Lab Sheet 08

IT1010 – Introduction to Programming   Semester 1, 2022

Objectives:
At the end of the class the students should be able to:
- Implement simple functions in C language

Exercise 1

Following is a sample C program that uses a function called calPayment() to calculate and return the payment of a customer based on the item he/she purchased. The item codes and the unit price of the items are given in following table.

Item code	Price(Rs.)
1	50.00
2	100.00

The item code and the quantity are parameters of the function.
The main program reads item code and the quantity as user inputs, calls calPayment() function and displays the payment of a customer.

```c
#include <stdio.h>
float calPayment(int itemCode, int quantity); //Function declaration
int main(void)
{
     float payment;
     int code, qty;

     printf("Enter item code : ");
     scanf("%d", &code);

     printf("Enter quantity : ");
     scanf("%d", &qty);

     payment = calPayment(code, qty); //Function calling

   printf("Payment = %.2f\n", payment);

     return 0;

}

float calPayment(int itemCode, int quantity) //Function implementation
{
     if(itemCode == 1)
          return 50.0 * quantity;
     else if(itemCode == 2)
          return 100.0 * quantity;
     else
          return 0;
}
```

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i) Type the given C program in Dev C++ IDE.
ii) Compile and run the C program.
iii) Set a break point at the statement that reads the item code.
iv) Using debugging option, add watches to the declared variables (code, payment, qty, itemCode, quantity).
v) Using next line button, execute remaining statements and observe the execution order of the C statements and how the variable values are changed when the function is called with different user input values.

Exercise 2

Following is a sample C program that a function called calBonus() to calculate the bonus amount of an employee based on the basic salary. If basic salary is greater than 20000 , the bonus amount will be twice of basic salary or otherwise it will be half of the basic salary. The function takes the basic salary as a parameter and returns the bonus amount.

The main program reads the basic salary of an employee from the key board, calls calBonus() function and displays the net salary of an employee.

```c
#include <stdio.h>
float calBonus(float basicSal);
int main(void)
{
    float salary, netSalary, bonusAmount;

    printf("Enter basic salary : ");
    scanf("%f", &salary);

    bonusAmount = calBonus(salary);
    netSalary = salary - bonusAmount;

    printf("Net salary : %.2f\n", netSalary);

    return 0;

}

float calBonus(float basicSal)//Function implementation
{
    float bonus;

    if(basicSal > 20000)
    {
        bonus = basicSal * 2;
    }
    else
        bonus = basicSal / 2;

    return bonus;
}
```

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Sample output 01

Enter basic salary :   25000.0
Net salary : 75000.00

Sample output 02

Enter basic salary :   10000.0
Net salary : 15000.00

    i)   Type the given C program in Dev C++ IDE.
    ii)   Compile and run the program to see whether you can get correct output. Use sample data.
    iii) If you can't get correct output, it means that there are logical errors in given program
    iv) Set a break point at the statement that reads the basic salary in main function.
    v)   Using debugging option, add watches to the declared variables.
    vi) Using next line button, execute remaining statements and identify logical errors.
    vii) Fix the logical errors, compile and run the program again to see it works successfully.

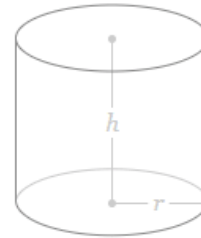**Exercise 3**
Implement the following three functions.
    circleArea() – calculate the area of a circle and return the result. The radius of the circle is passed as a parameter.
    cirlclePeri() - calculate the perimeter of a circle and return the result. The radius of the circle is passed as a parameter.
    recArea() – calculate the area of a rectangle and return the result. The width and length of the rectangle are passed as parameters.

In the main program, calculate the area of a cylinder using these functions. The height and the radius of the cylinder will be taken as user inputs in the main function. The formula to calculate the area of a cylinder is given below.

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$$A = 2\pi r h + 2\pi r^2$$

r Radius

h Height

i) Analyze the given question by identifying user input, calculation and output
ii) Write the C program in Dev C++ IDE.
iii) Compile and run the program.
iv) Set a break point to the C statement that reads the first user input in main program.
v) Using debugging option, add watches to the declared variables.
vi) Using next line button, execute remaining statements and observe the execution order of the C statements and how the variable values are changed.