Computer Laboratory - lab sheet 6

Task 1

Copy the program given below. Save (as `triangle.cpp`), compile and run it.

```
// Computing the area of a triangle
#include <iostream>
#include <cmath>
using namespace std;

// The function prototype
double TArea(double, double, double);

int main()
{
  double a, b, c, alan;

  cout << "Enter the sides of the triangle: ";
  cin  >> a >> b >> c;

  alan = TArea(a, b, c);
  cout << "The area of this triangle is " << alan << endl;

  return 0;
}

// Returns the area of any triangle of sides a, b and, c
double TArea(double a, double b, double c)
{
  // Check if any side is negative
  if (a<0. || b<0. || c<0.) return 0.0;

  // Check if any side is greater than the sum of the other two
  if (a >= b+c) return 0.0;
  if (b >= a+c) return 0.0;
  if (c >= a+b) return 0.0;

  // Calculate and return the area
  double u, area;
  u = 0.5*(a+b+c);
  area = sqrt(u*(u-a)*(u-b)*(u-c));
  return area;
}
```

Task 2

Write a C++ function named `double pro(int x,int s)` that takes a the values of x and s and returns the result of the following expression: $|\sin(x)|\exp(-x/s^2)$ Use the function in a main program.

Task 3

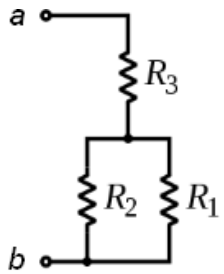
The function $s(n)$ returns the sum of the first n terms of $1 + 1/2 + 1/4 + 1/8 + \ldots$. Write a program to input the integer n and output the result $s(n)$. The object $s(n)$ should be implemented as a function.

Task 4

For the given circuit, write a C++ function named

```
void circuit(double Vab, double& i1, double& i2, double& i3)
```

where the input parameter `Vab` is the potential difference between points *a* and *b* and the output parameters `i1`, `i2` and `i3` are the current passing through each resistor. In the function, define the resistances as follows: R_1 = 1.1 kΩ, R_2=2.2 kΩ and R_3 =3.3 kΩ. Use the function in a main program.



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Computer Laboratory - lab sheet 6

Task 5

Copy the program given below. Save (as `max.cpp`), compile and run it.

```
// Overloaded max functions
#include <iostream>
using namespace std;

int max(int x, int y){
   return (x>y ? x:y);
}
int max(int x, int y, int z){
  int m = (x>y ? x:y);
  return (z>m ? z:m);
}
double max(double x, double y){
  return (x>y ? x:y);
}
int main(){
  cout << "max(9, 7) = " << max(9, 7) << endl;
  cout << "max(3, 6, 2) = " << max(3, 6, 2) << endl;
  cout << "max(3.1, 4.7) = " << max(3.1, 4.7) << endl;

  return 0;
}
```

Task 6

Copy the program given below. Save (as `prism.cpp`), compile and run it.

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

// The function prototype
double prismArea(double, double =1.0, double =1.0);

int main(){
  double x, y, z;

  x = 2.0;
  y = 2.5;
  z = 3.0;

  cout << prismArea(x) << endl;
  cout << prismArea(x, y) << endl;
  cout << prismArea(x, y, z) << endl;

  return 0;
}

// Returns the surface area of a prism
double prismArea(double a, double b, double c)
{
  double sa = 2.0*(a*b + a*c + b*c);
  return sa;
}
```