UNIVERSIDAD DE LAS FUERZAS ARMADAS-ESPE SEDE SANTO DOMINGO

DEPARTAMENTO DE CIENCIAS DE LA COMPUTACIÓN - DCCO-SS

CARRERA DE INGENIERÍA EN TECNOLOGÍAS DE LA INFORMACIÓN

PERIODO	:	202450
ASIGNATURA	:	Sistemas Operativos
TEMA	:	Taller 5
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SANTO DOMINGO - ECUADOR

2024

Comandos En Debian

Información del hardware (lspci y lsusb)

En el taller se procedió a ingresar comandos de en la terminal de Linux Debian, para se procedió a iniciar sesión como usuario root.

```
ander1234@DebianLinux2:~$ su -
Password:
root@DebianLinux2:~#
```

lspci: Muestra información sobre los buses PCI y los dispositivos conectados.

```
root@DebianLinux2:~# lspci
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)
00:02.0 VGA compatible controller: VMware SVGA II Adapter
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev
 02)
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (
rev 01)
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
00:0b.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI
 Controller
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller
[AHCI mode] (rev 02)
root@DebianLinux2:~#
```

lspci -v: Amplia la información lspci -vv: más detalles

```
root@DebianLinux2:~# lspci -v
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
        Flags: fast devsel

00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
        Flags: bus master, medium devsel, latency 0

00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01) (prog-if 8a [
ISA Compatibility mode controller, supports both channels switched to PCI native mode,
supports bus mastering])
        Flags: bus master, fast devsel, latency 64
        I/O ports at 01f0 [size=8]
        I/O ports at 03f4
        I/O ports at 0170 [size=8]
        I/O ports at 0374
        I/O ports at d000 [size=16]
```

```
root@DebianLinux2:~# lspci -vv
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
        Control: I/O- Mem- BusMaster- SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- S
ERR- FastB2B- DisINTx-
        Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort
- >SERR- <PERR- INTx-

00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
        Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- S
ERR- FastB2B- DisINTx-
        Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=medium >TAbort- <TAbort- <MAbo
rt- >SERR- <PERR- INTx-
        Latency: 0

00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01) (prog-if 8a [
ISA Compatibility mode controller, supports both channels switched to PCI native mode,
supports bus mastering])
        Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- S
ERR- FastB2B- DisINTx-
        Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort
- >SERR- <PERR- INTx-
        Latency: 64
```

```
        I/O ports at d000 [size=16]
        Kernel driver in use: ata_piix
        Kernel modules: ata_piix, ata_generic

00:02.0 VGA compatible controller: VMware SVGA II Adapter (prog-if 00 [VGA controller])
        Subsystem: VMware SVGA II Adapter
        Flags: bus master, fast devsel, latency 64, IRQ 18
        I/O ports at d010 [size=16]
        Memory at e0000000 (32-bit, prefetchable) [size=16M]
        Memory at f0000000 (32-bit, non-prefetchable) [size=2M]
        Expansion ROM at 000c0000 [virtual] [disabled] [size=128K]
        Kernel driver in use: vmwgfx
        Kernel modules: vmwgfx

00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev
 02)
        Subsystem: Intel Corporation PRO/1000 MT Desktop Adapter
        Flags: bus master, 66MHz, medium devsel, latency 64, IRQ 19
        Memory at f0200000 (32-bit, non-prefetchable) [size=128K]
        I/O ports at d020 [size=8]
        Capabilities: [dc] Power Management version 2
        Capabilities: [e4] PCI-X non-bridge device
        Kernel driver in use: e1000
        Kernel modules: e1000
```

