Assignment 5

1. Inplement the following algorithms to calculate the degree n polynomial interpolation of a function whose values y_i are given at distinct points x_i for $i = 0, \ldots, n$.

   a. Divided differences
   b. Iterated differences (Aitken's method)
   c. Lagrange interpolation

2. For each of the algorithms above put in a counter to count the number of multiplications involved in the calculation.

3. Use the list of values of $\sin(i/2^6)$ for $i \in [0, 2^8]$ and interpolate it using your algorithms. Compare the accuracy of the different algorithms by finding the maximum difference with the in-built values for sin at the points $x = i/2^8$ for $i \in [0, 2^{10}]$.

4. Use the power series method (as in Unit Test 1) to calculate the function $L(x)$ given by $\sum_{k=0}^{\infty} x^k/(k+1)^2$ accurately for $x = i/2^9$ for $i \in [0, 2^8]$. Use any interpolation method to calculate it for the values $x = i/2^{11}$ for $i \in [0, 2^{10}]$ and compare the values with the power series calculation.