

Informatique

Operating Systems

IDENTIFICATION

CODE : IST-4-OPS
ECTS : 3.0

HOURS

Lectures : 0.0 h
Seminars : 20.0 h
Laboratory : 0.0 h
Project : 0.0 h
Teacher-student
contact : 20.0 h
Personal work : 20.0 h
Total : 40.0 h

ASSESSMENT METHOD

- Programming project [C/Linux]. Computers are provided, but there is no dedicated lab session in the schedule.
- Short MCQ quizzes during each lecture.
- Written exam [1h].

TEACHING AIDS

TEACHING LANGUAGE

English

CONTACT

M. SALAGNAC Guillaume
guillaume.salagnac@insa-lyon.fr
Phone : 0472436413

AIMS

The aim of the course is to present the fundamental concepts and issues in the topic of operating Systems. We will first take a short historical tour of computer systems and discuss why operating systems were introduced. We will then describe the major components and abstractions of a general-purpose OS. Finally, we will address the programming interfaces of many operating systems based on processes, various interprocess communication techniques and scheduling of processes.

CONTENT

- using the unix command line: terminal, shell, commands, files vs directories, ls, cd, mkdir, cp, mv, rm
- compiling and debugging a C program: gcc=c++cc+as+ld, objdump, gdb, breakpoints, single-stepping, examining memory.
- introduction to the C language: syntax, variables, types, control structures (if, for, while), functions, formatted output with printf
- arrays and pointers: pointers and addresses, arrays, strings, passing command-line arguments to your programs
- processes, kernel and system calls, userland, processes
- file input/output: file descriptors, open/close/read/write syscalls, stdio streams, fopen/fgets/etc, buffering
- memory allocation: static vs dynamic, globals / stack / heap, malloc, structured data types, linked lists

BIBLIOGRAPHY

- [1] Operating System Concepts Essentials, A. Silberschatz P. Galvin and G. Gagne, Wiley.
- [2] The C Language. Brian W. Kernighan, Dennis M. Ritchie.
- [3] Computer Organization and Design. David Patterson, John L. Hennessy.

PRE-REQUISITE

- Computer architecture: registers vs ALU, CPU vs bus vs memory, the Von Neumann cycle, address space vs memory size, hexadecimal notation and powers of two.
- Computer programming: control flow and variables, functions, loops, simple data structures such as arrays and linked lists.
- C language: write, run and debug simple programs on linux. design data structures including pointer fields, strings.

INSA LYON

Campus LyonTech La Doua

20, avenue Albert Einstein - 69621 Villeurbanne cedex - France
Phone +33 [0]4 72 43 83 83 - Fax +33 [0]4 72 43 85 00

www.insa-lyon.fr