

M3 Lab: Command Line Interface

CITA 171: OPERATING SYSTEM USE & ADMIN

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2 LOGGING IN AND STARTING A TERMINAL PROGRAM

Start CITA 171 VM and log in. Press the **App Button** and type *terminal*. See Figure 1. Click the **Terminal** icon. See Figure 2.

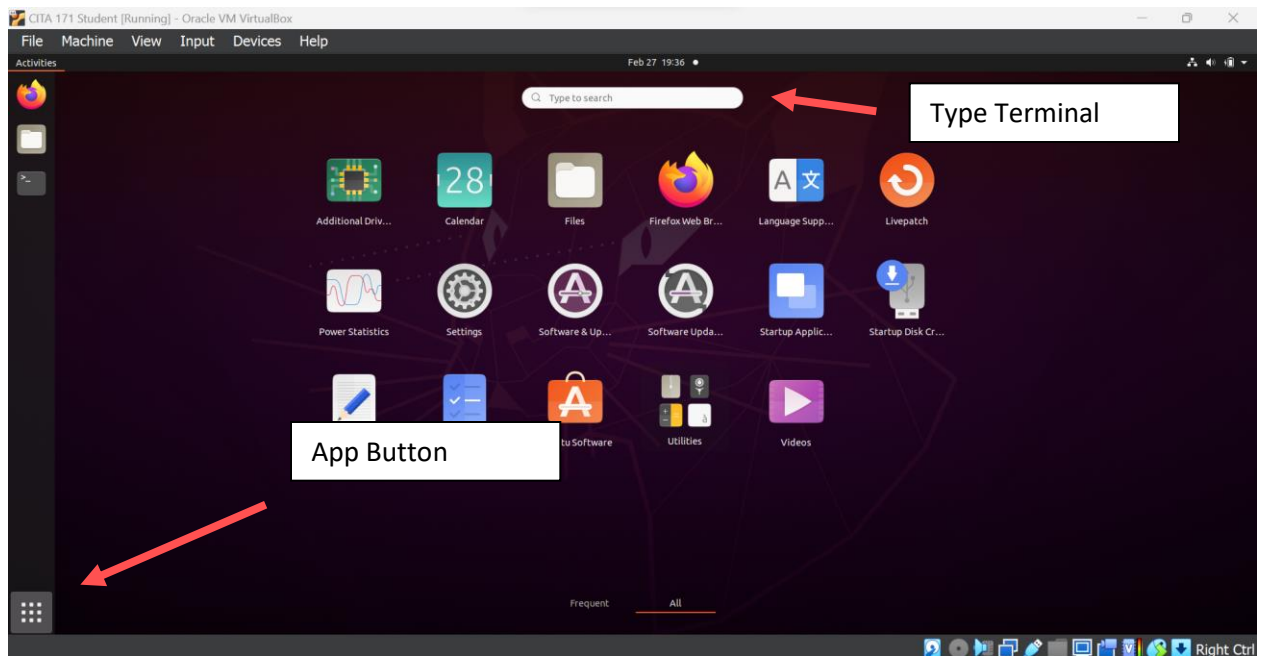


Figure 1 Searching for the Terminal Program

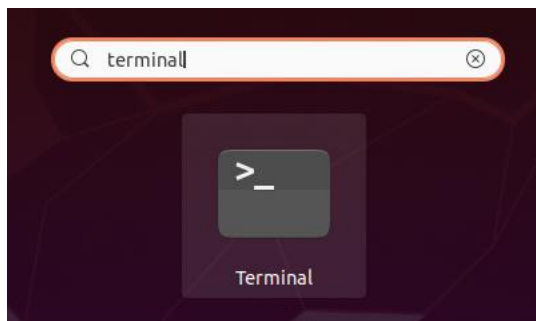


Figure 2 Starting the Terminal Program

3 IDENTIFYING THE COMMAND PROMPT

The command prompt's primary purpose is to indicate to the user that the system is ready to accept the next command. See Figure 3.

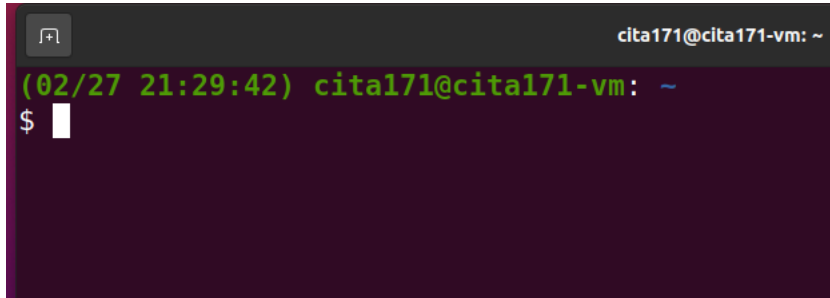


Figure 3 Command Prompt

4 IDENTIFYING THE COMMAND, COMMAND INPUT, COMMAND ARGUMENTS, AND COMMAND OUTPUT

The user types the **command** immediately after the command prompt. All the texts that follow the command are **command arguments**. The command and the command arguments are called the **command input**. When the user presses the Enter key, the system processes the command input and returns the result called the **command output**. The **four primary computer operations** are

1. Input
2. Processing
3. Output
4. Storage (optional)

See Figure 4.

