**LAB EXERCISE 3**

**TOPIC: FUNCTIONS**

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**SECTION:** 02

**QUESTION 1**

Describe the difference between predefined function and programmer-defined function?

|  |  |
| --- | --- |
| PREDEFINED FUNCTION | PROGRAMMER-DEFINED FUNCTION |
| A built-in function whose prototype already define in library that come with compiler | Function created by programmer according to need |
| Predefined function already implemented and just need to be called | Programmer-defined function need programmer to implement them |
| Needed to include proper header file | Needed function call and function definition |
| Source code does not appear in program | Source code (definition) appear in program |
| Example: sqrt() , abs() | Example: average(), isPrime() |

**QUESTION 2**

Write a statement to calculate the equation or to convert the statement below using function from library.

1. Square root of y.

sqrt(y); //#include <cmath>

1. x to the power of y.

pow(x,y); //#include <cmath>

1. cos x.

cos(x); //#include <cmath>

1. Change character to uppercase.

toupper(ch); //#include <cctype>

1. Copy the string of x into string y.

strcpy(y,x); //#include <cstring>

**QUESTION 3**

What is the difference between local variable, global variable, global constant and static local variable?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Local variable | Global variable | Global constant | Static local variable |
| Meaning | Variable defined inside a function | Variable defined outside all the functions | Variable that is defined outside all the functions and remain unchanged throughout execution of program. | Variable defined within a function but retain its value between function calls and it will exist until the program ends. |
| Visibility | Variable are hidden from other function | Variable are visible throughout the entire program | Variable are visible throughout the entire program | Variable are visible within function where it is declared. But it is invisible outside the function, even across file. |
| Accessible  / Scope | Other function cannot access local variable | Variable able to be accessed throughout the program | Variable able to be accessed throughout the program | Variable only accessible within function where it is declared. |
| Lifetime | Exist only while the function is executing | Exist until the program ends | Exist and unchanged until the program ends | Exist until the program ends but retain its value between function calls. |
| Readable | Value stored in a local variable is lost between calls to the function which the variable is declared. | Global variable can be accessed by all functions that are defined after the global variable is defined. | Global constant can be accessed by all functions that are defined. Its value cannot be changed once it is assigned. | Static local variable retains their contents between function calls. |
| Initialization | Local variable are not automatically initialized. It must be initialized by programmer. | Global variable is automatically initialized to 0 (numeric) or NULL (character) when the variable is defined. | Global constant is not automatically initialized. It is defined by programmer. Once it is assigned, the value cannot be changed | Defined and initialized only the first time the function is executed. 0 is the default initialization value. The value retains between function calls. |

**QUESTION 4**

Given the following coding, fill in the blank with the “terms” of function as a comment.

#include <iostream>

using namespace std;

int average(int, int, int); //function prototype

int main()

{

int x, y, z, avrg;

cout << "Please enter three numbers:" << endl;

cin >> x >> y >> z;

avrg = average (x, y, z); //function call

cout << "The average of the given three numbers is: " << avrg << endl;

return 0;

}

int average(int a, int b, int c) //function header

{

int sum, avrg2;

sum = a + b + c;

avrg2 = sum / 3;

return avrg2; //return statement

}

**QUESTION 5**

Find the errors in the following given code.

#include <iostream>

#include <cmath>//Error 1

using namespace std;

int average(int, int, int);//Error 2

int power (int); //Error 3

int main()

{

int x, y, z, avrg, powerOf;

cout << "Please enter three numbers:" << endl;

cin >> x >> y >> z;

avrg = average (x,y,z);//Error 4

cout << "The average of the given three numbers is: " << avrg << endl;

power (avrg);//Error 5

cout << "The average number to the power of two is: " << power (avrg) << endl; //Error 6

return 0;

}

int average(int a, int b, int c)

{

int sum, avrg2;

sum = a + b + c;

avrg2 = sum / 3;

return avrg2;//Error 7

}

int power (int p)

{

int pOf;

pOf = pow(p,2);

return pOf; //Error 8

}

**QUESTION 6**

Write a C++ program to calculate a rectangle’s area. The program consists of the following function:

* getLength – This function should ask the user to enter the rectangle’s length, and then returns that value as a double
* getWidth – This function should ask the user to enter the rectangle’s width, and then returns that value as a double.
* getArea – This function should accept the rectangle’s length and width as arguments and return the rectangle’s area.
* displayData – This function should accept the rectangle’s length, width and area as arguments, and display them in an appropriate message on the screen.
* main – This function consists of calls to the above functions.

For Question 6, provide the answer in .cpp file.