Lspci -s: Muestra información solo del dispositivo seleccionado
Ejemplo: lspci -v -s 00:02

```
root@DebianLinux2:~# lspci -s
lspci: option requires an argument -- 's'
Usage: lspci [<switches>]

Basic display modes:
-mm             Produce machine-readable output (single -m for an obsolete format)
-t              Show bus tree

Display options:
-v              Be verbose (-vv or -vvv for higher verbosity)
-k              Show kernel drivers handling each device
-x              Show hex-dump of the standard part of the config space
-xxx            Show hex-dump of the whole config space (dangerous; root only)
-xxxx           Show hex-dump of the 4096-byte extended config space (root only)
-b              Bus-centric view (addresses and IRQ's as seen by the bus)
-D              Always show domain numbers
-P              Display bridge path in addition to bus and device number
-PP             Display bus path in addition to bus and device number

Resolving of device ID's to names:
```

```
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service
        Flags: fast devsel, IRQ 20
        I/O ports at d040 [size=32]
        Memory at f0400000 (32-bit, non-prefetchable) [size=4M]
        Memory at f0800000 (32-bit, prefetchable) [size=16K]
        Kernel driver in use: vboxguest
        Kernel modules: vboxguest

00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (
rev 01)
        Subsystem: Dell 82801AA AC'97 Audio Controller
        Flags: bus master, medium devsel, latency 64, IRQ 21
        I/O ports at d100 [size=256]
        I/O ports at d200 [size=64]
        Kernel driver in use: snd_intel8x0
        Kernel modules: snd_intel8x0

00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB (prog-if 10 [OHCI])
        Flags: bus master, fast devsel, latency 64, IRQ 22
        Memory at f0804000 (32-bit, non-prefetchable) [size=4K]
        Kernel driver in use: ohci-pci
        Kernel modules: ohci_pci

00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
```

```
root@DebianLinux2:~# lspci -v-s
lspci: invalid option -- '-'
Usage: lspci [<switches>]

Basic display modes:
-mm             Produce machine-readable output (single -m for an obsolete format)
-t              Show bus tree

Display options:
-v              Be verbose (-vv or -vvv for higher verbosity)
-k              Show kernel drivers handling each device
-x              Show hex-dump of the standard part of the config space
-xxx            Show hex-dump of the whole config space (dangerous; root only)
-xxxx           Show hex-dump of the 4096-byte extended config space (root only)
-b              Bus-centric view (addresses and IRQ's as seen by the bus)
-D              Always show domain numbers
-P              Display bridge path in addition to bus and device number
```

lsusb: Muestra información sobre los buses y dispositivos usb conectados

```
root@DebianLinux2:~# lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 80ee:0021 VirtualBox USB Tablet
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
root@DebianLinux2:~#
```

lsusb -v: Más información

```
root@DebianLinux2:~# lsusb -v

Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Device Descriptor:
  bLength                18
  bDescriptorType         1
  bcdUSB               2.00
  bDeviceClass            9 Hub
  bDeviceSubClass         0
  bDeviceProtocol         0 Full speed (or root) hub
  bMaxPacketSize0        64
  idVendor           0x1d6b Linux Foundation
  idProduct          0x0002 2.0 root hub
  bcdDevice            6.01
  iManufacturer           3 Linux 6.1.0-21-amd64 ehci_hcd
  iProduct                2 EHCI Host Controller
  iSerial                 1 0000:00:0b.0
  bNumConfigurations      1
  Configuration Descriptor:
    bLength                 9
    bDescriptorType         2
```

lsusb –s: Información de un solo dispositivo
Ejemplo: lsusb -v -s 001:004

```
root@DebianLinux2:~# lsusb -v -s
lsusb: option requires an argument -- 's'
Usage: lsusb [options]...
List USB devices
  -v, --verbose
      Increase verbosity (show descriptors)
  -s [[bus]:][devnum]
      Show only devices with specified device and/or
      bus numbers (in decimal)
  -d vendor:[product]
      Show only devices with the specified vendor and
      product ID numbers (in hexadecimal)
  -D device
```

lsusb -t: Muestra información en árbol y la velocidad del puerto usb

```
root@DebianLinux2:~# lsusb -t
/:  Bus 02.Port 1: Dev 1, Class=root_hub, Driver=ohci-pci/12p, 12M
    |__ Port 1: Dev 2, If 0, Class=Human Interface Device, Driver=usbh
/:  Bus 01.Port 1: Dev 1, Class=root_hub, Driver=ehci-pci/12p, 480M
root@DebianLinux2:~#
```

Módulos del Kernel en Linux

lsmod: Muestra módulos cargados en el sistema

```
root@DebianLinux2:~# lsmod
Module                  Size  Used by
snd_seq_dummy          16384  0
snd_hrtimer            16384  1
snd_seq                90112  7 snd_seq_dummy
snd_seq_device         16384  1 snd_seq
rfkill                 36864  3
qrtr                   49152  4
intel_rapl_msr         20480  0
intel_rapl_common      32768  1 intel_rapl_msr
ghash_clmulni_intel    16384  0
sha512_ssse3           49152  0
sha512_generic         16384  1 sha512_ssse3
sha256_ssse3           32768  0
sha1_ssse3             32768  0
snd_intel8x0           49152  1
snd_ac97_codec        176128  1 snd_intel8x0
ac97_bus               16384  1 snd_ac97_codec
snd_pcm               159744  2 snd_intel8x0,snd_ac97_codec
```

