

Manipulate files and data

OS Practice CSC 420 Spring 2022

README

- Before working through this file, make sure you completed the getting started guide in `start_nb.org`.
- You can hide/open headers and codeblocks with the <TAB> key
- You can get this file and the `.emacs` file from GDrive
- The solutions and results herein were all obtained on a Pi

Building a playground

- Change to your `$HOME` directory
- Print your working directory
- Make a directory `playground`
- Switch on the verbose option
- Check that it worked using the wildcard `play*`

```
cd $HOME
pwd
mkdir -v playground
echo "found:" play*
```

```
found: playground
```

- [X] Check task group

Creating directories

- Change directory to `playground`¹ - do this in every code block!
- Print your working directory
- Make two directories `dir1` and `dir2`
- Switch on the verbose option
- Check that it worked using the wildcard `*[0-9]`

```
cd ~/playground
pwd
mkdir -v dir1 dir2
echo "found:" *[0-9]
```

```
mkdir: created directory 'dir1'
mkdir: created directory 'dir2'$'\r'
found: 1 100_10 2 FILE100 FILE1001 dir1 1_FILE100
```

- [X] Check task group

Copying files

- Copy /etc/passwd into the current working directory
- Switch on the verbose option
- Check that it worked using the wildcard pass??

```
cd ~/playground
cp -v /etc/passwd .
echo "found:" pass??
```

```
'/etc/passwd' -> '.$'\r'
found: pass??
```

- [X] Check task group

Moving and renaming files

- Change the name of passwd to fun
- Switch on the verbose option
- Check that it worked with the wildcard *fun*

```
cd ~/playground
mv -v passwd fun
echo "found:" *fun*
```

```
found: *fun*
```

- Move the renamed file fun to directory dir1
- Check that it worked with `ls -l`
- Move fun from dir1 to ~dir2 in one command
- Check that it worked with `ls -l`
- Move fun back to the current working directory
- Check that it worked with `ls -l`

```
cd ~/playground
mv -v fun dir1
ls -l dir1
mv -v dir1/fun dir2
ls -l dir2
mv -v dir2/fun .
ls -l .
```

```
total 0
total 350
-rwxrwxrwx 1 marcus marcus      4 Mar  7 22:32 1
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 100_10
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 10file
-rwxrwxrwx 1 marcus marcus      4 Mar  7 22:32 2
-rwxrwxrwx 1 marcus marcus    20 Feb 22 07:28 FILE100
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 FILE1001
```

```

-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 FILE100~~
-rwxrwxrwx 1 marcus marcus      0 Mar  8 09:11 cat
drwxrwxrwx 1 marcus marcus    512 Mar 10 08:37 dir1
drwxrwxrwx 1 marcus marcus    512 Mar 10 08:37 dir2
-rwxrwxrwx 1 marcus marcus    171 Mar  8 09:11 joined.txt
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 l_FILE100
-rwxrwxrwx 1 marcus marcus     47 Mar  8 09:11 lazy-dog.txt
-rwxrwxrwx 1 marcus marcus      0 Mar  7 22:32 ls
-rwxrwxrwx 1 marcus marcus     57 Mar  7 22:32 ls-error.txt
-rwxrwxrwx 1 marcus marcus    171 Mar  7 22:32 ls-output.txt
-rwxrwxrwx 1 marcus marcus  30914 Mar  8 09:11 ls.txt
-rwxrwxrwx 1 marcus marcus   6536 Mar  2 21:53 manipulate_03082022.org
-rwxrwxrwx 1 marcus marcus   5984 Mar  2 21:53 manipulate_nb.org
-rwxrwxrwx 1 marcus marcus   6913 Mar  1 06:44 manipulate_nb_03082022.org~
-rwxrwxrwx 1 marcus marcus  20752 Mar 10 08:36 manipulate_nb_solution.html
-rwxrwxrwx 1 marcus marcus  20654 Mar 10 08:35 manipulate_nb_solution.html~
-rwxrwxrwx 1 marcus marcus  11249 Mar 10 08:37 manipulate_nb_solution.org
-rwxrwxrwx 1 marcus marcus   3912 Feb 28 21:00 manipulate_old.org
-rwxrwxrwx 1 marcus marcus     57 Mar  7 22:32 output.txt
-rwxrwxrwx 1 marcus marcus      0 Mar  7 22:32 output1.txt
drwxrwxrwx 1 marcus marcus    512 Mar 10 08:36 playground
-rwxrwxrwx 1 marcus marcus  16172 Mar  8 11:22 redirection.org
-rwxrwxrwx 1 marcus marcus  27689 Mar  8 09:15 redirection_solution.html
-rwxrwxrwx 1 marcus marcus  27689 Mar  8 09:14 redirection_solution.html~
-rwxrwxrwx 1 marcus marcus  15674 Mar  8 09:19 redirection_solution.org
-rwxrwxrwx 1 marcus marcus  17013 Mar  8 09:11 redirection_solution.org~
-rwxrwxrwx 1 marcus marcus    640 Feb 22 07:28 sample.txt
-rwxrwxrwx 1 marcus marcus    640 Feb 22 07:28 sample1.txt
-rwxrwxrwx 1 marcus marcus   3874 Mar  2 20:50 start_nb.org
-rwxrwxrwx 1 marcus marcus  95857 Feb 28 22:44 start_nb.pdf
drwxrwxrwx 1 marcus marcus    512 Feb 22 07:28 testdir
-rwxrwxrwx 1 marcus marcus   8689 Mar  2 21:12 windows.org
-rwxrwxrwx 1 marcus marcus   6747 Mar  2 21:05 windows.org~
-rwxrwxrwx 1 marcus marcus     57 Mar  8 09:11 xaa
-rwxrwxrwx 1 marcus marcus     57 Mar  8 09:11 xab
-rwxrwxrwx 1 marcus marcus     57 Mar  8 09:11 xac
-rwxrwxrwx 1 marcus marcus      1 Mar  2 21:53 y

