LAB EXERCISE 3

TOPIC: FUNCTIONS

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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.

a) Square root of y.
   sqrt(y); //#include <cmath>
b) x to the power of y.
   pow(x,y); //#include <cmath>
c) cos x.
   cos(x); //#include <cmath>
d) Change character to uppercase.
   toupper(ch); //#include <cctype>
e) 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.