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**CSC121 PYTHON Programming**

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LAB 07 **FUNCTIONS [PART 1]**

# Objectives

In this lab assignment, students will learn:

- How to define functions

- How to invoke functions

- How to pass data to a function when it is invoked

- How to write programs with multiple functions

# Goals

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

- write code to define functions

- write code to invoke functions

- write code to pass data to a function when it is invoked

- write programs with multiple functions

# 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 5 Python files, one for each problem.

## Problem 1

A health insurance company wants a program to promote health and fitness. This program can do two things: calculate BMI (Body Mass Index) and determine whether a person has high blood pressure. To calculate BMI, the user must enter his height (in inches) and weight (in pounds). Us the following formula to calculate BMI:

BMI = (703 \* weight) / (height\*height)

To determine whether a person has high blood pressure, the user must enter his systolic pressure and diastolic pressure. If the systolic pressure >= 140 or the diastolic pressure is >= 90, he has high blood pressure.

Define and use the following two functions in this program:

calc\_bmi: Get height and weight from the user. Calculate and display BMI.

hypertension: Get systolic pressure and diastolic pressure from the user. Determine and display whether the user has high blood pressure.

Also write and use a main function to implement the mainline logic of the program. The user calculates BMI first, then determines whether the user has high blood pressure. The following is an example.

Health and Fitness Program

Enter height (in inches): 66

Enter weight (in pounds): 143

Your BMI is: 23.078282828282827

Enter your systolic pressure: 120

Enter your diastolic pressure: 80

You do not have high blood pressure.

Save your Python program in a file named **Lab07P1.py**. Submit the file to Blackboard for credit.

## Problem 2

Some users of the program in Problem 01 do not want to do both health tests. Rewrite the program so the user can choose one of the following:

1. Calculate BMI only
2. Determine high blood pressure only
3. Do both

The following is an example.

Health and Fitness Program

Enter 1 to calculate BMI only

Enter 2 to determine whether you have high blood pressure only

Enter 3 to do both

Enter your choice: 3

Enter height (in inches): 67

Enter weight (in pounds): 150

Your BMI is: 23.490755179327245

Enter your systolic pressure: 132

Enter your diastolic pressure: 91

You have high blood pressure.

Save your Python program in a file named **Lab07P2.py**. Submit the file to Blackboard for credit.

## Problem 3

Write a program to calculate tuition for students of a community college. In-state students pay $60 per credit hour, and will pay for only 12 credit hours even if they register for more hours. Out-of-state students pay $200 per credit hour, and will pay for 15 credit hours as the maximum. In the main function, ask the user whether he is in-state or out-of-state. Then ask the user how many credit hours he is taking. Pass number of credit hours to the following two functions:

Tuition\_instate: Calculate and display tuition for in-state students.

Tuition\_outstate: Calculate and display tuition for out-of-state students.

Call one of these two functions to calculate tuition. The following are two examples.

Are you in-state students? [y/n] y

How many credit hours are you taking? 14

You are paying in-state rate

Please pay $ 720

Are you in-state students? [y/n] n

How many credit hours are you taking? 17

You are paying out-of-state rate

Please pay $ 3000

Save your Python program in a file named **Lab07P3.py**. Submit the file to Blackboard for credit.

## Problem 4

Write a program to calculate target heart rate during fitness training. This program has two functions: main and heart\_rate\_calculator. Please do the following:

(a) In the main function, ask the user to enter age and resting heart rate.

(b) In the main function, call the heart\_rate\_calculator function. Pass the age and resting heart rate as arguments.

(c) In the heart\_rate\_calculator function, write code to calculate target heart rate during fitness training with the following formula:

*Target hart rate = (220 - age - resting heart rate) \* 0.4 + resting heart rate*

Display target heart rate.

The following is an example.

Enter age: 40

Enter resting heart rate: 70

Your target heart rate is 114.0

Save your Python program in a file named **Lab07P4.py**. Submit the file to Blackboard for credit.

## Problem 5

Each gymnast in a competition receives scores from 5 judges. Write a Python program to do the following.

1. In the main function, ask the user to enter 5 scores. Store the scores in a list.
2. Invoke the function score\_calculator and pass the whole list to it.
3. In the function score\_calculator, calculate and display the average of the 5 scores.

The following is an example.

Enter a score: 15.2

Enter a score: 14.9

Enter a score: 14.9

Enter a score: 15.3

Enter a score: 15.1

The average score is 15.079999999999998

Save your Python program in a file named **Lab07P5.py**. Submit the file to Blackboard for credit.

# Grading rubric

Writing and using main function [8 points]

Writing and using other functions [12 points]