

03 - Manipulating Files and Using Git

CS 2043: Unix Tools and Scripting, Spring 2016 [1]

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- A note about HW1...

Working with Files

Users and Groups

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- All accounts are presided over by the Superuser, or **root** account.
- Each user has absolute control over any files they own, which can only be superseded by **root**.
- Files can also be owned by a **group**, allowing more users to have access.

File Ownership

You can discern who owns a file many ways, the most immediate being `ls -l`

Permissions with `ls`

```
>>> ls -l Makefile
-rw-rw-r--. 1 sven users 4.9K Jan 31 04:42 Makefile
           sven      # the user
           users    # the group
```

The third column is the *user*, and the fourth column is the *group*.

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Directory permissions begin with a **d** instead of a **-**.

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- It is a file.
- User can read and write to the file, as well as execute it.
- Group members are allowed to read the file, but cannot write to or execute.
- Other cannot do *anything* with it.

Changing Permissions

Change Mode

`chmod <mode> <file>`

- Changes file / directory permissions to **<mode>**.
- The format of **<mode>** is a combination of three fields:
 - Who is affected: a combination of **u**, **g**, **o**, or **a** (all).
 - Use a **+** to add permissions, and a **-** to remove.
 - Specify type of permission: any combination of **r**, **w**, **x**.
- Or you can specify mode in octal: user, then group, then other.
 - e.g. **777** means user=7, group=7, other=7 permissions.

The octal version can be confusing, but will save you time.
Excellent resource in [2].

Changing Ownership

Changing the group

Change Group

```
chgrp group <file>
```

- Changes the group ownership of <file> to **group**.

As the super user, you can change who owns a file:

Change Ownership

```
chown user:group <file>
```

- Changes the ownership of <file>.
- The **group** is optional.
- The **-R** flag is useful for recursively modifying everything in a directory.

File Ownership, Alternate

If you are like me, you often forget which column is which in `ls -l...`

Stat of a file or filesystem

`stat [opts] <filename>`

- Gives you a wealth of information, generally more than you will ever actually need.
- **Uid** is the user, **Gid** is the group.
 - BSD/OSX: use `stat -x` for standard display of this command.
- Can be useful if you want to mimic file permissions you don't know.
 - Human readable: - `format=%A`, e.g. `-rw-rw-r--`
 - BSD/OSX: `-f %Sp` is used instead.
 - Octal: - `format=%a` (great for `chmod`), e.g. `664`
 - BSD/OSX: `-f %A` is used instead.

Platform Notes

- Convenience flag for **chown** and **chmod** on non-BSD Unix:

```
>>> chmod --reference=<src> <dest>
```

- Set the permissions of **dest** to the permissions of **src**!
- BSD/OSX users: **--reference** does not exist, you will have to execute two commands.

```
>>> chmod `stat -f %A <src>` <dest>
```

- The **stat** command inside of the **`backticks`** gets evaluated *before* **chmod** does.
- The **stat** command performs a little differently on BSD/OSX by default. Read the **man** page.

Types of Files and Usages

Plain Files

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- Documentation,
- Application settings,
- Source code,
- Logs, and
- Anything you may want to read via the terminal (e.g. `README.txt`).

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- Executables,
- Libraries,
- Media files,
- Archives (.zip, etc), and many more.

Reading Files Without Opening

Concatenate

`cat <filename>`

- Prints the contents of the file to the terminal window

`cat <file1> <file2>`

- Prints `file1` first, then `file2`.

more

`more <filename>`

- Scroll through one page at a time.
- Program exits when end is reached.

less

`less <filename>`

- Scroll pages or lines (mouse wheel, space bar, and arrows).
- Program does not exit when end is reached.

Beginning and End

Long files can be a pain with the previous tools.

Head and Tail of Input

```
head -[numlines] <filename>
```

```
tail -[numlines] <filename>
```

- Prints the first / last numlines of the file.
- Default is 10 lines.

Not Really a File...YET

You can talk to yourself in the terminal too!

Echo

`echo <text>`

- Prints the input string to the standard output (the terminal).
- We will soon learn how to use **echo** to put things into files, append to files, etc.

Let's Git Started

Another Brief Git Demo

If you are not at lecture, don't worry about this slide not making any sense.

```
>>> git clone <url>      # get a local copy
>>> git status            # informs you of changes
>>> git add <file(s)>     # if you need it online
>>> git commit            # saves this version
>>> git push              # puts the commit online
```

Demo Time!

Our first in class demo

Instructions are here:

<https://github.com/cs2043-sp16/lecture-demos/tree/master/lec03>

References I

[1] B. Abrahao, H. Abu-Libdeh, N. Savva, D. Slater, and others over the years.

Previous cornell cs 2043 course slides.

[2] C. Hope.

Linux and unix chmod command help and examples.

<http://www.computerhope.com/unix/uchmod.htm>,
2016.