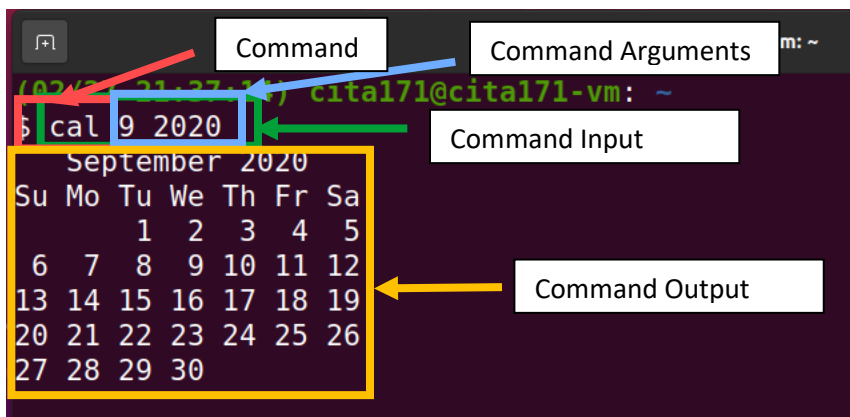
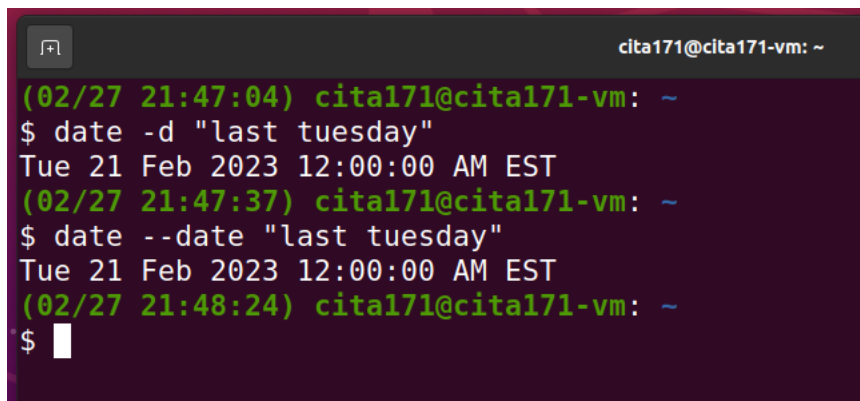


Figure 4 Command, Command Arguments, Command Input, and Command Output

5 IDENTIFYING COMMAND OPTIONS

Command options are special command arguments that change the default behavior of the command. One or two minus signs precede command options. A command option preceded by one minus sign

called a **short option**. One preceded by two minus signs is called a **long option**. There are no functional differences between short and long options. See Figure 5.

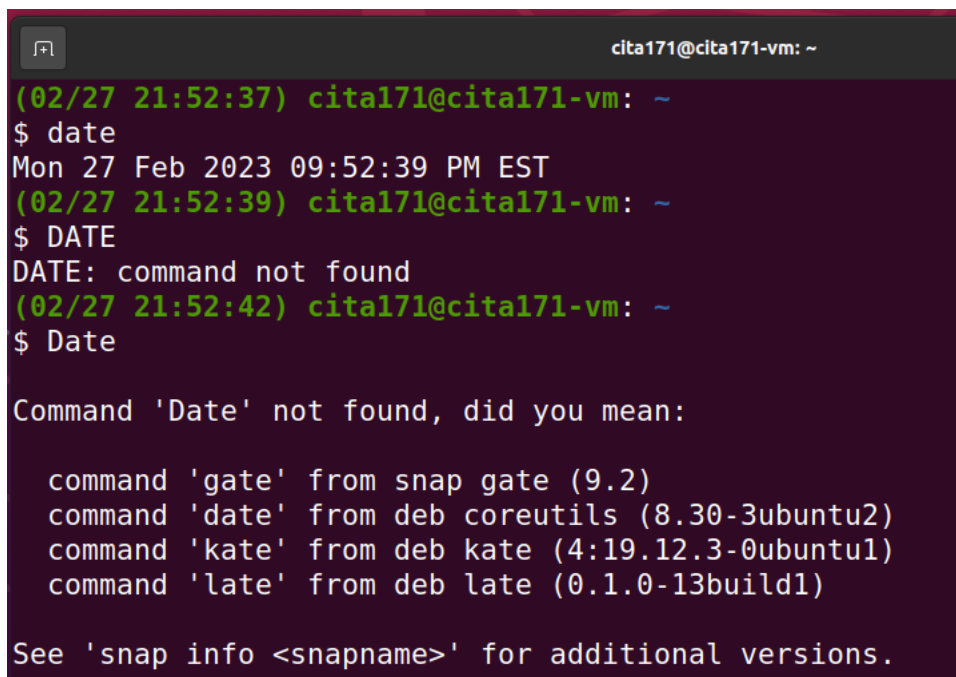


```
(02/27 21:47:04) cita171@cita171-vm: ~
$ date -d "last tuesday"
Tue 21 Feb 2023 12:00:00 AM EST
(02/27 21:47:37) cita171@cita171-vm: ~
$ date --date "last tuesday"
Tue 21 Feb 2023 12:00:00 AM EST
(02/27 21:48:24) cita171@cita171-vm: ~
$
```

