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## 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`.

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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 convenient 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'

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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' and 'bunzip2' 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'.

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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.

Do the following with help of `find`, `locate`, `apropos`, and `man` commands:

1. Read man page for shell command write.
2. Read man page for C function write.
3. Find out all man pages that have word 'qemu' in short description or keyword.
4. Search for file named 'hello.c' in entire filesystem.
5. Search for all files with extension '.c' in current folder.
6. Search for all files with extension '.c' in '/opt' folder.
7. 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`, `free`, `script` and `df` 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.

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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.

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## 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:

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.

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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. SSH to mirage server and create empty file named ssh.txt.
  17. Copy folder '1' to your home folder in mirage along with all sub-folders and files.
  18. Delete folder '1'.
  19. Copy folder '1' from your home folder in mirage to current folder.
  20. Delete folder '1' from your home folder in mirage folder.
  21. Change your password
  22. Clear screen.
  23. Restore your old password back.
  24. Find out all man pages that have word 'qemu' in short description, keyword or man page body.
  25. Search for file named 'keyring.png' in entire filesystem.
  26. Find all files with word 'chroot' in their name, without matching case inside folder '/usr/share'.
  27. Find IP address of server 'intranet.iiit.ac.in'.
  28. Find what user 'root' is doing, if 'root' is logged in.
  29. Find out free RAM available after subtracting RAM used in buffers and adding RAM used for caching in mega bytes.
  30. Find out free space available on partition mounted on '/' in human readable format. (Avoid printing information about other partitions).