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**CSC249 Data structure and algorithms**

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CHAPTER 1A LAB **BASIC PYTHON PROGRAMMING (PART 1)**

# Objectives

- Perform simple input and output operations

- Perform operations with numbers such as arithmetic and comparisons

- Perform operations with Boolean values

- Implement an algorithm using the basic constructs of sequences of statements, selection statements, and 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.

## Program 1

An employee’s total weekly pay equals the hourly wage multiplied by the total number of regular hours plus any overtime pay: Overtime pay equals the total overtime hours multiplied by 1.5 times the hourly wage. Write a program that takes as inputs the hourly wage, total regular hours, and total overtime hours and displays an employee’s total weekly pay. Example:

Enter hourly wage: $10.50

Enter the regular hours: 20

Enter the overtime hours: 12

The total weekly pay is $399.0

Save your Python program in a file named **Lab01AP1.py**. Submit the file to Blackboard for credit.

## Problem 2

A company gives volume discount to customers of their software product. Unit price depends on number of copies purchased:

|  |  |
| --- | --- |
| Number of copies purchased | Unit price |
| 1 - 10 | $99 |
| 11 - 50 | $89 |
| 51 - 100 | $79 |
| 101 or more | $69 |

Write a program to do the following. Ask the customer how many copies he is buying. Display the unit price. Calculate and display total price. For example, if a customer is buying 20 copies, unit price will be $89 and total price will be $1780. The following are two examples.

How many copies are you buying? 25

Unit price: $89

Total price: $2225

How many copies are you buying? 100

Unit price: $79

Total price: $7900

Save your Python program in a file named **Lab01AP2.py**. Submit the file to Blackboard for credit.

## Problem 3

In a rock-paper-scissors game, paper beats rock, rock beats scissors and scissors beat paper. Write a program to play rock-paper-scissors. This game is played by two players. Player 1 enters his choice first, followed by player 2. Ask the players to enter R for rock, P for paper or S for scissors. The players can enter either uppercase or lowercase letter. If any user enters something other than those three letters, the game is canceled for invalid entry. Otherwise, determines and displays the outcome (player 1 wins, player 2 wins or tie). The following are three examples.

Player 1: Enter R for rock, P for paper or S for scissors: R

Player 2: Enter R for rock, P for paper or S for scissors: S

Player 1 has won the game.

Player 1: Enter R for rock, P for paper or S for scissors: r

Player 2: Enter R for rock, P for paper or S for scissors: R

Tie

Player 1: Enter R for rock, P for paper or S for scissors: p

Player 2: Enter R for rock, P for paper or S for scissors: X

Game canceled because of invalid entry

Save your Python program in a file named **Lab01AP3.py**. Submit the file to Blackboard for credit.

## Program 4

A basketball game has four quarters. Write a program to do the following. Use a loop to input scores of team A and team B in each of the four quarters. Every time a score is entered, update and display the current total score of that team. After all four quarters, compare the total scores of the two teams and display which team has won. If the game is tied, the two teams will play overtime repeatedly until a team has won. Example:

Quarter 1

Enter team A score: 22

Team A total score so far: 22

Enter team B score: 17

Team B total score so far: 17

Quarter 2

Enter team A score: 23

Team A total score so far: 45

Enter team B score: 26

Team B total score so far: 43

Quarter 3

Enter team A score: 25

Team A total score so far: 70

Enter team B score: 25

Team B total score so far: 68

Quarter 4

Enter team A score: 28

Team A total score so far: 98

Enter team B score: 30

Team B total score so far: 98

The game is tied. Let's play overtime

Overtime 1

Enter team A score: 12

Team A total score so far: 110

Enter team B score: 12

Team B total score so far: 110

Overtime 2

Enter team A score: 14

Team A total score so far: 124

Enter team B score: 15

Team B total score so far: 125

Team B has won

Save your Python program in a file named **Lab01AP4.py**. Submit the file to Blackboard for credit.

# Grading rubric

Program 1:

Getting input [5 points]

Processing [15 points]

Displaying output [5 points]

Program 2:

Getting input [5 points]

Processing [15 points]

Displaying output [5 points]

Program 3:

Getting input [5 points]

Processing [15 points]

Displaying output [5 points]

Program 4:

Getting input [5 points]

Processing [15 points]

Displaying output [5 points]