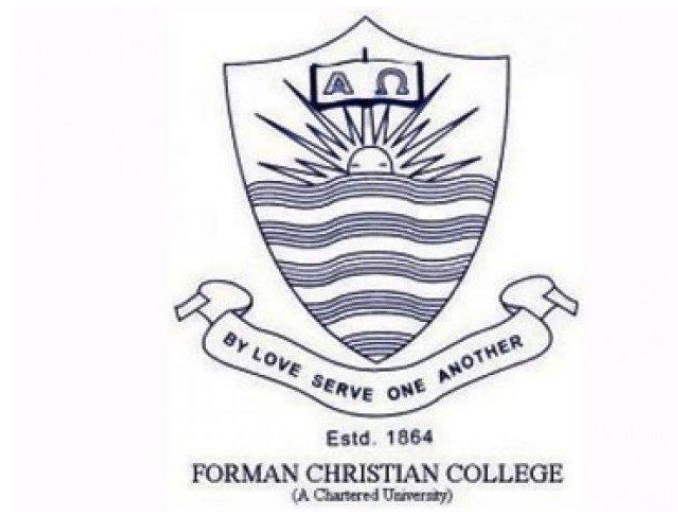


Introduction to C/C++

Comp 295
Spring 2023



Department of Computer Science
Forman Christian College University

Lab 4

Functions

Question #	Total Marks
Question 1	-
Question 2	-
Question 3	-
Question 4	
Question 5	

Example Code

```
#include <iostream>
using namespace std;

int add(int num1, int num2) {
    int sum = num1 + num2;
    return sum;
}

int main() {
    int a = 5;
    int b = 10;
    int result = add(a, b);
    cout << "The sum of " << a << " and " << b << " is " << result << endl;
    return 0;
}
```

In this example, the add function takes in two integer parameters num1 and num2, adds them together, and returns the result. The main function calls add with two integer arguments a and b, stores the returned value in result, and prints out the sum using cout.

In Lab Problem

Question 1. You have a variable score=0.

Make a function DiceRoll in which "score" is PASSED BY REFERENCE. DiceRoll produces a random number from 1 to 6 and adds the result to the score. In "main()" user inputs the number of times he wants to roll the dice and then the program runs the DiceRoll function that many times by passing "score" by reference. Output the score at the end. For random number use `srand(time(0))` in main() for seeding. Later in the DiceRoll() use `rand()` to calculate random number.

Question 2. Write a function named 'countOnes', which receives an integral value (base 10) and returns the number of ones in its binary patterns.

Hint:

Decimal to Binary Conversion		
$(27)_{10} = (11011)_2$	2 27	Remainder
	2 13	1
	2 6	1
	2 3	0
	2 1	1
	2 0	1

Question 3. Write a program that contains a function `int sum_of_digits(int)` which takes an integer number as parameter and returns the sum of the digits of that integer number.

For example, when 234 is passed to the function and it returns 9.

Question 4. A talent competition has five judges, each of whom awards a score between 0 and 10 to each performer. Fractional scores, such as 8.3, are allowed. A performer's final score is determined by dropping the highest and lowest score received, then averaging the three remaining scores. Write a program that uses this method to calculate a contestant's score. It should include the following functions:

- `void getJudgeData()` should ask the user for a judge's score, store it in a reference parameter variable, and validate it. This function should be called by main once for each of the five judges.
- `void calcScore()` should calculate and display the average of the three scores that remain after dropping the highest and lowest scores the performer received. This function should be called just once by main, and should be passed the five scores. The last two functions, described below, should be called by `calcScore`, which uses the returned information to determine which of the scores to drop.
- `int findLowest()` should find and return the lowest of the five scores passed to it.
- `int findHighest()` should find and return the highest of the five scores passed to it.

Input Validation: Do not accept judge scores lower than 0 or higher than 10.

***(You are not allowed to use arrays, use separate variables for the judges)**

Output:

Microsoft Visual Studio Debug Console

```
-----Welcome to Our Auditions-----  
  
Enter Score of Judge 1: 1.3  
Enter Score of Judge 2: 2.4  
Enter Score of Judge 3: 9.7  
Enter Score of Judge 4: 3.3  
Enter Score of Judge 5: 5.1  
Average Score of the Contestant is: 3.6
```

Question 5. Write a program to calculate students' average test scores and their grades. You may assume the following input data:

Johnson	85	83	77	91	76
Aniston	80	90	95	93	48
Cooper	78	81	11	90	73
Gupta	92	83	30	69	87
Blair	23	45	96	38	59
Clark	60	85	45	39	67
Kennedy	77	31	52	74	83
Bronson	93	94	89	77	97
Sunny	79	85	28	93	82
Smith	85	72	49	75	63

Use three arrays: a one-dimensional array to store the students' names, a (parallel) two-dimensional array to store the test scores, and a parallel one dimensional array to store grades. Your program must contain at least the following functions: a function to read and store data into two arrays, a function to calculate the average test score and grade, and a function to output the results. Have your program also output the class average.

Output:

```

Enter name and marks of the students:-
#Enter '-1' to end the enteries.
Enter name or "-1" to stop: Mustafa Kamal
Enter Mustafa Kamal's marks for test 1: 97
Enter Mustafa Kamal's marks for test 2: 87
Enter Mustafa Kamal's marks for test 3: 94
Enter Mustafa Kamal's marks for test 4: 92
Enter Mustafa Kamal's marks for test 5: 78
Enter name or "-1" to stop: Rabia Mustafa
Enter Rabia Mustafa's marks for test 1: 767
Enter valid input!: 76
Enter Rabia Mustafa's marks for test 2: 87
Enter Rabia Mustafa's marks for test 3: 97
Enter Rabia Mustafa's marks for test 4: 78
Enter Rabia Mustafa's marks for test 5: 98
Enter name or "-1" to stop: Laddan Jaffary
Enter Laddan Jaffary's marks for test 1: 85
Enter Laddan Jaffary's marks for test 2: 83
Enter Laddan Jaffary's marks for test 3: 68
Enter Laddan Jaffary's marks for test 4: 46
Enter Laddan Jaffary's marks for test 5: 76
Enter name or "-1" to stop: -1
Names                Marks                Average Scores                Grades
Mustafa Kamal        97 87 94 92 78        89                            B
Rabia Mustafa        76 87 97 78 98        87                            B
Laddan Jaffary        85 83 68 46 76        71                            C

Class average is: 82.3333
Program ended with exit code: 0

```