

1. *User management*. Here we suppose there are at least two users, namely, root and guest.

(i) Create a new user *user*

groupadd *user* – adds group with name *user*

useradd -g *user* -s /bin/bash -d /home/user -m *user* – adds user *user* to group *user*, -g allows to set primary group, -s allows to set shell that will be used to login in, -d allows to set home directory, -m allows to create home directory.

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo groupadd user  
[sudo] password for denis:  
denis@denis-VirtualBox:~$ sudo useradd -g user -s /bin/bash -d /home/user -m user
```

passwd *user* – allows to set new password for user *user*

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo passwd user  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully
```

id *user* – shows ids for user *user* (userid, groupid etc.)

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ id user  
uid=1001(user) gid=1001(user) groups=1001(user)
```

ls -ld /home/user – shows full information about /home/user directory

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ ls -ld /home/user  
drwxr-xr-x 2 user user 4096 kb 20 16:56 /home/user
```

(ii) Log in to the system as “user” (hint use **su**).

```
denis@denis-VirtualBox:~$ sudo login
denis-VirtualBox login: user
Password:
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 5.3.0-46-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

2 packages can be updated.
0 updates are security updates.

Your Hardware Enablement Stack (HWE) is supported until April 2023.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

user@denis-VirtualBox:~$
```

(ii) Edit **/etc/passwd** to prevent user **user** from logging in to the system.

```
denis:x:1000:1000:Denís Nalda,,,:/home/denis:/bin/bash
vboxadd:x:999:1::/var/run/vboxadd:/bin/false
user:x:1001:1001::/home/user:/sbin/nologin
```

```
denis@denis-VirtualBox:~$ sudo login
denis-VirtualBox login: user
Password:
Last login: нн кві 20 17:23:06 EEST 2020 on pts/0
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 5.3.0-46-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
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     https://ubuntu.com/livepatch

2 packages can be updated.
0 updates are security updates.

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Cannot execute /sbin/nologin: No such file or directory
```

2. Content of `/etc/passwd` and `/etc/group`.

(i) Look through `/etc/passwd` and `/etc/group` (hint: use `less` or `cat`).

```
denis@denis-VirtualBox:/$ less /etc/passwd
```

```
denis@denis-VirtualBox: /
File Edit View Search Terminal Help
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:/:/home/syslog:/usr/sbin/nologin
messagebus:x:103:107:/:/nonexistent:/usr/sbin/nologin
_apt:x:104:65534:/:/nonexistent:/usr/sbin/nologin
uidd:x:105:111:/:/run/uidd:/usr/sbin/nologin
avahi-autoipd:x:106:112:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:107:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
dnsmasq:x:108:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
rtkit:x:109:114:RealtimeKit,,,:/proc:/usr/sbin/nologin
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
whoopsie:x:112:117:/:/nonexistent:/bin/false
kernoops:x:113:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:114:119:/:/var/lib/saned:/usr/sbin/nologin
pulse:x:115:120:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
avahi:x:116:122:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
```

```
denis@denis-VirtualBox:/$ less /etc/group
```

```
File Edit View Search Terminal Help
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,denis
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
```

(ii) Get data from **/etc/passwd** and **/etc/group** about users: *root*, *guest*, *user* (hint: filter by **grep**).

```
denis@denis-VirtualBox:/$ cat /etc/passwd /etc/group | grep "root\|user\|guest"
root:x:0:0:root:/root:/bin/bash
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
user:x:1001:1001::/home/user:/sbin/nologin
root:x:0:
users:x:100:
user:x:1001:
denis@denis-VirtualBox:/$
```

(iii) Parse **/etc/passwd** and **/etc/group** with **cut**.

cut -f1 -d: /etc/passwd – outputs 1 field before separator symbol **:** from **/etc/passwd** file

```
denis@denis-VirtualBox:/$ cut -f1 -d: /etc/passwd
root
daemon
bin
sys
sync
games
man
lp
mail
news
uucp
proxy
www-data
backup
```

cut -f1,2 -d: /etc/passwd – outputs first and second fields, using **:** like a separator symbol from **/etc/passwd** file

```
denis@denis-VirtualBox:/$ cut -f1,2 -d: /etc/passwd
root:x
daemon:x
bin:x
sys:x
sync:x
games:x
man:x
lp:x
mail:x
news:x
uucp:x
proxy:x
www-data:x
backup:x
list:x
irc:x
gnats:x
```

cut -f1,7 -d: /etc/passwd – outputs first and seventh fields, using : like a separator symbol from /etc/passwd file

```
denis@denis-VirtualBox:/$ cut -f1,7 -d: /etc/passwd
root:/bin/bash
daemon:/usr/sbin/nologin
bin:/usr/sbin/nologin
sys:/usr/sbin/nologin
sync:/bin/sync
games:/usr/sbin/nologin
man:/usr/sbin/nologin
lp:/usr/sbin/nologin
mail:/usr/sbin/nologin
news:/usr/sbin/nologin
uucp:/usr/sbin/nologin
proxy:/usr/sbin/nologin
www-data:/usr/sbin/nologin
backup:/usr/sbin/nologin

