CS 536 (Park) **Assignment III** **Due: Sep. 19 (Fri.), 1997**

PROBLEM 1

(a) Read the remainder of Chapt. 3 from P & D.

(b) Give a 3-page summary overview of the following aspects of UNIX system programming: introduction, file I/O (`open`, `read`, `write`, `dup`, `stat`, `chmod`), and process control (`fork`, `exit`, `waitpid`, `exec`-family, `getpid`). Spend 1 page on the introduction, giving your interpretation of what UNIX system programming is, and making precise what *system calls* are and how they differ from regular function calls. Organize your description around the main system calls (a subset is indicated in parenthesis).

PROBLEM 2

Design two different versions of a TDMA (FDM + TDM) multiplexing scheme for a broadband medium of bandwidth 1 GHz which multiplexes 96 channels, each of data rate 64 kbps, running full duplex. Assume that the 96 channels may potentially be used to support voice traffic. Your design should be comprehensive quantifying all relevant parameters including frame time etc. What (if any) are the pros/cons of your two designs?

PROBLEM 3

Assume you are using direct sequence CDMA to transmit bit sequences where the code rate is r times the data rate. Assume the error rate (i.e., a bit in the encoded sequence flipping) is $0 < \varepsilon < 1$ and independent (across time). Suppose the goal is to achieve a reliability of $1 - \delta$, $0 < \delta < 1$, where *reliability* measures the probability that a data bit is correctly decoded at the receiver. Assuming a *single* session is to be supported, ε and δ are given, and the sole design parameter is r, find the solution for r.

Does the solution depend on the particular pseudorandom chipping code used? Explain.

If N sessions are to be multiplexed, how would N be qualitatively reflected in the above model and calculations?

PROBLEM 4

Problem 3.2, 3.5, 3.7, 3.8 from P & D.