



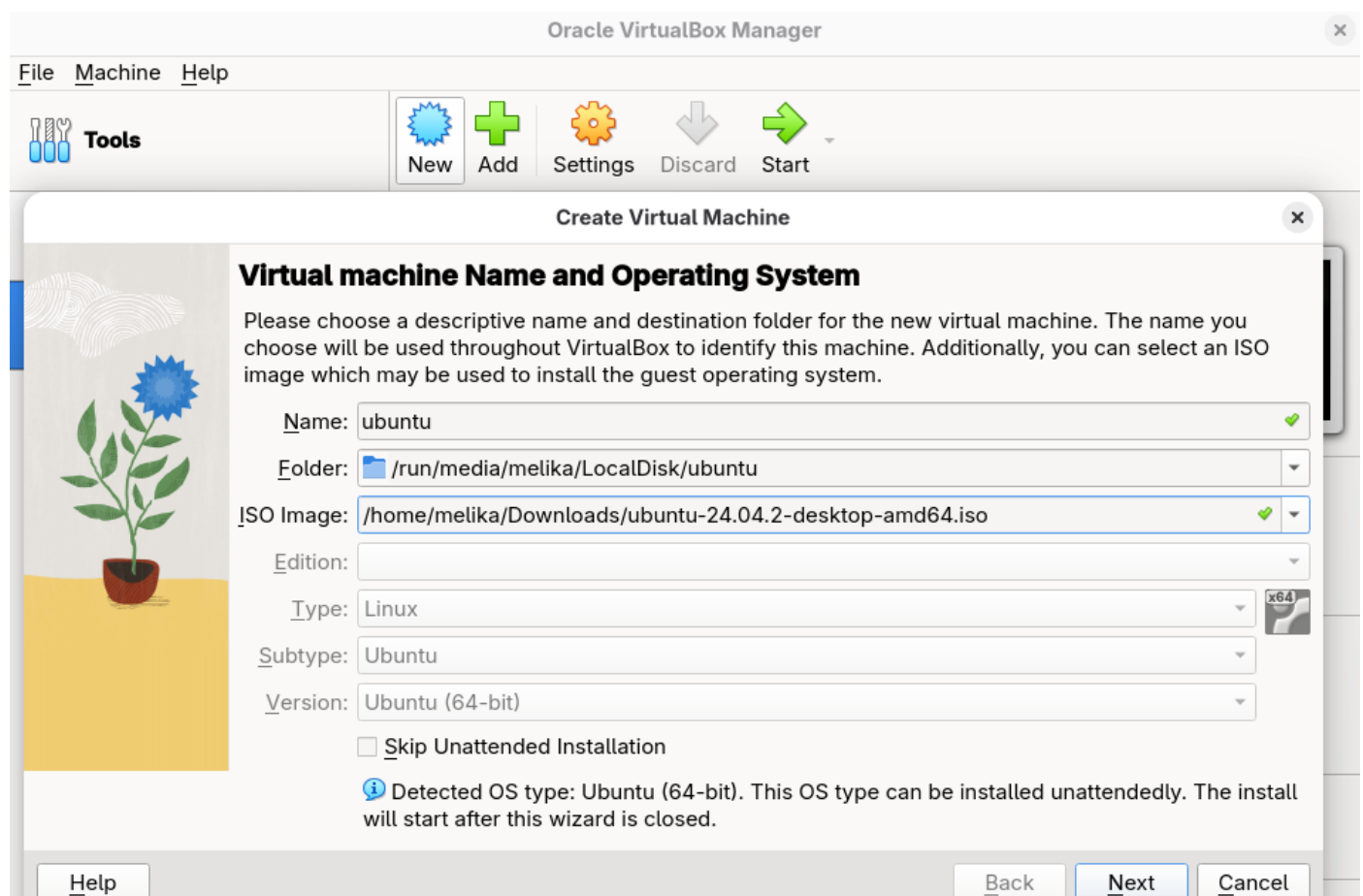
گزارش آزمایش ۱: آشنایی با سیستم‌عامل لینوکس

