HW: File Permissions
IC221, Spring AY24
110 points

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1. (15 points) Describe in your own words the purpose of each of the following Unix/Linux 'devices':

`/dev/cdrom`	This is an abstraction of the hardware for the CD-ROM read/write device: this is the file you read and write when you connect a CD-ROM to the computer.
`/dev/sda*`	This is an abstraction for the Hard Drive: this is the file you read and write to when you read and/or write data on the Hard Drive.
`/dev/loop*`	The loop device helps to map data blocks to a regular file in the file system, instead of mapping them to physical devices such as a hard disk or an optical disk drive. This can be useful to mount virtual disks, like filesystem images stored in a file, with the mount command.

2. (15 points) Describe the permission strings below in plain language. What permission do *owner*, *group*, and *other* have, respectively?

`rwxrw-rw-`	Owner: read, write, execute. Group and other: read, write.
`r-x--x--x`	Owner: read, execute. Group and other: execute.
`rw-rw-r--`	Owner and group: read, write. Other: read.

3. (20 points) Using the `man` page (or by trying it yourself in the terminal), describe the result of the following `chmod` commands.

`chmod a+x file`	Add execute permission to all for file.
`chmod u+x file`	Add execute permission to the user (owner) for file.
`chmod a-w file`	Remove write permission to all for file.
`chmod g+rw file`	Add read and write permission to group for file.

4. (10 points) On a lab computer, type `groups` into the shell. What groups are you in?

amnesia, adm, cdrom, sudo, dip, plugdev, users

5. (20 points) Where is the following information found on a Unix/Linux system?

The list of all users on the systems	/etc/passwd
The default group of each user	/etc/passwd
The list of all groups	/etc/group
Default location of users' (salted, hashed) passwords	/etc/shadow

hint: `man shadow`, `man passwd`, `man group`

6. (10 points) Explain one way you could still execute a given program, despite not having group or global (Other) execute permissions for it. Assume you only have read access to the program file in its current location. You are not the owner, and you don't have sudo/root permissions, either.

Having read permissions, I could copy the content of the program and create a new identical one which I would be the owner of, then allow myself to execute it with chmod u+x file and run it.

7. (20 points) Give equivalent octal versions of the following `chmod` commands. Assume there are no read/write/execute permissions at all on the file before the command is given.

Shorthand	Octal
`chmod ugo+rwx file1.txt`	111 111 111 > **7 7 7**
`chmod ugo-rwx file1.txt`	000 000 000 > **0 0 0**
`chmod u+rwx file1.txt; chmod go+rx file1.txt`	111 101 101 > **7 5 5**
`chmod u+rw file1.txt; chmod go+r file1.txt`	110 100 100 > **6 4 4**