```

- Move file fun into dir1 again
- Move directory dir1 into dir2
- Confirm that the file is there with `ls -l`

```

cd ~/playground
mv -v fun dir1
mv -v dir1 dir2
ls -l dir2/dir1

```

- Note that dir1 was moved into dir2 because it existed
- If it had not existed, dir1 would have been renamed dir2
- Put everything back and confirm at the end with `ls -l`

```

cd ~/playground
mv -v dir2/dir1 .
mv -v dir1/fun .
ls -l ~/playground

```

- [X] Check task group

Creating hard links

- Create a hard link fun-hard to fun in ./
- Create a hard link fun-hard to fun in dir1
- Create a hard link fun-hard to fun in dir2
- Switch on the verbose option for ln
- Confirm with `ls -l ./` and with `ls -l dir*`

```
cd ~/playground
ln -v fun fun-hard
ln -v fun dir1/fun-hard
ln -v fun dir2/fun-hard
ls -l .
ls -l dir*
```

```
-rwxrwxrwx 1 marcus marcus 1639 Mar 10 08:37 .
total 0
drwxrwxrwx 1 marcus marcus 512 Mar 10 08:37 dir1
```

- The number 4 in the listing is the number of hard links that exist for the file (including the default link)
- Show that fun and fun-hard are indeed the same files

```
cd ~/playground
ls -li fun*
```

- [X] Check task group

Creating symbolic links

- Create a symlink fun-sym to fun in ./
- Create a symlink fun-sym to fun in dir1
- Create a symlink fun-sym to fun in dir2
- Switch on the verbose option for ln
- Confirm with `ls -l ./` and with `ls -l dir*`

```
cd ~/playground
ln -vs fun fun-sym
ln -vs fun dir1/fun-sym
ln -vs fun dir2/fun-sym
ls -l .
ls -l dir*
```

```
'fun-sym'>'fun'
-rwxrwxrwx 1 marcus marcus 1639 Mar 10 08:37 .
total 0
drwxrwxrwx 1 marcus marcus 512 Mar 10 08:37 dir1
```

- Create a symlink dir1-sym to dir1 in ./

```
cd ~/playground
ln -vs dir1 dir1-sym
ls -l ./dir1*
```

```
'dir1-sym'$'\r' -> 'dir1'
lrwxrwxrwx 1 marcus marcus 4 Mar 10 08:37 ./dir1-sym
-> dir1
```

- [X] Check task group

Removing files and directories

- Remove the hard link fun-hard in ./ (with verbose option)
- Confirm with `ls -l`

```
cd ~/playground
rm -v fun-hard
```

- Remove fun and switch on verbose option²
- Confirm with `ls -l`

```
cd ~/playground
rm -iv fun
ls -l
```

```
bash: c:/Users/BIRKEN~1/AppData/Local/Temp/babel-YbjtPt/sh-script-mnDY0x: No such file or direc
```

- []

Check that fun-sym is broken now with `less` (don't do this in Emacs, but change to a proper terminal instead). You should get:

```
fun-sym: No such file or directory
```

