CO225 Lab 2

Ziyan Maraikar

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1. Write recusrive functions to compute the following functions by evaluating its Taylor series up to n terms.

   1.
   $$\log 1 + x = \sum_{0}^{\infty} (-1)^{n+1} \frac{x^n}{n}$$

   2.
   $$\cos x = \sum_{0}^{\infty} \frac{(-1)^n}{(2n)!} x^{2n}$$

2. Write a function to calculate the binomial coefficients are defined by the recurrence

   $$\binom{n}{k} = \begin{cases} \binom{n-1}{k=1} + \binom{n-1}{k} & 1 \le k \le n - 1 \\ \binom{n}{0} = \binom{n}{n} = 1 & n \ge 0 \end{cases}$$

3. Write a definition for the Ackermann function which takes two non-negative integer arguments is defined as follows

   $$A(m, n) = \begin{cases} n + 1 & m = 0 \\ A(m - 1, 1) & m > 0 \text{ and } n = 0 \\ A(m - 1, A(m, n - 1)) & m > 0 \text{ and } n > 0 \end{cases}$$

   Be careful when testing as the function grows large very suddenly!