```

cut -f1 -d: /etc/group – outputs 1 field before separator symbol : from /etc/group file

```
denis@denis-VirtualBox:/$ cut -f1 -d: /etc/group
root
daemon
bin
sys
adm
tty
disk
lp
mail
news
uucp
man
proxy
kmem
dialout

```

cut -f1,2 -d: /etc/group – outputs first and second fields, using : like a separator symbol from /etc/group file

```
denis@denis-VirtualBox:/$ cut -f1,2 -d: /etc/group
root:x
daemon:x
bin:x
sys:x
adm:x
tty:x
disk:x
lp:x
mail:x
news:x
uucp:x
man:x
proxy:x
kmem:x
dialout:x

```

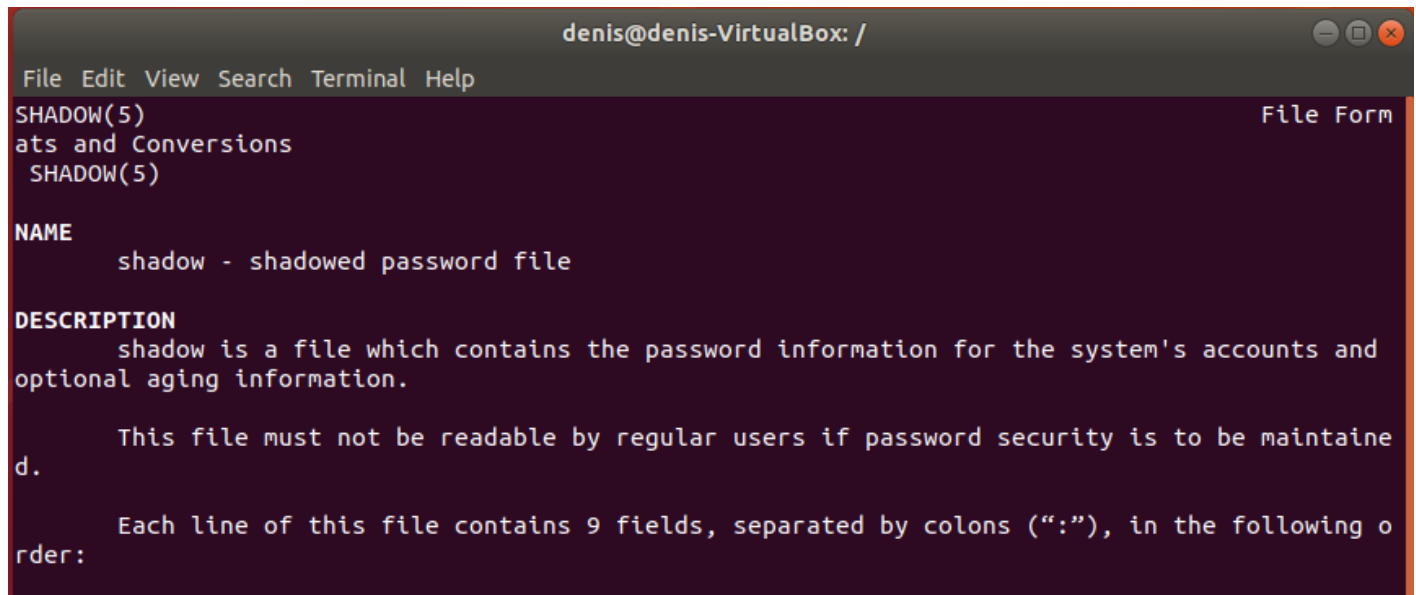
(iv) Try to call **less** on **/etc/shadow** and invoke **sudo less /etc/shadow**

```
File Edit View Search Terminal Help
root:!18345:0:99999:7:::
daemon:*18113:0:99999:7:::
bin:*18113:0:99999:7:::
sys:*18113:0:99999:7:::
sync:*18113:0:99999:7:::
games:*18113:0:99999:7:::
man:*18113:0:99999:7:::
lp:*18113:0:99999:7:::
mail:*18113:0:99999:7:::
news:*18113:0:99999:7:::
uucp:*18113:0:99999:7:::
proxy:*18113:0:99999:7:::
www-data:*18113:0:99999:7:::
backup:*18113:0:99999:7:::
list:*18113:0:99999:7:::
irc:*18113:0:99999:7:::
gnats:*18113:0:99999:7:::
nobody:*18113:0:99999:7:::
systemd-network:*18113:0:99999:7:::
systemd-resolve:*18113:0:99999:7:::
syslog:*18113:0:99999:7:::
messagebus:*18113:0:99999:7:::
```