ملیکا علیزاده ۴۰۱۱۰۶۲۵۵

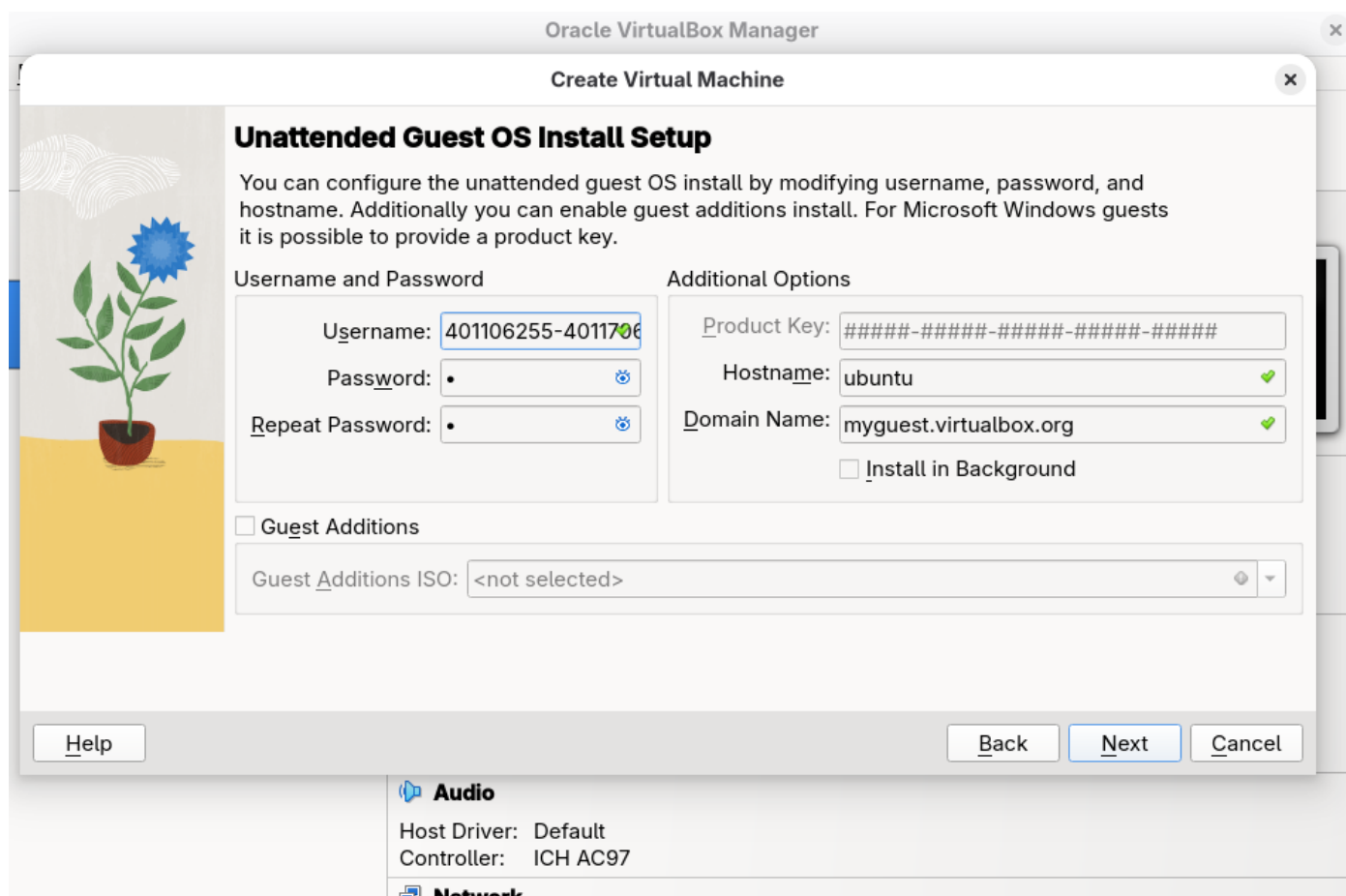
الینا هژبری ۴۰۱۱۷۰۶۶۱

۱ نصب سیستم‌عامل لینوکس

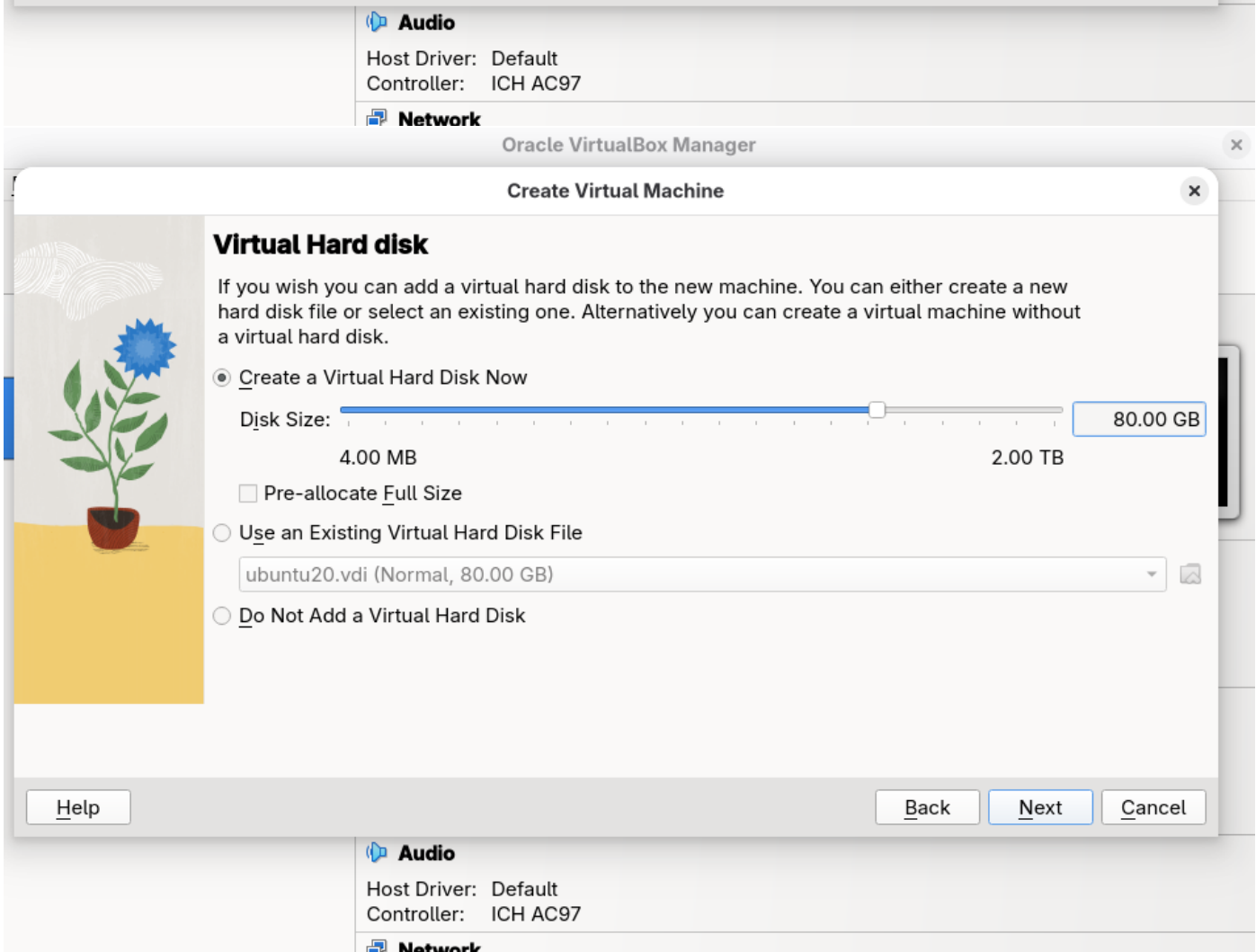
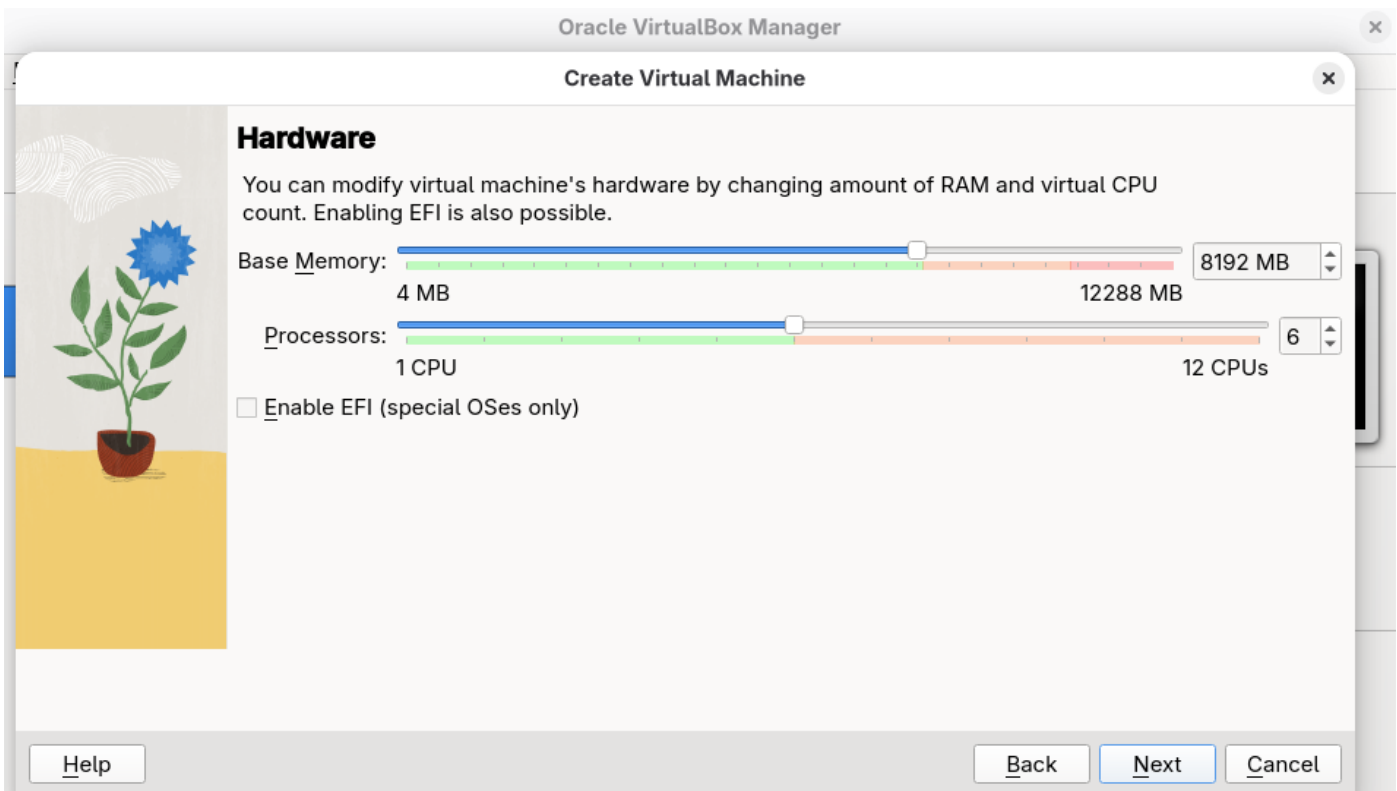
در این آزمایش با استفاده از نرم‌افزار VirtualBox سیستم‌عامل Ubuntu24.04 به صورت مجازی نصب شده‌است. مراحل نصب در تصاویر زیر آمده است:



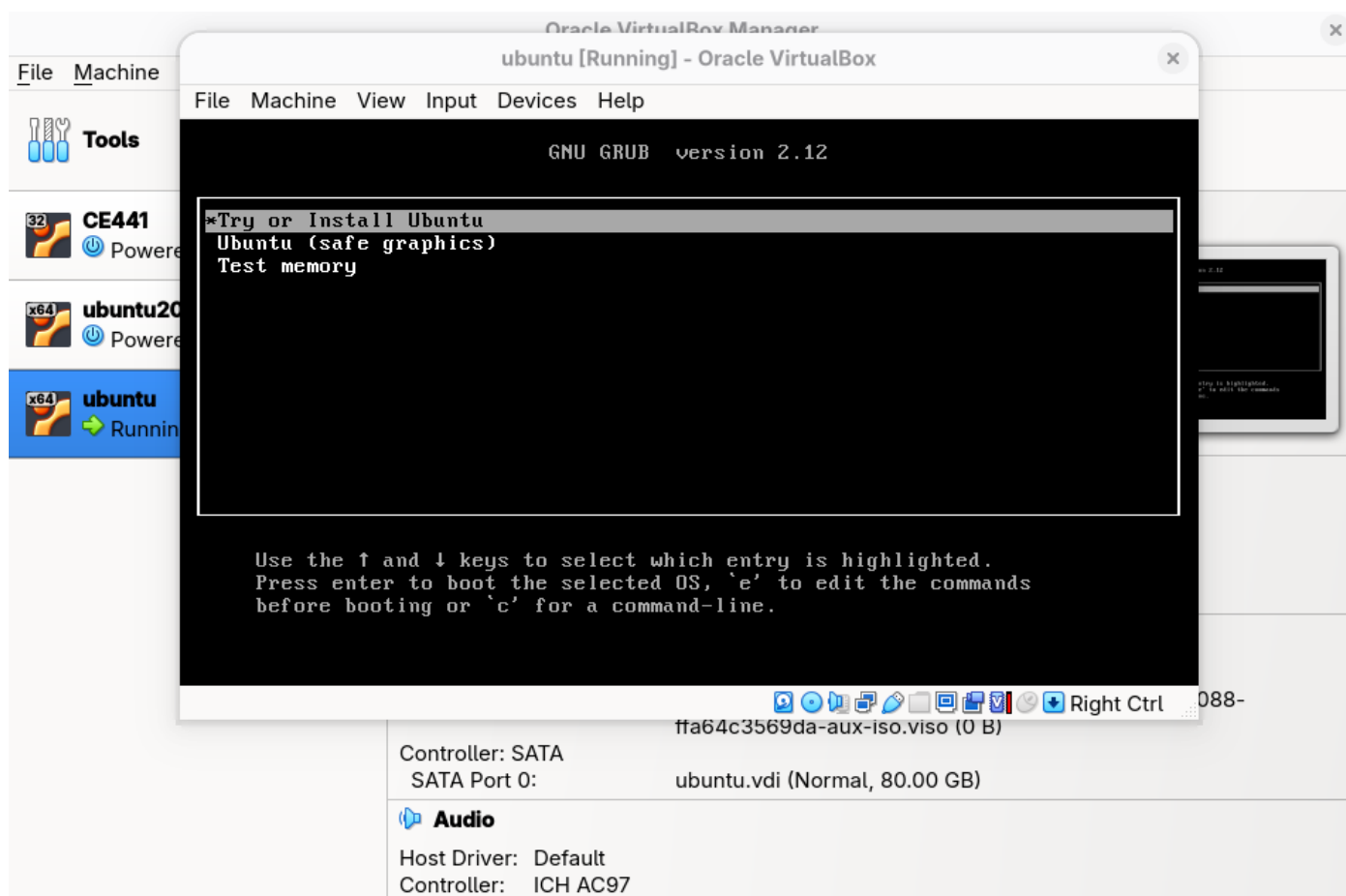
شکل ۱: انتخاب اسم و فایل iso برای نصب ماشین مجازی



شکل ۲: ثبت نام کاربری و رمز



شکل ۳: تنظیم مقدار رم، حافظه و تعداد رشته‌های پردازشی برای ماشین مجازی



شکل ۴: ادامه مراحل نصب

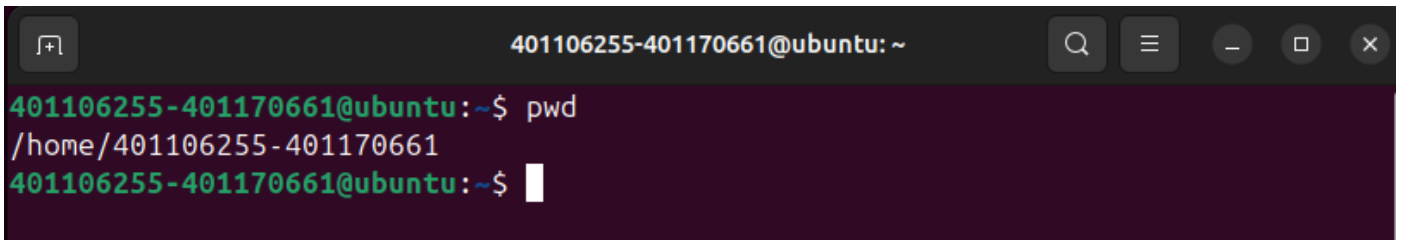
```

401106255-401170661@ubuntu: ~
401106255-401170661@ubuntu:~$ uname -r
6.14.0-24-generic
401106255-401170661@ubuntu:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04.2 LTS
Release:        24.04
Codename:       noble
401106255-401170661@ubuntu:~$
  
```

شکل ۵: مشاهده اطلاعات سیستم عامل و نسخه‌ی هسته

۲ آشنایی با دستورات پایه‌ی لینوکس

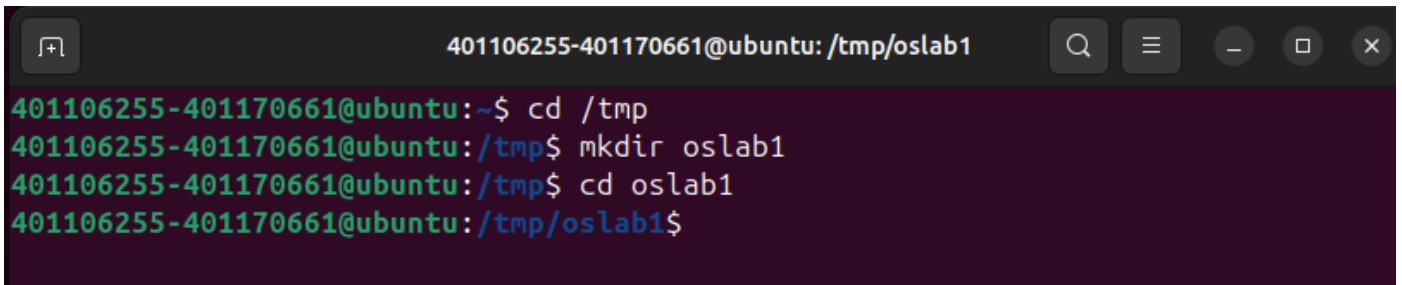
۱.

