COSC 335 – Operating Systems
Final Review
Spring 2009

1.) What is a PCB? What function does it serve? What are five things contained in a PCB?

2.) Fully describe the traditional implementation of ThreadJoin(tid).

3.) List and describe the five process states mentioned in class. Draw the state diagram for these states.

4.) What is hyperthreading? Does it provide a linear speedup? Why or why not?

5.) Does the following two-thread Too Much Milk solution guarantee only one jug of milk at a time, without fear of starvation? Explain your answer.

```
Leave note A;                    Leave note B;
while (note B)                   if (noNoteA)
  do nothing;                      if (noMilk)
if (noMilk)                          buy Milk;
  buy Milk;                      remove note B;
remove note A;
```

6.) What is a context switch? Give an example of where we've run into a problem because we have to be concerned about context switches.

7.) What is an Operating System?

8.) What are two things we can do to protect threads from each other? Fully describe one of the two approaches you mention.

9.) What is uniprogramming and why is it not suitable for modern PCs?

10.) What are some issues with threads sharing the same memory space? How can we solve these issues?

11.) What are the goals for a CPU scheduler? Fully describe each of these goals.

12.) What are deadlocks? What four conditions must hold for there to exist a deadlock in a system?

13.) Fully describe two different ways of **implementing** a directory structure (not two ways that directories are structured).

14.) Fully describe two different ways of accessing the information stored in a file.

15.) What are two different approaches to opening and closing files? What are the pros and cons of each?

16.) Identify and describe the levels in a layered file system.

17.) List five different file operations that the OS manages.

18.) What are the differences between protection and reliability and how can the OS ensure that data has both?

19.) Given the following jobs and assuming that they arrive in the order in which they appear, what are the average waiting time and average completion time for both FCFS and RR CPU (with a quantum of 25) scheduling techniques:

P1 – 25   P2 – 35   P3 – 15   P4 – 65
P5 – 40   P6 – 30   P7 – 10   P8 - 55

20.) In the Linux VFS architecture, what are the four main object types? What do they represent?

21.) Define and describe the following disk allocation methods: contiguous, linked and indexed. Be sure to include the submethods for indexed allocation.

22.) Name and describe four ways of dealing with free-space management in a filesystem.

23.) What is segmentation?

24.) What is virtual memory and what is it's key feature that makes it different than "pure" physical memory allocation schemes?

25.) List and describe two different ways of structuring a page table.

26.) Given the following reference string on a 4 page pagetable, how may page faults will the system have under a FIFO replacement policy?

1, 2, 3, 4, 0, 1, 3, 2, 4, 1, 0, 0, 1, 4, 3, 2