

# Assignment 13

## Device Query

- ❖ Try the below mentioned commands, explain their task in one line and paste the output for each of them.

### ➤ **lshw (List Hardware)**

```
kavan@Kavan:~$ lshw
```

WARNING: you should run this program as super-user.

```
kavan
```

```
description: Computer
```

```
width: 64 bits
```

```
capabilities: smp vsyscall32
```

```
*-core
```

```
description: Motherboard
```

```
physical id: 0
```

```
*-memory
```

```
description: System memory
```

```
physical id: 0
```

```
size: 8064MiB
```

```
*-cpu
```

```
product: 13th Gen Intel(R) Core(TM) i7-13620H
```

```
vendor: Intel Corp.
```

```
physical id: 1
```

```
bus info: cpu@0
```

```
version: 6.186.2
```

```
width: 64 bits
```

capabilities: fpu fpu\_exception wp vme de pse tsc msr pae mce cx8 apic sep mtrr  
pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ss ht syscall nx pdpe1gb rdtscp x86-  
64 constant\_tsc rep\_good nopl xtopology tsc\_reliable nonstop\_tsc cpuid pni pclmulqdq  
vmx ssse3 fma cx16 sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes xsave  
avx f16c rdrand hypervisor lahf\_lm abm 3dnowprefetch ssbd ibrs ibpb stibp  
ibrs\_enhanced tpr\_shadow vnmi ept vpid ept\_ad fsgsbase tsc\_adjust bmi1 avx2 smep  
bmi2 erms invpcid rdseed adx smap clflushopt clwb sha\_ni xsaveopt xsavec xgetbv1  
xsaves avx\_vnni umip waitpkg gfni vaes vpclmulqdq rdpid movdiri movdir64b fsrm  
serialize flush\_l1d arch\_capabilities

configuration: microcode=4294967295

\*-generic

description: System peripheral

product: Virtio file system

vendor: Red Hat, Inc.

physical id: 2

bus info: pci@4257:00:00.0

version: 01

width: 64 bits

clock: 33MHz

capabilities: bus\_master cap\_list

configuration: driver=virtio-pci latency=64

resources: iomemory:e0-df iomemory:e0-df iomemory:c0-bf irq:0

memory:e00000000-e00000fff memory:e00001000-e00001fff memory:c00000000-  
dfffffff

\*-virtio1 UNCLAIMED

description: Virtual I/O device

physical id: 0

bus info: virtio@1

configuration: driver=virtiofs

\*-display:0

description: 3D controller

product: Microsoft Corporation

vendor: Microsoft Corporation

physical id: 3  
bus info: pci@8383:00:00.0  
version: 00  
width: 32 bits  
clock: 33MHz  
capabilities: bus\_master cap\_list  
configuration: driver=dxgkrnl latency=0  
resources: irq:0

\*-scsi

description: SCSI storage controller  
product: Virtio console  
vendor: Red Hat, Inc.  
physical id: 4  
bus info: pci@8f33:00:00.0  
version: 01  
width: 64 bits  
clock: 33MHz  
capabilities: scsi bus\_master cap\_list  
configuration: driver=virtio-pci latency=64  
resources: iomemory:90-8f iomemory:90-8f iomemory:90-8f irq:0  
memory:9ffe00000-9ffe00fff memory:9ffe01000-9ffe01fff memory:9ffe02000-9ffe02fff

\*-virtio0 UNCLAIMED

description: Virtual I/O device  
physical id: 0  
bus info: virtio@0  
configuration: driver=virtio\_console

\*-display:1

description: 3D controller  
product: Microsoft Corporation  
vendor: Microsoft Corporation

physical id: 5  
bus info: pci@abca:00:00.0  
version: 00  
width: 32 bits  
clock: 33MHz  
capabilities: bus\_master cap\_list  
configuration: driver=dxgkrnl latency=0  
resources: irq:0

\*-pnp00:00

product: PnP device PNP0b00  
physical id: 6  
capabilities: pnp  
configuration: driver=rtc\_cmos

\*-network

description: Ethernet interface  
physical id: 1  
logical name: eth0  
serial: 00:15:5d:ba:ac:bb  
size: 10Gbit/s  
capabilities: ethernet physical  
configuration: autonegotiation=off broadcast=yes driver=hv\_netvsc  
driverversion=5.15.146.1-microsoft-standard-W duplex=full firmware=N/A  
ip=172.19.231.200 link=yes multicast=yes speed=10Gbit/s

WARNING: output may be incomplete or inaccurate, you should run this program as super-user.

