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**CSC121 PYTHON Programming**

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LAB 04 **ITERATIVE CONTROL STRUCTURES**

# Objectives

In this lab assignment, students will learn:

- How to use loops to solve problems

- How to write while statements

- How to write indefinite loops

- How to write definite loops

# Goals

In this lab assignment, students will demonstrate the abilities to:

- Use loops to solve problems

- Write while statements

- Write indefinite loops

- Write definite loops

# Instruction and Problems

Write a Python program for each of the problems in this lab.

Please use PyCharm to type and test your programs. Submit the Python files to Blackboard for credit. In this lab, you should submit 4 Python files, one for each problem.

## Problem 1

A high school senior is applying for colleges. He wants a program to calculate the out-of-pocket cost for attending each college he is applying. The out-of-pocket cost is determined by the following formula:

*out-of-pocket cost = tuition + room + board + other expenses – financial aid*

Write a program to calculate the out-of-pocket cost of every college he is applying. After each college, ask the user whether to calculate cost for another college. Enter ‘y’ for yes. The following is an example:

Enter name of college: Wake Tech

Enter tuition: 8500

Enter room: 6000

Enter board: 4000

Enter other expenses: 3000

Enter financial aid: 2000

Out-of-pocket cost for this college: 19500

Calculate cost for another college? [y/n] y

Enter name of college: Jefferson College

Enter tuition: 35000

Enter room: 7000

Enter board: 4500

Enter other expenses: 5000

Enter financial aid: 22000

Out-of-pocket cost for this college: 29500

Calculate cost for another college? [y/n] y

Enter name of college: Freedom University

Enter tuition: 20000

Enter room: 10000

Enter board: 5000

Enter other expenses: 5000

Enter financial aid: 30000

Out-of-pocket cost for this college: 10000

Calculate cost for another college? [y/n] n

Save your Python program in a file named **Lab04P1.py**. Submit the file to Blackboard for credit.

## Problem 2

We wrote the following program to calculate BTU needed to cool a room.

roomLength = float(input(**'Enter room length: '**))  
roomWidth = float(input(**'Enter room width: '**))  
roomHeight = float(input(**'Enter room height: '**))  
roomVolume = roomLength \* roomWidth \* roomHeight  
btuNeeded = roomVolume \* 3.5  
print(**'BTU needed for this room:'**, btuNeeded)

Modify the program by adding error checking loops. Room length, width and height must all be greater than 0. Every time the user enters a negative number, display an error message and ask the user to re-enter a valid value immediately. The following is an example

Enter room length: -12

Error: Room length cannot be negative.

Enter room length: 15

Enter room width: -11

Error: Room width cannot be negative.

Enter room width: 11

Enter room height: -10

Error: Room height cannot be negative.

Enter room height: 10

BTU needed for this room: 5775.0

Save your Python program in a file named **Lab04P2.py**. Submit the file to Blackboard for credit.

## Problem 3

An online store is selling DVDs for $4.99 each. The buyer pays a shipping and handling fee of $2.99 for the whole order. Write a program to calculate the bill for multiple customers. First ask the user to enter the number of customers. Then for each customer, enter the number of DVDs purchased. Calculate and display the bill for each customer. The following is an example.

How many customers? 3

Customer 1

Enter number of discs purchased: 2

Please pay this amount: 12.97

Customer 2

Enter number of discs purchased: 1

Please pay this amount: 7.98

Customer 3

Enter number of discs purchased: 6

Please pay this amount: 32.93

Save your Python program in a file named **Lab04P3.py**. Submit the file to Blackboard for credit.

## Problem 4

A classical music radio station is currently raising fund. Listeners call in to make a donation to support the station. Write a program to do the following. Ask the user to enter the number of donors today. Then use a loop to get the amount donated by each donor. Calculate and display the total donation for the day. The following are two examples:

How many people made donations today? 6

You will be asked to enter the amount of donation made by each donor.

Enter amount of donation: 50

Enter amount of donation: 100

Enter amount of donation: 80

Enter amount of donation: 70

Enter amount of donation: 50

Enter amount of donation: 40

Total amount of money raised today: 390

How many people made donations today? 4

You will be asked to enter the amount of donation made by each donor.

Enter amount of donation: 400

Enter amount of donation: 60

Enter amount of donation: 75

Enter amount of donation: 30

Total amount of money raised today: 565

Save your Python program in a file named **Lab04P4.py**. Submit the file to Blackboard for credit.

# Grading rubric for Each Problem

Writing loop [15 points]

Other statements [10 points]