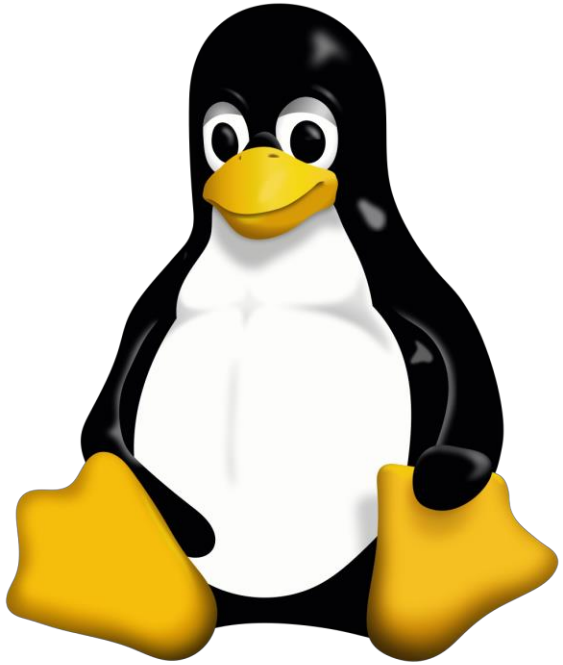
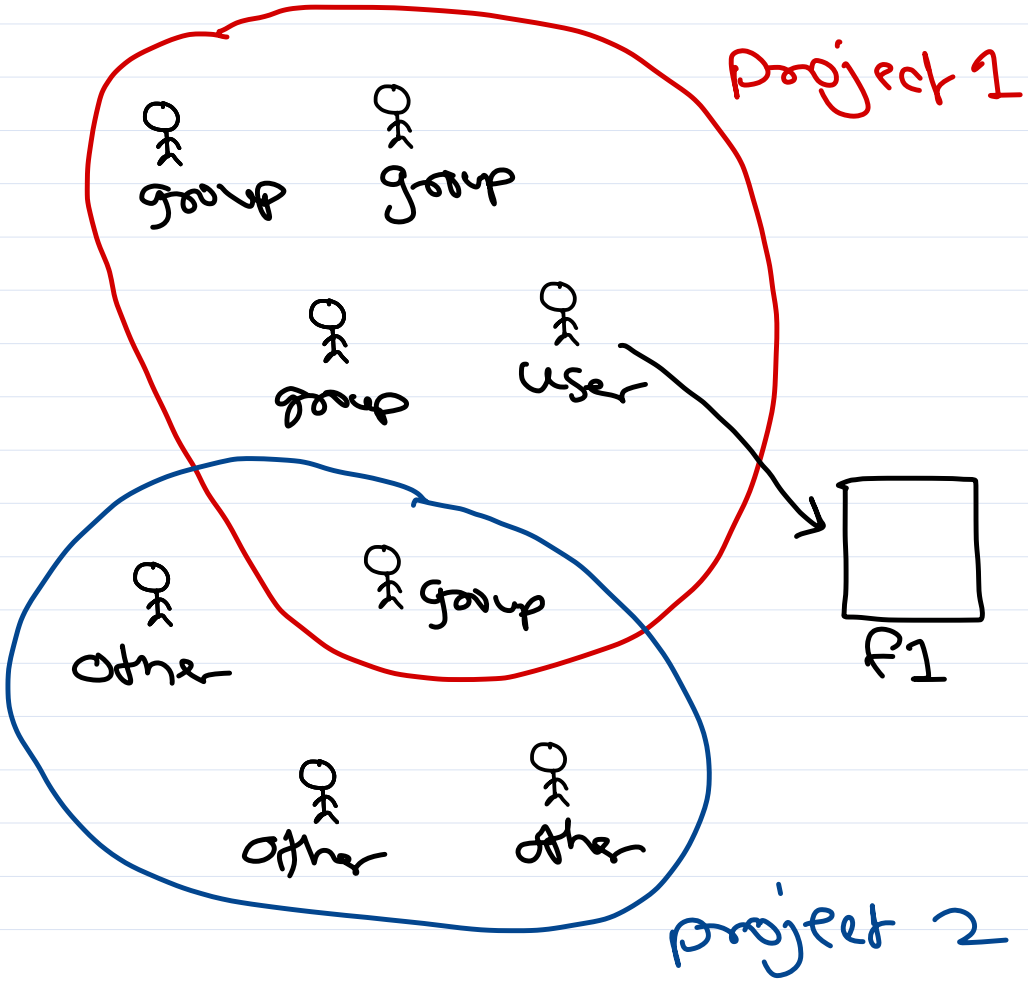


Operating System Concepts

Sunbeam Infotech

File permissions



In Linux, users are added into groups. When a new user is created, by default a new group created with same name.