A terminal window with a dark background. The title bar shows the user '401106255-401170661@ubuntu' and the current directory '~'. The prompt is '401106255-401170661@ubuntu:~\$'. The user has entered 'pwd' and the output is '/home/401106255-401170661'. The prompt is now '401106255-401170661@ubuntu:~\$' with a cursor.

```
401106255-401170661@ubuntu:~$ pwd
/home/401106255-401170661
401106255-401170661@ubuntu:~$
```

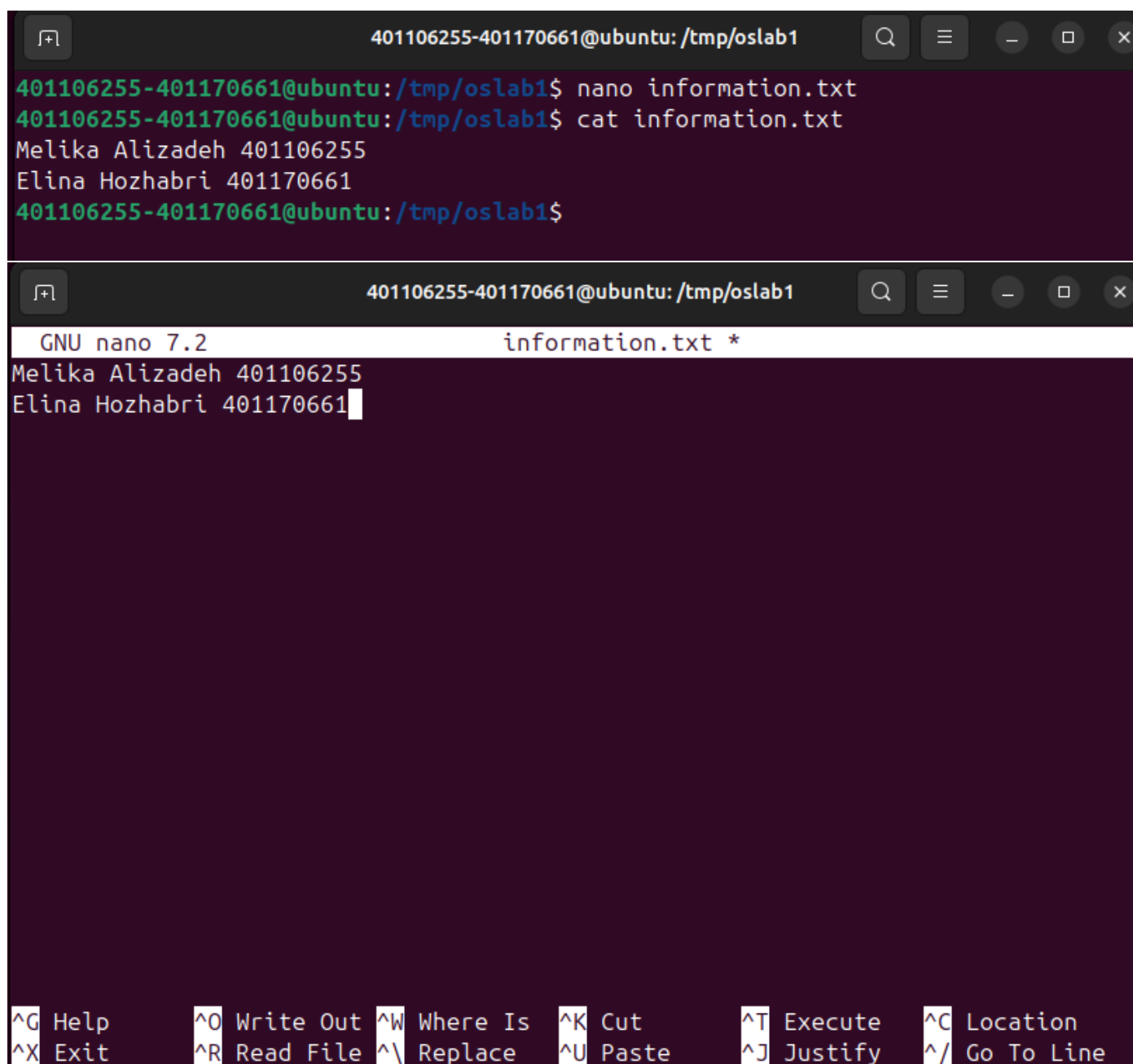
شکل ۶: نمایش آدرس دایرکتوری جاری به کمک دستور pwd

۲.

A terminal window with a dark background. The title bar shows the user '401106255-401170661@ubuntu' and the current directory '/tmp/oslab1'. The prompt is '401106255-401170661@ubuntu:~\$'. The user has entered 'cd /tmp', then 'mkdir oslab1', then 'cd oslab1', and finally the prompt is '401106255-401170661@ubuntu:/tmp/oslab1\$'.

```
401106255-401170661@ubuntu:~$ cd /tmp
401106255-401170661@ubuntu:/tmp$ mkdir oslab1
401106255-401170661@ubuntu:/tmp$ cd oslab1
401106255-401170661@ubuntu:/tmp/oslab1$
```

شکل ۷: با دستور cd به دایرکتوری /tmp رفته و بعد با دستور mkdir پوشه oslab1 ایجاد شده است.



The image consists of two screenshots of a terminal window. The top screenshot shows the user creating a file named 'information.txt' using the 'nano' command and then displaying its contents with the 'cat' command. The output shows two lines of text: 'Melika Alizadeh 401106255' and 'Elina Hozhabri 401170661'. The bottom screenshot shows the 'nano' editor interface with the same two lines of text. The editor's title bar indicates it is editing 'information.txt'. A help menu is visible at the bottom of the editor window, listing various keyboard shortcuts such as ^G for Help, ^O for Write Out, ^W for Where Is, ^K for Cut, ^T for Execute, ^C for Location, ^X for Exit, ^R for Read File, ^\ for Replace, ^U for Paste, ^J for Justify, and ^/ for Go To Line.

```

401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ nano information.txt
401106255-401170661@ubuntu: /tmp/oslab1$ cat information.txt
Melika Alizadeh 401106255
Elina Hozhabri 401170661
401106255-401170661@ubuntu: /tmp/oslab1$

GNU nano 7.2          information.txt *
Melika Alizadeh 401106255
Elina Hozhabri 401170661

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/ Go To Line

```

شکل ۸: ایجاد فایل متنی به کمک ویرایشگر nano (با Ctrl+o ذخیره و با Ctrl+x از آن خارج می‌شود).

