Assignment 1 - Basic shell

Practice questions

These questions are optional and for your practice only. You do not need to submit solution to these questions on courses website.

Do the following with help of '`mkdir`', '`cd`', '`touch`', '`ls`', '`rmdir`', '`clear`', '`echo`' and '`rm`' commands :

1. Create a directory named '`assignment1_practice`'.
2. Go inside directory named '`assignment1_practice`'.
3. Create empty file named '`test.txt`'.
4. Create empty file named '`.hidden`'
5. List files and folders (not hidden files) in current directory.
6. List files and folders (not hidden files) in current directory in long listing format.
7. List all files and folders (including hidden files) in current directory.
8. Create directories '`1`', '`2`', '`3`' with single command where directory '`3`' is inside directory '`2`' and directory '`2`' is inside directory '`1`'.
9. Create directories '`b`', '`c` with single command where both directory '`b`' and '`c` are inside directory '`assignment1_practice`'.
10. Delete directories '`1`', '`2`', '`3`' with one single command. Do not delete directories '`a`' or '`b`'.
11. Delete directories '`a`' and '`b`' with one single command.
12. Delete file named '`.hidden`'.
13. Delete file named '`test.txt`'.
14. Clear screen
15. Print 'Hello World' on screen.

Do the following with help of '`gedit`', '`tree`', '`mv`', '`cp`', '`cat`', '`more`', '`less`', '`head`', '`tail`' and '`wc`' commands:

1. Create and go inside directory named ‘a’
2. Create files ‘b’ and ‘c’ with few paragraphs of text in both of them.
3. Create directories ‘1’, ‘2’, ‘3’ with single command where directory ‘3’ is inside directory ‘2’ and directory ‘2’ is inside directory ‘1’.
4. Display list of all folders, sub-folders and files inside them for folder ‘a’ in tree format.
5. Move file ‘b’ to directory ‘2’.
6. Move file ‘c’ to directory ‘3’.
7. Display list of all folders, sub-folders and files inside them for folder ‘a’ in tree format.
8. Move directory ‘3’ so that it is directly inside directory ‘a’.
9. Display list of all folders, sub-folders and files inside them for folder ‘a’ in tree format.
10. See contents of file ‘c’ such that all contents all displayed on screen without any break and we get prompt back immediately.
11. Display contents of file ‘b’ such that we see only pagefull information at a time.
12. Display contents of file ‘c’ such that we can move back and forward to see the contents in convinient manner.
13. Display last ten lines of file ‘c’.
14. Display last twenty lines of file ‘c’.
15. Display first ten lines of file ‘b’.
16. Display first fifteen lines of file ‘b’
17. Find number of lines, words and characters in both files ‘b’ and ‘c’.
18. Copy files ‘b’ and ‘c’ to each directory inside directory ‘a’ where they already do not exist.
19. Display list of all folders, sub-folders and files inside them for folder ‘a’ in tree format.

Do the following with help of '`du`', '`tar`', '`gzip`', '`gunzip`', '`bzip2`', '`bunzip2`', '`zip`' and '`unzip`' commands:

1. Create and go inside directory named '`a`'
2. Create folder with names '`b`' and '`c`' such that folder '`c`' is inside folder '`b`'.
3. Create file named '`1`' inside folder '`b`' and file named '`2`' inside folder '`c`'.
4. Copy large amount of text into both files '`1`' and '`2`'.
5. Find out size occupied by files '`1`' and '`2`'.
6. Gzip file '`1`' so that we get '`1.gz`'
7. Find out the size occupied by file '`1`' after we use gzip algorithm to compress it.
8. Gunzip file '`1.gz`' so that we get file '`1`' back.
9. Compress file '`1`' using bzip2 algorithm so that we get '`1.bz2`'.
10. Find out size occupied by file '`1.bz2`'
11. Bunzip2 file '`1.bz2`' so that we get file '`1`' back.
12. Perform steps (6) to (11) for file '`2`'.
13. Analyze which compression algorithm is better bzip2 or gzip.
14. Find out size occupied by folder '`b`' including size occupied by folders, sub-folders and files inside it.
15. Create file '`b.tar`' which includes folder '`b`' and all its contents.
16. Find out size occupied by file '`b.tar`'.
17. Now use bzip2 algorithm to compress file '`b.tar`' so that we get '`b.tar.bz2`'.
18. Again create file '`b.tar`' which includes folder '`b`' and all its contents.
19. Now use gzip algorithm to compress file '`b.tar`' so that we get '`b.tar.gz`'.
20. Again create file '`b.tar`' which includes folder '`b`' and all its contents.

21. Now compare sizes of folder '`b`' and files '`b.tar`', '`b.tar.bz2`', '`b.tar.gz`' which contain same amount of information in different formats.

22. Read man pages of '`zip`' and '`unzip`' commands and learn how to use '`zip`' and '`unzip`' for compression.

23. What is major difference between '`zip`' and '`unzip`' commands with respect to '`tar`', '`gzip`' or '`bzip2`' commands? Concentrate only on functionality and ignore the differences in algorithms and compression achieved.

Do the following with help of '`which`', '`whereis`', '`find`', '`locate`', '`apropos`', '`man`' and '`grep`' commands:

1. Find out full path of binary file that gets exected when one types '`ls`' command on shell.

2. Find out full path of binary file that gets exected when one types '`cd`' command on shell.

3. Search for executables named '`ls`' in standard Linux executable file folders.

4. Search for executables named '`cd`' in standard Linux executable file folders.

5. Search for executables named '`mount`' in standard Linux executable file folders.

6. Read man page for shell command write.

7. Read man page for C function write.

8. Find out all man pages that have word '`qemu`' in short description or keyword.

9. Find out all man pages that have partial word '`qem`' in short description or keyword.

10. Store numbers from '`1`' to '`30`' in file '`numbers.txt`'.

11. Display lines from file '`numbers.txt`' that contain digit '`3`'.

12. Display lines from file '`numbers.txt`' that contain number '`10`'.

13. Display lines from file '`numbers.txt`' that contain number '`10`' such that one line before and one line after line containing number '`10`' also get displayed.

