COSC 4330   **TEST #2**   **JUNE 11, 2007**

Closed Book. You can have one sheet of notes. **Each question is worth 20 points.**

1. **True or false:**

    ___ T _**X**_ F   Lightweight processes were invented to provide an alternative to the
                exec() system call. (They provide a faster alternative to fork(().)

    ___ T _**X**_ F   Processes waiting for the CPU are in the **waiting state**.
                (No, they are in the ready state.)

    _**X**_ T ___ F   The **pthread library** implements **user-level threads**.

    ___ T _**X**_ F   The number of processes that can be simultaneously in the running state is
                hardware-specific.
                (It depends on the number of system processing units.)

2. How many lines of output will be printed by the following program?

    ```
    main(){
        int pid;
        if ((pid = fork()) == 0) {
            printf("How are you?\n");
        }
        printf("Fine.  Thank you.\n");
    } //main
    ```

    Answer: The program will print exactly _3_ lines.

3. Give **two major disadvantages** of **user-level threads** over kernel supported threads.

    • User-level threads cannot take advantage of multiprocessor architectures and let
      multiple threads of the same task run at the same time on different processing
      units.

    • When a user-level thread does a blocking system call, all threads sharing its
      address space are blocked.

4. Which processes can be safely **swapped out** and why?

    Processes that have been in the waiting state for a long time can be safely swapped out
    as theya re likely to remain for some time in the waiting state.

5. What would be the result of the execution of the following piece of code?

    ```
    int pipedesc[2];
    …
    pipe(pipedesc);
    close(0);
    dup(pipedesc[0]);
    ```

    Standard input is now redirected to pipedesc[0]..