Figure 5 Short and Long Command Options

6 NOTING COMMAND CASE SENSITIVITY

All Linux/Unix commands are case-sensitive. Upper cases and lower cases do matter. See Figure 6.



```
(02/27 21:52:37) cita171@cita171-vm: ~
$ date
Mon 27 Feb 2023 09:52:39 PM EST
(02/27 21:52:39) cita171@cita171-vm: ~
$ DATE
DATE: command not found
(02/27 21:52:42) cita171@cita171-vm: ~
$ Date

Command 'Date' not found, did you mean:

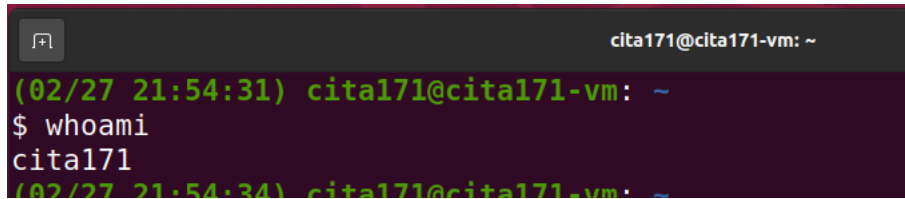
  command 'gate' from snap gate (9.2)
  command 'date' from deb coreutils (8.30-3ubuntu2)
  command 'kate' from deb kate (4:19.12.3-0ubuntu1)
  command 'late' from deb late (0.1.0-13build1)

See 'snap info <snapname>' for additional versions.
```

Figure 6 Command Case-Sensitivity

7 IDENTIFYING THE USERNAME

The **whoami** command returns the name of the user. See Figure 7.

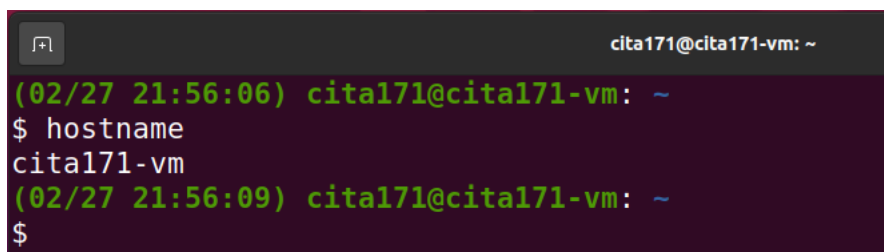
A terminal window with a dark background. The title bar shows a window icon and the text 'cita171@cita171-vm: ~'. The terminal content shows a timestamp '(02/27 21:54:31)' followed by the prompt 'cita171@cita171-vm: ~'. The user enters '\$ whoami' and the output is 'cita171'. A second timestamp '(02/27 21:54:34)' and prompt are visible at the bottom.

```
(02/27 21:54:31) cita171@cita171-vm: ~  
$ whoami  
cita171  
(02/27 21:54:34) cita171@cita171-vm: ~
```

Figure 7 The *whoami* Command

8 IDENTIFYING THE HOSTNAME

The **hostname** command returns the name of the currently logged-in computer. See Figure 8.

