

CS4104 Fall 2010 Homework Assignment 9
Due at 11:00pm on Thursday, October 28
50 Points

Pledge: I (we) have not received unauthorized aid on this assignment. I (we) understand the answers that I (we) have submitted. The answers submitted have not been directly copied from another source, but instead are written in my (our) own words.

1. [15 points] Suppose that you have a function PRIME that is a probabilistic algorithm for determining if a value n is prime or not. The probability that it reports n to be prime when it is in fact composite is less than half. Then, what is wrong with the following statement?
“The probability that n is in fact composite given that PRIME reports that n is prime is less than one half.”
2. [15 points] Show how to compute the square of a 2×2 matrix with only five multiplications.
3. [20 points] Suppose that you find an algorithm to multiply 4×4 matrices with k multiplications. What would be the complexity of a general matrix multiplication algorithm based on this algorithm? What is the maximal value of k that will lead to an asymptotic improvement over Strassen’s algorithm?