

# Sistemas Operativos: Apresentação

## Operating Systems: Introduction

2º MIEIC

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# Staff

## Lectures

- ▶ Prof. Pedro Ferreira do Souto [pfs@fe.up.pt](mailto:pfs@fe.up.pt)

## Labs

- ▶ ???
- ▶ Prof. Pedro Ferreira do Souto

# Objectives

Upon successful completion of this class you should be able to:

1. Describe the role of an operating system (OS) and identify its main abstractions;
2. Enumerate the main components of an OS and how they can be assembled into an OS;
3. For each of these components, explain its functionality, the key issues in providing its functionality and the main algorithms used in its implementation
4. Develop programs that use the operating system API
5. Explain what are the main issues in concurrent programming and the mechanisms used to overcome these issues
6. Develop concurrent programs without race conditions
7. Develop device-drivers for the Linux OS

# Prerequisites

- ▶ Programação 1 and Programação 2
  - ▶ In the lab classes you'll program a lot in C
- ▶ Computadores
  - ▶ The OS is the software layer that interacts directly with the HW

# Syllabus

## Operating Systems

- ▶ Mechanisms and principles
- ▶ OS API
- ▶ Linux device drivers

## Concurrent Programming

# Method

## Lecture classes

- ▶ Exposition of the key concepts and algorithms
- ▶ Hints for solving the lab exercises

## Lab classes

Reinforce the concepts taught in the lectures

## Small programming assignments

- ▶ With `gcc` in Linux

## One project

- ▶ Development of a Linux device driver

**Note** The project should be done in groups of 2 students.

- ▶ Most of the development will occur in May
- ▶ Different members may have different grades
  - ▶ Based on contribution to project
  - ▶ Using piece-wise linear function with breakpoints @ (33%, .85), (50%,1), (70%,1.1), (100%,1.1)

# Academic Integrity

- ▶ UP, FEUP and we take academic integrity very seriously
  - ▶ Check out the [Declaração de Princípios sobre a Integridade Académica na UP](#)
- ▶ Most likely the project will be that of last year
  - ▶ The purpose of the project is that you learn by doing it, there is no reason why it must be different every year
  - ▶ We will use special tools to detect copying of project code you submit
  - ▶ You are accountable for your partner, unless you clearly state which part of the code is yours.

# Working Load

- ▶ SO has 6 ECTS, i.e. about 160 hours
  - ▶ Assuming 1 ECTS equal to 27 hours
  - ▶ Check out the [European Credit Transfer and Accumulation System \(ECTS\)](#)



# Bibliography

- ▶ Book in Portuguese
  - ▶ **J.A. Marques, P. Ferreira, C. Ribeiro, L. Veiga, R. Rodrigues**, *Sistemas Operativos*, 2<sup>a</sup> Ed., FCA
- ▶ Other OS textbooks, such as:
  - ▶ **Andrew S. Tanenbaum**, *Modern Operating Systems*, 3rd Ed., Prentice-Hal
  - ▶ **A. Silberschatz, P. Galvin and G. Gagne**, *Operating System Concepts*, 7th Ed.

both available in the library.

- ▶ Earlier editions of these books, or of similar books, are better than no book at all

# On-line Resources

- ▶ Online books,
  - ▶ **Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau**  
[Operating Systems: Three Easy Pieces](#)
  - ▶ **J. Corbet, A. Rubini and G. Kroah-Hartman,**  
[Linux Device Drivers, 3rd Ed.](#), O'Reilly
- ▶ Course web page: <http://web.fe.up.pt/pfs/aulas/so2019/>
- ▶ [Course page on Moodle](#)
  - ▶ We'll use the forum functionality for the project
    - ▶ No code sharing, except if requested by staff
    - ▶ You can still help each other, by suggesting ideas or algorithms

# Grading

1. Final exam (F) in Moodle
  - ▶ One cheat sheet
    - ▶ A4 (both sides is OK)
    - ▶ **Handwritten by yourself**
2. Programming test (PP) (provisionally April 14th, Tuesday after Easter, but needs approval)
3. The project (Pr) must be demonstrated in the first class of the semester after its submission (provisionally May 22nd @ 20:00)
  - ▶ Different members may have different grades
4. Class participation (PA), including forum on Moodle

Formula  $0.5 F + 0.2 PP + 0.2 Pr + 0.10 PA$

**Thank You!**  
**Questions?**

# Announcements

## Classes

- ▶ Start 10 minutes after the hour, i.e. 14:40 on Wednesdays and 8:40 on Thursdays
  - ▶ Please be punctual: 5 minutes is 10% of 50 minutes

## Labs

- ▶ Start next week.

## Important Dates (provisionally)

<b>What</b>	<b>Date</b>
Programming Test	April, 14th (Tuesday)
Project	May, 22nd @ 20:00

- ▶ Project demo in the first lab class after due date.