### ➤ **lsusb (List USB Devices)**

kavan@Kavan:~\$ lsusb

Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub

Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

➤ **lspci (List PCI Devices)**

```
kavan@Kavan:~$ lspci
```

```
4257:00:00.0 System peripheral: Red Hat, Inc. Virtio file system (rev 01)
```

```
8383:00:00.0 3D controller: Microsoft Corporation Device 008e
```

```
8f33:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio console (rev 01)
```

```
abca:00:00.0 3D controller: Microsoft Corporation Device 008e
```

➤ **lsblk (List Block Devices)**

```
kavan@Kavan:~$ lsblk
```

```
NAME MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
```

```
sda  8:0  0 388.5M 1 disk
```

```
sdb  8:16 0   2G  0 disk [SWAP]
```

```
sdc  8:32 0   1T  0 disk /snap
```

```
      /mnt/wslg/distro
```

```
      /
```

➤ **lscpu (List CPU)**

```
kavan@Kavan:~$ lscpu
```

```
Architecture:      x86_64
```

```
CPU op-mode(s):    32-bit, 64-bit
```

```
Address sizes:      39 bits physical, 48 bits virtual
```

```
Byte Order:         Little Endian
```

```
CPU(s):             16
```

```
On-line CPU(s) list: 0-15
```

Vendor ID: GenuineIntel

Model name: 13th Gen Intel(R) Core(TM) i7-13620H

CPU family: 6

Model: 186

Thread(s) per core: 2

Core(s) per socket: 8

Socket(s): 1

Stepping: 2

BogoMIPS: 5836.79

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat  
pse36 clflush mmx fxsr sse sse2 ss ht syscall nx pdpe1gb rdtscp lm constant\_tsc  
rep\_good

      nopl xtopology tsc\_reliable nonstop\_tsc cpuid pni pclmulqdq vmx ssse3  
fma cx16 sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes xsave avx f16c rd

      rand hypervisor lahf\_lm abm 3dnowprefetch ssbd ibrs ibpb stibp  
ibrs\_enhanced tpr\_shadow vnmi ept vpid ept\_ad fsgsbase tsc\_adjust bmi1 avx2 smep  
bmi2 erms

      invpcid rdseed adx smap clflushopt clwb sha\_ni xsaveopt xsavec xgetbv1  
xsaves avx\_vnni umip waitpkg gfni vaes vpclmulqdq rdpid movdiri movdir64b fsrm seri

      alizer flush\_l1d arch\_capabilities

Virtualization features:

Virtualization: VT-x

Hypervisor vendor: Microsoft

Virtualization type: full

Caches (sum of all):

L1d: 384 KiB (8 instances)

L1i: 256 KiB (8 instances)

L2: 10 MiB (8 instances)

L3: 24 MiB (1 instance)

Vulnerabilities:

Gather data sampling: Not affected

Itlb multihit: Not affected

L1tf: Not affected

Mds: Not affected

Meltdown: Not affected

Mmio stale data: Not affected

Retbleed: Mitigation; Enhanced IBRS

Spec rstack overflow: Not affected

Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp

Spectre v1: Mitigation; usercopy/swaps barriers and \_\_user pointer sanitization

Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSE-eIBRS SW sequence

Srbds: Not affected

Tsx async abort: Not affected

## ➤ df (Disk Free)

kavan@Kavan:~\$ df

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
none	3997904	4	3997900	1%	/mnt/wsl
none	395990012	136101968	259888044	35%	/usr/lib/wsl/drivers
none	3997904	0	3997904	0%	/usr/lib/modules
none	3997904	0	3997904	0%	/usr/lib/modules/5.15.146.1-microsoft-standard-WSL2
/dev/sdc	1055762868	1902524	1000156872	1%	/
none	3997904	84	3997820	1%	/mnt/wslg
none	3997904	0	3997904	0%	/usr/lib/wsl/lib
rootfs	3994648	1884	3992764	1%	/init
none	3997904	808	3997096	1%	/run
none	3997904	0	3997904	0%	/run/lock

```

none      3997904    0 3997904 0% /run/shm
tmpfs     4096      0 4096 0% /sys/fs/cgroup
none      3997904    76 3997828 1% /mnt/wslg/versions.txt
none      3997904    76 3997828 1% /mnt/wslg/doc
C:\       395990012 136101968 259888044 35% /mnt/c
D:\       601881596 406166716 195714880 68% /mnt/d
G:\       15728640 12185968 3542672 78% /mnt/g
H:\       15728640 458840 15269800 3% /mnt/h
I:\       15728640 786924 14941716 6% /mnt/i
J:\       395990012 149096372 246893640 38% /mnt/j
snapfuse   128    128    0 100% /snap/bare/5
snapfuse   75776  75776    0 100% /snap/core22/864
snapfuse   93952  93952    0 100% /snap/gtk-common-themes/1535
snapfuse   41856  41856    0 100% /snap/snapd/20290
snapfuse   134272 134272    0 100% /snap/ubuntu-desktop-installer/1276
snapfuse   134912 134912    0 100% /snap/ubuntu-desktop-installer/1286

```

### ➤ **dmidecode (DMI Table Decode)**

```

kavan@Kavan:~$ dmidecode
# dmidecode 3.3
Scanning /dev/mem for entry point.
/dev/mem: Permission denied

```

### ➤ **ip a (IP Address)**

```

kavan@Kavan:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group
default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00

```



```
inet 127.0.0.1/8 scope host lo
    valid_lft forever preferred_lft forever

inet6 ::1/128 scope host
    valid_lft forever preferred_lft forever
```

```
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group
default qlen 1000
```

```
link/ether 00:15:5d:ba:ac:bb brd ff:ff:ff:ff:ff:ff

inet 172.19.231.200/20 brd 172.19.239.255 scope global eth0
    valid_lft forever preferred_lft forever

inet6 fe80::215:5dff:feba:acbb/64 scope link
    valid_lft forever preferred_lft forever
```

## ➤ top

```
kavan@Kavan:~$ top

top - 09:35:13 up 16 min, 1 user, load average: 0.09, 0.05, 0.01
Tasks: 32 total, 1 running, 31 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.2 us, 0.1 sy, 0.0 ni, 99.7 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 7808.4 total, 6572.0 free, 515.5 used, 721.0 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 7059.4 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1	root	20	0	167016	12612	8364	S	1.0	0.2	0:06.23	systemd
761	root	20	0	44224	37592	10140	S	0.7	0.5	0:03.71	python3
757	root	20	0	836632	79804	23512	S	0.3	1.0	0:02.82	python3.10
2	root	20	0	2280	1300	1188	S	0.0	0.0	0:00.00	init-systemd(Ub
11	root	20	0	2280	4	0	S	0.0	0.0	0:00.00	init
40	root	19	-1	47804	15108	14100	S	0.0	0.2	0:00.08	systemd-journal
60	root	20	0	22092	5836	4380	S	0.0	0.1	0:00.14	systemd-udev
71	root	20	0	4492	156	12	S	0.0	0.0	0:00.00	snapfuse