man -k shadow – searches information about *shadow* in all manuals

```
denis@denis-VirtualBox:/$ man -k shadow
gpasswd (1) - administer /etc/group and /etc/gshadow
grpconv (8) - convert to and from shadow passwords and groups
grpunconv (8) - convert to and from shadow passwords and groups
gshadow (5) - shadowed group file
login.defs (5) - shadow password suite configuration
ppmshadow (1) - add simulated shadows to a portable pixmap image
pwconv (8) - convert to and from shadow passwords and groups
pwunconv (8) - convert to and from shadow passwords and groups
shadow (5) - shadowed password file
shadowconfig (8) - toggle shadow passwords on and off
update-passwd (8) - safely update /etc/passwd, /etc/shadow and /etc/group
vigr (8) - edit the password, group, shadow-password or shadow-group file
vipw (8) - edit the password, group, shadow-password or shadow-group file
denis@denis-VirtualBox:/$
```

man 5 shadow – searches information about *shadow* in fifth section of man



```
denis@denis-VirtualBox: /
File Edit View Search Terminal Help
SHADOW(5) File Form
ats and Conversions
SHADOW(5)

NAME
    shadow - shadowed password file

DESCRIPTION
    shadow is a file which contains the password information for the system's accounts and optional aging information.

    This file must not be readable by regular users if password security is to be maintained.

    Each line of this file contains 9 fields, separated by colons (":"), in the following order:
```

Analyse content of **/etc/shadow** based on what you've found in **man 5 shadow**.

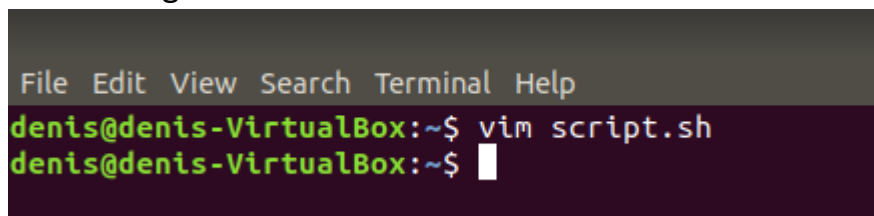
According to man 5 shadow, **/etc/shadow** contains information about encrypted passwords. Each string of this file contains name of user, encrypted password, date of the last change (number of days since 1 Jan, 1970), minimum password age (number of days before user can change it again), maximum password age (number of days after which user will have to change password), password warning period (number of days before password is going to expire during which the user should be warned), password inactivity period (number of days during which password will be active after it's expire to allow user to login and change password), account expiration date (number of days before the account's expiration since 1 Jan, 1970), reserved fields for future usage.

3. Dealing with **chmod**.

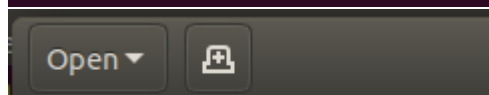
(i) An executable script. Open your favorite editor and put these lines into a file

```
#!/bin/bash
```

```
echo "Drugs are bad MKAY?"
```



```
denis@denis-VirtualBox:~$ vim script.sh
denis@denis-VirtualBox:~$
```



```
#!/bin/bash
echo "Drugs are bad MKAY?"
```

Give name "script.sh" to the script and call to

chmod +x script.sh

Then you are ready to execute the script:

./script.sh

```
denis@denis-VirtualBox:~$ chmod +x script.sh
denis@denis-VirtualBox:~$ ./script.sh
Drugs are bad MKAY?
```

(ii) Suppose, you have logged in to the system as *guest*. Create directory “testDir” in the **/tmp**; put some file into testDir and prohibit user *user* from visiting this directory (i.e. “testDir”).

```
denis@denis-VirtualBox:~$ cd /
denis@denis-VirtualBox:/$ cd /tmp
denis@denis-VirtualBox:/tmp$ mkdir testDir
denis@denis-VirtualBox:/tmp$ cd testDir
denis@denis-VirtualBox:/tmp/testDir$ touch testfile.txt
denis@denis-VirtualBox:/tmp/testDir$ ls .
testfile.txt
denis@denis-VirtualBox:/tmp/testDir$ cd ..
denis@denis-VirtualBox:/tmp$ chmod -R o-rwx ./testDir
```

```
user@denis-VirtualBox: /tmp
```

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```
user@denis-VirtualBox:/tmp$ cd testDir
bash: cd: testDir: Permission denied
user@denis-VirtualBox:/tmp$
```

(iii) Test, if it possible to forbid an owner of some file to read to or write from this file.

```
user@denis-VirtualBox:/tmp$ touch userfile.txt
user@denis-VirtualBox:/tmp$ chmod 007 userfile.txt
user@denis-VirtualBox:/tmp$ cat userfile.txt
cat: userfile.txt: Permission denied
user@denis-VirtualBox:/tmp$
```

Forbidden access to read, write and execute for owner and owner group.