MCS-378 Final Exam

This exam is closed-book and mostly closed-notes. You may, however, use up to three 8 1/2 by 11 sheets of paper with *hand-written* notes for reference. (Both sides of the sheets are OK.)

Please write your name only on this page. Do not turn the page until instructed, in order that everyone may have the same time. Then, be sure to look at all problems before deciding which one to do first. Some problems are easier than others, so plan your time accordingly. You have 120 minutes to work.

Write the answer to each problem on the page on which that problem appears. You may also request additional paper, which should be labeled with your test number and the problem number.

If you are stuck, ask for help. At worst, I'll offer to sell you a hint for some points.

Name: _____

Problem	Page	Possible	Score
1	2	12	
2	3	12	
3	4	12	
4	5	12	
5	6	12	
Total		60	

1. [**12 Points**]   A file system uses inodes like those used in traditional Unix or Linux systems (such as you worked with in a homework problem). However, in this system, each inode has room for 10 direct block pointers, then pointers to single indirect, double indirect, and triple indirect blocks. Each block holds 8KB (i.e., 8192 bytes). Each pointer to a block takes 4 bytes. How big does a file need to be before the triple indirect pointer gets used? (It is OK to just give a formula for computing the answer; you don't need to actually do the arithmetic.)

2. [**12 Points**]   A disk driver has requests queued for cylinders 100, 250, 110, and 95 in that order. For each of the following disk arm scheduling algorithms, indicate the order in which the requests would be processed, and the total seek distance in cylinders. In each case, assume that the disk head is initially at cylinder 98.

   (a) FCFS

   (b) SSTF

   (c) LOOK (initially headed towards lower-numbered cylinders)

   (d) C-LOOK

3. [**12 Points**]   You have now implemented distributed systems both using socket communications and using a distributed object system (RMI). If you had free choice which to use for a future system, which would you choose? Why? (If your answer is "that depends," tell what it depends on and why.)

4. [**12 Points**]   Suppose you are managing a computer system and are worried that your users' passwords may be exposed, for example by shoulder surfing or sniffing. What alternative authentication mechanism could you use instead of conventional passwords, in order to neutralize this threat to system security? What would the disadvantage be?

5. [**12 Points**]   Write a paragraph briefly summarizing one of the papers that we read on a topic relating to file systems or distributed systems. Do *not* pick one of the most recent two papers, on security in the real world and role-based access control. Do not pick a paper for which you led the discussion. Your summary should state what problem the authors were trying to solve, and what the general nature of their solution is.