.۴

```
401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ ls
information.txt
401106255-401170661@ubuntu: /tmp/oslab1$ mv information.txt myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$ ls
myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$
```

شکل ۹: تغییر نام فایل با دستور mv

.۵

```
401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ ls
myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$ cp myinformation.txt backupinfo.txt
401106255-401170661@ubuntu: /tmp/oslab1$ ls
backupinfo.txt  myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$
```

شکل ۱۰: کپی فایل با دستور cp

.۶

```
401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ ls
backupinfo.txt  myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$ cat myinformation.txt
Melika Alizadeh 401106255
Elina Hozhabri 401170661
401106255-401170661@ubuntu: /tmp/oslab1$
```

شکل ۱۱: نمایش محتوای فایل با دستور cat

۷. در `echo "Hello There" > myinformation.txt` کل محتوای فایل توسط متن خواسته شده مجدداً نوشته می‌شود. ولی در `echo "Hello There" >> myinformation.txt` متن خواسته شده به محتوای فعلی فایل افزوده می‌شود. هر دو دستور در حالتی که فایل وجود نداشته باشد ابتدا فایل را می‌سازند.

```
401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ echo "Hello There!" > myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$ echo "Hello There!" >> myinformation.txt

401106255-401170661@ubuntu: /tmp/oslab1$ cat myinformation.txt
Hello There!
Hello There!
401106255-401170661@ubuntu: /tmp/oslab1$
```

شکل ۱۲: اجرای دستورات مشخص شده

۸.

```
401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ ls
backupinfo.txt  myinformation.txt
401106255-401170661@ubuntu: /tmp/oslab1$ cat > testfile.txt
This is a new file created with cat.
401106255-401170661@ubuntu: /tmp/oslab1$ ls
backupinfo.txt  myinformation.txt  testfile.txt
401106255-401170661@ubuntu: /tmp/oslab1$ cat testfile.txt
This is a new file created with cat.
401106255-401170661@ubuntu: /tmp/oslab1$
```

شکل ۱۳: ساخت فایل متنی جدید با دستور `cat` (خروج از حالت نوشتن در فایل با `Ctrl+d` که پایان فایل را مشخص می‌کند).


```

401106255-401170661@ubuntu: /tmp/oslab1
root      3465  0.0  0.0    0    0 ?        I   21:40   0:00 [kworker/u25:
root      3548  0.0  0.0    0    0 ?        I<  21:41   0:00 [kworker/u33:
root      3651  0.0  0.0    0    0 ?        I   21:49   0:00 [kworker/5:1-
root      3676  0.0  0.5 591168 41580 ?        Ssl 22:04   0:01 /usr/libexec/
root      3701  0.0  0.0 83980 2912 ?        Ss  22:04   0:00 gpg-agent --h
root      3717  0.0  0.0    0    0 ?        I   22:04   0:00 [kworker/1:2-
root      3727  0.0  0.0    0    0 ?        I   22:04   0:01 [kworker/u26:
4011062+  3873  0.0  0.2 31900 19120 ?        S   22:10   0:00 /usr/bin/pyth
4011062+  3876  0.0  0.3 458416 27372 ?        Sl  22:10   0:00 /usr/bin/gnom
4011062+  3882  0.1  0.6 553748 52564 ?        Ssl 22:10   0:04 /usr/libexec/
4011062+  3889  0.0  0.0 11156 5000 pts/0    Ss  22:10   0:00 bash
root      3897  0.0  0.0    0    0 ?        I   22:10   0:00 [kworker/u26:
root      4005  0.0  0.0    0    0 ?        I   22:19   0:00 [kworker/4:2-
root      4011  0.0  0.0    0    0 ?        I   22:22   0:00 [kworker/u30:
root      4073  0.0  0.0    0    0 ?        I<  22:37   0:00 [kworker/u32:
root      4074  0.0  0.0    0    0 ?        I<  22:37   0:00 [kworker/u36:
root      4081  0.0  0.0    0    0 ?        I   22:43   0:00 [kworker/u30:
4011062+  4125  0.0  0.7 3014660 64624 ?        Sl  22:47   0:00 gjs /usr/shar
root      4171  0.0  0.0    0    0 ?        I   22:47   0:00 [kworker/2:2-
root      4182  0.0  0.0    0    0 ?        I   22:51   0:00 [kworker/u29:
root      4188  0.0  0.0    0    0 ?        I   22:52   0:00 [kworker/u27:
root      4213  0.0  0.0    0    0 ?        I   22:55   0:00 [kworker/u30:
4011062+  4215 100  0.0 13616 4464 pts/0    R+  22:56   0:00 ps aux
401106255-401170661@ubuntu: /tmp/oslab1$

```

شکل ۱۴: لیست پردازنده‌های در حال اجرا با دستور ps aux

```

401106255-401170661@ubuntu: /tmp/oslab1
401106255-401170661@ubuntu: /tmp/oslab1$ ps aux | grep a
root      1  0.0  0.1 23084 13772 ?        Ss   21:28   0:03 /sbin/init sp
lash
root      2  0.0  0.0    0    0 ?        S    21:28   0:00 [kthreadd]
root      3  0.0  0.0    0    0 ?        S    21:28   0:00 [pool_workque
ue_release]
root      6  0.0  0.0    0    0 ?        I<   21:28   0:00 [kworker/R-kv
free_rcu_reclaim]
root     12  0.0  0.0    0    0 ?        I    21:28   0:00 [kworker/u24:
0-ipv6_addrconf]
root     14  0.0  0.0    0    0 ?        I    21:28   0:00 [rcu_tasks_kt
hread]
root     15  0.0  0.0    0    0 ?        I    21:28   0:00 [rcu_tasks_ru
de_kthread]
root     16  0.0  0.0    0    0 ?        I    21:28   0:00 [rcu_tasks_tr
ace_kthread]
root     19  0.0  0.0    0    0 ?        S    21:28   0:00 [rcu_exp_par_
gp_kthread_worker/0]
root     20  0.0  0.0    0    0 ?        S    21:28   0:00 [rcu_exp_gp_k
thread_worker]
root     21  0.0  0.0    0    0 ?        S    21:28   0:00 [migration/0]
root     26  0.0  0.0    0    0 ?        S    21:28   0:00 [migration/1]
root     32  0.0  0.0    0    0 ?        S    21:28   0:00 [migration/2]
root     38  0.0  0.0    0    0 ?        S    21:28   0:00 [migration/3]

```

شکل ۱۵: لیست پردازنده‌ها با حرف a

```

401106255-401170661@ubuntu: /usr/bin
401106255-401170661@ubuntu: /tmp/oslab1$ cd /usr/bin
401106255-401170661@ubuntu: /usr/bin$ ls
 '[' nano
aa-enabled nautilus
aa-exec nautilus-autorun-software
aa-features-abi nautilus-sendto
aconnect nawk
acpidbg nc
add-apt-repository nc.openbsd
addpart neqn
airscan-discover netaddr
alsabat netcat
alsaloop networkctl
alsamixer networkd-dispatcher
alsatplg newgrp
alsaucm ngettext
amidi nice
amixer nisdomainname
apg nl
apgbfm nm-applet
aplay nmcli
aplaymidi nm-connection-editor
apport-bug nm-online
apport-cli nmtui