```

73 root    20  0  4696 1784 1296 S  0.0  0.0  0:00.88 snapfuse
77 root    20  0  4624  184   36 S  0.0  0.0  0:00.00 snapfuse
79 root    20  0  4728 1844 1336 S  0.0  0.0  0:02.56 snapfuse
81 root    20  0  4956 1736 1248 S  0.0  0.0  0:01.02 snapfuse
88 systemd+ 20  0 25532 12596 8396 S  0.0  0.2  0:00.11 systemd-resolve
105 root    20  0  4304 2680 2436 S  0.0  0.0  0:00.00 cron
113 message+ 20  0  8588 4640 4104 S  0.0  0.1  0:00.08 dbus-daemon
134 root    20  0 30096 19060 10276 S  0.0  0.2  0:00.08 networkd-dispat
142 syslog  20  0 222400 9152 4292 S  0.0  0.1  0:00.02 rsyslogd
146 root    20  0 1984488 49784 19544 S  0.0  0.6  0:03.84 snapd
150 root    20  0 15324 7532 6588 S  0.0  0.1  0:00.09 systemd-logind
225 root    20  0 107224 21668 13144 S  0.0  0.3  0:00.04 unattended-upgr
228 root    20  0  3236 1112 1024 S  0.0  0.0  0:00.00 agetty
233 root    20  0  3192 1044  960 S  0.0  0.0  0:00.00 agetty
353 root    20  0  2284  112    0 S  0.0  0.0  0:00.00 SessionLeader
354 root    20  0  2300  116    0 S  0.0  0.0  0:00.01 Relay(355)
355 kavan   20  0  6172 4972 3248 S  0.0  0.1  0:00.04 bash
356 root    20  0  7524 4964 4040 S  0.0  0.1  0:00.01 login
416 kavan   20  0 16908 8804 7348 S  0.0  0.1  0:00.04 systemd
417 kavan   20  0 168776 3396  16 S  0.0  0.0  0:00.00 (sd-pam)
422 kavan   20  0  6068 5064 3400 S  0.0  0.1  0:00.01 bash
656 root    20  0  4764 1684 1216 S  0.0  0.0  0:01.10 snapfuse
731 root    20  0  4780 3416 3180 S  0.0  0.0  0:00.02 subiquity-serve
3082 kavan  20  0  7792 3640 3032 R  0.0  0.0  0:00.03 top

```

## ➤ htop

```
kavan@Kavan: ~  
0[ 0.0%] 4[ 0.0%] 8[ 0.0%] 12[ 0.0%]  
1[ 0.0%] 5[ 0.0%] 9[ 1.3%] 13[ 0.0%]  
2[ 0.0%] 6[ 0.7%] 10[ 0.0%] 14[ 0.0%]  
3[ 0.0%] 7[ 0.0%] 11[ 0.0%] 15[ 0.0%]  
Mem[|||||] 521M/7.63G Tasks: 32, 28 tks: 1 running  
Swap[ ] 0M/2.00G Load average: 0.01 0.03 0.00  
Uptime: 00:19:28  
  
PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command  
1 root 20 0 163M 12612 8364 S 0.7 0.2 0:07.81 /sbin/init  
761 root 20 0 4022M 31592 10140 S 0.7 0.5 0:04.50 python3 /snap/ubuntu-desktop-installer/1286/usr/bin/cloud-init status --wait  
2 root 20 0 2280 1300 1188 S 0.0 0.0 0:00.00 /init  
11 root 20 0 2280 4 0 S 0.0 0.0 0:00.00 plan9 --control-socket 6 --log-level 4 --server-fd 7 --pipe-fd 9 --log-truncate  
12 root 20 0 2280 4 0 S 0.0 0.0 0:00.00 plan9 --control-socket 6 --log-level 4 --server-fd 7 --pipe-fd 9 --log-truncate  
13 root 20 0 2280 1300 1188 S 0.0 0.0 0:00.00 /init  
40 root 19 -1 47804 15108 14100 S 0.0 0.2 0:00.08 /lib/systemd/systemd-journald  
60 root 20 0 22092 5836 4380 S 0.0 0.1 0:00.15 /lib/systemd/systemd-udev  
71 root 20 0 4492 156 12 S 0.0 0.0 0:00.00 snapfuse /var/lib/snapd/snaps/bare_5.snap /snap/bare/5 -o ro,nodev,allow_other,suid  
73 root 20 0 4696 1784 1296 S 0.0 0.0 0:00.88 snapfuse /var/lib/snapd/snaps/core22_864.snap /snap/core22/864 -o ro,nodev,allow_other,suid  
77 root 20 0 4624 184 36 S 0.0 0.0 0:00.88 snapfuse /var/lib/snapd/snaps/gtk-common-themes_1535.snap /snap/gtk-common-themes/1535 -o ro,nodev,allow_other,suid  
79 root 20 0 4728 1844 1336 S 0.0 0.0 0:02.56 snapfuse /var/lib/snapd/snaps/snapd_20290.snap /snap/snapd/20290 -o ro,nodev,allow_other,suid  
81 root 20 0 4956 1736 1248 S 0.0 0.0 0:01.02 snapfuse /var/lib/snapd/snaps/ubuntu-desktop-installer_1276.snap /snap/ubuntu-desktop-installer/1276 -o ro,nodev,a  
88 systemd-r 20 0 25532 12596 8396 S 0.0 0.2 0:00.11 /lib/systemd/systemd-resolved  
105 root 20 0 4304 2680 2436 S 0.0 0.0 0:00.00 /usr/sbin/cron -f -p  
113 messagebu 20 0 8588 4640 4104 S 0.0 0.1 0:00.00 @dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --syslog-only  
134 root 20 0 30096 19060 10276 S 0.0 0.2 0:00.08 /usr/bin/python3 /usr/bin/networkd-dispatcher --run-startup-triggers  
142 syslog 20 0 217M 9152 4292 S 0.0 0.1 0:00.02 /usr/sbin/rsyslogd -n -iNONE  
146 root 20 0 1937M 48568 19544 S 0.0 0.6 0:03.06 /usr/lib/snapd/snapd  
150 root 20 0 15324 7532 6588 S 0.0 0.1 0:00.09 /lib/systemd/systemd-logind  
161 syslog 20 0 217M 9152 4292 S 0.0 0.1 0:00.00 /usr/sbin/rsyslogd -n -iNONE  
162 syslog 20 0 217M 9152 4292 S 0.0 0.1 0:00.00 /usr/sbin/rsyslogd -n -iNONE  
163 syslog 20 0 217M 9152 4292 S 0.0 0.1 0:00.00 /usr/sbin/rsyslogd -n -iNONE  
225 root 20 0 104M 21668 13144 S 0.0 0.3 0:00.04 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-signal  
228 root 20 0 3236 1112 1024 S 0.0 0.0 0:00.00 /sbin/agetty -o -p -- \u --noclear --keep-baud console 115200,38400,9600 vt220  
233 root 20 0 3192 1044 960 S 0.0 0.0 0:00.00 /sbin/agetty -o -p -- \u --noclear tty1 linux  
236 root 20 0 104M 21668 13144 S 0.0 0.3 0:00.00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-signal  
240 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.47 /usr/lib/snapd/snapd  
241 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.33 /usr/lib/snapd/snapd  
242 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.00 /usr/lib/snapd/snapd  
243 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.06 /usr/lib/snapd/snapd  
244 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.00 /usr/lib/snapd/snapd  
259 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.04 /usr/lib/snapd/snapd  
268 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.01 /usr/lib/snapd/snapd  
269 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.12 /usr/lib/snapd/snapd  
270 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.39 /usr/lib/snapd/snapd  
285 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.13 /usr/lib/snapd/snapd  
347 root 20 0 1937M 48568 19544 S 0.0 0.6 0:00.06 /usr/lib/snapd/snapd  
353 root 20 0 2284 112 0 S 0.0 0.0 0:00.00 /init  
354 root 20 0 2300 116 0 S 0.0 0.0 0:00.02 /init  
355 kavan 20 0 6172 4972 3248 S 0.0 0.1 0:00.04 bash  
F1 Help F2 Setup F3 Search F4 Filter F5 Tree F6 Sort By F7 Nice F8 Nice+ F9 Kill F10 Quit
```

## ➤ nvidia-smi

```
kavan@Kavan: ~$ nvidia-smi  
Mon Mar 11 09:39:21 2024  
+-----+  
| NVIDIA-SMI 550.60.01 | Driver Version: 551.76 | CUDA Version: 12.4 |  
+-----+  
| GPU Name Persistence-M | Bus-Id Disp.A | Volatile Uncorr. ECC |  
| Fan Temp Perf Pwr:Usage/Cap | Memory-Usage | GPU-Util Compute M. |  
| | | MIG M. |  
+-----+  
| 0 NVIDIA GeForce RTX 4060 ... On | 00000000:01:00.0 Off | |  
| N/A 43C P0 14W / 80W | 0MiB / 8188MiB | 0% Default |  
| | | N/A |  
+-----+  
+-----+  
| Processes: |  
| GPU GI CI PID Type Process name GPU Memory |  
| ID ID | | | | Usage |  
+-----+  
| No running processes found |  
+-----+
```

➤ **lstopo**

➤ **perf**

➤ **numactl**

➤ **sar**