A terminal window with a dark background. The title bar shows a window icon and the text 'cita171@cita171-vm: ~'. The terminal content shows a timestamp '(02/27 21:56:06)' followed by the prompt 'cita171@cita171-vm: ~'. The user enters '\$ hostname' and the output is 'cita171-vm'. A second timestamp '(02/27 21:56:09)' and prompt are visible at the bottom.

```
(02/27 21:56:06) cita171@cita171-vm: ~  
$ hostname  
cita171-vm  
(02/27 21:56:09) cita171@cita171-vm: ~  
$
```

Figure 8 The *hostname* Command

9 IDENTIFYING THE OPERATING SYSTEM INFORMATION

The **uname** command is used to identify the operating system information. This command is typically used with the **-a (--all)** option. The output includes the kernel name, the hostname, the kernel release number, the distribution information, the computer architecture information, etc. See Figure 9.

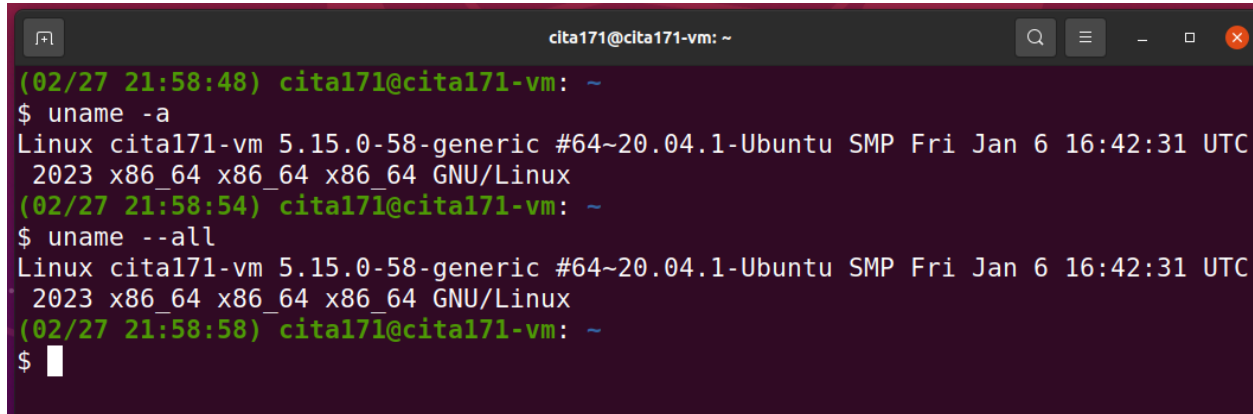
A terminal window titled 'cita171@cita171-vm: ~' showing the execution of the 'uname' command. The prompt is '(02/27 21:58:48) cita171@cita171-vm: ~'. The user enters '\$ uname -a'. The output is 'Linux cita171-vm 5.15.0-58-generic #64~20.04.1-Ubuntu SMP Fri Jan 6 16:42:31 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux'. The user then enters '\$ uname --all'. The output is 'Linux cita171-vm 5.15.0-58-generic #64~20.04.1-Ubuntu SMP Fri Jan 6 16:42:31 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux'. The user then enters '\$' and the prompt is '(02/27 21:58:58) cita171@cita171-vm: ~'.

Figure 9 The uname Command

10 IDENTIFYING THE CPU INFORMATION

The **lscpu** command is used to identify the CPU information. The output includes the CPU architecture, the number of CPUs, sockets, cores, CPU speeds, etc. See Figure 10.