```

شکل ۱۶: فایل‌های پوشه /usr/bin

```

401106255-401170661@ubuntu: /usr/bin
401106255-401170661@ubuntu: /usr/bin$ ls -lh
total 176M
-rwxr-xr-x 1 root root 55K Apr 5 2024 '['
-rwxr-xr-x 1 root root 19K Mar 19 18:09 aa-enabled
-rwxr-xr-x 1 root root 19K Mar 19 18:09 aa-exec
-rwxr-xr-x 1 root root 19K Mar 19 18:09 aa-features-abi
-rwxr-xr-x 1 root root 23K Apr 7 2024 aconnect
-rwxr-xr-x 1 root root 1.6K Jun 15 07:53 acpidbg
-rwxr-xr-x 1 root root 17K Feb 18 21:26 add-apt-repository
-rwxr-xr-x 1 root root 15K Jun 5 12:17 addpart
-rwxr-xr-x 1 root root 155K Apr 8 2024 airscan-discover
-rwxr-xr-x 1 root root 47K Apr 7 2024 alsabat
-rwxr-xr-x 1 root root 84K Apr 7 2024 alsaloop
-rwxr-xr-x 1 root root 81K Apr 7 2024 alsamixer
-rwxr-xr-x 1 root root 75K Apr 7 2024 alsatplg
-rwxr-xr-x 1 root root 31K Apr 7 2024 alsaucm
-rwxr-xr-x 1 root root 31K Apr 7 2024 amidi
-rwxr-xr-x 1 root root 63K Apr 7 2024 amixer
-rwxr-xr-x 1 root root 274 Apr 8 2024 apg
-rwxr-xr-x 1 root root 27K Apr 8 2024 apgbfm
-rwxr-xr-x 1 root root 83K Apr 7 2024 aplay
-rwxr-xr-x 1 root root 27K Apr 7 2024 aplaymidi
-rwxr-xr-x 1 root root 2.3K Apr 18 2024 apport-bug
-rwxr-xr-x 1 root root 14K Jul 8 14:50 apport-cli

```

شکل ۱۷: نمایش حجم فایل‌ها

```

401106255-401170661@ubuntu: /usr/bin
401106255-401170661@ubuntu: /usr/bin$ ls -lh | grep -e fs -e ld
-rwxr-xr-x 1 root root      27K Jan  9  2024 cifstat
-rwxr-xr-x 1 root root      35K Apr  5  2024 fold
-rwxr-xr-x 1 root root    864K Mar 17 13:20 grub-fs-test
lrwxrwxrwx 1 root root      34 Mar 17 13:20 grub-ntldr-img -> ../lib/grub/i386-
pc/grub-ntldr-img
-rwxr-xr-x 1 root root     75K Apr 10 13:30 gtk4-builder-tool
-rwxr-xr-x 1 root root     35K Jan 27 19:56 gtk-builder-tool
-rwxr-xr-x 1 root root     31K Apr 10  2024 hbpdecode
lrwxrwxrwx 1 root root      10 Dec  9  2024 ldapadd -> ldapmodify
-rwxr-xr-x 1 root root     67K Dec  9  2024 ldapcompare
-rwxr-xr-x 1 root root     67K Dec  9  2024 ldapdelete
-rwxr-xr-x 1 root root     67K Dec  9  2024 ldapexop
-rwxr-xr-x 1 root root     67K Dec  9  2024 ldapmodify
-rwxr-xr-x 1 root root     63K Dec  9  2024 ldapmodrdn
-rwxr-xr-x 1 root root     67K Dec  9  2024 ldappasswd
-rwxr-xr-x 1 root root     99K Dec  9  2024 ldapsearch
-rwxr-xr-x 1 root root     15K Dec  9  2024 ldapurl
-rwxr-xr-x 1 root root     63K Dec  9  2024 ldapwhoami
-rwxr-xr-x 1 root root     5.3K Jul  9 16:47 ldd
lrwxrwxrwx 1 root root      29 Jul  9 16:47 ld.so -> ../lib64/ld-linux-x86-64.s
o.2
-rwxr-xr-x 1 root root    119K Apr  8  2024 lowntfs-3g
-rwxr-xr-x 1 root root     735 Jan  8  2025 lsinitransfs

```

شکل ۱۸: لیست فایل‌ها با fs یا ld

۳ فعالیت‌ها

توضیح دستورات:

- دستور cut برای برش و جداسازی بخشی از متن است و برای جداکردن ستون و کارکترهای خاص هم استفاده می‌شود.
- دستور find برای جستجوی فایل‌ها و دایرکتوری‌ها در یک دایرکتوری به کار می‌رود. همچنین می‌توان با این دستور بر اساس نام، نوع، اندازه و سایر ویژگی‌های فایل جستجو انجام داد.
- دستور head چند خط اول از فایل یا ورودی را خروجی می‌دهد. پیش فرض آن ۱۰ خط اول است.
- دستور tail چند خط آخر از فایل یا ورودی را خروجی می‌دهد. پیش فرض آن ۱۰ خط آخر است.
- دستور touch برای ایجاد فایل خالی جدید است. اما اگر فایل از قبل وجود داشته باشد زمان آخرین تغییرات فایل تغییر می‌کند.
- دستور wc تعداد خطوط، کلمات و کاراکترهای یک فایل یا ورودی را می‌شمارد و نمایش می‌دهد.
- دستور kill برای ارسال سیگنال به یک پردازش استفاده می‌شود. و برای خاتمه دادن به یک پردازش با استفاده از PID آن پردازش نیز از این دستور استفاده می‌شود.

فرمان‌ها:

- `wc -l mybook.txt`
- `find . -type f -name 'a*' | wc -l`
- `ls -lh mybook.txt`

۴ اعمال تغییرات و کامپایل مجدد هسته‌ی سیستم عامل

دریافت هسته و ابزارهای لازم

```
401106255-401170661@ubuntu: ~  
401106255-401170661@ubuntu:~$ uname -r  
6.14.0-24-generic  
401106255-401170661@ubuntu:~$
```

شکل ۱۹: مشاهده نسخه فعلی هسته

```
401106255-401170661@ubuntu: ~  
401106255-401170661@ubuntu:~$ uname -r  
6.14.0-24-generic  
401106255-401170661@ubuntu:~$ sudo apt-cache search linux-source  
[sudo] password for 401106255-401170661:  
linux-source - Linux kernel source with Ubuntu patches  
linux-source-6.8.0 - Linux kernel source for version 6.8.0 with Ubuntu patches  
401106255-401170661@ubuntu:~$ sudo apt install linux-source-6.8.0  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
Suggested packages:  
  kernel-package libqt3-dev  
The following NEW packages will be installed:  
  linux-source-6.8.0  
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.  
Need to get 356 MB of archives.  
After this operation, 359 MB of additional disk space will be used.  
Get:1 http://ir.archive.ubuntu.com/ubuntu noble-updates/main amd64 linux-source-  
6.8.0 all 6.8.0-64.67 [356 MB]  
Fetched 356 MB in 1min 10s (5,082 kB/s)  
Selecting previously unselected package linux-source-6.8.0.  
(Reading database ... 152689 files and directories currently installed.)  
Preparing to unpack .../linux-source-6.8.0_6.8.0-64.67_all.deb ...  
Unpacking linux-source-6.8.0 (6.8.0-64.67) ...
```

شکل ۲۰: دریافت کد منبع هسته

```
401106255-401170661@ubuntu: ~
401106255-401170661@ubuntu: ~ x 401106255-401170661@ubuntu: ~ x
401106255-401170661@ubuntu:~$ sudo apt install build-essential fakeroot
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
build-essential is already the newest version (12.10ubuntu1).
fakeroot is already the newest version (1.33-1).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
401106255-401170661@ubuntu:~$ sudo apt build-dep linux
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  uuid-dev
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 0 B/33.5 kB of archives.
After this operation, 125 kB of additional disk space will be used.
Do you want to continue? [Y/n]
Selecting previously unselected package uuid-dev:amd64.
(Reading database ... 179216 files and directories currently installed.)
Preparing to unpack .../uuid-dev_2.39.3-9ubuntu6.3_amd64.deb ...
Unpacking uuid-dev:amd64 (2.39.3-9ubuntu6.3) ...
Setting up uuid-dev:amd64 (2.39.3-9ubuntu6.3) ...
Processing triggers for man-db (2.12.0-4build2) ...
```

