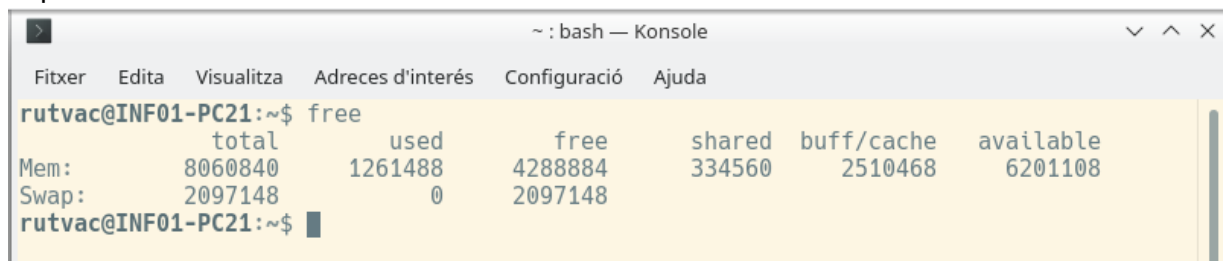Ruth Vacas Miñana
1DAM
Sistemas informaticos
ACTIVITIES 3 -5

3. Capture the execution of the following commands:

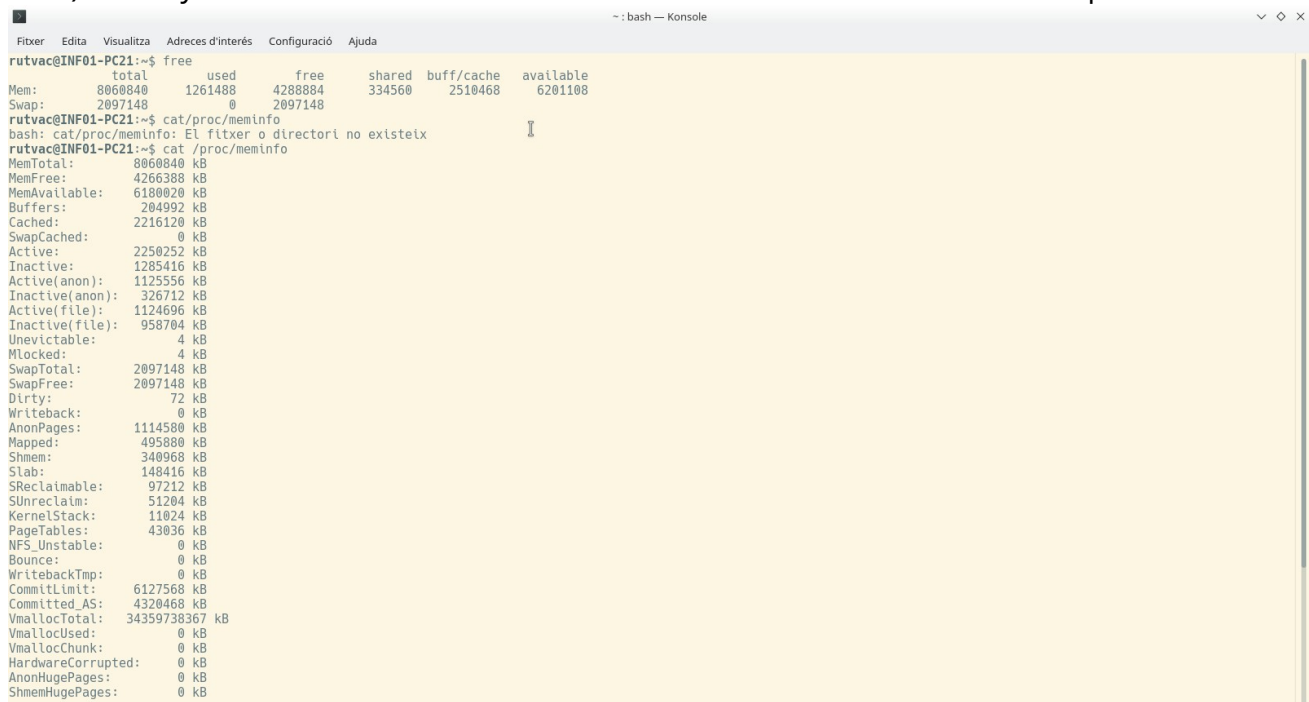a) To see the amount of RAM installed on our computer and see how much is occupied and how much free: $ free

b) Memory information without the need to install additional software. $ cat /proc/meminfo

c) To view information of computer components (filtering by memory) (may be required to install. $sudo apt-get install lshw):

