**ITCS 1212L**

**PostLab 4**

**Introduction to Functions and Modular Programs**

**Learning Objectives:**

* **To learn the process of creating functions and function prototypes.**
* **To learn the process of calling a function.**
* **To learn how to create a modular program.**
* **Practice developing the main algorithm which is composed of different functions calls.**

1. In this part, we would like to study a menu-driven modular program. You need to look at this code, enter and execute it and answer the following questions:

* How many functions does exist in this program including main( ) ?
* Write pseudocode for the main( ) function, you can use if and switch as they are for the decision making.
* What does this program do?
* If the user selects choice A, the following functions (starting from main( ) ) are going to be called. main() 🡺 showMenu() 🡺 calculateMembershipRate() 🡺 displayMembership()
* How about choices B, C, and D?
* Why is this program called menu-driven and modular?

#include <iostream>

using namespace std;

// Function protoypes

char showMenu();

double calculateMembershipRate(char, int);

void displayMembershipRate(double);

int main()

{

// Declare variables

char choice; // To hold menu choice

int months; // To hold the number of months

double membershipRate; // To calculate the membership rates

// Function call to display the menu and return the menu

// choice

choice = showMenu();

// Accept number of months and calculate membership rates if user chooses A, B or C

if(choice != 'D') {

// Get the number of months

cout << "For how many months: " << endl;

cin >> months;

// Make a function call to calculate the membership rates. Send choice, and months as parameters

membershipRate = calculateMembershipRate(choice, months);

// Make a function call to display the final membership rate

displayMembershipRate(membershipRate);

}

else {

cout << "Goodbye !" << endl;

}

return 0;

}

// Function definition to display the menu choice and return the choice to the user

char showMenu()

{

char userChoice;

// Display the menu choices to the user

cout << "\nHealth Club Membership Menu" << endl;

cout << "A. Standard Adult Membership " << endl;

cout << "B. Child Membership " << endl;

cout << "C. Senior Citizen Membership " << endl;

cout << "D. Quit " << endl;

cout << "Enter (A, B, C or D) as your membership choice: " << endl;

cin >> userChoice;

// Return the menu choice back to the user

return userChoice;

}

// Function definition to calculate memebership rate for the user based on user choice and number of months

double calculateMembershipRate(char userChoice, int numMonths)

{

// Constants for membership rates

const double ADULT = 40.00;

const double CHILD = 20.00;

const double SENIOR = 30.00;

double rate = 0; // Variable to hold the membership rate

// Switch between user choice

switch(userChoice)

{

case 'A': // calculate the mebership rate for adult

rate = numMonths \* ADULT;

break;

case 'B': // calculate the membership rate for child

rate = numMonths \* CHILD;

break;

case 'C': // calculate the membership rate for senior

rate = numMonths \* SENIOR;

break;

default: // Invalid choice

cout << "Invalid Choice" << endl;

}

// Return the rate back to the main function

return rate;

}

// Function call to display the membership rate to the user

void displayMembershipRate(double finalRate)

{

cout << "The total charges are: $" << finalRate << endl;

}

Create a console project lab4E.cbj in codeblocks and type the above menu-driven program in it.

1. **Pick your vacation destination**

We are trying to create a program which shows a menu. The menu lists 4 different cities numbered 1 to 4. Option number 5 of the menu is to exit the program. There will be a program will return the weather condition for that city. Do the following tasks:

1. There should be a function called menu( ) with no parameters and a return data type of integer representing the user’s choice from the menu. Write the prototype for the function menu( ) and also implement it.
2. Write a test program to test the menu( ).
3. **My Portfolio**

Write a program that determines the stock price of four companies (INTL, GOOG, IBM, and MSFT) and with number of stocks for each one from the user, it calculates the total value of portfolio. It should include the following two functions, which are called inside the main() function:

* double getStocks(string s)

{

return 100.0; //We will replace this later , just use it in your program

}

String s is passed the stock symbol (string) and returns the value of each stock.

* double calculateTotalPortolioValue() has no parameters. It determines the total value of the portfolio. You need to implement this function.

Figure out the logic on paper first.

4. Write a program that will read two floating point numbers (the first read into a variable called first and the second read into a variable called second and then calls the function swap with the actual parameters first and second. The swap function having formal parameters number1 and number2 should swap the value of the two variables.

5. Write a program that will input the number of wins and losses that a baseball team acquired during a complete season. The wins should be input in a parameter-less value returning function that returns the wins to the main function. A similar function should do the same thing for the losses. A third value returning function calculates the percentage of wins. It receives the wins and losses as parameters and returns the percentage (float) to the main program which then prints the result. The percentage should be printed as a percent to two decimal places.