Also there are predefined groups e.g. sudo, root, dial, ...

file → user and group.

file permi at 3 levels:

- user → rwx
- group → rwx
- other → rwx

File permissions

chmod +x filepath ← give perm to ugo
+w
+r

chmod -x filepath ← remove perm from ugo
-w
-r

chmod g+w file ← give/revoke w to group
g-w file

chmod u+w file ← give/revoke w to user
u-w file

chmod o+w file ← give/revoke w to other
o-w file

rwx rwx rwx
u g o

give perm: rwx r-x r--
111 101 100
7 5 4

chmod 754 filepath.

To change user/owner of file:

sudo chown user:group filepath.

(-R) → for all files in dir and subdirs recursively

Booting

① Bootable device
- Storage device whose first sector contains bootstrap pgm.

② Bootstrap pgm
- that loads OS kernel in RAM.

③ bootloader
- resides in 2nd sector of bootable device
- gives options to end user to select OS to boot.
- based on user option start bootstrap program of that OS.

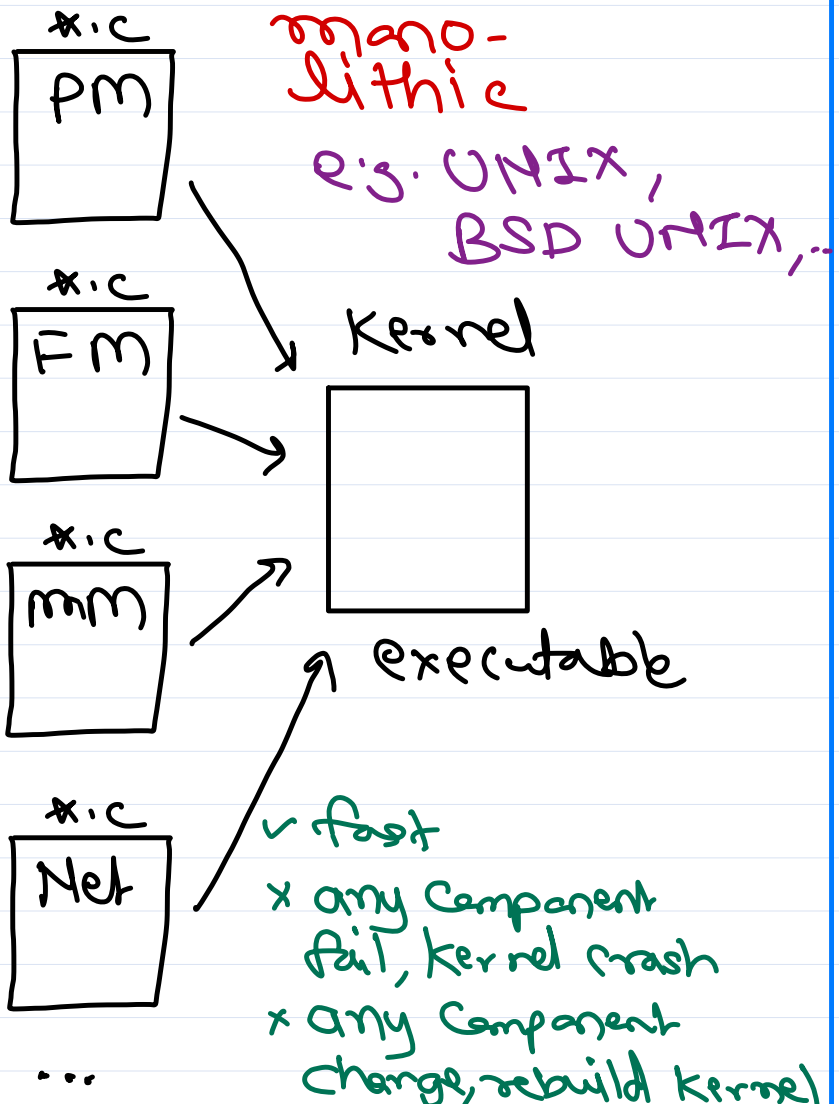
e.g. windows - ntldr (legacy), bootmgr (vista+)

- Linux - (GRUB or LILO)
- Mac OS X - Bootcamp
- Solaris - SILO
- BSD Unix - BTX

④ POST
- Program from BIOS Rom that execute when computer power on.

⑤ Bootstrap loader
- Program from BIOS Rom that find the bootable device i.e. p.d. or disk or ...