$ sudo lshw –short

```
rutvac@INF01-PC21:~$ sudo lshw -short
H/W path        Device      Class          Description
=====================================================
                            system         ALDA+ (To be filled by O.E.M.)
/0                          bus            B85M-DS3H-A
/0/0                        memory         64KiB BIOS
/0/4                        memory         128KiB L1 cache
/0/5                        memory         512KiB L2 cache
/0/6                        memory         3MiB L3 cache
/0/7                        memory         8GiB System Memory
/0/7/0                      memory         DIMM [empty]
/0/7/1                      memory         DIMM [empty]
/0/7/2                      memory         DIMM [empty]
/0/7/3                      memory         8GiB DIMM DDR3 Synchronous 1600 MHz (0,6 ns
/0/41                       processor      Intel(R) Core(TM) i3-4160 CPU @ 3.60GHz
/0/100                      bridge         4th Gen Core Processor DRAM Controller
/0/100/2                    display        4th Generation Core Processor Family Integr
/0/100/3                    multimedia     Xeon E3-1200 v3/4th Gen Core Processor HD A
/0/100/14                   bus            8 Series/C220 Series Chipset Family USB xHC
/0/100/14/0     usb3        bus            xHCI Host Controller
/0/100/14/0/b   input       USB Optical Mouse
/0/100/14/0/c   input       USB Keyboard
/0/100/14/1     usb4        bus            xHCI Host Controller
/0/100/16                   communication  8 Series/C220 Series Chipset Family MEI Con
/0/100/1a                   bus            8 Series/C220 Series Chipset Family USB EHC
/0/100/1a/1     usb1        bus            EHCI Host Controller
/0/100/1a/1/1               bus            USB hub
/0/100/1b                   multimedia     8 Series/C220 Series Chipset High Definitio
/0/100/1c                   bridge         8 Series/C220 Series Chipset Family PCI Exp
/0/100/1c.2                 bridge         8 Series/C220 Series Chipset Family PCI Exp
/0/100/1c.2/0   eth0        network        RTL8111/8168/8411 PCI Express Gigabit Ether
/0/100/1d                   bus            8 Series/C220 Series Chipset Family USB EHC
/0/100/1d/1     usb2        bus            EHCI Host Controller
/0/100/1d/1/1               bus            USB hub
/0/100/1f                   bridge         B85 Express LPC Controller
/0/100/1f.2                 storage        8 Series/C220 Series Chipset Family 6-port
/0/100/1f.3                 bus            8 Series/C220 Series Chipset Family SMBus C
/0/1            scsi0       storage
/0/1/0.0.0      /dev/sda    disk           500GB TOSHIBA DT01ACA0
/0/1/0.0.0/1    /dev/sda1   volume         465GiB EXT4 volume
/0/2            scsi1       storage
/0/2/0.0.0      /dev/cdrom  disk           iHAS124   F
/1                          power          To Be Filled By O.E.M.
rutvac@INF01-PC21:~$
```