modinfo: Amplia la información de un modulo
Ejemplo: modinfo ahci

modprobe -r: Borrar un modulo
Ejemplo: modprobe -r floppy

```
root@DebianLinux2:~# modinfo ahci
filename:       /lib/modules/6.1.0-21-amd64/kernel/drivers/ata/ahci.ko
version:        3.0
license:        GPL
description:    AHCI SATA low-level driver
author:         Jeff Garzik
srcversion:     BA66CDC9CDD8E336664DEB5
alias:          pci:v*d*sv*sd*bc01sc06i01*
alias:          pci:v00000014d00007A08sv*sd*bc*sc*i*
alias:          pci:v00001C44d00008000sv*sd*bc*sc*i*
alias:          pci:v0000144Dd0000A800sv*sd*bc*sc*i*
alias:          pci:v0000144Dd00001600sv*sd*bc*sc*i*
alias:          pci:v00001B21d00001166sv*sd*bc*sc*i*
alias:          pci:v00001B21d00001165sv*sd*bc*sc*i*
alias:          pci:v00001B21d00001164sv*sd*bc*sc*i*
alias:          pci:v00001B21d00001064sv*sd*bc*sc*i*
alias:          pci:v00001B21d00001062sv*sd*bc*sc*i*
alias:          pci:v00001B21d00000624sv*sd*bc*sc*i*
alias:          pci:v00001B21d00000622sv*sd*bc*sc*i*
alias:          pci:v00001B21d00000621sv*sd*bc*sc*i*
alias:          pci:v00001B21d00000612sv*sd*bc*sc*i*
alias:          pci:v00001B21d00000611sv*sd*bc*sc*i*
```

Insmod: Cargar un fichero. ko en el sistema
Ejemplo:
insmod floppy.ko
lsmod | grep floppy

```
root@DebianLinux2:~# lsmod | grep video
video                  65536  0
wmi                    36864  1 video
root@DebianLinux2:~# ls
vboxpostinstall.sh
```

modprobe: Carga o borra módulos
Ejemplo: modprobe floppy

```
root@DebianLinux2:~# modprobe | grep video
modprobe: ERROR: missing parameters. See -h.
root@DebianLinux2:~# modprobe video
root@DebianLinux2:~# ls
vboxpostinstall.sh
```

modprobe -r: Borrar un modulo
Ejemplo: modprobe -r floppy

```
root@DebianLinux2:~# modprobe -r video
root@DebianLinux2:~# lsmod | grep floppy
```

Pendrive USB

ls –l sd: se cambio por lsblk
Disco duro y sus particiones (Sin pendrive)

```
root@DebianLinux2:~# lsblk
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda      8:0    0    50G  0 disk
├─sda1   8:1    0    49G  0 part /
├─sda2   8:2    0     1K  0 part
└─sda5   8:5    0   975M  0 part [SWAP]
sr0     11:0    1 749.4M  0 rom
root@DebianLinux2:~#
```

Pendrive enlaces y directorios:
cd /sys/class/
ls
cd block/
ls
ls -l

```
root@DebianLinux2:~# cd /sys/class
root@DebianLinux2:/sys/class# ls
ata_device   devlink   i2c-adapter    pci_bus       regulator     spi_master
ata_link     dma       input          phy           rfkill        thermal
ata_port     dmi       intel_scu_ipc  powercap      rtc           tpm
backlight    drm       iommu          power_supply  scsi_device   tpmrm
bdi          firmware  leds           ppdev         scsi_disk     tty
block        gpio      mem            pps           scsi_generic  vc
bsg          graphics  misc           printer       scsi_host     vtconsole
devcoredump  hidraw    msr            ptp           sound         wakeup
devfreq      hwmon     net            pwm           spidev
```