- [] Make sure that you understand what "broken symbolic link" in this context means, and why fun-sym is now broken
- Remove the symbolic links (switch on verbose option)
- Confirm with `ls -l`

```
cd ~/playground
rm -v fun-sym dir1-sym
ls -l
```

```
removed 'dir1-sym'$'\r'
total 350
-rwxrwxrwx 1 marcus marcus      4 Mar  7 22:32 1
```

```

-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 100_10
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 10file
-rwxrwxrwx 1 marcus marcus      4 Mar  7 22:32 2
-rwxrwxrwx 1 marcus marcus     20 Feb 22 07:28 FILE100
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 FILE1001
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 FILE100~~
-rwxrwxrwx 1 marcus marcus      0 Mar  8 09:11 cat
drwxrwxrwx 1 marcus marcus    512 Mar 10 08:37 dir2
lrwxrwxrwx 1 marcus marcus      3 Mar 10 08:37 fun-sym
-> fun
-rwxrwxrwx 1 marcus marcus    171 Mar  8 09:11 joined.txt
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 l_FILE100
-rwxrwxrwx 1 marcus marcus     47 Mar  8 09:11 lazy-dog.txt
-rwxrwxrwx 1 marcus marcus      0 Mar  7 22:32 ls
-rwxrwxrwx 1 marcus marcus     57 Mar  7 22:32 ls-error.txt
-rwxrwxrwx 1 marcus marcus    171 Mar  7 22:32 ls-output.txt
-rwxrwxrwx 1 marcus marcus   30914 Mar  8 09:11 ls.txt
-rwxrwxrwx 1 marcus marcus   6536 Mar  2 21:53 manipulate_03082022.org
-rwxrwxrwx 1 marcus marcus   5984 Mar  2 21:53 manipulate_nb.org
-rwxrwxrwx 1 marcus marcus   6913 Mar  1 06:44 manipulate_nb_03082022.org~
-rwxrwxrwx 1 marcus marcus  20752 Mar 10 08:36 manipulate_nb_solution.html
-rwxrwxrwx 1 marcus marcus  20654 Mar 10 08:35 manipulate_nb_solution.html~
-rwxrwxrwx 1 marcus marcus  11249 Mar 10 08:37 manipulate_nb_solution.org
-rwxrwxrwx 1 marcus marcus   3912 Feb 28 21:00 manipulate_old.org
-rwxrwxrwx 1 marcus marcus     57 Mar  7 22:32 output.txt
-rwxrwxrwx 1 marcus marcus      0 Mar  7 22:32 output1.txt
drwxrwxrwx 1 marcus marcus    512 Mar 10 08:36 playground
-rwxrwxrwx 1 marcus marcus  16172 Mar  8 11:22 redirection.org
-rwxrwxrwx 1 marcus marcus  27689 Mar  8 09:15 redirection_solution.html
-rwxrwxrwx 1 marcus marcus  27689 Mar  8 09:14 redirection_solution.html~
-rwxrwxrwx 1 marcus marcus  15674 Mar  8 09:19 redirection_solution.org
-rwxrwxrwx 1 marcus marcus  17013 Mar  8 09:11 redirection_solution.org~
-rwxrwxrwx 1 marcus marcus    640 Feb 22 07:28 sample.txt
-rwxrwxrwx 1 marcus marcus    640 Feb 22 07:28 sample1.txt
-rwxrwxrwx 1 marcus marcus   3874 Mar  2 20:50 start_nb.org
-rwxrwxrwx 1 marcus marcus  95857 Feb 28 22:44 start_nb.pdf
drwxrwxrwx 1 marcus marcus    512 Feb 22 07:28 testdir
-rwxrwxrwx 1 marcus marcus   8689 Mar  2 21:12 windows.org
-rwxrwxrwx 1 marcus marcus   6747 Mar  2 21:05 windows.org~
-rwxrwxrwx 1 marcus marcus     57 Mar  8 09:11 xaa
-rwxrwxrwx 1 marcus marcus     57 Mar  8 09:11 xab
-rwxrwxrwx 1 marcus marcus     57 Mar  8 09:11 xac
-rwxrwxrwx 1 marcus marcus      1 Mar  2 21:53 y

```

- Go \$HOME and remove the playground (with verbose option)
- Check with `ls -vl`

```

cd ~/
rm -vr playground
ls -vl