$ sudo lshw -C memory

```
/1                          power          To Be Filled By O.E.M.
rutvac@INF01-PC21:~$ sudo lshw -C memory
  *-firmware
       description: BIOS
       vendor: American Megatrends Inc.
       physical id: 0
       version: F2 APD
       date: 11/24/2015
       size: 64KiB
       capacity: 4032KiB
       capabilities: pci upgrade shadowing cdboot bootselect socketedrom edd int13flo
ppy1200 int13floppy720 int13floppy2880 int5printscreen int9keyboard int14serial int17
printer acpi usb biosbootspecification uefi
  *-cache:0
       description: L1 cache
       physical id: 4
       slot: CPU Internal L1
       size: 128KiB
       capacity: 128KiB
       capabilities: internal write-back
       configuration: level=1
  *-cache:1
       description: L2 cache
       physical id: 5
       slot: CPU Internal L2
       size: 512KiB
       capacity: 512KiB
       capabilities: internal write-back unified
       configuration: level=2
  *-cache:2
       description: L3 cache
       physical id: 6
       slot: CPU Internal L3
       size: 3MiB
       capacity: 3MiB
       capabilities: internal write-back unified
       configuration: level=3
  *-memory
       description: System Memory
       physical id: 7
       slot: System board or motherboard
       size: 8GiB
     *-bank:0
          description: DIMM [empty]
```

$ sudo lshw -C processor

...

$ sudo lshw -class network

$ sudo lshw -html > hardware.html

id:	`inf01-pc21`
description:	Desktop Computer
product:	ALDA+ (To be filled by O.E.M.)
vendor:	APD
version:	ALDA+C
serial:	3552036BN15770
width:	64 bits
capabilities:	smbios-2.7 dmi-2.7 smp vsyscall32

configuration:

administrator_password	=	disabled
boot	=	normal
chassis	=	desktop
family	=	To be filled by O.E.M.
frontpanel_password	=	disabled
keyboard_password	=	disabled
power-on_password	=	disabled
sku	=	To be filled by O.E.M.
uuid	=	40028D03-5C04-2605-E006-AE0700080009

id:	`core`
description:	Motherboard
product:	B85M-DS3H-A
vendor:	Gigabyte Technology Co., Ltd.
physical id:	`0`
version:	To be filled by O.E.M.
serial:	To be filled by O.E.M.
slot:	To be filled by O.E.M.

id:	`firmware`
description:	BIOS
vendor:	American Megatrends Inc.
physical id:	`0`
version:	F2 APD
date:	11/24/2015
size:	64KiB
capacity:	4032KiB
capabilities:	pci upgrade shadowing cdboot bootselect socketedrom edd int13floppy1200 int13floppy720 int13floppy2880 int5printscreen int9keyboard int14serial int17printer acpi usb biosbootspecification uefi

id:	`cache:0`
description:	L1 cache
physical id:	4
slot:	CPU Internal L1

id:	inf01-pc21
size:	128KiB
capacity:	128KiB
capabilities:	internal write-back
configuration:	
level = 1	
id:	cache:1
description:	L2 cache
physical id:	5
slot:	CPU Internal L2
size:	512KiB
capacity:	512KiB
capabilities:	internal write-back unified
configuration:	
level = 2	
id:	cache:2
description:	L3 cache
physical id:	6
slot:	CPU Internal L3
size:	3MiB
capacity:	3MiB
capabilities:	internal write-back unified
configuration:	
level = 3	
id:	memory
description:	System Memory
physical id:	7
slot:	System board or motherboard
size:	8GiB
id:	bank:0
description:	DIMM [empty]
product:	[Empty]
vendor:	[Empty]
physical id:	0
serial:	[Empty]
slot:	ChannelA-DIMM0
id:	bank:1
description:	DIMM [empty]
product:	[Empty]
vendor:	[Empty]
physical id:	1
serial:	[Empty]
slot:	ChannelA-DIMM1
id:	bank:2

id:		inf01-pc21
description:		DIMM [empty]
product:		[Empty]
vendor:		[Empty]
physical id:		2
serial:		[Empty]
slot:		ChannelB-DIMM0
id:	bank:3	
description:	DIMM DDR3 Synchronous 1600 MHz (0,6 ns)	
product:	CT102464BA160B.M16	
vendor:	Conexant (Rockwell)	
physical id:	3	
serial:	00000000	
slot:	ChannelB-DIMM1	
size:	8GiB	
width:	64 bits	
clock:	1600MHz (0.6ns)	
id:	cpu	
description:	CPU	
product:	Intel(R) Core(TM) i3-4160 CPU @ 3.60GHz	
vendor:	Intel Corp.	
physical id:	41	
bus info:	cpu@0	
version:	Intel(R) Core(TM) i3-4160 CPU @ 3.60GHz	
slot:	SOCKET 0	
size:	2504MHz	
capacity:	3600MHz	
width:	64 bits	
clock:	100MHz	
capabilities:	x86-64 fpu fpu_exception wp vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm cpuid_fault invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid xsaveopt dtherm arat pln pts md_clear flush_l1d cpufreq	

