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Devices
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Devices

⌘ abstract interfaces to installed device drivers

☒ /dev/ttyS0, /dev/eth0, /dev/fd0

☒ also represents some OS features

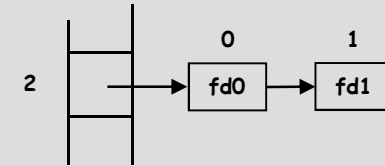
☒ /dev/kmem, /dev/null

☒ association of device to driver via major and minor numbers

☒ *major number: specifies a device class*

☒ *minor number: specifies which instance of the class is being addressed*

- may be specified to modify the driver's behaviour
 - e.g. blocksize to use, rewind/no rewind, etc.



```
[bob@redhat ~ 203]# ls -l /dev/fd0*
brw-rw-r-- 1 root floppy 2, 0 May 6 1998 /dev/fd0
brw-rw-r-- 1 root floppy 2, 12 May 6 1998 /dev/fd0D360
brw-rw-r-- 1 root floppy 2, 16 May 6 1998 /dev/fd0D720
brw-rw-r-- 1 root floppy 2, 28 May 6 1998 /dev/fd0H1440
brw-rw-r-- 1 root floppy 2, 12 May 6 1998 /dev/fd0H360
brw-rw-r-- 1 root floppy 2, 16 May 6 1998 /dev/fd0H720
brw-rw-r-- 1 root floppy 2, 4 May 6 1998 /dev/fd0d360
brw-rw-r-- 1 root floppy 2, 8 May 6 1998 /dev/fd0h1200
brw-rw-r-- 1 root floppy 2, 20 May 6 1998 /dev/fd0h360
brw-rw-r-- 1 root floppy 2, 24 May 6 1998 /dev/fd0h720
```

☒ naming often used to represent device's capabilities or properties

☒ /dev/sda1, /dev/c1t1d0s0

☒ (see p.55, Frisch)

Device Types

⌘ two types

⌘ block special

⌘ *disk/tape, etc.*

```
# ls -l /dev/hda
brw-rw---- 1 root disk 3, 0 May 6 1998 /dev/hda
```

⌘ character special (also called *raw*)

⌘ *terminals, modems, etc.*

```
# ls -l /dev/ttyS0
crw----- 1 root tty 4, 64 Nov 21 14:15 /dev/ttyS0
```

⌘ *raw access to block devices (such as disks) is used by fsck and other device-oriented programs*

- may give greater efficiency
- may bypass security limitations

⌘ linux only defines one type of device

⌘ from sd: *"At this time, only block devices are provided. Raw devices have not yet been implemented."*

⌘ conventionally gathered in /dev

⌘ SysV uses many subdirectories of /dev

⌘ created using mknod

```
# mknod /dev/mynewdevice c 4 75
```

/proc

⌘ *proc: special filesystem type*

- ☒ *"... designed to enable processes to be manipulable using UNIX file system accessing calls."*
- ☒ mounted as /proc
- ☒ entries represent
 - ☒ *running process*
 - ☒ *device or other configuration information*
- ☒ avoids potential security problems
 - ☒ *no need to have privileged programs just to provide this sort of information*
 - e.g. ps

```
# cd /proc
```

```
# ls
```

| | | | | | |
|------|------|---------|-------------|---------|---------|
| 1/ | 3/ | 46/ | cpuinfo | loadavg | rtc |
| 2/ | 309/ | 495/ | devices | locks | scsi/ |
| 229/ | 322/ | 496/ | dma | mdstat | self@ |
| 238/ | 331/ | 5/ | filesystems | meminfo | stat |
| 249/ | 341/ | 647/ | interrupts | misc | sys/ |
| 260/ | 342/ | 648/ | ioports | modules | uptime |
| 272/ | 343/ | 649/ | kcore | mounts | version |
| 283/ | 345/ | 658/ | kmsg | net/ | |
| 298/ | 4/ | cmdline | ksyms | pci | |

```
# cat interrupts
```

```
0: 7029046 timer
1: 2 keyboard
2: 0 cascade
4: 188 + serial
5: 1 sound blaster
8: 1 + rtc
10: 1858 3c509
11: 109642 + fdomain
12: 0 PS/2 Mouse
13: 1 math error
14: 27358 + ide0
```