CS170 Problem Set 11 Out: Apr 6, 2001 Due: Apr 13, 2001

ANSWERS.

1. CLR 37-1.
2. CLR 31.2-2.
3. CLR 31.2-4.
4. In class we analyzed the effect of *blocking* on reducing the number of slow memory accesses in conventional matrix multiplication: we showed that if we multiply s-by-s blocks in the inner loop of blocked matrix multiplication then the number of slow memory accesses dropped from $2n^3 + 2n^2$ to $2n^3/s + 2n^2$. Extend this analysis to the case of multiplying $C = C + A \cdot B$ where A is n-by-k and B is k-by-m. You may assume that s divides m, n and k. You should turn in your algorithm, indicating when data is moved between fast and slow memory, and show your analysis counting the number of such data moves.
5. CLR 31.2-6.
6. How many *real* arithmetic operations (adds and multiplies) does it takes to multiply 2 complex n-by-n matrices, where complex arithmetic is implemented in the most straightforward way? Apply the idea of the last question to show how to do it more cheaply.