configuration:

cores	= 2	
enabledcores	= 1	
threads	= 2	

id:		pci
description:		Host bridge

id:	inf01-pc21
product:	4th Gen Core Processor DRAM Controller
vendor:	Intel Corporation
physical id:	100
bus info:	pci@0000:00:00.0
version:	06
width:	32 bits
clock:	33MHz

configuration:

driver = hsw_uncore

resources:

irq : 0

id:	display
description:	VGA compatible controller
product:	4th Generation Core Processor Family Integrated Graphics Controller
vendor:	Intel Corporation
physical id:	2
bus info:	pci@0000:00:02.0
version:	06
width:	64 bits
clock:	33MHz
capabilities:	msi pm vga_controller bus_master cap_list rom

configuration:

driver = i915

latency = 0

resources:

irq : 27

memory : f7800000-f7bfffff

memory : e0000000-efffffff

ioport : f000(size=64)

memory : c0000-dffff

id:	multimedia:0
description:	Audio device
product:	Xeon E3-1200 v3/4th Gen Core Processor HD Audio Controller
vendor:	Intel Corporation
physical id:	3
bus info:	pci@0000:00:03.0
version:	06
width:	64 bits
clock:	33MHz

id:	inf01-pc21
capabilities:	pm msi pciexpress bus_master cap_list
configuration:	

| driver | = | snd_hda_intel |
| latency | = | 0 |

resources:

| irq | : 30 |
| memory | : f7d14000-f7d17fff |

id:	usb:0
description:	USB controller
product:	8 Series/C220 Series Chipset Family USB xHCI
vendor:	Intel Corporation
physical id:	14
bus info:	pci@0000:00:14.0
version:	05
width:	64 bits
clock:	33MHz
capabilities:	pm msi xhci bus_master cap_list
configuration:	

| driver | = | xhci_hcd |
| latency | = | 0 |

resources:

| irq | : 24 |
| memory | : f7d00000-f7d0ffff |

id:	usbhost:0
product:	xHCI Host Controller
vendor:	Linux 4.15.0-151-generic xhci-hcd
physical id:	0
bus info:	usb@3
logical name:	usb3
version:	4.15
capabilities:	usb-2.00
configuration:	

driver	=	hub
slots	=	12
speed	=	480Mbit/s

id:	usb:0
description:	Mouse
product:	USB Optical Mouse
vendor:	Logitech

id:	inf01–pc21
physical id:	b
bus info:	usb@3:b
version:	72.00
capabilities:	usb-2.00
configuration:	

driver   = usbhid

maxpower   = 100mA

speed   = 1Mbit/s

id:	usb:1
description:	Keyboard
product:	USB Keyboard
vendor:	SIGMACHIP
physical id:	c
bus info:	usb@3:c
version:	1.10
capabilities:	usb-1.10
configuration:	

driver   = usbhid

maxpower   = 98mA

speed   = 1Mbit/s

id:	usbhost:1
product:	xHCI Host Controller
vendor:	Linux 4.15.0-151-generic xhci-hcd
physical id:	1
bus info:	usb@4
logical name:	usb4
version:	4.15
capabilities:	usb-3.00
configuration:	

driver = hub

slots = 6

speed = 5000Mbit/s

id:	communication
description:	Communication controller
product:	8 Series/C220 Series Chipset Family MEI Controller #1
vendor:	Intel Corporation
physical id:	16
bus info:	pci@0000:00:16.0
version:	04
width:	64 bits

id:	inf01-pc21
clock:	33MHz
capabilities:	pm msi bus_master cap_list
configuration:	

driver = mei_me

latency = 0

resources:

irq : 28

memory : f7d1e000-f7d1e00f

id:	usb:1
description:	USB controller
product:	8 Series/C220 Series Chipset Family USB EHCI #2
vendor:	Intel Corporation
physical id:	1a
bus info:	pci@0000:00:1a.0
version:	05
width:	32 bits
clock:	33MHz
capabilities:	pm debug ehci bus_master cap_list
configuration:	

driver = ehci-pci

latency = 0

resources:

irq : 16

memory : f7d1c000-f7d1c3ff

id:	usbhost
product:	EHCI Host Controller
vendor:	Linux 4.15.0-151-generic ehci_hcd
physical id:	1
bus info:	usb@1
logical name:	usb1
version:	4.15
capabilities:	usb-2.00
configuration:	

driver = hub

slots = 2

speed = 480Mbit/s

id:	usb
description:	USB hub
vendor:	Intel Corp.
physical id:	1

id:	inf01-pc21
bus info:	usb@1:1
version:	0.05
capabilities:	usb-2.00
configuration:	

driver = hub

slots = 6

spee
d = 480Mbit/s

id:	multimedia:1
description:	Audio device
product:	8 Series/C220 Series Chipset High Definition Audio Controller
vendor:	Intel Corporation
physical id:	1b
bus info:	pci@0000:00:1b.0
version:	05
width:	64 bits
clock:	33MHz
capabilities:	pm msi pciexpress bus_master cap_list
configuration:	

driver = snd_hda_inte
l

latency = 0

resources:

irq : 29

memor
y : f7d10000-f7d13fff

id:	pci:0
description:	PCI bridge
product:	8 Series/C220 Series Chipset Family PCI Express Root Port #1
vendor:	Intel Corporation
physical id:	1c
bus info:	pci@0000:00:1c.0
version:	d5
width:	32 bits
clock:	33MHz
capabilities:	pci pciexpress msi pm normal_decode bus_master cap_list
configuration:	

driver = pciepor
t

resources:

irq : 16

id:	pci:1
description:	PCI bridge

id:	`inf01-pc21`
product:	8 Series/C220 Series Chipset Family PCI Express Root Port #3
vendor:	Intel Corporation
physical id:	`1c.2`
bus info:	`pci@0000:00:1c.2`
version:	d5
width:	32 bits
clock:	33MHz
capabilities:	pci pciexpress msi pm normal_decode bus_master cap_list
configuration:	

driver = pcieport

resources:

irq   : 18

ioport   : e000(size=4096)

memory : f7c00000-f7cfffff

ioport   : f0000000(size=1048576)

id:	`network`
description:	Ethernet interface
product:	RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller
vendor:	Realtek Semiconductor Co., Ltd.
physical id:	`0`
bus info:	`pci@0000:02:00.0`
logical name:	`eth0`
version:	0c
serial:	40:8d:5c:26:e0:ae
size:	1Gbit/s
capacity:	1Gbit/s
width:	64 bits
clock:	33MHz
capabilities:	pm msi pciexpress msix vpd bus_master cap_list ethernet physical tp mii 10bt 10bt-fd 100bt 100bt-fd 1000bt 1000bt-fd autonegotiation
configuration:	

autonegotiation = on

broadcast   = yes

driver   = r8169

driverversion = 2.3LK-NAPI

duplex   = full

firmware   = rtl8168g-2_0.0.1 02/06/13

ip   = 10.2.1.40

latency   = 0

id: inf01-pc21

link	=	yes
multicast	=	yes
port	=	MII
speed	=	1Gbit/s

resources:

irq	: 18
ioport	: e000(size=256)
memory	: f7c00000-f7c00fff
memory	: f0000000-f0003fff

id: usb:2

description: USB controller

product: 8 Series/C220 Series Chipset Family USB EHCI #1

vendor: Intel Corporation

physical id: 1d

bus info: pci@0000:00:1d.0

version: 05

width: 32 bits

clock: 33MHz

capabilities: pm debug ehci bus_master cap_list

configuration:

driver	=	ehci-pci
latency	=	0

resources:

irq	: 23
memory	: f7d1b000-f7d1b3ff

id: usbhost

product: EHCI Host Controller

vendor: Linux 4.15.0-151-generic ehci_hcd

physical id: 1

bus info: usb@2

logical name: usb2

version: 4.15

capabilities: usb-2.00

configuration:

driver	=	hub
slots	=	2
speed	=	480Mbit/s

id: usb

description: USB hub

id:	inf01-pc21
vendor:	Intel Corp.
physical id:	1
bus info:	usb@2:1
version:	0.05
capabilities:	usb-2.00

configuration:

driver = hub

slots = 6

speed = 480Mbit/s

id:	isa
description:	ISA bridge
product:	B85 Express LPC Controller
vendor:	Intel Corporation
physical id:	1f
bus info:	pci@0000:00:1f.0
version:	05
width:	32 bits
clock:	33MHz
capabilities:	isa bus_master cap_list

configuration:

driver = lpc_ich

latency = 0

resources:

irq : 0

id:	storage
description:	SATA controller
product:	8 Series/C220 Series Chipset Family 6-port SATA Controller 1 [AHCI mode]
vendor:	Intel Corporation
physical id:	1f.2
bus info:	pci@0000:00:1f.2
version:	05
width:	32 bits
clock:	66MHz
capabilities:	storage msi pm ahci_1.0 bus_master cap_list

configuration:

driver = ahci

latency = 0

resources:

irq : 25

ioport : f0b0(size=8)

ioport : f0a0(size=4)

id:	inf01-pc21
ioport : f090(size=8)	
ioport : f080(size=4)	
ioport : f060(size=32)	
memory : f7d1a000-f7d1a7ff	

id:	serial
description:	SMBus
product:	8 Series/C220 Series Chipset Family SMBus Controller
vendor:	Intel Corporation
physical id:	1f.3
bus info:	pci@0000:00:1f.3
version:	05
width:	64 bits
clock:	33MHz
configuration:	
latency = 0	
resources:	
memory : f7d19000-f7d190ff	
ioport : f040(size=32)	

id:	scsi:0
physical id:	1
logical name:	scsi0
capabilities:	emulated
id:	disk
description:	ATA Disk
product:	TOSHIBA DT01ACA0
vendor:	Toshiba
physical id:	0.0.0
bus info:	scsi@0:0.0.0
logical name:	/dev/sda
version:	A750
serial:	Y55NAAXHS
size:	465GiB (500GB)
capabilities:	partitioned partitioned:dos
configuration:	
ansiversion = 5	
logicalsectorsize = 512	
sectorsize = 4096	
signature = 668854fc	
id:	volume
description:	EXT4 volume

id:	inf01–pc21
vendor:	Linux
physical id:	1
bus info:	`scsi@0:0.0.0,1`
logical name:	`/dev/sda1`
logical name:	`/`
version:	1.0
serial:	985cd788-7836-4ace-ad71-f15dd02ae340
size:	465GiB
capacity:	465GiB
capabilities:	primary bootable journaled extended_attributes large_files huge_files dir_nlink recover 64bit extents ext4 ext2 initialized

configuration:

created	=	2019-10-24 10:29:04
filesystem	=	ext4
lastmountpoint	=	/root
modified	=	2022-10-18 16:10:06
mount.fstype	=	ext4
mount.options	=	rw,relatime,errors=remount-ro,data=ordered
mounted	=	2022-10-18 16:10:06
state	=	mounted

id:	`scsi:1`
physical id:	2
logical name:	`scsi1`
capabilities:	emulated

id:	cdrom
description:	DVD-RAM writer
product:	iHAS124 F
vendor:	ATAPI
physical id:	`0.0.0`
bus info:	`scsi@1:0.0.0`
logical name:	`/dev/cdrom`
logical name:	`/dev/cdrw`
logical name:	`/dev/dvd`
logical name:	`/dev/dvdrw`
logical name:	`/dev/sr0`
version:	CL08
capabilities:	removable audio cd-r cd-rw dvd dvd-r dvd-ram

configuration:

ansiversion	=	5

id:	inf01-pc21
status	= nodisc

| id:	power
description:	To Be Filled By O.E.M.
product:	To Be Filled By O.E.M.
vendor:	To Be Filled By O.E.M.
physical id:	1
version:	To Be Filled By O.E.M.
serial:	To Be Filled By O.E.M.
capacity:	32768mWh

