CS3204 Operating Systems - Spring 2001
Instructor: Dr. Craig A. Struble
Homework 1

Assigned: Wednesday, Jan. 24, 2001 **Due:** Wednesday, Jan. 31, 2001

All answers must be written concisely and in complete sentences.

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1. *[5 pts.]* Exercise 1 in Nutt, Chapter 1. Support your answers by sufficient argument.

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2. *[5 pts.]* Exercise 4 in Nutt, Chapter 1.

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3. *[5 pts.]* Exercise 6 in Nutt, Chapter 1.

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4. *[5 pts.]* In a multiprogramming and time-sharing environment several users share the system simultaneously. Identify two security problems that arise in this situation.

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5. *[5 pts.]* Exercise 2 in Nutt, Chapter 2.

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6. *[10 pts.]* On a Linux machine, locate and print a copy of the portion or portions of `/usr/include/linux/sched.h` that define the process descriptor. Write the structure and field(s) from the header file corresponding to the information listed below. Submit the printed portion of `sched.h` with your solution.

a. process identifier (PID)	b. start of the list of children
c. current state (e.g. running)	d. priority
e. time execution started	f. amount of CPU time consumed
g. main memory used by the process	h. file descriptor table
i. parent process	j. pointers to place this process in its sibling list

Note: If the above file does not exist on your system, then it's likely that you forgot to install the Linux kernel sources. Instructions for installing the Linux kernel sources will be on the web site shortly.

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7. *[15 pts.]* Refer to the Linux manual pages for `clone` and `fork` and the system call implementations for `sys_clone` and `sys_fork` in `/usr/src/linux/arch/i386/kernel/process.c` to answer the following questions. Looking in `/usr/src/linux/kernel/fork.c` will also be helpful.

- How does `__clone` differ from `fork`?
- Provide a sample call `__clone` so that the child process shares the same memory space. Note that the first argument to `__clone` is a function.
- From the implementations `__clone` and `fork` what is common to both? Include code segments to support your answer.