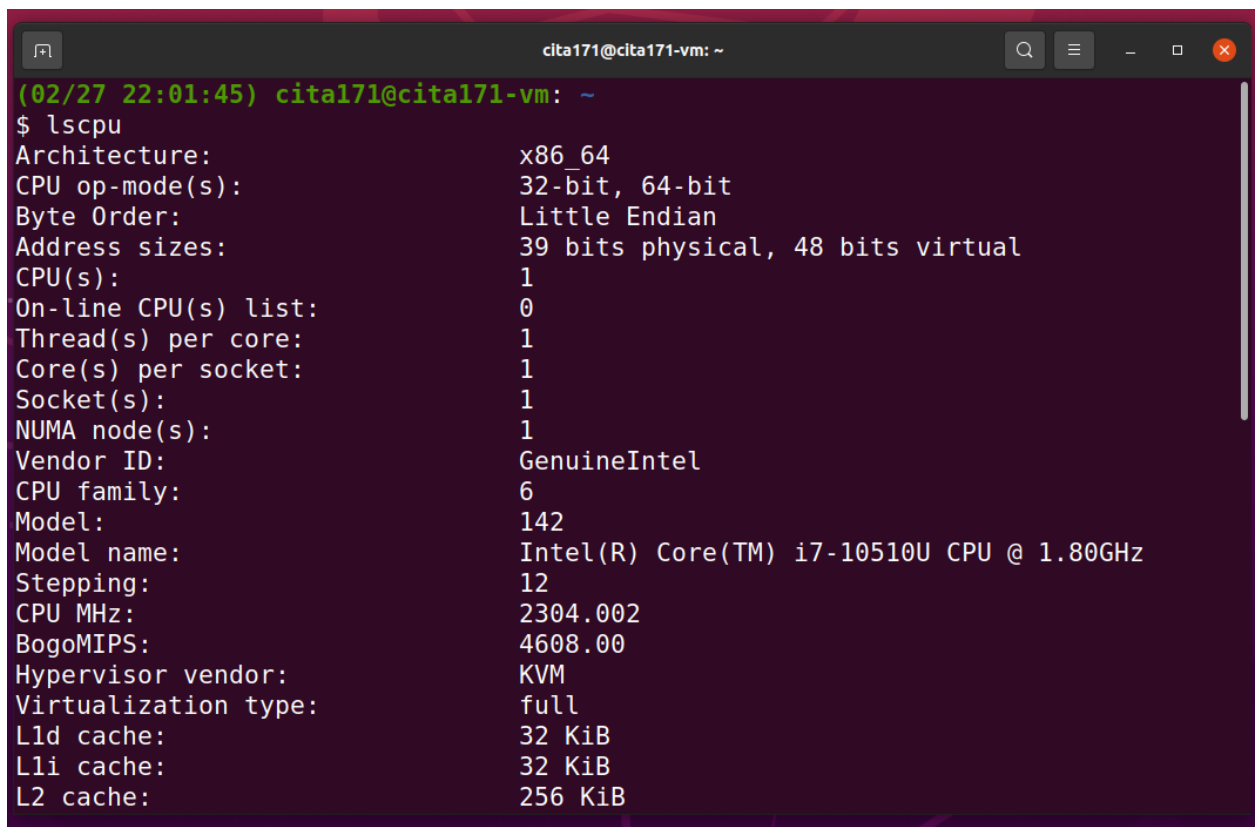
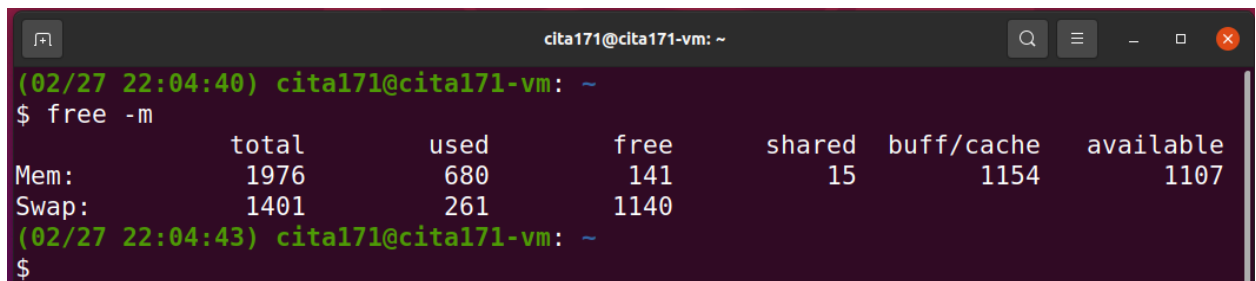
A terminal window titled 'cita171@cita171-vm: ~' showing the execution of the 'lscpu' command. The prompt is '(02/27 22:01:45) cita171@cita171-vm: ~'. The user enters '\$ lscpu'. The output is:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 39 bits physical, 48 bits virtual
CPU(s): 1
On-line CPU(s) list: 0
Thread(s) per core: 1
Core(s) per socket: 1
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 142
Model name: Intel(R) Core(TM) i7-10510U CPU @ 1.80GHz
Stepping: 12
CPU MHz: 2304.002
BogoMIPS: 4608.00
Hypervisor vendor: KVM
Virtualization type: full
L1d cache: 32 KiB
L1i cache: 32 KiB
L2 cache: 256 KiB

Figure 10 The lscpu Command

11 IDENTIFYING THE RAM INFORMATION

The **free** command is used to identify the RAM information. This command is typically used with the **-m** option to display the information in megabytes rather than in kilobytes. See Figure 11.

A terminal window titled 'cita171@cita171-vm: ~' with search, menu, and window control icons in the title bar. The terminal shows a timestamp '(02/27 22:04:40)' followed by the prompt 'cita171@cita171-vm: ~'. The user enters '\$ free -m'. The output is a table with 7 columns: 'total', 'used', 'free', 'shared', 'buff/cache', and 'available'. The rows are 'Mem:' and 'Swap:'.

	total	used	free	shared	buff/cache	available
Mem:	1976	680	141	15	1154	1107
Swap:	1401	261	1140			

Below the table, the terminal shows another timestamp '(02/27 22:04:43)' followed by the prompt 'cita171@cita171-vm: ~' and a new prompt '\$'.

