Chapter 1 exercises

1. Implement a C++ program which calculates 10! (10 factorial) and displays the result,
   (a) using a `for` loop
   (b) using a `while` loop
   (c) using a `do/while` loop
2. Implement a C++ function which calculates the factorial of an integer,
   (a) using a `for` loop
   (b) using a `while` loop
   (c) using a `do/while` loop
3. Create a class representing a call option, with the appropriate data members, a constructor, a copy constructor, an assignment operator, and member functions to access the properties (such as the strike and the maturity) of the option.
4. Create a set of classes (with a class hierarchy) representing at least six different types of options, each with a constructor, a copy constructor, an assignment operator, and member functions to access the properties (such as the strike and the maturity) of the option.
5. Based on the example class hierarchy discussed in Section 1.3.3, implement a class representing a tri-diagonal matrix.
6. Implement a function to determine the maximum of two arguments as a template. For which arguments will your template compile, for which not?
7. Create a class hierarchy representing shapes. Include at least the following shapes: triangle, circle, rectangle, square. Implement (at least) public member functions for calculating the area and the circumference of each shape.