

# Shell Scripting

Day1

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Mansoura Open Source

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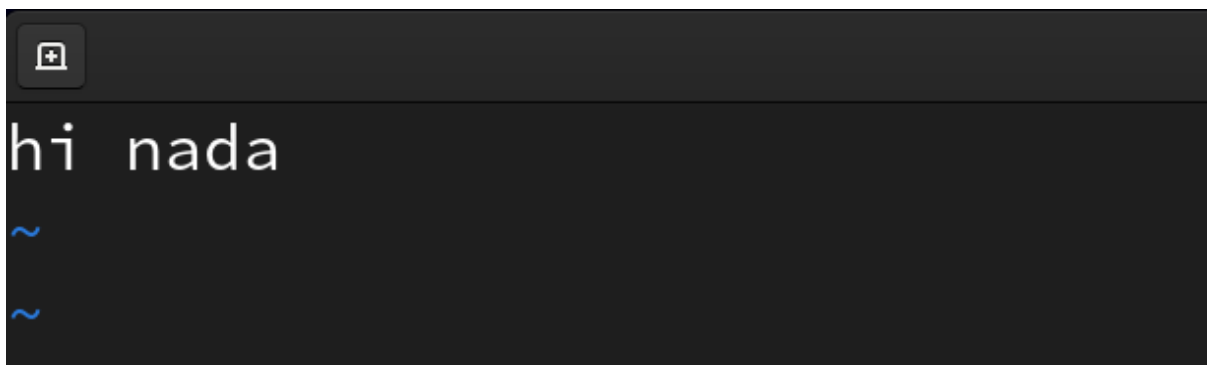
## Lec task:

How can we apply changes directly to the original file when using sed

By using option -i or --in-place

sed -i 'what we need to change' filename

```
nada :>vi hi
```

A terminal window with a dark background. The title bar shows a window icon. The prompt is 'hi nada'. Below the prompt, there are two lines of blue tilde '~' representing empty lines in the file.

```
hi nada
~
~
```

```
nada :>sed -i 's/n/N/' hi
```

A terminal window with a dark background. The title bar shows a window icon. The prompt is 'hi Nada'. Below the prompt, there are two lines of blue tilde '~' representing empty lines in the file.

```
hi Nada
~
~
```

## Using sed utility

1- Display the lines that contain the word “lp” in the /etc/passwd file.

-n : stop the default to print only the mentioned

sed -n '/lp/p' /etc/passwd

```
welcome :) , the date is :
Tue Jan 14 12:59:47 PM EET 2025
nada :>sed -n '/lp/p' /etc/passwd
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
flatpak:x:988:988:User for flatpak system helper:/:/sbin/nologin
```

Only for check :

The lines that contain 'lp'

```
nada :>cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
```

```
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:997:995:User for geoclue:/var/lib/geoclue:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/sbin/nologin
pipewire:x:996:993:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
libstoragemgmt:x:990:990:daemon account for libstoragemgmt:/usr/sbin/nologin
cockpit-wsinstance:x:989:989:User for cockpit-ws instances:/nonexisting:/sbin/nologin
flatpak:x:988:988:User for flatpak system helper:/sbin/nologin
colord:x:987:987:User for colord:/var/lib/colord:/sbin/nologin
setroubleshoot:x:986:986:SELinux troubleshoot server:/var/lib/setroubleshoot:/usr/sbin/nologin
clevis:x:985:985:Clevis Decryption Framework unprivileged user:/var/cache/clevis:/usr/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
sssd:x:984:984:User for sssd:/sbin/nologin
gnome-initial-setup:x:983:983::/run/gnome-initial-setup:/sbin/nologin
dnsmasq:x:982:982:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/usr/sbin/nologin
chrony:x:981:981:chrony system user:/var/lib/chrony:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/usr/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
nada_mohamed2243:x:1000:1000:Nada_Mohamed2243:/home/nada_mohamed2243:/bin/bash
ahmed:x:1001:1001:ahmed mohamed:/home/ahmed:/bin/bash
testu:x:1002:1002:test user:/home/testu:/bin/bash
nada :>
```

lp as a word only (not as a part of word)

