Homework 5

Due Date: Friday, June 7, 2002, ***at 11:59PM; no late assignments accepted*** **Points**: 100

UNIX System

1. (*10 points*) I want to make the file libprog.a in my home directory available to everyone so they can copy it, but I do not want anyone to be able to see any other files in my home directory. How should I set the "other" bits of my directory's protection mask to do this?

2. (*10 points*) What command would you use to remove columns from a file??

C Programming

3. (*50 points*) Write a program called *fileinfo* that prints the following information about the files named on the command line:

   - file name
   - device inode number resides on
   - file inode number
   - file generation number
   - file type; if symbolic link, name of file the link points to
   - owner (as both login name if known and UID)
   - group (as both group name if known and GID)
   - owner rights (as “read", “write", “execute")
   - group rights (as "read", “write", "execute")
   - world rights (as "read", "write", "execute")
   - other sttributes ("setuid", "setgid", "sticky”)
   - size in bytes
   - size in blocks (1 block = 1024 bytes; any leftover bytes counts as 1 block)
   - time of last access (in human-readable form)
   - time of last modification (in human-readable form)
   - time of inode creation (st_ctime; in human-readable form)

   Hint: Look at the manual page for *stat*(2) to see how to get this information. Use *ctime*(3) to convert the dates from internal to human-readable form; use *readlink*(2) to figure out to which file a symbolic link points

4. (*30 points*) Consider an array of characters. Let bits 0-7 be the bits of array element 0, bits 8-15 the bits of array element 1, and so forth. The bits for each character are numbered high-to-low, so the character ‘e’ (hexadecimal 65) has bit 7 set to 0, bit 6 set to 1, bit 5 set to 1, bit 4 set to 0, bit 3 set to 0, bit 2 set to 1, bit 1 set to 0, and bit 0 set to 1. Write C preprocessor macros to do the following:

   a. Set the nth bit of char array buf to val:

   ```
   SET_BIT(buf, n, val)
   ```

   b. Get the value of the nth bit of char array buf:

   ```
   GET_BIT(buf, n)
   ```

Extra Credit

5. (*10 points*) Modify the program you wrote in problem 3 to take an argument, –L. If this argument is given and the file is a smbolic link, print information about the file named by the symbolic link.