CS 420
HOMEWORK ASSIGNMENT H7

DUE DATE: Monday, December 3

1. Calculate the maximum number of interrupts per second that a machine can process assuming the following:
    a. When an interrupt occurs, the following must be written to the execution stack in memory to preserve their values (all values occupy one memory word):
        i. 32 CPU registers
        ii. The program counter
        iii. The program status word
    b. Reading or writing a word to memory requires 5 nsec.
    c. Remember that processing an interrupt requires both saving the current execution context and loading a different execution context

2. How much time would it take to read a sector on a hard disk drive if it rotates at 7200 rpm, has 500 sectors per track and sectors contain 512 bytes?

3. What is the minimum data transfer rate of the disk in the previous question? The answer should be stated in bytes/sec.

4. Show comparisons of RAID 0 through RAID 5 with respect to write performance, read performance, additional storage required and reliability (ability to tolerate errors).

5. A vendor of hard disk drives has two models using the same size disks and also each drive has 10,000 cylinders. The only difference is that the more recent model has a higher linear data density than the older model. What performance parameters are different between the two models and which parameters are the same?

6. The speed of rewriting the screen on a monitor can be critical for displaying certain types of data. How long would it take to rewrite a 1024 X 768 pixel screen that uses a 24-bit RGB color representation for each pixel, assuming that the screen is memory mapped and it takes an average of 2 nsec to copy a byte to memory?

Either type your solutions or print legibly. Solutions that cannot be easily deciphered are incorrect!

General Instructions:

- NOTE: This assignment is to be submitted by printing the answers on paper that is turned in at the start of class on the due date.
- Homework submissions should be prepared using computer document preparation applications such a word processor or similar editor. Handwritten solutions are only acceptable if they are neat and can be easily read by the grader – neatness, readability and grammar count!
- Homework submissions will be clearly marked with the student's name, date and assignment identification at the top of the first page.
- All homework is to be completed by each student individually and represent that student's original, unassisted work. Any material copied in any way from other sources must be clearly identified and attributed.
- The problem solutions printed on paper are submitted at the start of class on the due date.