Operating Systems, Prof. Philippe Cudré-Mauroux, Inès Arous

Handout

# Series S01: Introduction

1. **Shopping and Reading**

- Get [Tan 06, Tan 14] and browse them.
- Read [Tan 14] chap 1.3 pp. 20-35: Computer Hardware Review, chap 1.5.1, pp 39-41 : Processes, chap 1.6.1 System calls for Process management
- Study [Tan 14], chap 1.1 pp. 3-6: What is an operating system? [Tan 06], chap 2.5, pp. 112-124: Overview of processes in Minix 3.

1. **Course Registrations (mandatory!)**

a) Subscribe to the Course:
`my.unifr.ch`

b) Subscribe to the Moodle module :
`https://moodle2.unifr.ch/course/view.php?id=17314`

Enrollment Key: `os`

1. **Linux Installation**

Install Linux Debian inside a VirtualBox by following the instructions described in [1].

If you did not succeed, please prepare a description about the steps you carried out, at which point you failed and what you have observed.

We will have a look at your system next course, no need to hand in anything. Except if you had any problems just write a short paragraph at which step you failed and why you think it does not work.

2. **Theoretical questions:**

a. What is the difference between kernel and user mode? Explain how having two distinct modes aids in designing an operating system.

b. Which of the following instructions should be allowed only in kernel mode?

(a) Disable all interrupts.

(b) Read the time-of-day clock.

(c) Set the time-of-day clock.

(d) Change the memory map.

c. Virtual machines have become very popular for a variety of reasons. Nevertheless, they have some downsides. Name one.

3. **Practical questions:**
    a. Collect the following basic information about your machine: How many CPU cores does the machine have? How much memory, and what fraction of it is free? Name the command you used and explain briefly the output.
    b. A process is basically a program in execution. Associated with each process is its address space, a list of memory locations from 0 to some maximum, which the process can read and write. Open a bash shell. Find its pid. Write down the process tree starting from the first init process (pid = 1) to your bash shell and describe how you obtained it.

**Hand-in:** Upload your answers on Moodle

**References**

[1] Moodle > Tutorials "L01_Linux_First_contact"
[Tan 06] Andrew S. Tanenbaum, Albert S. Woodhull, "The MINIX book - Operating Systems: Design and Implementation", 3rd ed, Pearson / Prentice Hall 2006.
[Tan 14] ANDREW S. TANENBAUM HERBERT BOS, "Modern Operating Systems" 4th ed, Pearson Prentice-Hall 2014