Figure 11 The free Command

12 IDENTIFYING THE ATTACHED STORAGE DEVICES

The **lsblk** command is used to identify the storage devices that are attached to the system. See Figure 12.


```

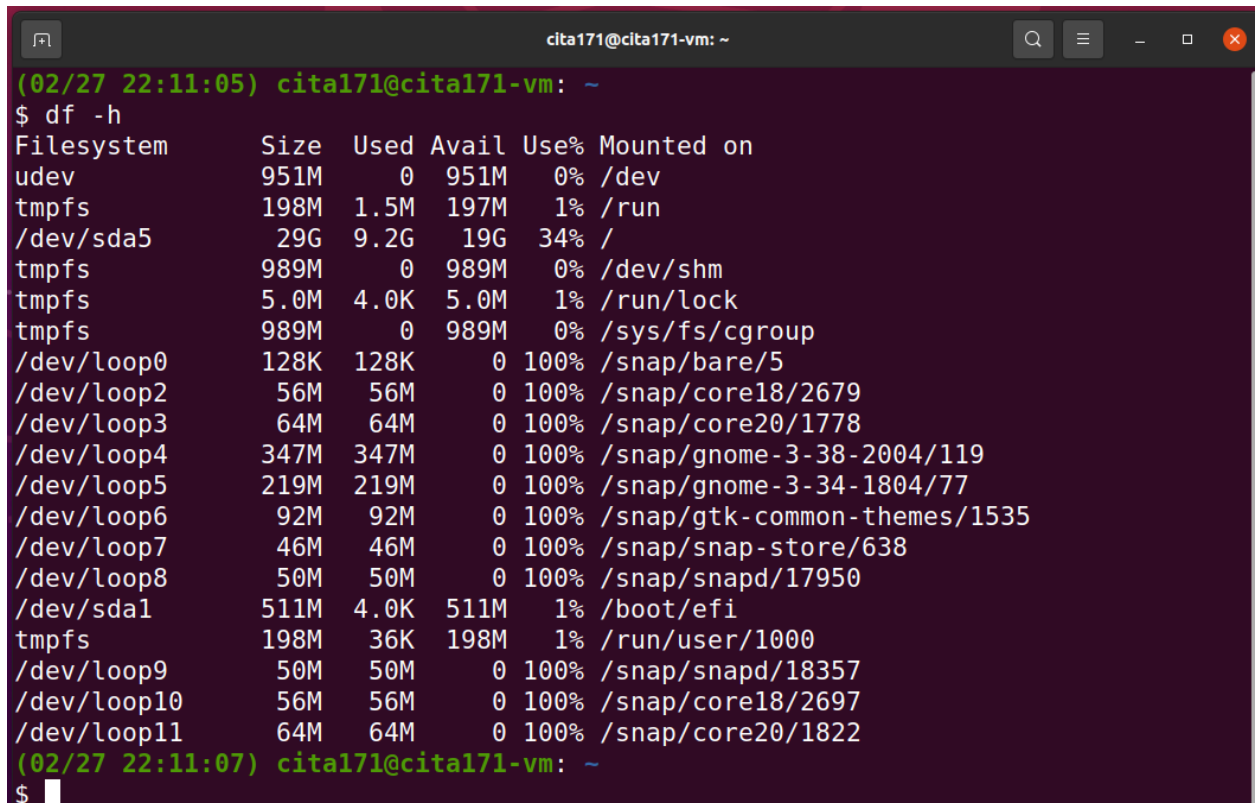
cita171@cita171-vm: ~
(02/27 22:07:45) cita171@cita171-vm: ~
$ lsblk
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
loop0        7:0      0    4K  1 loop /snap/bare/5
loop2        7:2      0  55.6M  1 loop /snap/core18/2679
loop3        7:3      0  63.3M  1 loop /snap/core20/1778
loop4        7:4      0 346.3M  1 loop /snap/gnome-3-38-2004/119
loop5        7:5      0   219M  1 loop /snap/gnome-3-34-1804/77
loop6        7:6      0   91.7M  1 loop /snap/gtk-common-themes/1535
loop7        7:7      0    46M  1 loop /snap/snap-store/638
loop8        7:8      0   49.8M  1 loop /snap/snapd/17950
loop9        7:9      0   49.9M  1 loop /snap/snapd/18357
loop10       7:10     0  55.6M  1 loop /snap/core18/2697
loop11       7:11     0  63.3M  1 loop /snap/core20/1822
sda          8:0      0   30G   0 disk
├─sda1       8:1      0   512M   0 part /boot/efi
├─sda2       8:2      0     1K   0 part
└─sda5       8:5      0  29.5G   0 part /
sr0         11:0     1 1024M   0 rom
(02/27 22:07:48) cita171@cita171-vm: ~
$

```

Figure 12 The lsblk Command

13 IDENTIFYING FREE STORAGE SPACES

The **df** command is used to identify free storage information. This command is typically used with the **-h** (**--human-readable**) option to display the information in different units that are easier for the user instead of the default kilobytes. See Figure 13.

