**CSC 209 UNIX Tools**

|  |  |  |
| --- | --- | --- |
|  | **Assignment 7** |  |

**Objectives: Objectives: UNIX Commands (ln, find, grep) and Regular Expression**

**Note**: **Read** the entire assignment carefully and carry out the following tasks one by one. For some steps, I may provide the required UNIX command. For others, identify the UNIX commands you need. **UNIX is case sensitive**. Create folders and files exactly as indicated below, paying special attention to case. Complete the report as indicated below and submit the same. I do not want to see copy-and-paste of your computer output in your report. By forcing you to write I am hoping that you will remember the UNIX commands used and the results observed.

1. Login to holly server using your Webmail Net-ID and password.

Since we are not using the graphical user interface (GUI), you have to rely on your knowledge of UNIX commands. Take a note of how the command prompt placed by the shell appears and report below:

Shell prompt: [51] [etay1@courses2016:~]$

Type an appropriate command to print the working directory.

Command to print the working directory: pwd

Your login directory: /home/etay1

Use an appropriate command to switch to the **csc209** folder which you created in Assignment # 1.

Command to switch from login directory to **csc209**: cd csc209

1. Complete the following steps:

Determine the current working directory.

Command to print the working directory: pwd

Your current working directory: /home/etay1/csc209

You should currently be located in **csc209**. Create a new folder named **asgn07** under **csc209**. Set the access permissions for **asgn07** as **rwx --- ---** by typing a command:

**chmod 700 asgn07**

Command to create the **asgn07** folder: mkdir asgn07

Command to set the access permissions: **chmod 700 asgn07**

Move to **asgn07** and determine the current working directory.

Command to switch from **csc209** directory to **asgn07**: cd csc209

Command to print the working directory: pwd

Your current working directory: /home/etay1/csc209/asgn07

Shell prompt: [58] [etay1@courses2016:~/csc209/asgn07]$

**From now on, unless explicitly permitted, you should not move away from this asgn07 directory.**

**If you happen to log out in the middle of the exercise, be sure to use appropriate command(s)**

**and move to asgn07 before you continue.**

2. With a single command, without changing directory, copy the file **test01** in my directory **~nyu/csc209/asgn07** to your directory **asgn07**.

Command to copy **test01**: cp ~nyu/csc209/asgn07/test01 .

Verify the success of copying with **ls -l** command for this file. Write down the output.

Command to verify success: ls -l

Output:

total 4

-rw------- 1 etay1 domain users 246 Nov 7 02:33 test01

3. Determine the number of lines in the file using the **wc** command.

Command to determine the number of lines: wc -l test01

Output of the previous command: 16 test01

Display the file using the **od –c** command and determine the number of lines by counting the **\n** characters.

Command to display the file character by character: od -c test01

Number of **\n** characters seen: 16

Display the file with line number and see its content.

Command to display file with line number: cat -n test01

Number of lines in the file displayed: 16

Describe what you observed (How many lines have some text? How many lines have no displayed characters?

8 lines with no characters and 8 lines with characters

4. Create a hard link to **test01** and name the link **test02**. Note that a hard link only creates an additional reference to an already existing file.

Command for creating hard link: ln test01 test02

Create a soft or symbolic link to **test01** and name it **test03**. A soft link creates a new symbolic link file.

Command for creating soft link: ln -s test01 test03

Copy **test01** and create **test04**. The **cp** command creates a new file, but **mv** command does not.

Command for copy: cp test01 test04

5. Type one command to display long listing of all four files along with their **inode** numbers (use shell filename expansion wildcard). Report your findings.

Command for long listing of all files with **inode** numbers: ls -i

Output: 6696069 test01

Output: 6696069 test02

Output: 6696070 test03

Output: 6696072 test04

From the **inode** numbers seen, how many distinct files are there: 3

List the distinct files: : 6696069 6696070 6696072

Suppose we perform **mv test01 test05 (DO NOT PERFORM THIS)**

What will be **inode** number of **test05** after the command is executed? : 6696069

Why? mv command does not create a new file 🡪 it would be the same as test01

6. Perform a long listing of the current working directory and write the output (entire line).

Output:

total 12

-rw------- 2 etay1 domain users 246 Nov 7 02:33 test01

-rw------- 2 etay1 domain users 246 Nov 7 02:33 test02

lrwxrwxrwx 1 etay1 domain users 6 Nov 7 02:43 test03 -> test01

-rw------- 1 etay1 domain users 246 Nov 7 02:47 test04

There are **two** indications that **test03** is a symbolic link file. Compare the output of **test03** with that of **test02** and write down the differences.