OS Kernel Types



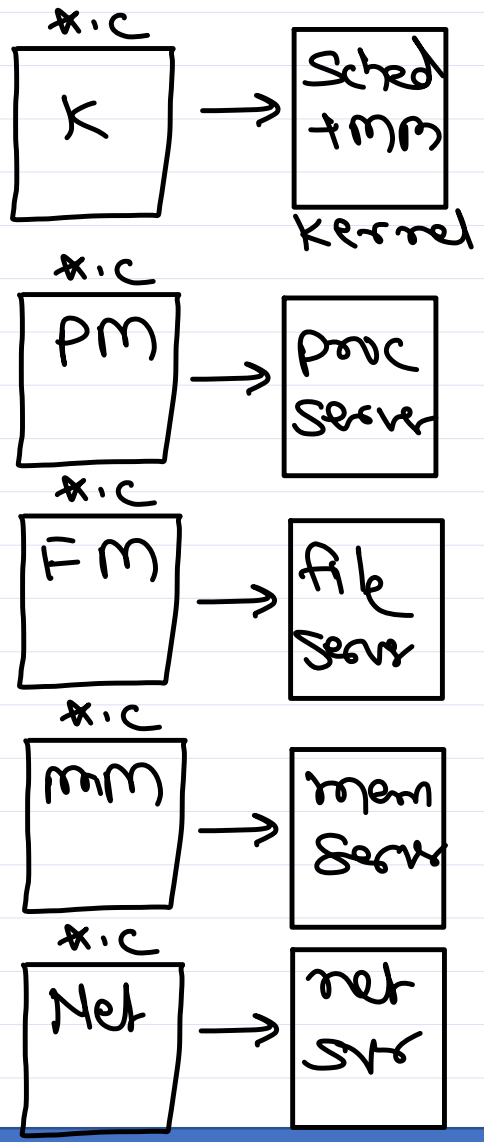
mono-lithic

e.g. UNIX, BSD UNIX,...

✓ fast

✗ any Component fail, kernel crash

✗ any Component change, rebuild kernel



micro Kernel

✓ main kernel is small

✓ other fun... separate exe (servers)

✓ Kernel & Servers Communicate-IPC.

✓ Robust

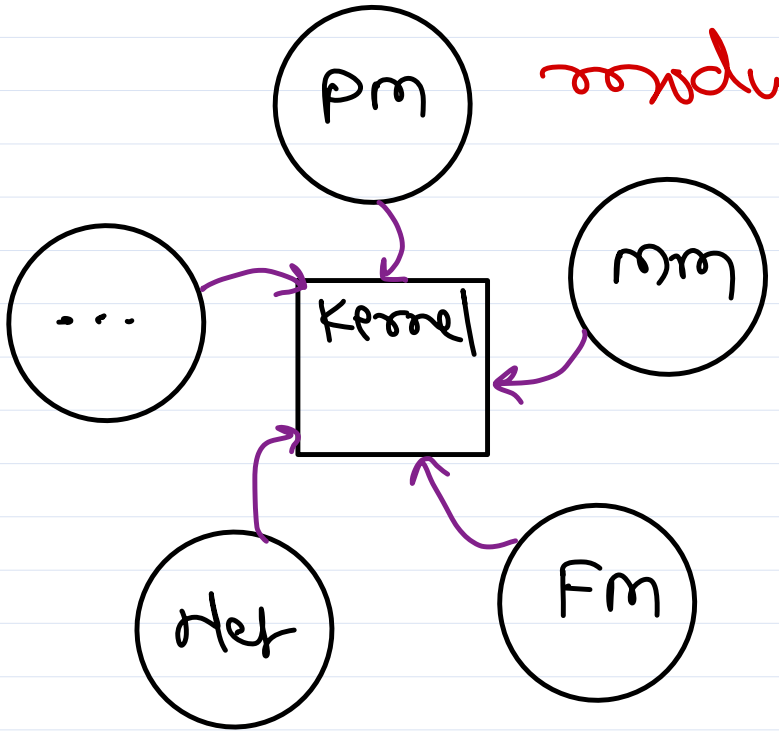
✓ any Component fail, only the Comp stop.

✓ any Component change, rebuild only that Comp.

✗ Slower exec.

e.g. Symbian, MACH, QNX, ...

OS Kernel Types



modular, e.g. Windows, ...

- ✓ each Component is loadable module.
- ✓ when fn needed, module load in kernel at runtime, & execute in kernel process.

- ✓ since only one process, no Ipc need.
- ✓ execution faster.
- ✓ any Comp. change, only Compile that Comp.
- ✗ any Comp. fails, whole kernel crash.