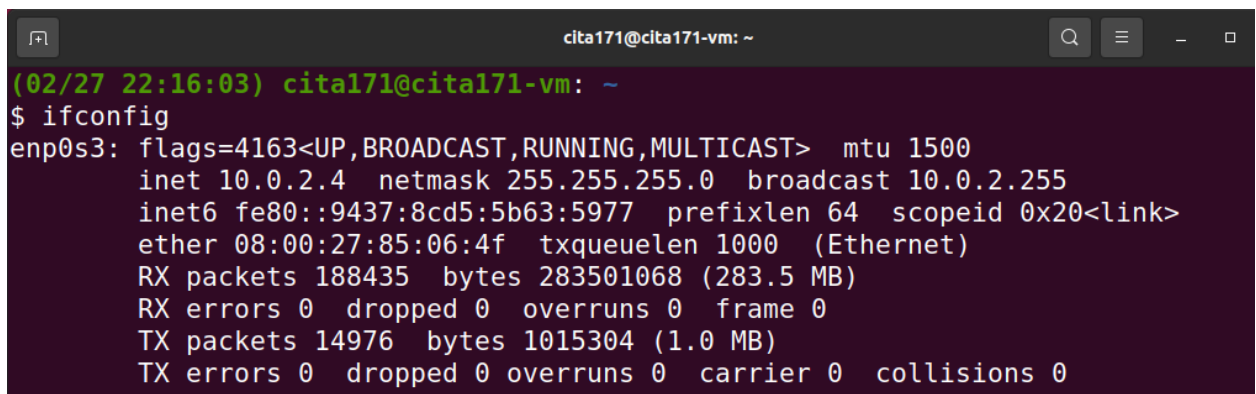


```
(02/27 22:11:05) cita171@cita171-vm: ~
$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            951M   0    951M   0% /dev
tmpfs           198M  1.5M   197M   1% /run
/dev/sda5       29G   9.2G   19G   34% /
tmpfs           989M   0    989M   0% /dev/shm
tmpfs           5.0M  4.0K   5.0M   1% /run/lock
tmpfs           989M   0    989M   0% /sys/fs/cgroup
/dev/loop0      128K  128K     0 100% /snap/bare/5
/dev/loop2       56M   56M     0 100% /snap/core18/2679
/dev/loop3       64M   64M     0 100% /snap/core20/1778
/dev/loop4      347M  347M     0 100% /snap/gnome-3-38-2004/119
/dev/loop5      219M  219M     0 100% /snap/gnome-3-34-1804/77
/dev/loop6       92M   92M     0 100% /snap/gtk-common-themes/1535
/dev/loop7       46M   46M     0 100% /snap/snap-store/638
/dev/loop8       50M   50M     0 100% /snap/snapd/17950
/dev/sda1       511M  4.0K   511M   1% /boot/efi
tmpfs           198M  36K   198M   1% /run/user/1000
/dev/loop9       50M   50M     0 100% /snap/snapd/18357
/dev/loop10      56M   56M     0 100% /snap/core18/2697
/dev/loop11      64M   64M     0 100% /snap/core20/1822
(02/27 22:11:07) cita171@cita171-vm: ~
$
```

