21CSCI01P

Introduction to Computing

Lab (2)

This tutorial covers

- **Tutorial:**
    1. **Functions**
- **Problems from 6 to 11 in the lecture slides.**
- **Chapter 6 in the textbook, 8th edition.**

Problem (1): Answer the following requirements for each program.

Program 1: Change the following program such that function `multiply` returns the sum instead of using the pass by reference in the function call.

```
1. #include <iostream>
2. using namespace std;
3. void multiply(int &sum, int a, int b) {
4.     sum = a * b;
5. }
6. int main() {
7.     int s, x = 2, y = 3;
8.     multiply (s, x, y);
9.     cout << s;
10.    return 0;
1. }
```

Answer here:

Program 2: change the `add` overload functions such that it receives double variables as input parameters and return double.

```
2. #include <iostream>
3. using namespace std;
4. int add(int a, int b) {
5.     return a + b;
6. }
7. int add(int a, int b, int c) {
8.     return add(a, b) + c;
9. }
10. int add(int a, int b, int c, int d) {
11.     return add(a, b, c) + d;
12. }
13. int add(int a, int b, int c, int d, int e) {
14.     return add(a, b, c, d) + e;
15. }
16.  int main() {
17.     cout << add(1, 2, 3, 4, 5);
18.     return 0;
19. }
```

Answer here:

Program 3: Trace the following program and write the output for the following inputs:

i. num = 5 and type = 2
ii. num = 10 and type = 8

```
1. // This C++ gets a decimal number, and based on the user requirement,
2. // the program converts this number to either binary or octal number.
3. #include <string>
4. #include <iostream>
5. using namespace std;
6. string convertDec(int dec, int t) {
7.    string s = "";
8.    int r;                      //remainder
9.    while (dec != 0) {
10.      r = dec % t;            //use mode sign to get remainder
11.      s = to_string(r) + s;   //add the remainder to output
12.      dec = dec / t;
13.   }
14.   return s;
15.}
16.int main() {
17.   int num, type;
18.   cout << "Enter number you want to convert: "; cin >> num;
19.   cout << "Press 2 for binary and 8 for octal : "; cin >> type;
20.   cout << "result of conversion: " << convertDec(num, type);
21.   return 0;
22.}
```

Answer here:

Problem (2): open visual studio and write the following programs.

Program 1:

Write a C++ program that receive from the user 3 integers then sort their values in an ascending order. The program should have the following:

1. A function `sort()` with no return value.
   - This function has 3 input parameters. Pass those parameters by reference.
   - The body of this function should sort the values of these 3 values in an ascending order.
2. In the main function,
   a. Define 3 integer variables `x, y and z`.
   b. Ask the user to enter the values of these variables.
   c. Call the `sort()` function and pass the three variables to it.
   d. Print the values of these 3 variables.

Answer here:

Program 2:

Write a C++ program that does the following:

1. Create a function named `printMulti()` with no return value.
    - This function has 2 input parameters. Pass those parameters by value. The first parameter "`text`" of type `string`, and the second parameter "`num`" of type `int`.
    - This function prints the value of the string "`text`", number of times equals to the integer "`num`". Each iteration is printed in a new line.
2. Overload `printMulti()` function by defining the following:
    - The function has no return value.
    - This function has 2 input parameters. Pass those parameters by value. The first parameter "`intVal`" of type `int`, and the second parameter "`num`" is of type `int`.
    - This function prints the value of "`intVal`" number of times equals to "`num`". Each iteration is printed in a new line.
3. In the main function,
    a. Define 3 variables {x, y, z}, where x is of type string, and y and z of type integer.
    b. Ask the user to enter the values of these variables.
    c. Call the function printMulti () and pass the values {x and z}.
    d. Call the function printMulti (), and pass the values {y and z}.

Answer here:

Problem (3): choose the correct answer

1. **What is the output of the following Program?**

```
#include<iostream>
using namespace std;
int f1(int x){
     return x + x;
}
int f2(int x){
     return f1(x) + x;
}
int f3(int x){
     return f2(x) + f2(x);
}
int main(){
     cout << f3(2);
     return 0;
}
```

Select the correct answer:

a) 16
b) 18
c) 8
d) 12
e) 10

2. **What is the output of the following Program?**

```
#include<iostream>
using namespace std;
int funct1(int x, int &y){
        int z = 6;
        x += z;
        y += z;
        z = x + y;
        return z;
}
int main(){
        int a = 4, b = 5, g = 7;
        if (a != b)
                g = funct1(a, b);
        cout<<"a="<<a<<", b="<<b<<", g="<<g<<".";
 return 0;
}
```

a) a=4, b=5, g=7.

b) a=4, b=6, g=18.

c) a=4, b=11, g=21.

d) a=2, b=11, g=18.

e) a=2, b=5, g=18.