```

```

removed directory 'playground'$'\r'
total 350
-rwxrwxrwx 1 marcus marcus      4 Mar  7 22:32 1
-rwxrwxrwx 1 marcus marcus      4 Mar  7 22:32 2
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 10file
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 100_10
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 FILE100~~
-rwxrwxrwx 1 marcus marcus     20 Feb 22 07:28 FILE100
-rwxrwxrwx 1 marcus marcus      0 Feb 22 07:28 FILE1001
-rwxrwxrwx 1 marcus marcus      0 Mar  8 09:11 cat

```

```

drwxrwxrwx 1 marcus marcus 512 Mar 10 08:37 dir2
lrwxrwxrwx 1 marcus marcus 3 Mar 10 08:37 fun-sym
-> fun
-rwxrwxrwx 1 marcus marcus 171 Mar 8 09:11 joined.txt
-rwxrwxrwx 1 marcus marcus 47 Mar 8 09:11 lazy-dog.txt
-rwxrwxrwx 1 marcus marcus 0 Mar 7 22:32 ls
-rwxrwxrwx 1 marcus marcus 30914 Mar 8 09:11 ls.txt
-rwxrwxrwx 1 marcus marcus 57 Mar 7 22:32 ls-error.txt
-rwxrwxrwx 1 marcus marcus 171 Mar 7 22:32 ls-output.txt
-rwxrwxrwx 1 marcus marcus 0 Feb 22 07:28 l_FILE100
-rwxrwxrwx 1 marcus marcus 6536 Mar 2 21:53 manipulate_03082022.org
-rwxrwxrwx 1 marcus marcus 5984 Mar 2 21:53 manipulate_nb.org
-rwxrwxrwx 1 marcus marcus 6913 Mar 1 06:44 manipulate_nb_03082022.org~
-rwxrwxrwx 1 marcus marcus 20654 Mar 10 08:35 manipulate_nb_solution.html~
-rwxrwxrwx 1 marcus marcus 20752 Mar 10 08:36 manipulate_nb_solution.html
-rwxrwxrwx 1 marcus marcus 11249 Mar 10 08:37 manipulate_nb_solution.org
-rwxrwxrwx 1 marcus marcus 3912 Feb 28 21:00 manipulate_old.org
-rwxrwxrwx 1 marcus marcus 57 Mar 7 22:32 output.txt
-rwxrwxrwx 1 marcus marcus 0 Mar 7 22:32 output1.txt
-rwxrwxrwx 1 marcus marcus 16172 Mar 8 11:22 redirection.org
-rwxrwxrwx 1 marcus marcus 27689 Mar 8 09:14 redirection_solution.html~
-rwxrwxrwx 1 marcus marcus 27689 Mar 8 09:15 redirection_solution.html
-rwxrwxrwx 1 marcus marcus 17013 Mar 8 09:11 redirection_solution.org~
-rwxrwxrwx 1 marcus marcus 15674 Mar 8 09:19 redirection_solution.org
-rwxrwxrwx 1 marcus marcus 640 Feb 22 07:28 sample.txt
-rwxrwxrwx 1 marcus marcus 640 Feb 22 07:28 sample1.txt
-rwxrwxrwx 1 marcus marcus 3874 Mar 2 20:50 start_nb.org
-rwxrwxrwx 1 marcus marcus 95857 Feb 28 22:44 start_nb.pdf
drwxrwxrwx 1 marcus marcus 512 Feb 22 07:28 testdir
-rwxrwxrwx 1 marcus marcus 6747 Mar 2 21:05 windows.org~
-rwxrwxrwx 1 marcus marcus 8689 Mar 2 21:12 windows.org
-rwxrwxrwx 1 marcus marcus 57 Mar 8 09:11 xaa
-rwxrwxrwx 1 marcus marcus 57 Mar 8 09:11 xab
-rwxrwxrwx 1 marcus marcus 57 Mar 8 09:11 xac
-rwxrwxrwx 1 marcus marcus 1 Mar 2 21:53 y

```

- [] Check this last task group
- Save this file with C-x C-s
- Kill the buffer with C-x k (confirm)

You may close Emacs!

Command summary

- [] Complete the table!

COMMAND	MEANING	EXAMPLE
cd		
pwd		
mkdir		
echo		
mv -v		
rm -vr		

COMMAND	MEANING	EXAMPLE
---------	---------	---------

ln -vs		
--------	--	--

ls -l		
-------	--	--

Footnotes:

¹ If you work with code blocks inside Emacs, you may have to resort to absolute filenames to make sure that you are where you want to be.

² In Org-mode, you need to use the `:cmdline` header argument and redirect the input, in this case from a file `y` that only contains the character `y`, which I created for this purpose.

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[Validate](#)