Operating Systems 2024-25 (Lab exercise I – 15%)

Deliverable: Your answers (linux commands) in a word file and their results (Prt.Sc.)

1. Create in your working directory a file named 'ask1.txt' with the following contents (first name, last name, username, postal code, city, tel). Display the contents of the file, with its lines numbered.

   George Pappas george2 12136 Peristeri -------
   Nick Nikolaoy nick23 12232 Aigaleo 5314555
   George Georgioy george583 11132 Athens -------
   Helen Georgioy helen3 12136 Peristeri 5748456
   Nick Pappas nick4 11223 Aigaleo 5324123
   Helen Ioannoy helen367 13222 Athens -------
   Helen Thanoy helen36 11132 Peristeri 9718345
   Vasilis Mamalis vas32 12345 Dafni 9738383
2. Run the command 'cal -3 > calfile.txt' and explain what exactly does.
3. Merge (concatenate) the files 'calfile.txt' and 'ask1.txt' into one file named 'full.txt'.
4. List the five most recently modified files of your working directory.
5. Create a directory named 'mydir1'. Move to the new directory and copy there the file 'full.txt' (from the parent dir). Then, rename it to 'new.txt'. Return to the parent directory. Remove directory 'mydir1' and its contents.
6. Give the proper commands to dsiplay: (α) all the files of director /usr, with information for their inode and their size in blocks. (β) all the contents of the directory tree (recursively - i.e. including subdirectories etc.) under directory /usr, with full details for each of them (and display them page by page).
7. Create a directory named 'testdir1'. Move to the new directory and create there a 'hard link' (named 'ask1link') to the file 'ask1.txt' of the parent directory. Confirm (giving the proper command and explaining what you see) that the link has been created and that it's a 'hard' link and not a 'symbolic' (soft) link.
8. Get inside file 'ask1link' and remove its last line. Has that change been done in file 'ask1.txt' too?. Display the contents of 'ask1.txt' and explain.
9. Create a directory 'kat1' and two files (inside kat1) named 'file1' and 'file2', with contents the words 'one' and 'two', respectively. Run (inside kat1) the command 'cp *' and explain the result. Then run the command 'mv *' and explain the result.
10. Display the lines of file 'ask1.txt' than end with one or more consecutive digits.
11. Display the lines of file 'ask1.txt' that contain the pattern 'Pap' but they don't contain the pattern 'Aig'.
12. Display the lines of file 'ask1.txt' that begin with 'G' or 'N' and contain the patterns 'Geo' και 'Per' (in that order).
13. How many users are connected to the system and their username does not begin with 'os1' ?
14. Display all the user processes (attached to a terminal) running in the system.
15. How many user processes run in the system and their name ends with 'sh' ?
16. Display the processes (of any type) running from the account of the system administrator.
17. How many files of your current directory (only the current - not including subdirectories) have permissions 'rw' for all (user, group, others) και 'x' for none ?
18. Find (and list with full details) all the directories of the system, with name beginning with 'b'.
19. Find (and list with full details) all the files of directory '/dev', with name beginning with 'tty'.
20. Sort the contents of file 'ask1.txt' according to 'username' in descending order.
21. Sort all the '.c' files of your current directory according to their size.
22. Sort all the files of your account with permissions 644 according to their size.
23. Sort all the contents of directory '/dev', firstly according to the owner and secondly according to the group, and save the output in file 'binfiles.txt'.
24. Create a file containing details for all the users that are connected to the system and their username begins with 'os1', sorted according to their connection date and time.
25. Change (giving the proper command) all the occurrences of name 'Nick' in file 'ask1.txt' to 'Nickolaos'.
26. Suppose you have the following file system items, with protection strings: (α) '-rwxr-x--x', (β) 'drwxr-x--- ' and (γ) 'drwx--x--x. Explain what type of file system items they are, and which are the (for each of them) the permissions for the 'user', the 'group' and the 'others'.
27. Change the permissions of all the files of the directory 'testdir1', so that only the owner (user) has permission to execute and write, and everybody has permission to read.
28. Change the permissions of the directory 'testdir1', so that only the owner (user) and the group have permission to access (none else - suppose that the current permissions of the directory are 755).
29. Create a new user in your system with username 'myfriend'. Then, change the 'owner' of file 'ask1.txt' to 'myfriend', and then move it (file 'ask1.txt') to the working directory of its new owner.

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30. Let's have the following (by executing the corresponding commands):

```
use1@localhost:~$ w
USER     TTY      FROM      LOGIN@   IDLE   JCPU   PCPU WHAT
user1    pts/0    1.2.3.4   03:34    0.00s  0.38s  0.01s w
user2    pts/1    5.6.7.8   03:45    0.00s  0.38s  0.01s ls
user3    pts/2    9.7.5.3   03:57    0.00s  0.38s  0.01s ps

user1@localhost:~$ ls -al /dev/pts/*
crw--w---- 1 user1 tty 136, 0 Oct 25 04:04 /dev/pts/0
crw--w--w- 1 user2 tty 136, 1 Oct 25 04:04 /dev/pts/1
crw--w--w- 1 user3 tty 136, 2 Oct 25 04:04 /dev/pts/2
```

Explain what is the type of the above file system items.

Explain also what will be the result of the following commands:

```
user1@localhost:~$ cat > /dev/pts/1
user1@localhost:~$ wall "test"
```

31. Create the files f1, f2, f3, f4, f5, f6 ,f7 with the following permissions:
    f1, 757
    f2, 313
    f3, 010
    f4, 642
    f5, 551
    f6, 133
    f7, 111

    Use the command 'ls –l' in pipe with 'egrep' to find the files that:

    a. The 'group' has permissions 'r-x'
    b. The 'user' and the 'others' have exactly the same permissions
    c. The 'user, the 'group' and the 'others' have the same 'write' permission
    d. The 'user, the 'group' and the 'others' have the same 'write' and 'execute' permissions
    e. The 'group' and the 'others' have the same 'read' and 'execute' permissions

32. Suppose the lines of file /etc/passwd are like the following:

    spouneri:x:2107:1067:Pouneridis Sokratis:/home/student/e2021/spouneri:/bin/bash

    Suppose also that in the 5th field, (a) always the last-name of the user precedes and his/her first-name follows, and (b) there is only one last-name and one first-name, in uppercase and/or lowercase Latin characters.

    The remaining fields will always be in lowercase Latin characters.

    Using 'egrep' search /etc/passwd and find all the users of the system which:

    a. Use 'bash' as their default shell
    b. Their HOME DIRECTORY lies in /home
    c. Their UID is the same with their GID
    d. At least the 5 first letters of their last-name are also part of their username
    e. At least the 3 first letters of their last-name and the 3 first letters of their first-name are also part of their username