4. Install a benchmark on your computer (hardinfo, CPU-X on Ubuntu or CPU-Z on Windows) and prepare a Report with the information you can get from the tests. Including all the relevant information you can get: processor, cache, RAM, BIOS,…
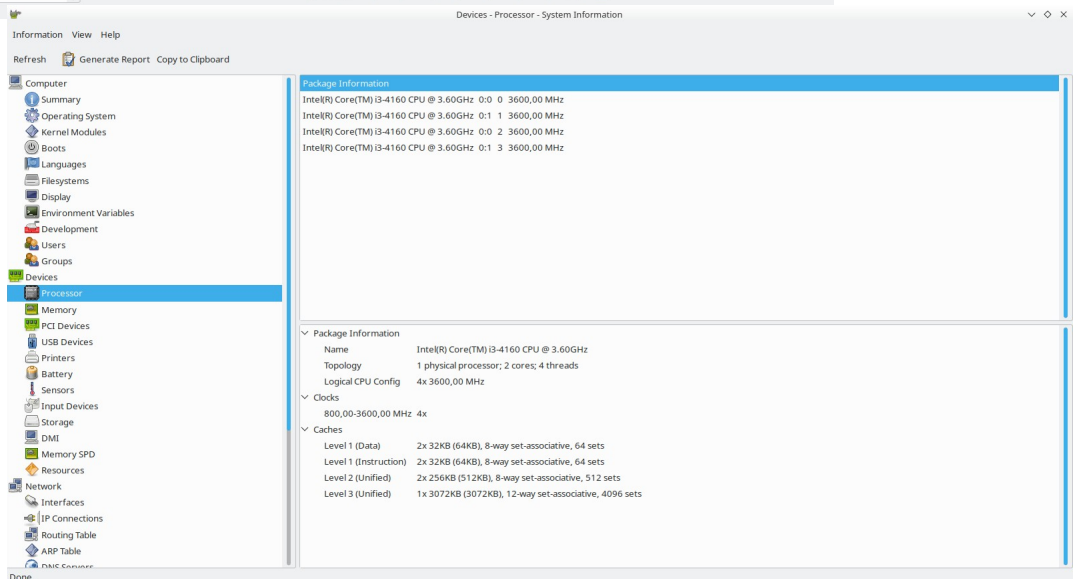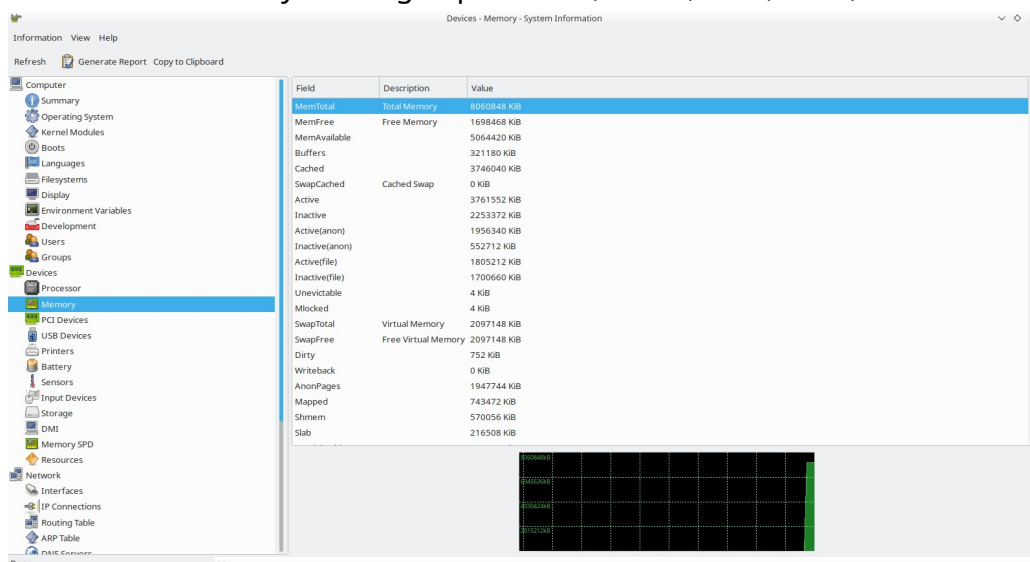