* Different access permissions
* 🡪 indicates it’s a symbolic link

What is the size of the symbolic file **test03**? 6

The symbolic link file contains the absolute or relative path supplied at the time of creation. In this case the file contains exactly six characters **test01** because that is what we provided when we formed the link with the command: **ln –s test01 test03**

7. Display the contents of **test02** and **test03**. Report what you saw.

Command to display **test02**: cat test02

What did you observe? (Describe) displays sentences about what line number they are

Command to display **test03**: cat test03

What did you observe? (Describe) displays sentences about what line number they are

Note that displaying the symbolic link file **test03** results in following the link to locate **test01** and displaying its contents.

8. Type: **cmp test01 test02** The **cmp** command compares two files; it will write no output if the file contents are identical. It writes to standard output the byte and line number at which the first difference occurred. Bytes and lines are numbered beginning with 1.

Command to compare **test01** and **test02**: cmp test01 test02

Likewise, compare **test01** against **test0**3 and **test01** against **test04**. Report differences observed.

Command to compare **test01** and **test03**: cmp test01 test03

Command to compare **test01** and **test04**: cmp test01 test04

Result of the various comparisons: no results since they’re identical

9. Rename the file **test01** as **test05**.

Command to rename **test01** as **test05**: mv test01 test05

Display the contents of **test03**. Report what you saw and explain problems if any.

Command to display **test03**: cat test03

What did you observe? (Describe) no such file or directory

What is the reason for the problem?

mv command erases the original file so test03 isn’t linked anymore

Copy **test02** as **test06**.

Command to copy **test02** as **test06**: cp test02 test06

Use **pico** editor to delete the first blank line in **test06**.

Command to edit **test06**: pico test06

Now compare **test02** and **test06**. Report what you observed.

Command to compare **test02** and **test06**: cmp test02 test06

Result of comparison: test02 test06 differ: byte 87, line 4

10. Do a directory long listing of the file **passwd-** in the directory **/etc**

(It is not a typo, the name of the file ends with a hyphen).

Command: ls -l /etc/passwd-

Output: -rw-r--r--. 1 root root 2289 Jul 26 13:16 /etc/passwd-

Who is the owner of the file? root

What is the group membership? root

What is your user name? etay1

What is your group membership? read

What access permissions do you have for the file (write in terms of **rwx**) rw

Create a symbolic link named **pass** in your current working directory to the file **passwd-** located in the directory **/etc**

Command: ­­­­­­­­­­­­­­­­ ­­­­­­­­­­­­­­­­ln -s /etc/passwd- pass

Given the command above, estimate the size of the symbolic link file **pass**

Size of the file **pass** expected: 9

Did you succeed? Type the **ls –l** command on the file to verify success.

Command: ls -l pass

Output:

lrwxrwxrwx 1 etay1 domain users 12 Nov 7 03:05 pass -> /etc/passwd-

Size of the symbolic link file as seen in the above output: 12

Observe that you do not need any permission on the file to create a symbolic link to it.

Type the command: **rm pass**

Which file will get deleted? **pass** or **/etc/passwd-**

Check if **pass** exists any more by typing the **ls –l** command on the file.

Command: ls -l pass

Output: ls: cannot access pass: No such file or directory

Check if **/etc/passwd-** exists by typing the **ls –l** command on the file.

Command: ls -l /etc/passwd-

Output: -rw-r--r--. 1 root root 2289 Jul 26 13:16 /etc/passwd-

11. Without changing directory, using a relative path, create a file named **zero** of size zero under the **asgn01** folder. Use the **ls –l** command on the file to check its success.

Command to create **zero** under **asgn01**: touch ../asgn01/zero

Command to verify success: ls -l ../asgn01/zero

Output: -rw------- 1 etay1 domain users 0 Nov 7 03:10 ../asgn01/zero

Similarly create another file named **zero** under **asgn02**. Use the **ls –l** command on the file alone to check its success.

Command to create **zero** under **asgn02**: touch ../asgn02/zero

Command to verify success: ls -l ../asgn02/zero

Output: -rw------- 1 etay1 domain users 0 Nov 7 03:11 ../asgn02/zero

Without changing directory, write a **find** command to look at your **csc209** directory and directories below for a file named **zero**.

