LAB EXERCISE 3

TOPIC: FUNCTIONS

NAME: LEONG JIA LING
MATRIC NO: A24CS0104
SECTION: 02

QUESTION 1

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

- Predefined function is provided by the language/standard library while programmer-defined function is created by you, the programmer.
- Predefined function is already implemented and just need to be called while programmer-defined function, the programmer must implement them.
- Examples of predefined function is **sqrt()**, **abs()**, **cout**, and etc. while examples of programmer-defined function is **average()**, **isPrime()**, and etc.

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(strY, strX); //include<cstring>

QUESTION 3

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

- **Local variables** are used for temporary, function-specific tasks. It is the variables defined inside a function.
- **Global variables** are useful for sharing data between functions. It is any variable defined outside all the function in a program.
- **Global constants** are a safer alternative to global variables as the values do not change throughout the program's execution.
- **Static local variables** allow a function to retain their state across multiple calls, combining the benefits of local scope and extended lifetime.

Features	**Local variables**	**Global variables**	**Global constants**	**Static local variables**
Scope	The function/block	Entire program	Entire program	The function/block
Lifetime	Until function exits	Entire program	Entire program	Entire program
Accessibility	Limited to the function	All functions	All functions	Limited to the function
Modifiability	Modifiable	Modifiable	Not modifiable	Modifiable

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 declaration
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>   //ERROR1
using namespace std;
int average(int, int, int);   //ERROR2
int power (int);   //ERROR3
int main()
{
 int x, y, z, avrg, powerOf;
 cout << "Please enter three numbers:" << endl;
 cin >> x >> y >> z;
 avrg = average (x, y, z);    //ERROR4
 cout << "The average of the given three numbers is: " << avrg <<  endl;
 powerOf = power (avrg);   //ERROR5
 cout << "The average number to the power of two is: " << powerOf <<
endl;   //ERROR6
 return 0;
}
int average(int a, int b, int c)
{
 int sum, avrg2;
 sum = a + b + c;
 avrg2 = sum / 3;
 return avrg2;   //ERROR7
}
int power (int p)
{
 int pOf;
 pOf = pow(p,2);
 return pOf;   //ERROR8
}
```

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.

Compile and Run:

```
This program is to calculate the area of a rectangle.
Enter rectangle's length: 12
Enter rectangle's width: 13

Length of rectangle : 12cm
Width of rectangle : 13cm
Area of rectangle : 156cm
PS C:\Users\User\Downloads\SECJ1013\programs>
```