شکل ۲۱: دریافت ابزارهای لازم برای کامپایل و نصب هسته

```
401106255-401170661@ubuntu: ~
401106255-401170661@ubuntu:~$ sudo apt-get source linux
Reading package lists... Done
NOTICE: 'linux' packaging is maintained in the 'Git' version control system at:
git://git.launchpad.net/~ubuntu-kernel/ubuntu/+source/linux/+git/noble
Please use:
git clone git://git.launchpad.net/~ubuntu-kernel/ubuntu/+source/linux/+git/noble
to retrieve the latest (possibly unreleased) updates to the package.
Need to get 236 MB of source archives.
Get:1 http://ir.archive.ubuntu.com/ubuntu noble-updates/main linux 6.8.0-64.67 (
dsc) [9,342 B]
Get:2 http://ir.archive.ubuntu.com/ubuntu noble-updates/main linux 6.8.0-64.67 (
tar) [230 MB]
Get:3 http://ir.archive.ubuntu.com/ubuntu noble-updates/main linux 6.8.0-64.67 (
diff) [5,617 kB]
Fetched 236 MB in 48s (4,904 kB/s)
dpkg-source: info: extracting linux in linux-6.8.0
dpkg-source: info: unpacking linux_6.8.0.orig.tar.gz
dpkg-source: info: applying linux_6.8.0-64.67.diff.gz
dpkg-source: info: upstream files that have been modified:
  linux-6.8.0/.editorconfig
  linux-6.8.0/Documentation/ABI/stable/sysfs-block
  linux-6.8.0/Documentation/ABI/testing/debugfs-driver-qat
  linux-6.8.0/Documentation/ABI/testing/ima_policy
  linux-6.8.0/Documentation/ABI/testing/sysfs-bus-iiio-filter-admv8818
```

شکل ۲۲: بازگشایی کدهای هسته

و نصب دیگر ابزارهای لازم با دستور زیر:

`sudo apt install git fakeroot build-essential ncurses-dev xz-utils libssl-dev bc flex libelf-dev bison`

مراحل کامپایل هسته:

```

401106255-401170661@ubuntu:~$ apt-get source linux
Reading package lists... Done
NOTICE: 'linux' packaging is maintained in the 'Git' version control system at:
git://git.launchpad.net/~ubuntu-kernel/ubuntu/+source/linux/+git/noble
Please use:
git clone git://git.launchpad.net/~ubuntu-kernel/ubuntu/+source/linux/+git/noble
to retrieve the latest (possibly unreleased) updates to the package.
Skipping already downloaded file 'linux_6.8.0-64.67.dsc'
Skipping already downloaded file 'linux_6.8.0.orig.tar.gz'
Skipping already downloaded file 'linux_6.8.0-64.67.diff.gz'
Need to get 0 B of source archives.
Skipping unpack of already unpacked source in linux-6.8.0
401106255-401170661@ubuntu:~$ cd linux-6.8.0/
401106255-401170661@ubuntu:~/linux-6.8.0$ cp /boot/config-$(uname -r) .config
cp: cannot create regular file '.config': Permission denied
401106255-401170661@ubuntu:~/linux-6.8.0$ sudo cp /boot/config-$(uname -r) .conf
ig

```

شکل ۲۳: کپی فایل کانفیگ هسته فعلی

```

401106255-401170661@ubuntu:~/linux-6.8.0$ sudo make olddefconfig
HOSTCC scripts/basic/fixdep
HOSTCC scripts/kconfig/conf.o
HOSTCC scripts/kconfig/confdata.o
HOSTCC scripts/kconfig/expr.o
LEX scripts/kconfig/lexer.lex.c
YACC scripts/kconfig/parser.tab.[ch]
HOSTCC scripts/kconfig/lexer.lex.o
HOSTCC scripts/kconfig/menu.o
HOSTCC scripts/kconfig/parser.tab.o
HOSTCC scripts/kconfig/preprocess.o
HOSTCC scripts/kconfig/symbol.o
HOSTCC scripts/kconfig/util.o
HOSTLD scripts/kconfig/conf
.config:283:warning: symbol value 'n' invalid for BASE_SMALL
.config:803:warning: symbol value 'm' invalid for HAVE_KVM_IRQ_BYPASS
.config:4823:warning: symbol value 'm' invalid for SERIAL_SC16IS7XX_I2C
.config:4824:warning: symbol value 'm' invalid for SERIAL_SC16IS7XX_SPI
#
# configuration written to .config
#
401106255-401170661@ubuntu:~/linux-6.8.0$

```

شکل ۲۴: کامپایل فایل کانفیگ هسته


```

401106255-401170661@ubuntu: ~/linux-6.8.0
401106255-401170661@ubuntu:~/linux-6.8.0$ sudo make -j6
WRAP      arch/x86/include/generated/uapi/asm/bpf_perf_event.h
WRAP      arch/x86/include/generated/uapi/asm/errno.h
WRAP      arch/x86/include/generated/uapi/asm/fcntl.h
WRAP      arch/x86/include/generated/uapi/asm/ioctl.h
WRAP      arch/x86/include/generated/uapi/asm/ioctls.h
UPD      include/generated/uapi/linux/version.h
WRAP      arch/x86/include/generated/uapi/asm/ipcbuf.h
WRAP      arch/x86/include/generated/uapi/asm/param.h
UPD      include/config/kernel.release
WRAP      arch/x86/include/generated/uapi/asm/poll.h
WRAP      arch/x86/include/generated/uapi/asm/resource.h
WRAP      arch/x86/include/generated/uapi/asm/socket.h
WRAP      arch/x86/include/generated/uapi/asm/sockios.h
WRAP      arch/x86/include/generated/uapi/asm/termbits.h
SYSHDR    arch/x86/include/generated/uapi/asm/unistd_32.h
WRAP      arch/x86/include/generated/uapi/asm/termios.h
WRAP      arch/x86/include/generated/uapi/asm/types.h
UPD      include/generated/compile.h
HOSTCC    arch/x86/tools/relocs_32.o
UPD      include/generated/utsrelease.h
SYSHDR    arch/x86/include/generated/uapi/asm/unistd_64.h
mkdir -p /home/401106255-401170661/linux-6.8.0/tools/objtool && make O=/home/401
106255-401170661/linux-6.8.0 subdir=tools/objtool --no-print-directory -C objtoo

```

شکل ۲۵: کامپایل هسته

```

401106255-401170661@ubuntu:~/linux-6.8.0$ sudo make modules_install
[sudo] password for 401106255-401170661:
SYMLINK /lib/modules/6.8.12/build
INSTALL /lib/modules/6.8.12/modules.order
INSTALL /lib/modules/6.8.12/modules.builtin
INSTALL /lib/modules/6.8.12/modules.builtin.modinfo
INSTALL /lib/modules/6.8.12/kernel/arch/x86/events/amd/amd-uncore.ko