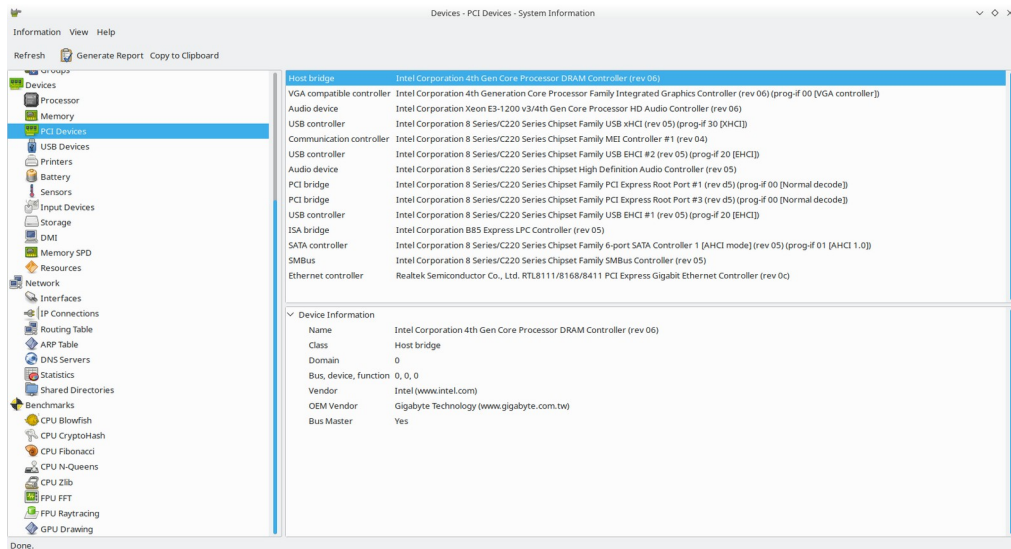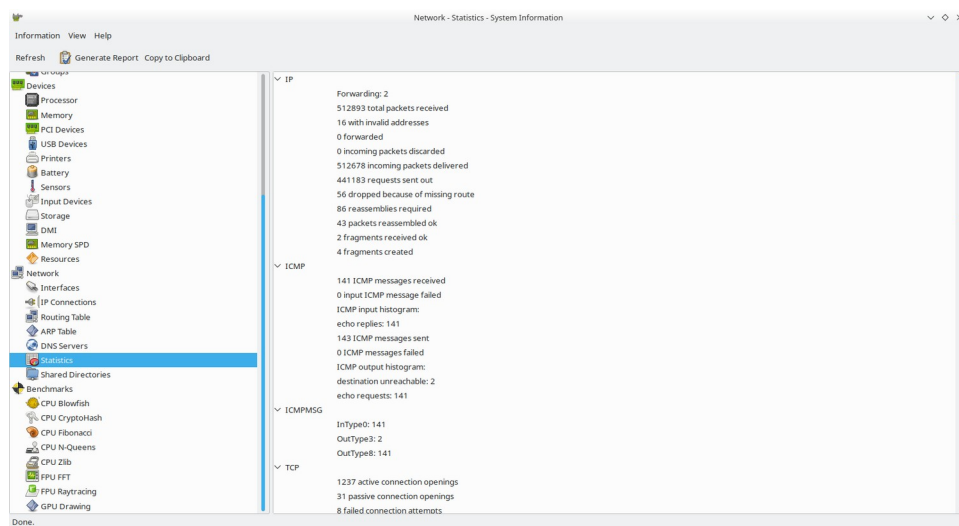
5. According to the previous results, do you think you need to change any components or add on your computer to increase its performance?. Talk to a classmate an write some sentences in english to explain the reasons for that change to the rest of the class