Concurrent Computing: The guide

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2.1 Polynomials

A **degree** $n-1$ polynomial in x can be seen as a function:

$$A(x) = \sum_{i=0}^{n-1} a_i \cdot x^i$$

Any integer that's bigger than the degree of a polynomial is a *degree bound* of said polynomial. The polynomial A is:

$$a_0 \cdot x^0 + a_1 \cdot x^1 + a_2 \cdot x^2 \cdots + a_{n-1}x^{n-1}$$

The values a_i are the *coefficients*, the degree is $n-1$ and n is a degree bound. We're able to express any integer as some kind of polynomial by setting x to some base, say for decimal numbers:

$$A = \sum_{i=0}^{n-1} a_i \cdot 10^i$$

The variable x just allows us to evaluate the polynomial at a point. A really fast way to evaluate the polynomial is to use **Horner's Rule**.

Horner's Rule

Instead of computing all the terms individually, we do:

$$A(3) = a_0 + 3 \cdot (a_1 + 3 \cdot (a_2 + \cdots + 3 \cdot (a_{n-1})))$$

This method requires $O(n)$ operations