\b → it ensures that the pattern matches only whole words and not parts of words.

```
nada :>sed -n '/\b\lp\b/P' /etc/passwd
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
```

**2- Display /etc/passwd file except the third line.**

**sed '3d' /etc/passwd**

```
nada :>sed '3d' /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/:/sbin/nologin
tss:x:59:59:Account used for TPM access:/:/usr/sbin/nologin
systemd-coredump:x:999:997:systemd Core Dumper:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:998:996:User for polkitd:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:997:995:User for geoclue:/var/lib/geoclue:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/:/sbin/nologin
pipewire:x:996:993:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
libstoragemgmt:x:990:990:daemon account for libstoragemgmt:/:/usr/sbin/nologin
cockpit-wsinstance:x:989:989:User for cockpit-ws instances:/nonexisting:/sbin/nologin
```

Only for check :

Line 3 that has been deleted:

```
nada :>cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/:/sbin/nologin
tss:x:59:59:Account used for TPM access:/:/usr/sbin/nologin
systemd-coredump:x:999:997:systemd Core Dumper:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:998:996:User for polkitd:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
```

**3- Display /etc/passwd file except the last line.**

**sed '\$d' /etc/passwd**

```
nada :>sed '3d' /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
```

Only for check :

The last line in general

```
tcpdump:x:72:72:::/sbin/nologin
nada_mohamed2243:x:1000:1000:Nada_Mohamed2243:/home/nada_mohamed2243:/bin/bash
ahmed:x:1001:1001:ahmed mohamed:/home/ahmed:/bin/bash
testu:x:1002:1002:test user:/home/testu:/bin/bash
```

After run our command →

```
nada_mohamed2243:x:1000:1000:Nada_Mohamed2243:/home/nada_mohamed2243:/bin/bash
ahmed:x:1001:1001:ahmed mohamed:/home/ahmed:/bin/bash
nada :>|
```

**4- Display /etc/passwd file except the lines that contain the word “lp”.**

**sed '/lp/d' /etc/passwd**

```
nada :>sed '/lp/d' /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown

pipewire:x:996:993:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
libstoragemgmt:x:990:990:daemon account for libstoragemgmt:/usr/sbin/nologin
cockpit-wsinstance:x:989:989:User for cockpit-ws instances:/nonexisting:/sbin/nologin
colord:x:987:987:User for colord:/var/lib/colord:/sbin/nologin
setroubleshoot:x:986:986:SELinux troubleshoot server:/var/lib/setroubleshoot:/usr/sbin/nologin
clevis:x:985:985:Clevis Decryption Framework unprivileged user:/var/cache/clevis
```

Only for check :

The 2 lines which appear in q1 deleted

Delete the exact lp word

```
nada :>sed '/\b\lp\b/d' /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
```

**5- Substitute all the words that contain “lp” with “mylp” in /etc/passwd file.**

**sed 's/lp/mylp/g' /etc/passwd**

```
nada :>sed 's/lp/mylp/g' /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
mylp:x:4:7:mylp:/var/spool/mylpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
```

```
cockpit-wsinstance:x:989:989:User for cockpit-ws instances:/nonexisting:/sbin/nologin
flatpak:x:988:988:User for flatpak system hemylper:/:/sbin/nologin
colord:x:987:987:User for colord:/var/lib/colord:/sbin/nologin
setroubleshoot:x:986:986:SELinux troubleshoot server:/var/lib/setroubleshoot:/usr/bin/
```

**Substitute and print this only**

**Sed -n 's/lp/mylp/gp' /etc/passwd**

```
nada :>sed -n 's/lp/mylp/gp' /etc/passwd
mylp:x:4:7:mylp:/var/spool/mylpd:/sbin/nologin
flatpak:x:988:988:User for flatpak system hemylper:/:/sbin/nologin
nada :>
```

## Using awk utility

**1- Print the full name (comment) of all users in the system.**

-F: →specify the field separator.

full name (comment) → field 5 → \$5

**awk -F: '{print \$5}' /etc/passwd**

```
nada :>awk -F: '{print $5}' /etc/passwd
root
bin
daemon
adm
lp
sync
```

```
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
```

