

# [MI2.01] System Architectures

## 01.report.bash.tex

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March 2020

### 1 List logged in users

List everyone logged in and save the list in a file called “users” in your own home directory

- Input

```
w > ~/users
```

- Output

```
22:46:28 up 10 min,  1 user,  load average: 1,38, 1,10, 0,62
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT
vinhnam   :0        :0            01:36    ?xdm?   4:47   0.00s /usr/lib/gdm3/gdm-x-session
--run-script env GNOME_SHELL_SESSION_MODE=ubuntu gnome-session --session=ubuntu
```

### 2 List all running processes

List all processes that are running and add this list to the end of the “users” file

- Input

```
ps -aux >> ~/users
```

- Output

```
22:46:28 up 10 min,  1 user,  load average: 1,38, 1,10, 0,62
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
vinhnam   :0        :0              01:36   ?xdm?   4:47   0.00s /usr/lib/gdm3/gdm-x-session
--run-script env GNOME_SHELL_SESSION_MODE=ubuntu gnome-session --session=ubuntu
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1  0.5  0.0 225780  9812 ?        Ss   22:35   0:07 /lib/systemd/systemd
--system --deserialize 36
root         2  0.0  0.0      0     0 ?        S    22:35   0:00 [kthreadd]
root         4  0.0  0.0      0     0 ?        I<   22:35   0:00 [kworker/0:0H]
root         5  0.0  0.0      0     0 ?        I    22:35   0:00 [kworker/u24:0]
root         6  0.0  0.0      0     0 ?        I<   22:35   0:00 [mm_percpu_wq]
...
```

### 3 List logged on users then sort by username

List everyone who is logged on sorted by their username

- Input

```
w | sort
```

- Output

```
23:08:32 up 32 min,  1 user,  load average: 0,99, 0,88, 0,92
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
vinhnam   :0        :0              01:36   ?xdm?   2:46   0.00s /usr/lib/gdm3/gdm-x-session
--run-script env GNOME_SHELL_SESSION_MODE=ubuntu gnome-session --session=ubuntu
```

### 4 Count number of session then do descending order sort

Count number of session each logged in user, sorted by this number in descending order

- Input

```
awk {'print $1'} | who | cut -f1 -d ' ' | sort -k 1 | uniq -c
```

- Output

```
1 vinhnam
```

### 5 Show “/etc/fstab” content

Show content of the first and last 3 lines of the file “/etc/fstab”

- Input

```
(head -3 /etc/fstab & tail -3 /etc/fstab)
```

- Output

```
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
UUID=2D07-58CD /boot/efi vfat umask=0077 0 1
# swap was on /dev/sda2 during installation
UUID=dc9656ef-467b-4d51-9dd6-6fe795cdd0ea none swap sw 0 0
```

## 6 Retrieve data then write to a new file

Retrieve line number 5 to 10 from the file “/etc/fstab” and write these lines into a new file “extract.txt”

- Input

```
sed -n 5,10p /etc/fstab > ~/extract.txt
```

- Output

```
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=2b78f333-bf9a-4a0c-9fe7-71df6a72a6b9 / ext4 errors=remount-ro 0 1
# /boot/efi was on /dev/sda3 during installation
```

## 7 List all files to which the user has full permissions

List all files in current directory, recursively, to which the user has full permissions

- Input

```
ls -laR ./ | grep rwx
```

- Output

```
drwxr-xr-x 6 vinhnam vinhnam 4096 Thg 8 18 2019 ..
drwxr-xr-x 2 vinhnam vinhnam 4096 Thg 8 18 2019 __pycache__
drwxr-xr-x 2 vinhnam vinhnam 4096 Thg 8 18 2019 .
drwxr-xr-x 3 vinhnam vinhnam 4096 Thg 8 18 2019 ..
drwxr-xr-x 3 vinhnam vinhnam 4096 Thg 8 18 2019 .
drwxr-xr-x 6 vinhnam vinhnam 4096 Thg 8 18 2019 ..
drwxr-xr-x 2 vinhnam vinhnam 4096 Thg 8 18 2019 __pycache__
drwxr-xr-x 2 vinhnam vinhnam 4096 Thg 8 18 2019 .
drwxr-xr-x 3 vinhnam vinhnam 4096 Thg 8 18 2019 ..
drwxr-xr-x 4 vinhnam vinhnam 4096 Thg 8 18 2019 .
...
```

## 8 Compare and measure the similarity between two files

Compare two files and show percentage of similarities between them

- Input

```
dif='expr $(diff $1 $2 | egrep "^(>|<)" | wc -l)'; total='expr $(cat $1 | wc -l)';  
echo "Similarity = 'echo "scale=2; (1-$dif/$total)*100" | bc' %"
```

- Output

```
Similarity = 80.00 %
```

## 9 Find all files satisfy a condition

Find all files in current directory, recursively, that are at least 90% similar

- Input

```
list='find .'  
for f1 in $list; do  
    for f2 in $list; do  
        if [ "$f1" != "$f2" ] && [ -f "$f1" ] && [ -f "$f2" ]; then  
            dif='diff $f1 $f2 | egrep "^(>|<)" | wc -l'  
            aLines='wc -l < $f1'  
            bLines='wc -l < $f2'  
            if [ $aLines -eq 0 ] && [ $bLines -eq 0 ]; then  
                exit 0  
            fi  
            similar='echo "scale=2; (100-$dif * 100 * 2 / ($aLines + $bLines))" | bc'  
            if [ "$similar" -gt 90 ]; then  
                echo Similarity $similar: $f1 $f2  
            fi  
        fi  
    done  
done
```

- Output

```
Similarity users extract.txt
```