Sistema Real

cat /proc/interrupts: Muestra las interrupciones asociadas

```
root@DebianLinux2:/sys# cat /proc/interrupts
           CPU0
  0:         39   IO-APIC   2-edge      timer
  1:       4528   IO-APIC   1-edge      i8042
  8:          0   IO-APIC   8-edge      rtc0
  9:          0   IO-APIC   9-fasteoi   acpi
 12:       5832   IO-APIC  12-edge      i8042
 14:          0   IO-APIC  14-edge      ata_piix
 15:       3706   IO-APIC  15-edge      ata_piix
 18:          0   IO-APIC  18-fasteoi   vmwgfx
 19:       2526   IO-APIC  19-fasteoi   ehci_hcd:usb1, enp0s3
 20:      57572   IO-APIC  20-fasteoi   vboxguest
 21:      46290   IO-APIC  21-fasteoi   ahci[0000:00:0d.0], snd_intel8x0
 22:         30   IO-APIC  22-fasteoi   ohci_hcd:usb2
NMI:          0   Non-maskable interrupts
LOC:    1321790   Local timer interrupts
SPU:          0   Spurious interrupts
PMI:          0   Performance monitoring interrupts
IWI:          0   IRQ work interrupts
```

Módulos disponibles cat /proc/dma

```
root@DebianLinux2:/sys# cat /proc/dma
 4: cascade
```

cat /proc/ioports : Muestra dispositivos

```
root@DebianLinux2:/sys# cat /proc/ioports
0000-0cf7 : PCI Bus 0000:00
  0000-001f : dma1
  0020-0021 : pic1
  0040-0043 : timer0
  0050-0053 : timer1
  0060-0060 : keyboard
  0064-0064 : keyboard
  0070-0071 : rtc_cmos
    0070-0071 : rtc0
  0080-008f : dma page reg
  00a0-00a1 : pic2
  00c0-00df : dma2
  00f0-00ff : fpu
  0170-0177 : 0000:00:01.1
    0170-0177 : ata_piix
  01f0-01f7 : 0000:00:01.1
    01f0-01f7 : ata_piix
  0376-0376 : 0000:00:01.1
    0376-0376 : ata_piix
  03c0-03df : vga+
  03f6-03f6 : 0000:00:01.1
    03f6-03f6 : ata_piix
```

Lspci: Información sobre los dispositivos conectados

```
root@DebianLinux2:/sys# lspci
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)
00:02.0 VGA compatible controller: VMware SVGA II Adapter
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Cont
 02)
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Serv
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio C
rev 01)
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
00:0b.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family
 Controller
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA
[AHCI mode] (rev 02)
```

lspci -s 05:09 -v : Información detallada de dispositivo especifico

```
root@DebianLinux2:/sys# lspci -s 05:09
root@DebianLinux2:/sys# ls
block  bus  class  dev  devices  firmware  fs  hypervisor  kernel  module  p
root@DebianLinux2:/sys#
```

Lspci -tv: Muestra un árbol de dispositivos

```
root@DebianLinux2:/sys# lspci -tv
-[0000:00]-+-00.0  Intel Corporation 440FX - 82441FX PMC [Natoma]
           +-01.0  Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
           +-01.1  Intel Corporation 82371AB/EB/MB PIIX4 IDE
           +-02.0  VMware SVGA II Adapter
           +-03.0  Intel Corporation 82540EM Gigabit Ethernet Controller
           +-04.0  InnoTek Systemberatung GmbH VirtualBox Guest Service
           +-05.0  Intel Corporation 82801AA AC'97 Audio Controller
           +-06.0  Apple Inc. KeyLargo/Intrepid USB
           +-07.0  Intel Corporation 82371AB/EB/MB PIIX4 ACPI
           +-0b.0  Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI
roller
           \-0d.0  Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [A
mode]
```

Lsusb: Información de buses y dispositivos conectados

```
root@DebianLinux2:/sys# lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 80ee:0021 VirtualBox USB Tablet
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
```

lsmod | less: Para ver modulos

```
root@DebianLinux2:/sys# lsmod
Module                  Size  Used by
snd_seq_dummy          16384  0
snd_hrtimer            16384  1
snd_seq                90112  7 snd_seq_dummy
snd_seq_device         16384  1 snd_seq
rfkill                 36864  3
qrtr                   49152  4
intel_rapl_msr         20480  0
intel_rapl_common      32768  1 intel_rapl_msr
ghash_clmulni_intel    16384  0
sha512_ssse3           49152  0
sha512_generic         16384  1 sha512_ssse3
sha256_ssse3           32768  0
sha1_ssse3             32768  0
snd_intel8x0           49152  1
snd_ac97_codec        176128  1 snd_intel8x0
ac97_bus               16384  1 snd_ac97_codec
snd_pcm               159744  2 snd_intel8x0,snd_ac97_codec
snd_timer              49152  3 snd_seq,snd_hrtimer,snd_pcm
aesni_intel           393216  0
joydev                 28672  0
```