Command to locate file **zero**: find ~/csc209 -name zero

Entries listed:

/home/etay1/csc209/asgn01/zero

/home/etay1/csc209/asgn02/zero

12. Without changing directory, write a **find** command to look at your **csc209** directory and directories below for a file(s) named **zero**, and delete it (them).

Command to locate and delete zero: find ~/csc209 -name zero -delete

Re-execute the **find** command in the step above to see if the files named **zero** are still present.

Command to locate file **zero** again: find ~/csc209 -name zero

Any files found? none

13. Without changing directory, write a **find** command to look at your **csc209** directory and directories below for all files with a file name extension **.c**, i.e., files with name **\*.c** where **\*** is file name expansion wildcard symbol.

Command to locate **.c** files: find ~/csc209 -name \*.c

Entries listed (just write the path under **csc209**):

/home/etay1/csc209/asgn04/helloWithCount.c

/home/etay1/csc209/asgn03/GCD.c

/home/etay1/csc209/asgn02/hello.c

14. Give one command to list all entries in and under the current working directory which have number of links = 2. (Check man pages for **find** if necessary to see the exact form of find command you need.)

Command to locate files with exactly 2 links: find . -links +2

Entries listed (just write the path under **asgn07**): none

15. Without changing directory, with one command list all entries in and under **csc209** which have been modified in less than 7 days. (Check man pages for **find** if necessary to see exact form of find command you need.)

Command to locate recently modified files: find ~/csc209 -mtime -7

Entries listed (just write the path under **csc209**):

/home/etay1/csc209

/home/etay1/csc209/asgn07

/home/etay1/csc209/asgn07/test03

/home/etay1/csc209/asgn07/test06

/home/etay1/csc209/asgn07/test04

/home/etay1/csc209/asgn07/test02

/home/etay1/csc209/asgn07/test05

/home/etay1/csc209/asgn01

/home/etay1/csc209/asgn02

16. Give one **grep** command to select and list, with line number, all the lines in **test02** that include the pattern **line** (Use **egrep** for **grep**. Sometimes they give different results.)

Command provided: grep -n line test02

Lines listed (just provide line numbers): 2, 3 ,5 ,14

Give another command to select and list, with line number, all the lines with the same pattern, but case insensitive.

Command provided: grep -in line test02

Lines listed (just provide line numbers): 1, 2, 3, 5, 9, 11, 14

17. Give one **grep** command to select and list, with line number, all the lines in **test02** that includes the pattern **real**

Command provided: grep -n real test02

Lines listed (just provide line numbers): 5, 14

Give another command to select and list, with line number, all the lines with the same pattern, but as a word, i.e., lines that include the word **real**

Command provided: grep -inw real test02

Lines listed (just provide line numbers): 14

18. Display the file **test02** with line number and with end of line marked with **$** sign.

Command: ­­­­­­­­­­­­­­­­­­­­grep -n $ test02

Total number of lines: 16

Visually locate the lines with the question mark (**?**) symbol.

How many? 2 Give line numbers: 3,9

Visually locate the lines with the period (**.**) symbol.

How many? 6 Give line numbers: 1, 2, 3, 5, 11, 14

Visually locate the lines with no characters (including no blank characters).

How many? 8 Give line numbers: 4, 6, 7, 8, 13, 15, 16

Visually locate the lines with one or more characters (including blank characters).

How many? 9 Give line numbers: 1, 2, 3, 5, 9, 10, 11, 12, 14

Visually locate lines that end with the period (**.**) symbol.

How many? 6 Give line numbers: 1, 2, 3, 5, 11, 14

Visually locate lines that begin with a blank character.

How many? 5 Give line numbers: 2, 3, 5, 10, 12

19. Give one **grep** command to select and list, with line number, all the lines in **test02** that include a question mark (**?**). Check your output against what you visually counted.

Command: grep -n ? test02

Lines listed (just provide line numbers): 3, 9

20. Give one command to select and list, with line number, all the lines in **test02** that include a period (**.**). Check your output against what you visually counted.

Command: grep -n [.] test02

Lines listed (just provide line numbers): 1, 2, 3, 5, 11, 14

Give one command to select and list, with line number, all the lines in **test02** that end with a period (**.**). Check your output against what you visually counted.

Command: grep -n [.$] test02

Lines listed (just provide line numbers): 1, 2, 3, 5, 11, 14

Give one command to select and list, with line number, all the lines in **test02** that begin with a blank space. Check your output against what you visually counted.

Command: grep -n '^ ' test02

Lines listed (just provide line numbers): 2, 3, 5, 10, 12