LAB EXERCISE 3

TOPIC: FUNCTIONS

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QUESTION 1

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

ANSWER:

ASPECT	PREDEFINED FUNCTION	PROGRAMMER-DEFINED FUNCTION
Definition	Already defined by the programming language or library	Defined by the programmer as needed for the program
Purpose	Perform standard tasks like input,output, math and etc.	Performs custom tasks based on the program's requirements.
Example	sqrt() , floor() , strlen()	void printHeading(), displayMessage()

QUESTION 2

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

a) Square root of y.
b) x to the power of y.
c) cos x.
d) Change character to uppercase.
e) Copy the string of x into string y.

ANSWERS:

a) sqrt(y)
b) pow(x,y)
c) cos(x)
d) toupper(Char_Exp)
e) strcpy (y,x)

QUESTION 3

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

ANSWERS:

Local variable is a variable that is declared inside a function and can only be accessed within that function. The variable is destroyed after the function ends, and its value is not retained between different function calls. This means it is hidden from other functions and cannot be accessed by them while global variable is a variable declared outside any function in the program and can be accessed by all functions defined after it and this variable exists for the entire duration of the program. Global constant refers to a value that does not change throughout the program's execution and it is set once and used throughout the program without being modified. Static local variable retains its value between function calls it is initialized once the first time the function is executed.The default value for a static local variable is 0, the default initialization value.

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;
      int average(int, int, int);   Function Prototype
      cout << "The average of the given three numbers is: " <<
     avrg << endl;
      return 0;
}
int average(int a, int b, int c)  Value-returning Function
{
      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>              //error 1
using namespace std;
int average(int, int);           //error 2
int power (float p);             //error 3
int main()
{
 int x, y, z, avrg, powerOf;
 cout << "Please enter three numbers:" << endl;
 cin >> x >> y >> z;
 avrg = average ();                          //error 4
 cout << "The average of the given three numbers is: " << avrg
<<  endl;
 power ();                                   //error 5
 cout << "The average number to the power of two is: " << power
() << endl;                                  //error 6
return 0;
}
int average(int a, int b, int c)
{
 int sum, avrg2;
 sum = a + b + c;
 avrg2 = sum / 3;                           //error 7
}
int power (int p)
{
 int pOf;
 pOf = pow(p,2);
 return 0;                                   //error 8
}
```

Answers:

```
#include <iostream>
#include<cmath>          //error 1  add #include<cmath>
using namespace std;
int average (int a, int b, int c)  //error 2
int power (int p);           //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;
 powerOf = pow (avrg,2);           //error 5
 cout<< "The average number to the power of two is: " <<powerOf
<<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.

```cpp
#include <iostream>
using namespace std;


double getLength ()
{
    double length;
    cout<<" Enter rectangle's length: ";
    cin>>length;
    return length;
}
double getWidth()
{
    double width;
    cout<<" Enter rectangle's width: ";
    cin>>width;
    return width;
}
double getArea(double length, double width)
{
    return length * width;
}
void displayData(double length, double width,double area)
{
    cout<<"The reactangle's length: "<<length<<endl;
    cout<<"The reactangle's width: "<<width<<endl;
    cout<<"The reactangle's area: "<<area<<endl;
}
int main()
{
    double length= getLength();
    double width= getWidth();
    double area=getArea(length,width);
    displayData(length, width, area);

    return 0;
}
```