14. Display all lines from file '`numbers.txt`' that do not contain digit '`2`'.

15. Search for file named '`hello.c`' in entire filesystem.

16. Search for all files with extension '`.c`' in current folder.

17. Search for all files with extension '`.c`' in '`/opt`' folder.

18. Search for all files with extension '`.png`' in '`/usr/share`' folder without matching case for alphabets png. That is even show files with extension '`.PNG`' or '`.Png`' in results.

Do the following with help of '`w`', '`who`', '`whoami`', '`ifconfig`', '`ping`', '`ln`', '`free`', '`script`', '`df`' and '`chmod`' commands:

1. Find out the name of current user logged in.

2. Find out names of all the users logged in system.

3. Find out names of all users logged into system and also find out what they are doing.

4. Check if server '`intranet.iiit.ac.in`' is on-line.

5. Find out IP address of machine on which you are working.

6. Find out amount of RAM installed on machine.

7. Find out free RAM available after subtracting RAM used in buffers and adding RAM used for caching.

8. Find out what '`script`' command does and learn to use it.

9. Find number and size of partitions configured on current system.

10. Create directory '`a`'.

11. Create directory '`b`' such that contents of directory '`a`' appear in directory '`b`'. If we create/delete/modify files in directory '`a`' the same changes should be visible in directory '`b`' too.

12. Create text file named '1'.

13. Create file named '2' such that contents of file '1' appear as contents of file '2'. If changes are made to contents of file '1' then same changes should be visible in file '2' too. If however we delete file '1' then file '2' should not have any meaning.

14. Change permission of file '3' such that all (user, group and others) have no access (read, write or execute) on it.

15. Change permission of file '3' to 775.

16. Change permission of file '3' such that users do not have execute permissions on it. Other permissions should remain as before.

17. Change permission of file '3' such that others can write to it. Other permissions should remain as before.

18. Change permissions on file '3' such that all (user, group and others) can execute it.

19. Change permisssion on file '3' such that user, group cant execute it, other permissions should remain same.

Assignment questions

First practice '`script`' command and understand how it works properly. Use '`script`' command to capture commands / output when you do below mentioned exercises. The final script output file has to be uploaded on courses website. You also need to submit text file containing commands which can be used to solve the stated problem.

Since courses website will allow only one file submission, you have to 'tar' text file and script output file together and upload the final tar file as solution.

Give commands which can be used to achieve stated result/output: (Note that you must use only single command to achieve the stated result / output. Combination of multiple commands can be used only when specifically mentioned.)

1. Create a directory with your roll number as name.
2. Go inside directory named your roll number.
3. Create a directory named '`assignment1`'.
4. Go inside directory named '`assignment1`'.
5. Create directories '`1`', '`2`', '`3`', '`a`' with single command where directory '`3`' is inside directory '`2`' and directory '`2`' is inside directory '`1`'. Both directory '`1`' and directory '`a`' are inside folder '`assignment1`'.
6. List all files and folders (including hidden files) in current directory in long listing format.
7. Create file named '`.hidden`' in directory '`1`' and write few paragraphs of text in it.
8. Copy file '`.hidden`' to directory '`3`'.
9. Display all files and folders (include hidden files) inside directory '`assignment1`' up to two levels of depth such that full path is displayed for each file/folder with respect to current directory.
10. Display only number of words contained in file '`.hidden`'.
11. Display first three lines of file '`.hidden`'.
12. Compress directories '`1`' and '`a`' so that they get stored in file '`new.tar.bz2`'.

13. Delete all directories '`1`', '`2`', '`3`', and '`a`' with one single command.

14. Uncompress file '`new.tar.bz2`'. so that we get all its contents back.

15. Find out size occupied by folder '`1`' including its sub-folders and files in human readable format.

16. Find out all man pages that have word '`qemu`' in short description, keyword or man page body.

17. Find out which file gets executed when you type command '`ifconfig`' on shell and press enter.

18. Search for executables named '`ifconfig`' in standard Linux executable file folders.

19. Display lines from file '`/etc/httpd/conf/httpd.conf`' file that contain string '`ServerName`', include seven lines before and three lines after every match in the output.

20. Search for file named '`keyring.png`' in entire filesystem.

21. Find all files with word '`chroot`' in their name, without matching case inside folder '`/usr/share`'.

22. Find IP address of server '`intranet.iiit.ac.in`'.

23. Find what user '`root`' is doing, if '`root`' is logged in.

24. Find out free RAM available after subtracting RAM used in buffers and adding RAM used for caching in mega bytes.

25. Find out free space available on partition mounted on '/' in human readable format. (Avoid printing information about other partitions).

26. Change group permissions on file '`.hidden`' to 4 (read, no write and no execute) without affecting other permissions.

27. Create file '`visible`' such that it and file '`.hidden`' have same contents. Changes made to either of them should be visible in other file too. Even if we delete one of these two files, contents of other file should be preserved.

28. Create directory '`absolute`' in current directory such that this directory always has same contents as stored in '`/home`' even if we move this directory to other locations.

29. Create directory '`relative`' in current directory such that this directory always has same contents as directory '`source`' having same parent as directory '`relative`'. If we move directory '`relative`' then it should point to directory '`source`' stored in new parent directory.

30. Set permissions on file '`visible`' such that current user cannot read, execute or modify it, but all the other users of the system can.