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**CSC121 Python Programming**

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LAB 02 **WRITING SIMPLE PYTHON PORGRAMS**

**SOLUTION**

Warning: This document is copyrighted and confidential. Showing any part of this document to anybody in any form, including but not limited to posting it on the Internet, is prohibited and considered as helping other students to cheat. Violators will be punished.

# Objectives

In this lab assignment, students will learn:

- How to write Python statements to get input from keyboard

- How to write Python statements to convert data from one type to another

- How to write Python statements to perform calculations

- How to write Python statements to display output

# Goals

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

- Write Python statements to get input from keyboard

- Write Python statements to convert data from one type to another

- Write Python statements to perform calculations

- Write Python statements to display output

# Instruction and Problems

Write a Python program for each of the problems in this lab. The following is an example.

*The power of an air conditioner is measured in British Thermal Units (BTU). The higher the BTU, the more heat the air conditioner can bring away. When people buy an air conditioner, they need to know how many BTU they need to keep the room cool. Design a program to estimate how many BTU we need when we install a window air conditioner in a room. This number is determined by the volume of the room. The rule of thumb is that we need 3.5 BTU per cubic foot. The program should ask the user to enter the length, width and height of the room. It should calculate and display the number of BTU needed for the air conditioner.*

Python program:

\_\_author\_\_ = **'Man-Chi Leung'**room\_length = float(input(**'Enter room length: '**))  
room\_width = float(input(**'Enter room width: '**))  
room\_height = float(input(**'Enter room height: '**))  
room\_volume = room\_length \* room\_width \* room\_height  
btu\_needed = room\_volume \* 3.5  
print(**'BTU needed for this room:'**, btu\_needed)

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 hotdog stand sells hotdogs, potato chips and sodas. Hotdogs are $2.50 each. Potato chips are $1.50 per bag. Sodas are $1.25 per cans. Design a program to do the following. Ask the user to enter number of hotdogs, chips and sodas ordered by the customer. The program will calculate and display the total amount due.

Solution:

hotdogs = int(input("How many hotdogs? "))

chips = int(input("How many bags of chips? "))

sodas = int(input("How many cans of sodas? "))

hotdogs\_total = hotdogs \* 2.50

chips\_total = chips \* 1.50

sodas\_total = sodas \* 1.25

total\_due = hotdogs\_total + chips\_total + sodas\_total

print("Please pay this amount: ", total\_due)

## Problem 2

Each student in a course needs to submit 3 lab assignments and take 2 tests. Design a program to do the following. Ask the user to enter 3 lab scores and 2 test scores. Calculate and display the lab average and the test average. Also calculate and display the course grade, which equals 55% of the lab average plus 45% of the test average.

Solution:

lab1 = float(input("Enter Lab 1 score: "))

lab2 = float(input("Enter Lab 2 score: "))

lab3 = float(input("Enter Lab 3 score: "))

test1 = float(input("Enter Test 1 score: "))

test2 = float(input("Enter Test 2 score: "))

lab\_average = (lab1 + lab2 + lab3)/3

test\_average = (test1 + test2)/2

course\_grade = lab\_average \* 0.55 + test\_average \* 0.45

print("Lab average: ", lab\_average)

print("Test average: ", test\_average)

print("Course grade: ", course\_grade)

## Problem 3

Design a program to calculate sales tax, tip and the total amount of a meal purchased at a restaurant. The program asks the user to enter the charge for the food. It will calculate and display the sales tax and tip. Sales tax is 7% of the food charge. Tip is 18% of the food charge. Also calculate and display the total amount due from the customer.

Solution:

food\_charge = float(input("Enter food charge: "))

sales\_tax = food\_charge \* 0.07

tip = food\_charge \* 0.18

total\_due = food\_charge + sales\_tax + tip

print("Sales tax: ", sales\_tax)

print("Tip: ", tip)

print("Total amount due: ", total\_due)

## Problem 4

Admission to an aquarium is $14 per person. There is also an IMAX theatre in the building, which charges $8 per ticket for a 3D shark show. Customers have three choices: admission to the aquarium only without watching 3D show, watch 3D show only with no admission to the aquarium, or do both with a 25% discount. Design a program for group orders. Ask the group to enter number of people who want admission only but no 3D show, number of people who want 3D show only but no admission to the aquarium, and number of people who want both. Calculate and display the total amount due from the group.

Solution:

admission\_only = int(input("How many people want aquarium admission only? "))

show\_only = int(input("How many people want 3D show only? "))

both = int(input("How many people want both? "))

admission\_only\_total = admission\_only \* 14

show\_only\_total = show\_only \* 8

both\_total = both \* (14+8) \* 0.75

total\_due = admission\_only\_total + show\_only\_total + both\_total

print("Total amount due: ", total\_due)

## Problem 5

The jackpot of a lottery is paid in 20 annual installments. There is also a cash option, which pays the winner 65% of the jackpot instantly. In either case 30% of the winnings will be withheld for tax. Design a program to do the following. Ask the user to enter the jackpot amount. Calculate and display how much money the winner will receive annually before tax and after tax if annual installments is chosen. Also calculate and display how much money the winner will receive instantly before and after tax if cash option is chosen.

Solution:

jackpot = float(input("Enter jackpot amount: "))

installment\_before\_tax = jackpot / 20

installment\_after\_tax = installment\_before\_tax \* 0.70

cash\_before\_tax = jackpot \* 0.65

cash\_after\_tax = cash\_before\_tax \* 0.70

print("Annual installments option")

print("Money winner receives annually before tax: ", installment\_before\_tax)

print("Money winner receives annually after tax: ", installment\_after\_tax)

print("Cash option")

print("Money winner receives instantly before tax: ", cash\_before\_tax)

print("Money winner receives instantly after tax: ", cash\_after\_tax)

# Grading rubric for Each Problem

Getting user input [4 points]

Performing calculations [12 points]

Displaying output [4 points]