CO225 Lab 2

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

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

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

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

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

3. Write a definition for the Ackermann function which takes two non-negative integer arguments,

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

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