

1. Survival Kit

- Technical Appendix: *l'annexe*
- The Shell and Classical UNIX Filters: cf. INF422
- Helper Tools for System Programming

Help Yourself

UNIX `man` pages

- Read `man` pages:
<http://www.linuxmanpages.com> or <http://linux.die.net/man>
 - ▶ Quick reference in French:
<http://www.blaess.fr/christophe/documents.php?pg=001>
 - ▶ **BusyBox**: shell for embedded systems:
<http://www.enseignement.polytechnique.fr/informatique/INF422/busybox.html>
- Command-line usage
 - ▶ `$ man 1 command` (UNIX command)
 - ▶ `$ man 2 system_call` (primitive system calls)
 - ▶ `$ man 3 library_call` (e.g., C library, system call front-end stubs)
 - ▶ Warning: multiple entries with the same name may appear in different sections of the `man` pages
→ run `$ man -k name` if you are not sure
 - ▶ The **SEE ALSO** section at the bottom of most `man` pages is an important way to navigate through this valuable source of precise/reference information

C Language and Standard Library

This Is Not a Programming Course

You may like C or not...

But C and Operating Systems are meant to work together

There is no choice but to learn and practice it!

Getting Help

- Definitive reference: C language book by B. Kernighan and D. Ritchie
- Use quick reference card and online C tutorial (see INF583 web page)

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Processes and System Calls

Processes: `ps/pstree`

- All processes: `ps -ef` or `ps -efww` (full command line)
- Easier to use `pstree` to inspect child threads

System Call Trace: `strace`

- Traces the sequence of system calls (with their arguments and return status)
- Verbose, but fast and useful to debug concurrent programs

Open files: `lsof/fuser`

- List open files
- List processes using a specific file

Other Helper Tools

Debugger: `gdb`

- Read the technical appendix (*l'annexe*), page 93
- Always compile with `-g`

Project manager: `make`

- A `Makefile` is provided with the labs
- You are encouraged to learn how to write one and extend it if needed

Shell and Internationalization Tricks

- Learn the basic functions of your *shell*
Which shell am I using? `$ echo $SHELL`
- Hint: switch to another language (to English a priori)
With `tcsh`: `$ setenv LANG C` or `$ setenv LANG fr_FR`
With `bash`: `$ export LANG=C` or `$ export LANG=fr_FR`
List internationalizations: `$ locale -a | more`