CO225 Lab 3

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Write a tail-recursive function to compute the functions below using the following procedure.

1. Write the nested `loop` function signature with the requried number of accumulators.
2. Write the invariant as a comment.
3. Write the `loop` base case .
4. Based on the invariant write the `loop` recursive case.

1. Tail recursive Fibonnacci sequence.

$$fib\, n = \begin{cases} 0 & n = 0 \\ 1 & n = 1 \\ fib(n-1) + fib(n-2) & \text{otherwise} \end{cases}$$

2. Write the following function *without* using the factorial and power ($**$) functions. Hint: start the summation from the first term.

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

3. Write a tail recurisve implementation of the binomial coefficient $\binom{n}{k}$ using the following identity

$$\binom{n}{k} = \frac{n}{k}\binom{n-1}{k-1}$$