**Practical 7 (Part B)**

**Pass-by-address Functions**

1. Trace the program below. What will be the output produced?

#include <iostream>

using namespace std;

void function1 (int\* x, int\* y);

void function2 (int a, int b,int \*x,int \*y);

int main()

{

int a = 4, b = 6, c, d;

cout << "a = " << a << ", b = " << b << endl;

function1(&a, &b);

cout << "a = " << a << ", b = " << b << endl;

function2 (a, b ,&c ,&d);

cout << "a = " <<a<< ", b = " <<b<< ", c = " <<c<< ", d = "<<d<< endl;

return 0;

}

void function1 (int\* x, int\* y)

{

\*x = \*x + \*y;

\*y = \*y + \*x;

}

void function2 (int a, int b,int \*x,int \*y)

{

\*x = a + b;

\*y = a \* b;

}

1. Write a calculator program that calculates the quotient and modulus of two integer numbers in one function using pass by address.
2. Redo Part A question 5, this time use only one function to calculate both the perimeter and area of the triangle. Named the function calculateTriangle.
3. Consider the definition of the function main:

int main()

{

int x, y;

char z;

double rate, hours;

double amount;

}

Write the following definitions.

1. Write the definition of the function named initialize\_variables that initializes x and y to 0 and z to the blank character.
2. Write the definition of the function named getHourlyRate that prompts the user to input the hours worked and rate per hour to assign to the respective variables hours and rate given in the main function.
3. Write the definition of the value-returning function named payCheck that calculates and returns the amount to be paid to an employee based on the hours worked and rate per hour. The hours worked and rate per hour are stored in the variables hours and rate, respectively, of the function main. The formula for calculating the amount to be paid is as follows: for the first 40 hours, the rate is the given rate; for hours over 40, the rate is 1.5 times the given rate.

For example: If hours = 46 and rate = 50.0, then

Amount = 40\* 50.0 + 6 \* 1.5 \* 50.0 = 2000.0 + 450.0 = 2450.00

1. Write the definition of the function printCheck that prints the hours worked, rate per hour, and the amount due.
2. Given the following C++ simple program,

#include<iostream>

using namespace std;

int main()

{

int num1,num2,sum;

cout<<"Enter 2 number: ";

cin>>num1>>num2;

sum=num1+num2;

cout<<"The sum of "<<num1<<" and "<<num2 <<" is "<<sum<<endl;

cout<<"program ended\n";

return 0;

}

Rewrite the program with 4 different functions as follows:

input : reads two numbers

total : sums up the two numbers

display\_total : displays the total

display\_end : displays the ending message

You are not allowed to declare any global variable. You can use pass by reference to help you to solve the problem.

1. Write a function called **convertTime**, which accepts the number of seconds (integer) seconds and has three integer output parameters hr, min, sec. The function will convert the number of seconds into hours, minutes and seconds.

(Hint: hr = seconds/3600, min= seconds%3600/60, sec=seconds%60)

e.g. input of 7000 should produce the output values: 1, 56, 40.

Write a program that asks a user to input a time period in seconds, calls the function **convertTime** to convert the time period into hours, minutes and seconds, and then prints the result in the format below:

7000 seconds = 1 hr 56 min 40 sec

1. (a) Write a function with the header: **void additionQuiz** (int level, int \*correct, double \*score) that will generate 5 addition (x+y) questions (using for-loop) involving random numbers between 1 to n, where n = level \* 20. [use rand( )% n + 1 for both x and y]. The user will type the answer and your function must respond appropriately with the message “Correct” or “Wrong”. Example:

Q1: 5 + 3 = 8 Correct !

Q2: 4 + 2 = 9 Wrong !

... … …

The output parameters represent the number of correct answers and the % score.

(b) Write the program to ask the user for the level desired, call the function above to carry out the quiz, then display the results as follows:

You got 3 correct answers out of 5 questions.

Your score : 60 %

Note: The rand( ) function gives a fixed set of pseudo-random (ie. “predictable”) numbers based on a “seed” value. To obtain an unpredictable set, use a seed based on the current time.