Figure 13 The df Command

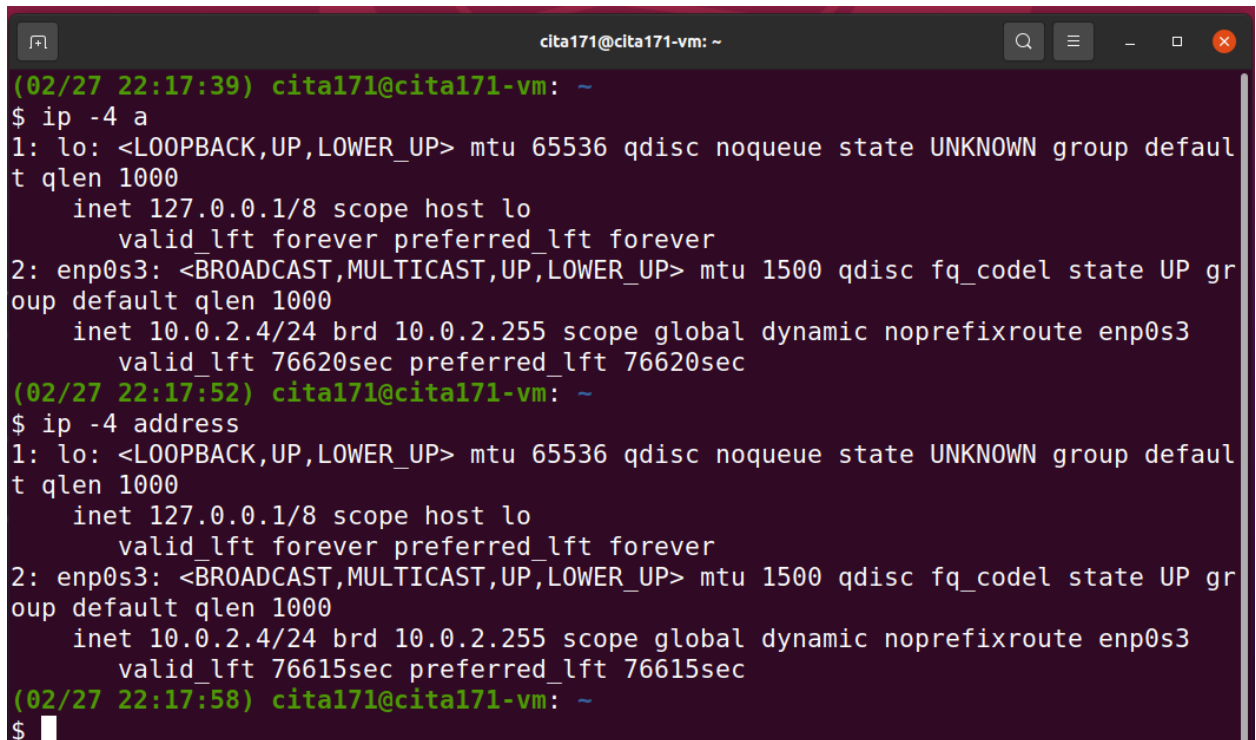
14 IDENTIFYING THE NETWORK SETTINGS

The **ifconfig** and **ip** commands are used to identify the system's network settings. The **ifconfig** command is the older command, and more systems encourage users to use the **ip** command. The **ip** command is typically used with the **-4 a (-4 address)** command arguments. See Figure 14 and Figure 15.



```
(02/27 22:16:03) cita171@cita171-vm: ~
$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.4 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::9437:8cd5:5b63:5977 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:85:06:4f txqueuelen 1000 (Ethernet)
    RX packets 188435 bytes 283501068 (283.5 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 14976 bytes 1015304 (1.0 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Figure 14 The ifconfig Command

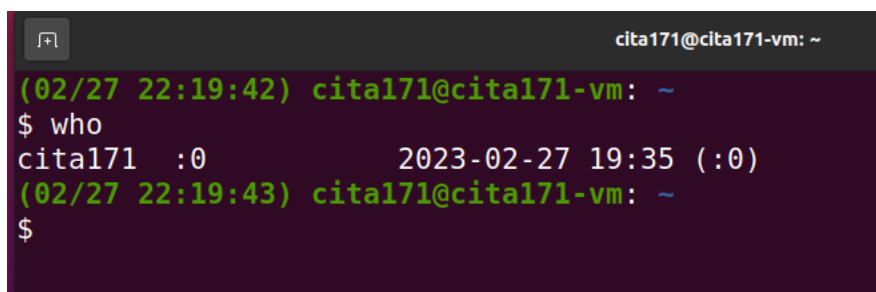


```
(02/27 22:17:39) cita171@cita171-vm: ~  
$ ip -4 a  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000  
    inet 10.0.2.4/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3  
        valid_lft 76620sec preferred_lft 76620sec  
(02/27 22:17:52) cita171@cita171-vm: ~  
$ ip -4 address  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000  
    inet 10.0.2.4/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3  
        valid_lft 76615sec preferred_lft 76615sec  
(02/27 22:17:58) cita171@cita171-vm: ~  
$
```

Figure 15 The ip Command

15 IDENTIFYING OTHER LOGGED-IN USERS

The **who** command is used to identify other users who are currently logged into the system. See Figure 16.



```
(02/27 22:19:42) cita171@cita171-vm: ~  
$ who  
cita171  :0          2023-02-27 19:35 (:0)  
(02/27 22:19:43) cita171@cita171-vm: ~  
$
```

Figure 16 The who Command