CS 162, Fall 1991
Final
Professor A. Smith

The exam is closed book. Any question for which you give no answer at all will receive 20% partial credit.

Problem #1

One thing that adds security to the Unix password system is "salt." Salt consists of two randomly generated characters, different for each user, which are stored in the /etc/passwd file for each file. The Salt is used to determine which of 4096 variations of the password encryption algorithm are used to encrypt a given password. What is the advantage of using "salt?". Explain. (15)

Problem #2

Explain what an "intentions list" is, and how and why it is used. (15)

Problem #3

When you log into Unix, it tells you when youlast logged on. Why? (10)

Problem #4

Define and explain what a stack algorithm is. Why is it good? If two algorithms are compared and one is not a stack algorithm and the other is, will one always give better (fewer page faults) results? Why and why not? (17)

Problem #5

Explain the purpose of a token in a ring network Why is there only one token? (13)

Problem #6

What are the functions that "open" and "close" perform? (16)

Problem # 7

Describe and explain all of the problems that could occur if users could write directories directly. Be precise and specific.

Problem # 8

What is a polyalphabetic cipher? How would you go about breaking it? (10)

Problem #9

Explain the only perfect method of encryption, and why it is perfect. What do we mean by perfect? (11)

Problem # 10

True/False questions (27):

a: The "chmod" command in Unix is used to alter capabilities. _____

b: Files in Unix are contiguously allocated. _____

c. Deleting a directory deletes all files within that directory. _____

d. When a file is opened, its descriptor is kept in main memory. _____

e. Internally the OS refers to files by name. _____

f. Directories are stored on disk just like regular files. _____

g. If A has a symbolic link to B's file, (these are the only two links to the file) and B removes its hard link from the file, the link count of the file is decremented and the file still exists, but B no longer has access to it. _____

h. A Unix file descriptor must allocate at least 13 pointers, even if the file it points to has only 4 blocks. _____

i. Unix password files are world-readable. _____

Problem # 11

We discussed two ways of comparing paging algorithms: A curve of space vs. faults, and space-time product. Define each, and explain which is better and why. (15)

Problem # 12

Explain (all of) the advantages and disadvantages of disk caching. (15)

Problem # 13

(a) What is the approximate length of time required for a full rotation on most hard disks? (6)

(b) Suppose that youhave a new mythical disk called the dervish. The rotation time is as in part a. The seek time is 10 microsections/cylinder, and there are 100 cylinders. I claim that disk scheduling algorithms such as SCAN and SSTF are no longer very good. Why? What would be a good scheduling alogorithm for the dervish disk? (16)
