CS 344: HWK3

Problem 1. Given a polynomial $p(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$, where the coefficients are a_i's, Horner's method is an efficient algorithm for evaluating the polynomial at a number c that works as follows:

Multiply a_n by c, then add a_{n-1}. Then multiply the result by c and add a_{n-2}. Then multiply the result by c and add a_{n-3} and so on until you reach a_0. This over all gives an $O(n)$ algorithm for evaluation of $p(c)$.

Apply Horner's method to the polynomial $p(x) = 5x^3 - 2x^2 + 3x - 7$ at $c = 2$. How many multiplications and additions?

Problem 2. For the array $23, 17, 14, 6, 13, 10, 5, 18$.

(a) Sort via Mergesort

(b) Sort via Quicksort

(c) Sort via Heapsort.

Problem 3. Solve the recurrence relation

$$T(n) = 2T(n/2) + \lg n, \quad T(1) = 0.$$