Lab 10

1. Write a C++ program which creates a tests a factorial function.

2. Write a C++ program which defines two functions called Exp(x) and ExpH(x) respectively.
   The function Exp(x) should use a Taylor polynomial of degree 12 to approximate the function e^x. The polynomial should be evaluated using direct evaluaton of the powers of x.
   The function ExpH(x) should use a Taylor polynomial of degree 12 to approximate the function e^x and the polynomial should be evaluated using Horner's method.
   Get your program to output the triples

   $$\text{x}, |\exp(\text{x})\text{-Exp(x)}|, |\exp(\text{x})\text{-ExpH(x)}|$$

   for $x = 0, 0.01, 0.02, \ldots, 0.3$ to a text file called **Taylor.txt**.

3. Write a C++ program which uses Euler's method to estimate a solution for the initial value problem

   $$\frac{dy}{dx} = \frac{y}{x} + 2x^2 y, \quad y(1) = 2.$$