```

شکل ۲۶: نصب ماژول‌ها

```

401106255-401170661@ubuntu:~/linux-6.8.0$ sudo make install
INSTALL /boot
run-parts: executing /etc/kernel/postinst.d/dkms 6.8.12 /boot/vmlinuz-6.8.12
* dkms: running auto installation service for kernel 6.8.12
* dkms: autoinstall for kernel 6.8.12 [ OK ]
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 6.8.12 /boot/vmlinuz
-6.8.12
update-initramfs: Generating /boot/initrd.img-6.8.12

```

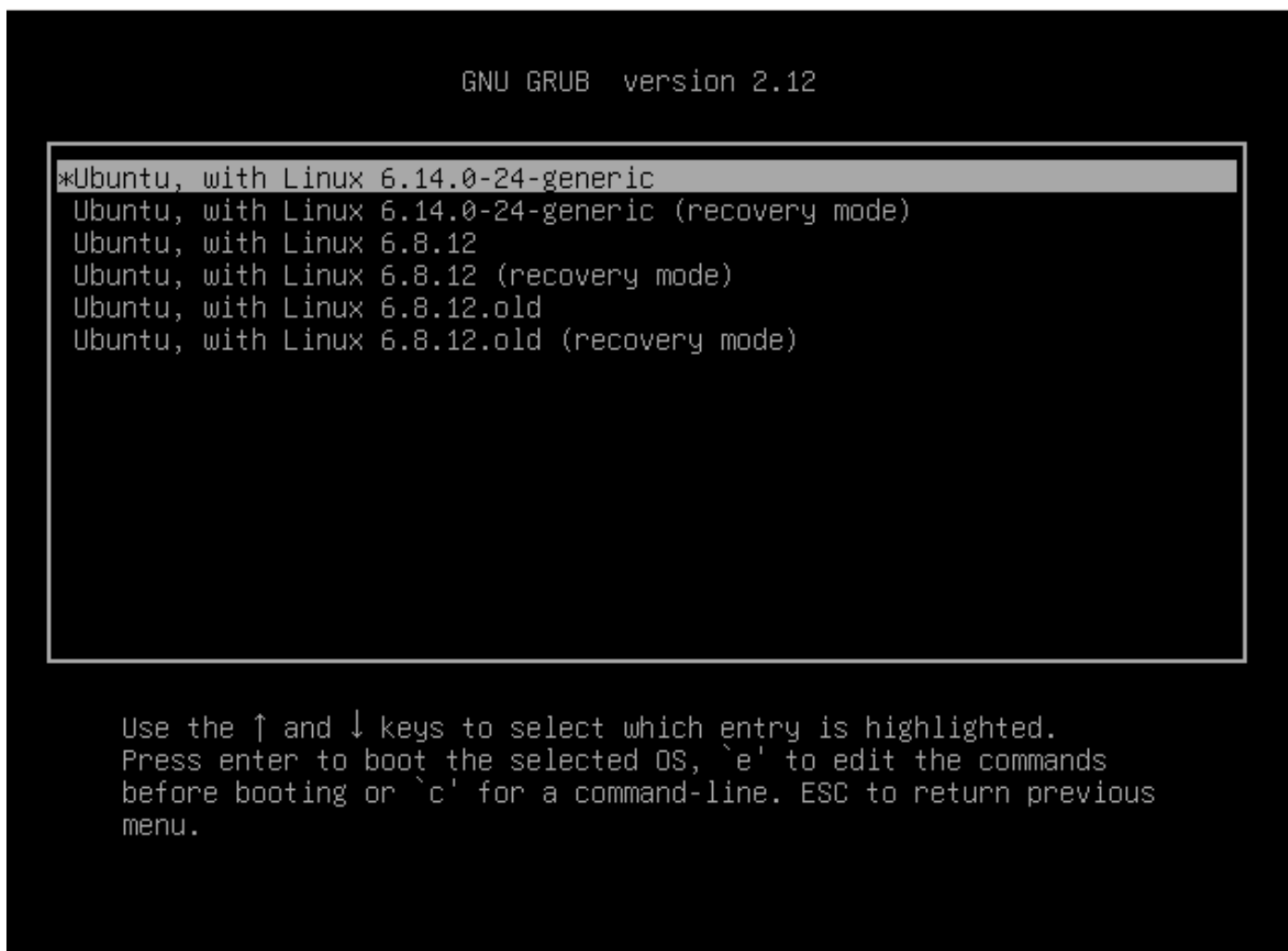
شکل ۲۷: نصب هسته


```

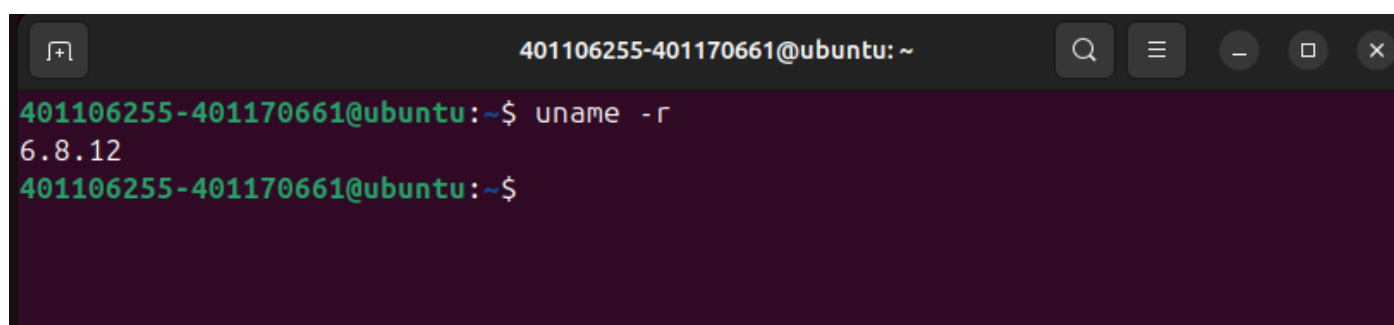
401106255-401170661@ubuntu:~/kernel-dev/linux-6.8.0$ sudo update-grub
Sourcing file `/etc/default/grub'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-6.14.0-24-generic
Found initrd image: /boot/initrd.img-6.14.0-24-generic
Found linux image: /boot/vmlinuz-6.8.12
Found initrd image: /boot/initrd.img-6.8.12
Found linux image: /boot/vmlinuz-6.8.12.old
Found initrd image: /boot/initrd.img-6.8.12
Found memtest86+x64 image: /boot/memtest86+x64.bin
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
401106255-401170661@ubuntu:~/kernel-dev/linux-6.8.0$

```

شکل ۲۸: به‌روزرسانی grub برای مشاهده نسخه‌ی جدید هسته



شکل ۲۹: انتخاب نسخه نصب شده از grub (۱۲.۸.۶)

A terminal window with a dark background. The title bar at the top shows the user and host information: '401106255-401170661@ubuntu: ~'. On the right side of the title bar are standard window control buttons: a magnifying glass for search, a hamburger menu for settings, and minus, maximize, and close buttons. The terminal content shows a green prompt '401106255-401170661@ubuntu:~\$' followed by the command 'uname -r'. The output '6.8.12' is displayed on the next line. A second green prompt '401106255-401170661@ubuntu:~\$' is visible on the line below.

```
401106255-401170661@ubuntu:~$ uname -r
6.8.12
401106255-401170661@ubuntu:~$
```

شکل ۳۰: مشاهده نسخه‌ی هسته