22C : 231 Design and Analysis of Algorithms
Homework 1
Due Wednesday, September 13

1. Program the simple $O(n^2)$ algorithm and the other $O(n^{\log_2 3})$ divide-and-conquer algorithm for multiplying two polynomials of degree $n-1$. For the input, use random integers as the coefficients of the two polynomials. Compare the observed running times of the two algorithms as you increase n.

2. Program the simple $O(n^2)$ algorithm and the divide-and-conquer $O(n \log^2 n)$ (or $O(n \log n)$) for computing the closest pair of a set of n points in the plane. For the input, use random integers for the coordinates of the points. Compare the observed running times of the two algorithms as you increase n.

What you should submit is a nice report that summarizes your observations. Don't submit your source code unless you are asked to. I suggest increasing n to about 10^4 or 10^5, assuming the programs finish in reasonable time for such input sizes. Use your favorite programming language and environment.