**Computer Programming**

**Lab Journal - Lab # 13**

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**Objective**

This lab will cover

* Default functions
* Inline functions
* Pointers
* Debugging

**Exercise 1**

Understand and write the output of the following code fragments. Also describe what is being performed in this code in one line.

|  |  |
| --- | --- |
| 1. | #include <iostream>  using namespace std;  inline int max(int n1, int n2) {  return (n1 > n2) ? n1 : n2;  }  int main() {  int i1 = 5, i2 = 6;  cout << max(i1, i2) << endl;  system("pause");  return 0;  } |
| Output:    The function is used or loaded into the RAM when it is called. | |
| 2. | #include <iostream>  using namespace std;  int divide(int a, int b = 2)  {  int r;  r = a / b;  return r;  }  int main()  {  cout << divide(12);  cout << endl;  cout << divide(20, 4);  cout << endl;  system("pause");  return 0;  } |
| Output:    Default parameters are used where the value is missing and arguments value are used from main when both values are provided. | |
| 3. | #include <iostream>  using namespace std;  void duplicate(int& a, int& b, int& c)  {  a = a \* 2;  b = b \* 2;  c = c \* 2;  }  int main()  {  int x = 1, y = 3, z = 7;  duplicate(x, y, z);  cout << "x=" << x << ", y=" << y << ", z=" << z << endl;  system("pause");  return 0;  } |
| Output:    The values are sent by reference which cause the change in real values stored at that address. | |
| 4. | #include <iostream>  using namespace std;  int subtraction(int a, int b)  {  int r;  r = a - b;  return r;  }  int main()  {  int x = 5, y = 3, z;  z = subtraction(7, 2);  cout << "The first result is " << z << '\n';  cout << "The second result is " << subtraction(7, 2) << '\n';  cout << "The third result is " << subtraction(x, y) << '\n';  z = 4 + subtraction(x, y);  cout << "The fourth result is " << z << '\n';  system("pause");  return 0;  } |
| Output:    The values are given in first and second in the arguments whereas values are given through variable in third and in fourth addition of 4 is done to the value. | |

**Exercise 2**

|  |  |  |
| --- | --- | --- |
| 1. | **Give the function definition header and function prototype for each of the following:** | |
|  | Function **hypotenuse** that takes two double-precision, floating-point arguments, **side1** and **side2,** and returns a double-precision, floating-point result. | |
| **Function Definition Header** | **Function Prototype** |
| double hypotenuse(float side1, float side2, float x)  {  int result;  return result;  } | double hypotenuse(float side1, float side2, float x); |
| Function **smallest** that takes three integers, **x, y, z,** and returns an integer. | |
| **Function Definition Header** | **Function Prototype** |
| float lowest(float x, float y, float z)  {  float min = x;  if (y < min)  {  min = y;  }  if (z < min)  {  min = z;  }  return min;  } | float lowest(float x, float y, float z); |

**Exercise 3**

Write a program that take 3 float values as arguments. It returns the smallest of the three values. Provide default values for the three parameters.

**Code :**

#include <iostream>

using namespace std;

float lowest(float, float, float);

void main()

{

float a = 4.5, b = 8.3, c = 7.9;

float low = lowest(a, b, c);

cout << "Lowest Value is : " << low;

cout << endl;

system("pause");

}

float lowest(float x = 1.2, float y = 0.0, float z = 9.7)

{

float min = x;

if (y < min)

{

min = y;

}

if (z < min)

{

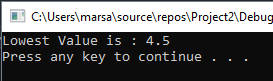
min = z;

}

return min;

}

**Output :**



**Exercise 4**

Write a program which asks the user to enter the width and height of a right-angled triangle. Pass these values to a function ‘Area’ to compute the area of the triangle. Display the area in the function main. Provide default parameters for this function too.