Hybrid

made form multiple kernel source codes.

e.g. Mac OS X

= BSD Unix a.k.a. Darwin (UCB) → Unix + MACH (CMU) → mm

Linux Kernel

- mainly - monolithic
- static components
  - mem mgmt
  - cpu sched
  - process & thread mgmt
  - system calls
  - ...

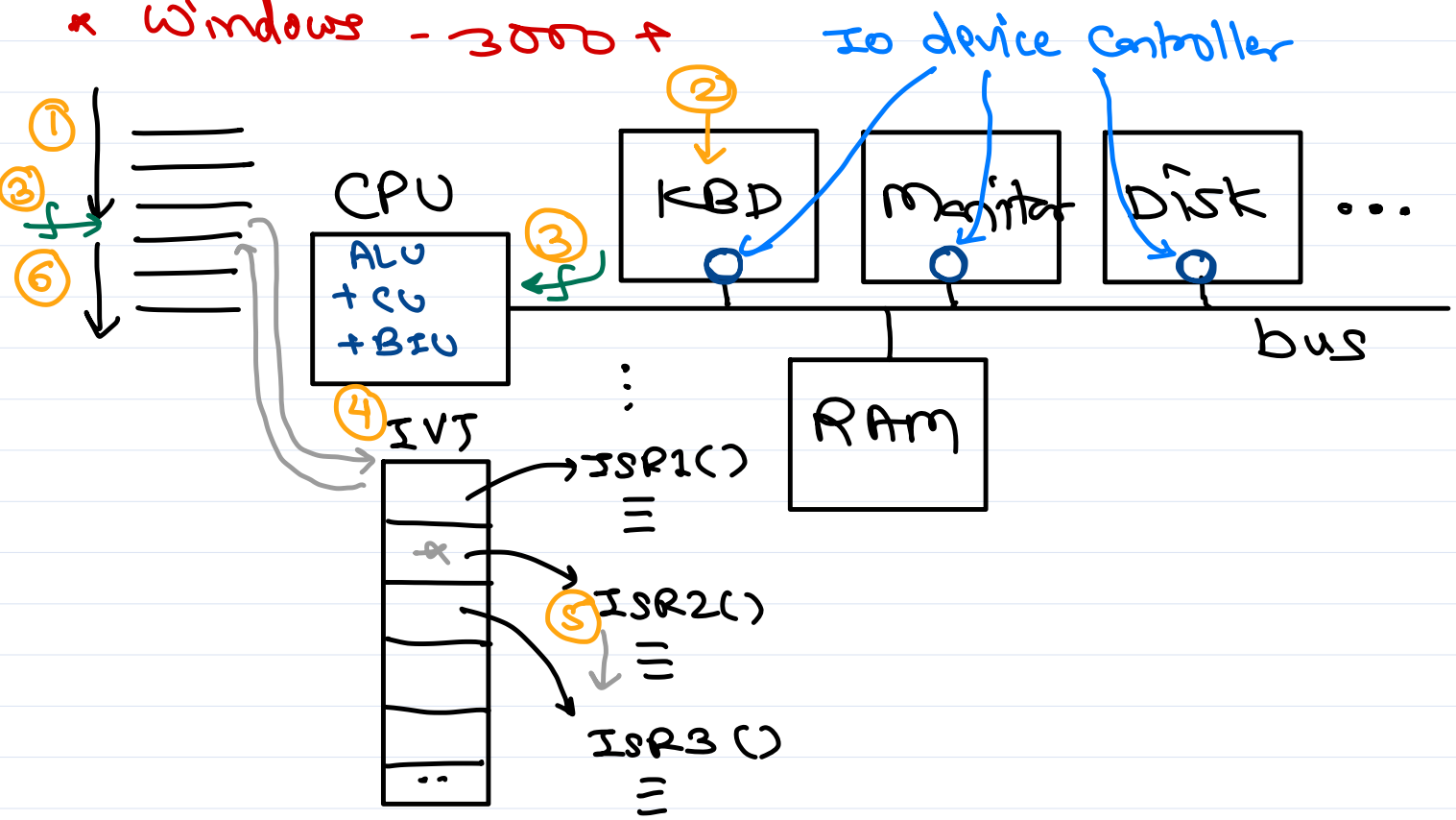
  → vmlinuz (kernel executable) → /boot dir | monolithic
- dynamic components
  - file system (drivers).
  - device drivers.

  → *.ko (kernel modules) → /lib/modules dir | modular.

* kernel source code: www.kernel.org.
  code repo: github.com

System calls

* fns exposed by kernel so that user pgm access. kernel fn.
* UNIX - 64 sys calls
* Linux - 300+
* Windows - 3000+



Thank you!

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