'August',

          'September', 'October','November', 'December']

# initiate total rainfall

total\_rainfall = 0

# setting boundaries / data collection

for year in range(years): # outer loop for each year

    print(f'Year {year + 1}')

    for month in months: # inner loop for each month

        rainfall = float(input('Enter the inches of rainfall ' \

                                f'for {month}:\n'))

        total\_rainfall += rainfall

#calculate months

total\_months = years \* 12

# calculate average rainfall per month

if total\_months > 0:

    avg\_rainfall = total\_rainfall / total\_months

else:

    avg\_rainfall = 0

# print statements

print(f'Total number of months:, {total\_months}')

print(f'Total inches of rainfall: {total\_rainfall}')

print(f'Average rainfall per month: {avg\_rainfall:.2f}')

# singular and plural

if years == 1:

    print(f'Data was collected for {years} year.')

else:

    print(f'Data was collected for {years} years.')

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# Part 2: CSU Global Bookstore

**Pseudocode:**

// Enter Valid Input:

INITIALIZE valid\_input to False

WHILE *valid\_input* is False

PROMPT user to enter books purchased this month (valid numbers are: 0, 2, 4, 6, 8 or more)

STORE *user\_input* in books

IF books in [0, 2, 4, 6] or books >= 8

SET *valid\_input* to TRUE

ELSE

PRINT ‘Invalid input. Please enter 0, 2, 4, 6, or 8 or more.’

// Set Criteria for Points:

IF books is 2

PRINT this month you purchased 2 books, you earn 5 points’

IF books is 4

PRINT this month you purchased 4 books, you earn 15 points’

IF books is 6

PRINT this month you purchased 2 books, you earn 30 points’

IF books is 8 or more

PRINT this month you purchased *{books}* books, you earn 60 points’

ELSE

PRINT this month you purchased 0 books, you earn 0 points’

END

**Source code:**

"Points Awarded by CSU Bookstore"

# enter valid input

valid\_input = False

while not valid\_input:

    books = int(input('Enter books purchased this month'

                      '(valid numbers are: 0, 2, 4, 6, 8 or more):\n'))

    if books in [0, 2, 4, 6] or books >= 8:

        valid\_input = True

    else:

        print('Invalid input. Enter either 0, 2, 4, 6, or 8 or more')

# set criteria for total books\_purchased:

if books == 2:

    print(f'This month you purchased {books} books, you earn 5 points')

elif books == 4:

    print(f'This month you purchased {books} books, you earn 15 points')

elif books == 6:

    print(f'This month you purchased {books} books, you earn 30 points')

elif books >= 8:

    print(f'This month you purchased {books} books, you earn 60 points')

else:

    print(f'This month you purchased {books} books, you earn 0 points')

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# **GIT repository link**

<https://github.com/Ch1T1me/CSC500.git>

# **Challenges**

During this assignment I faced many challenges in part 1. I kept going back and forth on whether I wanted to use a def(function) or not. Every time I would start my code, I found myself doing a lot of staring; at my code and online examples I found on ZyBooks labs. It’s not that I don’t understand how to use ‘def’, I simply need more practice with it. In the end I decided that today wasn’t going to add to the more practice I needed and went ahead with use a, for statement. Once I figured out a structure for my code, I was finally able to begin coding. I think the first sections I completed were the “input gathering”, “initiating total\_rainfall”, and then the “print statements”. I use a LOT of resources for the meat of this code. I knew what I was doing but had a bunch of strands everywhere with no flow. I am now proud to say that I finished it, despite the run it gave me for my money.

Part 2 was ten times easier than 1. I got held back a little bit on deciding whether I would completely restrict the user from entering a number not listed in the points criteria or come up with a formula to garner points for the unlisted numbers (1, 3, 5, and 7). I obviously decide against the latter, seeing that it would be more tedious. I remembered a video on the LinkedIn learning you provided for us in Module 4 on how to prevent users from inputting values not within the limits given to them, and prompt them to then do so correctly. Did I think I would ever use that video in this class? No. Dis it help me tremendously? Yes!

# **References**

ZyBooks: CSC500: Principles of Programming (Labs 5.11 - 5.18)

<https://www.geeksforgeeks.org/statement-indentation-and-comment-in-python/>

<https://www.geeksforgeeks.org/python-membership-identity-operators-not-not/>

<https://www.linkedin.com/learning/c-plus-plus-essential-training-for-career-changers/when-to-use-a-do-while-loop?autoAdvance=false&u=2245842>

<https://youtu.be/6iF8Xb7Z3wQ?si=opX-yX8bgPJa4yjB>