**Code :**

#include <iostream>

using namespace std;

float area(int x, int y);

void main()

{

int base, hieght;

float tri;

cout << "Enter base value : ";

cin >> base;

cout << "Enter hieght value : ";

cin >> hieght;

tri = area(base, hieght);

cout << "Area of triangle with base : " << base << " and hieght : " << hieght << " = " << tri << endl;

system("pause");

}

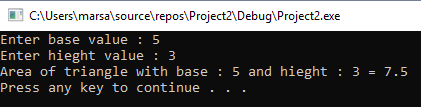
float area(int x = 5, int y = 2)

{

return 0.5\*x\*y;

}

**Output :**



**Exercise 5**

Writea C++ program that uses an inline function **sphereVolume** to prompt user for the radius of the sphere, and to calculate and print the volume of that sphere using the assignment **volume = (4/3) \* 3.14159 \* pow(radius, 3).**

**Code :**

#include <iostream>

#include<math.h>

using namespace std;

inline double sphereVolume(double rad) {

return (4 / 3) \* 3.14159 \* pow(rad, 3);

}

void main()

{

double radius, vol;

cout << "Enter radius value : ";

cin >> radius;

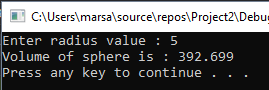
vol = sphereVolume(radius);

cout << "Volume of sphere is : " << vol << endl;

system("pause");

}

**Output :**



**Exercise 6 (Optional)**

Write a C++ program with two functions **U\_Case( )** and **L\_Case( ),** that takes an alphabet from the user and display it in the other case i.e. if the user enters an alphabet in lower case it should call U\_Case( ) and convert it to uppercase and then display it and incase the user enters an alphabet in uppercase it should call L\_Case().

**Code:**

#include <iostream>

#include<ctype.h>

using namespace std;

char U\_Case(char a);

char L\_Case(char b);

void main()

{

char ch, After;

cout << "Enter any alphabet : ";

cin >> ch;

if (ch >= 'a' && ch <= 'z')

{

After = U\_Case(ch);

}

else if (ch >= 'A' && ch <= 'Z')

{

After = L\_Case(ch);

}

cout << After << endl;

system("pause");

}

char U\_Case(char a)

{

return a -= 32;

}

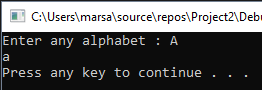
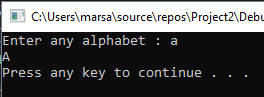
char L\_Case(char b)

{

return b += 32;

}

**Output:**

**Exercise 7**

Debug and find error in the following code. Specify and rewrite the code without error

#include<iostream>

#include<conio.h>

using namespace std;

const int s = 5;

void sort(intar1[], int);

int temp;

int main()

{

       int myArray[s];

       cout <<"Enter the numbers"<< endl;

       for (int i = 0; i <= s; i++)

       {

              cin >> myArray[i];

       }

       sort(myArray, s);

       for (int i = 0; i <= s; i++)

       {

              cout << myArray[i];

       }

       \_getch();

}

void sort(intar1[], intsize)

{

       for (int i = 0; i <= size; i++)

       {

              for (int j = 0; j <= size; j++)

              {

                     if (ar1[j] < ar1[j + 1])

                     {

                           temp = ar1[j];

                           ar1[j] = ar1[j + 1];

                           ar1[j + 1] = temp;

                     }

              }

       }

}

**Code:**

#include<iostream>

#include<conio.h>

using namespace std;

void sort(int ar1[], int);

int main()

{

const int s = 5;//Declaration and initialization inside main

int myArray[s];

cout << "Enter the numbers" << endl;

for (int i = 0; i < s; i++)//Removal of equal to sign

{

cin >> myArray[i];

}

sort(myArray, s);

for (int i = 0; i < s; i++)//Removal of equal to sign

{

cout << myArray[i];

}

\_getch();

}

void sort(int ar1[], int size)

{

int temp;//Declaration inside sort

for (int i = 0; i < size; i++)//Removal of equal to sign

{

for (int j = 0; j < size - i - 1; j++)//Use of correct logic and Removal of equal to sign

{

if (ar1[j] > ar1[j + 1])//Sorting in ascending order

{

temp = ar1[j];

ar1[j] = ar1[j + 1];

ar1[j + 1] = temp;

}

}

}

}