**awk -F: '{print "full name : " \$5}' /etc/passwd**

```
nada :>awk -F: '{print "full name : " $5}' /etc/passwd
full name : root
full name : bin
full name : daemon
full name : adm
```

**awk -F: 'BEGIN{print "full name "} {print \$5}' /etc/passwd**

```
nada :>awk -F: 'BEGIN{print "full name"} {print $5}' /etc/passwd
full name
root
bin
daemon
```

**2- Print login, full name (comment) and home directory of all users.( Print each line preceded by a line number)**

line number → NR (record number)

login → first field → \$1

full name (comment) → field 5 → \$5

home directory → field 6 → \$6

**awk -F: '{print NR,\$1,\$5,\$6}' /etc/passwd**

```
nada :>awk -F: '{print NR,$1,$5,$6}' /etc/passwd
1 root root /root
2 bin bin /bin
3 daemon daemon /sbin
4 adm adm /var/adm
5 lp lp /var/spool/lpd
```

**awk -F: '{print "record number : ", NR ,",login name : ",\$1,", full name : ", \$5,", home dir : ",\$6}' /etc/passwd**

```
nada :>awk -F: '{print "record number : ", NR,"login name : ",$1,"full name : ",$5,"home dir : ",$6}' /etc/passwd
record number : 1 ,login name : root ,full name : root ,home dir : /root
record number : 2 ,login name : bin ,full name : bin ,home dir : /bin
record number : 3 ,login name : daemon ,full name : daemon ,home dir : /sbin
record number : 4 ,login name : adm ,full name : adm ,home dir : /var/adm
```

**awk -F: 'BEGIN{print "NR", "login name", "full name", "home dir"} {print NR,\$1,\$5,\$6}' /etc/passwd**

```
nada :>awk -F: 'BEGIN{print "NR", "login name", "full name", "home dir"} {print NR,"", $1,"", "$5,"", $6}' /etc/passwd
NR login name full name home dir
1 root root /root
2 bin bin /bin
3 daemon daemon /sbin
4 adm adm /var/adm
```

**3- Print login, uid and full name (comment) of those uid is greater than 500.**

login → first field → \$1

User id → field 3 → \$3

full name (comment) → field 5 → \$5

**awk -F: '{if(\$3 > 500) print "login name : ",\$1,"user id : ",\$3,"full name : ",\$5}' /etc/passwd**

```
nada :>awk -F: '{if($3 > 500) print "login name : ",$1,"user id : ",$3,"full name : ",$5}' /etc/passwd
login name : nobody ,user id : 65534 ,full name : Kernel Overflow User
login name : systemd-coredump ,user id : 999 ,full name : systemd Core Dumper
login name : polkitd ,user id : 998 ,full name : User for polkitd
login name : geoclue ,user id : 997 ,full name : User for geoclue
login name : pipewire ,user id : 996 ,full name : PipeWire System Daemon
```

**4- Print login, uid and full name (comment) of those uid is exactly 500**

**awk -F: '{if(\$3 == 500) print "login name : ",\$1,"user id : ",\$3,"full name : ",\$5}' /etc/passwd**

```
nada :>awk -F: '{if($3 == 500) print "login name : ",$1,"user id : ",$3,"full name : ",$5}' /etc/passwd
nada :>
```

**5- Print line from 5 to 15 from /etc/passwd**

**awk '{if(NR>=5 && NR<=15) print NR," : ",\$0}' /etc/passwd**



```
nada :>awk '{if(NR>=5 && NR<=15) print NR,":",$0}' /etc/passwd
5 : lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
6 : sync:x:5:0:sync:/sbin:/bin/sync
7 : shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
8 : halt:x:7:0:halt:/sbin:/sbin/halt
9 : mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
10 : operator:x:11:0:operator:/root:/sbin/nologin
11 : games:x:12:100:games:/usr/games:/sbin/nologin
12 : ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
13 : nobody:x:65534:65534:Kernel Overflow User:/:/sbin/nologin
14 : tss:x:59:59:Account used for TPM access:/:/usr/sbin/nologin
15 : systemd-coredump:x:999:997:systemd Core Dumper:/:/sbin/nologin
nada :>
```

