

CS3432.03 (W99)

Problem Set # 3

Notes

- This is *not* a team project. Each student will work individually.
- Your solution should include:
 - (1) A *brief* theoretical discussion of your algorithm, including choice of appropriate data structures (and why they are appropriate).
 - (2) “Top-down” development of the program *based on your theoretical discussion, in which the algorithm was proposed*. This step is the most crucial and the one students often do least well. One of the important features of top down development is to ensure at all times that your write-up is closely connected with your final implementation (code). Please cross-reference extensively.
 - (3) Implementation and testing with several inputs, including cases that are “borderline” and which might make the program to misbehave. Your testing should be “aggressive”: You should be trying to find misbehaviour in your program.
 - (4) A general discussion aiming to convince that the program works (this should not, of course, be of the form “the program works for 11 inputs therefore it works for all inputs”—correctness and testing must not be confused).
 - (5) Implement and test-run also the corresponding “normal” multiplication and compare the run time with that of the “fast” scheme you implemented. Discuss your experimental findings in the context of what you expected from theory.
- Due: End of March, 1999.

1. Theme: Fast Multiplication Schemes

Implement one of:

- **Unlimited precision Integer Multiplication**

using any “fast” scheme you like (Karatsuba, Schönhage-Straßen or its derivatives).

- **Straßen “fast” Matrix Multiplication**