CS174 Sp2001 **Homework 6** **due: Mar 8, 2001**

This homework is due by 5pm on Thursday March 8th. Please hand it to the CS174 homework box on the second floor of Soda Hall.

1. For the randomized routing algorithm from lecture 11, suppose that you want to guarantee that all packets reach their destination in time $T(n)$ with probability $1 - 2^{-n}$. How small can $T(n)$ be?

2. Consider a program that computes $B = f(A)$, where A, B are $n \times n$ matrices with rational coefficients, A is the input, and B the output from the program. B is supposed to be the inverse of A. Give a randomized program checker for this task. What is the complexity of your checker? Assume arithmetic operations have unit cost.

3. Suppose you are given a large polynomial $p(a_{11}, \ldots, a_{ij}, \ldots, a_{nn})$ which is claimed to be the determinant of the matrix $A = \{a_{ij}\}$. Describe a program checker, compute is running time and error bound.

4. Let $a = a_1 a_2 \cdots a_n$ be an n-character string. Your task is to compute fingerprints of all length k contiguous substrings of this string (for pattern matching). How would you do this? You should be able to do it in $O(n)$ time independent of k.