CSE 7343 Fall 2002 PROJECT

The CSE 7343 Project for this semester is based on the NACHOS operating system as described in the addendum to your text available on the web page. The project consists of three programming tasks which are due by midnight on November 4, November 25, and December 13 (respectively). Each task requires modifying NACHOS according to the task description, developing test data, testing your programs, and then submitting (via email) for grading the source code, developed test data, and test results. Projects are to be completed in groups of 3 or 2 where each person in the group will receive the same grade. Each assignment will be graded on a 100 point scale. The project is worth 1/4 of your total grade. The three project portions will be weighted 50%, 30%, and 20% respectively.

With each task you are to submit the code, the test execution, and a README file which describes what you did, which files were changed, how you tested, and a discussion of test results. Code which is changed MUST contain comments showing what changes were made. Late projects will be accepted, but you are urged to complete each portion by the due date. The following grading scheme will be used for each project:

- Submissions Requirements (10pts) (Code, Readme, Test)
- Comments in Code (10pts)
- Testing (Test programs, test results) (20pts)
- Modifications (Do what was required) (60pts)

**These tasks are not easy, so begin work as soon as possible.**

Prior to beginning the programming, you need to identify teams and notify Dr. Dunham via email as to the members of each team. Please send this information to Dr. Dunham via email by October 1. In addition all Nachos material should be obtained from the web site (see my home page for the link).

The project tasks are listed below:

1. Nachos Assignment #1: Build a thread system
   
   **Due date: November 4. midnight.**

   Please read the documentation in the thread.tex file. Implement producer/consumer communication through a bounded buffer, using locks AND condition variables. Your test should involve writing into a buffer from 2 concurrently executing producer threads and reading from the same buffer with 2 concurrently executing consumer threads. Each producer (consumer) writes into the buffer (reads from the buffer) one character at a time. Each producer should write into the buffer the phrase
"HELLO WORLD! ". (You may use any phrase you wish.) Test your code with buffers of size 1, 5, 20. Your output must show the sequence of items that each producer/consumer writes/reads into/from the buffer. In your Readme file, include a paragraph describing and comparing the results of the three tests. NOTE: You should test with the -rs option.

2. Nachos Assignment #2: Multiprogramming

Due date: November 25, midnight.

Implement the Exec, Join, and Exit system commands. Develop test programs to show the valid use of these commands. Implement multiprogramming with time-slicing. Instrument the operating system to keep track of average response time for executing user programs. Run your test programs with three different values for the time-slice. Your Readme file should contain a paragraph comparing the performance from the three sets of tests. Please read the documentation in the userprog.tex file.

3. Nachos Assignment #3: Virtual Memory

Due date: December 13, midnight.

Implement virtual memory. For this, you will need routines to move a page from disk to memory and from memory to disk. You may represent the backing store using the Nachos file system, Unix file system, or simple in memory (Unix) array. You may use any page replacement scheme desired (Please indicate in Readme file.). Evaluate performance using three different sizes of physical memory. Include in your Readme file a paragraph describe the differences in performance. Please read the documentation in the vm.tex file. NOTE: Your output must now include statistics about number of page faults.