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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 4 Python files, one for each problem.

## Problem 1

Energy consumption is measured in units of kilowatt hours (kWh). The more kWh a household use in a month, the higher the energy bill. A power company charges customers $0.12 per kWh for the first 500 kWh. After the first 500 kWh, the rate is $0.15 per kWh. Write a program to calculate energy charge. You must write and use the following two functions.

1. A main function: Ask the user to enter number of kWh used. Call the bill\_calculator function and pass number of kWh used to it as an argument.
2. A bill\_calculator function: This function has a parameter to receive number of kWh used. Calculate and display the energy charge.

The following is an example.

Enter kilowatt hours used: 510

Please pay this amount: 61.5

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

## Problem 2

The energy company in Program 1 now uses different rates for residential and business customers. Residential customers pay $0.12 per kWh for the first 500 kWh. After the first 500 kWh, the rate is $0.15 per kWh. Business customers pay $0.16 per kWh for the first 800 kWh. After the first 800 kWh, the rate is $0.20 per kWh. Write a program to calculate energy charge. You must write and use the following two functions.

1. A main function: Ask the user to enter number of kWh used and customer type (enter R for residential or B for business). Call the bill\_calculator function and pass number of kWh used and customer type to it as arguments. You must use positional arguments to pass kWh used and customer type.
2. A bill\_calculator function: This function has two parameters to receive number of kWh used and customer type. Calculate and display the energy charge.

The following is an example.

Enter kilowatt hours used: 810

Enter R for residential customer, B for business customer: R

Please pay this amount: 106.5

The following is another example.

Enter kilowatt hours used: 810

Enter R for residential customer, B for business customer: b

Please pay this amount: 130.0

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

## Problem 3

Rewrite Program 2. This is you must use keyword arguments to pass number of kWh and customer type to the bill\_calculator function when it is called.

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

## Problem 4

Students in a course need to do lab assignments and take tests. Course grade is calculated from these scores. Write a program to calculate course grade. You must write and use the following two functions.

1. A main function: First, ask the user how many labs there are. Use a loop to enter lab scores and store them in a list. Display the list of lab scores. Second, ask the user how many tests there are. Use a loop to enter test scores and store them in another list. Display the list of test scores. Third, tell the user that the default weights for labs and tests are 50 and 50. If the user wants to use the default weights, enter D. Otherwise, enter C. If the user chooses to use default weights, call the grade\_calculator function and pass the list of lab scores and the list of test scores as two arguments. Do not pass any arguments about weights. If the user chooses not to use default weights, ask the user to enter the weights for labs and tests, respectively. Then call the grade\_calculator function and pass the list of lab scores, the list of test scores, lab weight and test weight as four arguments. You are free to use positional or keyword arguments.
2. A grade\_calculator function: This function has four parameters: lab score list, test score list, lab weight and test weight. Use default parameter for lab weight and test weight. Default values are 50 and 50. First, calculate and display average lab score. Second, calculate and display average test score. Third, use average lab score, average test score, lab weight and test weight to calculate course grade. Display course grade.

The following is an example. Default weights are used.

How many labs? 3

Enter a lab score: 87

Enter a lab score: 93

Enter a lab score: 90

Lab scores: [87.0, 93.0, 90.0]

How many tests? 2

Enter a test score: 85

Enter a test score: 75

Test scores: [85.0, 75.0]

The default weights for course grade are 50% labs and 50% tests.

Enter C to change the weights or D to use default weights: D

Lab average: 90.0

Test average: 80.0

Course grade: 85.0

The following is another example. Default weights are not used.

How many labs? 3

Enter a lab score: 93

Enter a lab score: 87

Enter a lab score: 90

Lab scores: [93.0, 87.0, 90.0]

How many tests? 2

Enter a test score: 85

Enter a test score: 75

Test scores: [85.0, 75.0]

The default weights for course grade are 50% labs and 50% tests.

Enter C to change the weights or D to use default weights: c

Enter lab percentage (without the % sign): 60

Enter test percentage (without the % sign): 40

Lab average: 90.0

Test average: 80.0

Course grade: 86.0

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

# Grading rubric for Program 1 and 2:

Writing and using main function [10 points]

Writing and using bill\_calculator function [15 points]

# Grading rubric for Program 3:

Using keyword arguments [10 points]

# Grading rubric for Program 4:

Writing and using main function [20 points]

Writing and using grade\_calculator function [20 points]