## 6- Change lp to mylp

awk '{gsub(/lp/, "mylp"); print}' /etc/passwd

```
nada :>awk -F: '{gsub(/lp/,"mylp"); print $0}' /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
mylp:x:4:7:mylp:/var/spool/mylpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown

cockpit-wsinstance:x:989:989:User for cockpit-ws instances:/nonexisting:/sbin/nologin
flatpak:x:988:988:User for flatpak system hemylper:/:/sbin/nologin
colord:x:987:987:User for colord:/var/lib/colord:/sbin/nologin
setroubleshoot:x:986:986:SELinux troubleshoot server:/var/lib/setroubleshoot:/usr/sb
```

## As a word not part of word

**awk -F: '{for (i = 1; i <= NF; i++) {if (\$i == "lp") \$i = "mylp"; }print \$0;}' OFS=":" /etc/passwd**

**OFS=":" → make output field separator ":" because the default is space**

```
nada :>awk -F: '{for(i=1;i<=NF;i++){if($i == "lp") $i="mylp";} print $0;}' OFS=":" /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
mylp:x:4:7:mylp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
```

**Both :**

```
awk -F: '{for (i = 1; i <= NF; i++)
{
    if ($i ~ /lp/)
        $i = substr($i,1,index($i,"lp")-1) "mylp"
    substr($i,index($i,"lp")+2) ;
    }print $0;
}' OFS=":" /etc/passwd
```

```
nada :>awk -F: '{for(i=1;i<=NF;i++){if($i ~ /lp/) $i=substr($i,1,index($i,"lp")-1)
)"mylp" substr($i,index($i,"lp")+2);} print $0;}' OFS=":" /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
mylp:x:4:7:mylp:/var/spool/mylpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
```

```
libstoragemgmt:x:990:990:daemon account for libstoragemgmt:/usr/sbin/nologin
cockpit-wsinstance:x:989:989:User for cockpit-ws instances:/nonexisting:/sbin/nologin
flatpak:x:988:988:User for flatpak system hemylper:/usr/sbin/nologin
colord:x:987:987:User for colord:/var/lib/colord:/sbin/nologin
setroubleshoot:x:986:986:SELinux troubleshoot server:/var/lib/setroubleshoot:/usr/sbin/nologin
```

## 7- Print all information about the greatest uid.

we can't return to a specific line so we have → maxline

To store the info of each max uid

```
awk -F: 'BEGIN {max=0} {if ($3>max) {max=$3; maxline=$0}}
END {print maxline}' /etc/passwd
```

```
nada :>awk -F: 'BEGIN {max=0}{if($3>max){max=$3; maxline=$0}} END{print maxline}' /etc/passwd
nobody:x:65534:65534:Kernel Overflow User:/usr/sbin/nologin
```

## 8- Get the sum of all accounts id's.

```
awk -F: 'BEGIN {sum=0} {sum+=$3} END {print sum}'  
/etc/passwd
```

```
nada :>awk -F: 'BEGIN {sum=0}{sum+=$3} END{print sum}' /etc/passwd  
83025
```

## Bonus

### 1. Get the sum of accounts id's that has the same group.

```
awk -F: ' {sum[$4]+=$3} END {for(group in sum) print "the group  
id : " , group , " , the sum of user id : " , sum[group]}' /etc/passwd
```

```
nada :>awk -F: '{sum[$4]+=$3} END{for(group in sum) print "the group id : " , group ,  
",the sum of user id : ",sum[group]}' /etc/passwd  
the group id : 0 ,the sum of user id : 29  
the group id : 1 ,the sum of user id : 1  
the group id : 2 ,the sum of user id : 2  
the group id : 4 ,the sum of user id : 3  
the group id : 7 ,the sum of user id : 4
```

### 2. Make the following report:

#### User-Group Report

-----

**Group1 Name:**

**User1**

**User2**

**Group2 Name:**

**User3**

**User4**

- 
- 
-