Lab Sheet 1

Complete all of the following tasks described below. This is an exercise: you do not have to submit anything and it will not be assessed.

1. Write a Python program to compute the area of a triangle given the length of its three sides based on the following formula:

$$\text{area} = \sqrt{s \times (s - s_1) \times (s - s_2) \times (s - s_3)}$$

   where s_1, s_2, s_3 are the three side lengths and $s = (s_1 + s_2 + s_3)/2$. You may use the exponentiation operator $**$ to calculate the square root e.g. $2 ** 0.5$ gives the square root of two.

2. Write a Python program that asks the user to enter a non-negative integer and that outputs the factorial of that number. Recall that the factorial of n (denoted $n!$) is defined as follows:

$$n! = n \cdot (n - 1) \cdot (n - 2) \cdots 3 \cdot 2 \cdot 1$$

   Do not use the `math.factorial` function.

3. A quadratic function has the form $f(x) = ax^2 + bx + c$, where a, b and c are constants and a is nonzero. The real roots of this equation can be found using the formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

   If the square root is zero the equation has a single root and if it is negative the equation has no roots. Write a program that computes the real roots of a quadratic function. Your program should begin by prompting the user for the values of a, b and c. Then it should display a message indicating how many roots it has along with the values of those roots (if any).