ARCOS Group
Computer Architecture Area
University Carlos III of Madrid

Operating Systems Design
Bachelor in Computer Science and Engineering

Course Presentation

Motivation

- Software installed in every system:
  - Operating System: Software oriented to allow user and hardware communication and to manage resources friendly and efficiently.
- Software in continuous evolution:
  - New user demands (voice, multi-touch, etc.)
  - New hardware devices (controller's, multi cores, virtualization, etc.)
  - Integration with new environments (network, cloud, etc.)
- OS is system software and more:
  - Multidisciplinary software (user interfaces, security, etc.)
  - Complex software needs advanced techniques (SW engineering, project planning, etc.)





Contents

- **Course features**
- Information sources
- Course organization
- Evaluation system

Course goals

- COMPUTER SCIENCE AND ENGINEERING DEGREE
  - **OPERATING SYSTEMS DESIGN**
- To allow the student know and understand the organization, structure and internal view of the OS, to acquire skills to design OS elements, and to explain the impact of the design decisions on the behavior and performance of a computer system.

Course Syllabus

- 1. Introduction
- 2. How the Operating System works.
- 3. Processes, drivers and extended services.
- 4. File Systems design.
- 5. Memory management.
- 6. Advanced concepts

Previous knowledge

- Operating Systems Basics
- Computer organization
- Programming
- Data Structures and Algorithms
- Software Design Principles
- Information retrieval & presentation techniques

Students **must** review and re-study the previous knowledge

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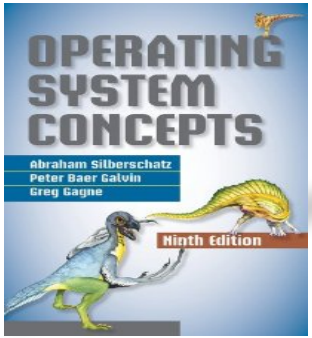
Aula Global

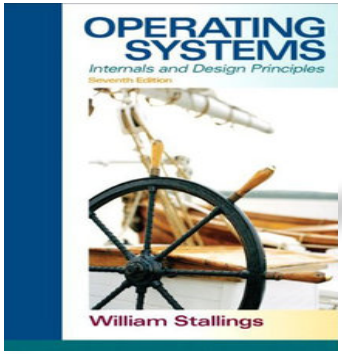
- https://aulaglobal.uc3m.es/

- Aula Global virtual platform will be used to publish the course official materials (slides, exercises, projects, quizzes, etc.) and rules (evaluation, description, office hours, etc.)
- Moreover it provides messages for notifications to students and forums to allow student cooperation and to provide answers to FAQ.

Primary references



- Operating system concepts.
  A. Silberschatz,
  P. Galvin, G. Gagne,
  McGraw-Hill,
  2012 (9ª ed)
- **In e-format in the UC3M library**



- Operating Systems: Internals and Design Principles
  William Stallings,
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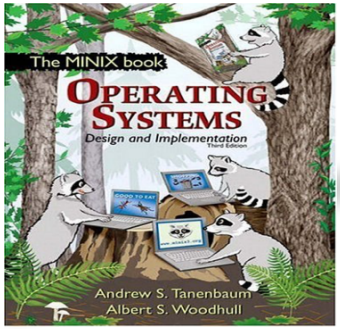
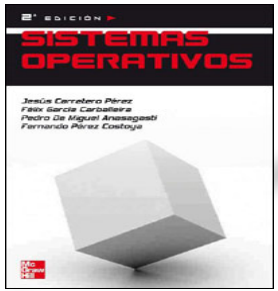


- Operating Systems. Design and implementation
  A. S. Tanenbaum,
  A. S. Woodhull
  Prentice Hall,
  2006 (3ª ed)

Additional references



- Sistemas Operativos: una visión aplicada (segunda edición)
  Jesús Carretero Pérez,
  Félix García Carballeira,
  Pedro de Miguel
  Fernando Pérez.
  McGraw-Hill, 2007

- Problemas de Sistemas Operativos: de la base al diseño.
  Jesús Carretero Pérez,
  Félix García Carballeira,
  Fernando Pérez Costoya,
  MacGraw-Hill, 2003

Teaching Staff

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Sabatini, 2.2B17

David del Rio
Sabatini, 2.2B08

- Theory:
  - Lectures teaching
  - Exercises and quizzes
  - Evaluation of the theory concepts and their application
- Projects:
  - Development of projects
  - Project presential sessions
  - Evaluation

Classroom and Schedule

- **Theory classroom:**
  - Mondays 09:00 – 10:50 Room: 4.1 E 02
- **Labs**
  - Tuesdays 09:00 – 10:50 Room: 2.2 C 05

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Lectures distribution

- 18 weeks semester:
  - 14 weeks class activities.
  - 1 week for tutoring, extra work, review, etc.
  - 2 weeks for students to prepare evaluation
  - 1 week for evaluation

  - Detailed weekly planning in Aula Global

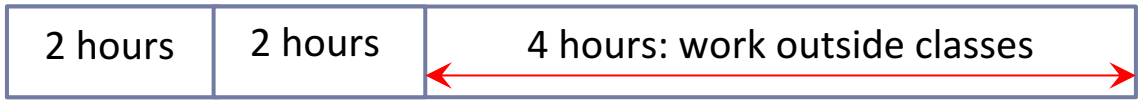
Clasroom formative activities

- Lectures
  - One per week (2 hours)
  - Mostly theory
- Labs and problem solving:
  - One per week (2 hours)
  - Applying concepts, solving exercises, lab assignments, quizzes, programming assignments, …
- Extra sessions
  - Help with the programming assignments

Student formative activities

- Tutoring and office hours
  - To clarify questions at professor office.
- Student personal work
  - Understanding concepts and basics.
  - Solving exercises and programming assignments.
  - Preparing presentations.
  - Extra reading and preparation for evaluation.

Weekly effort needed



- The course requieres 8 working hours per week.
- ATTENDING THE CLASS ONLY IS NOT ENOUGH
  - New concepts (some of them are difficult).
- Personal work: minimum of 4 hours per week
  - Read the weekly planning

IMPORTANT:

Work from the start of the course, do not wait until the deadlines!

Main Activities

- Two programming assignments
  - In groups, maximum three students
- Three hands-on assignments
  - Guided
  - Published in Aula Global
- Quizzes

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- **Evaluation system**

Student evaluation

- The grading will be done either through:
  - a continuous evaluation process

Hands-on Labs + Extra assignments + Programming Assignments + Semester Exam. Ordinary session

  - or through a final exam in the ordinary session

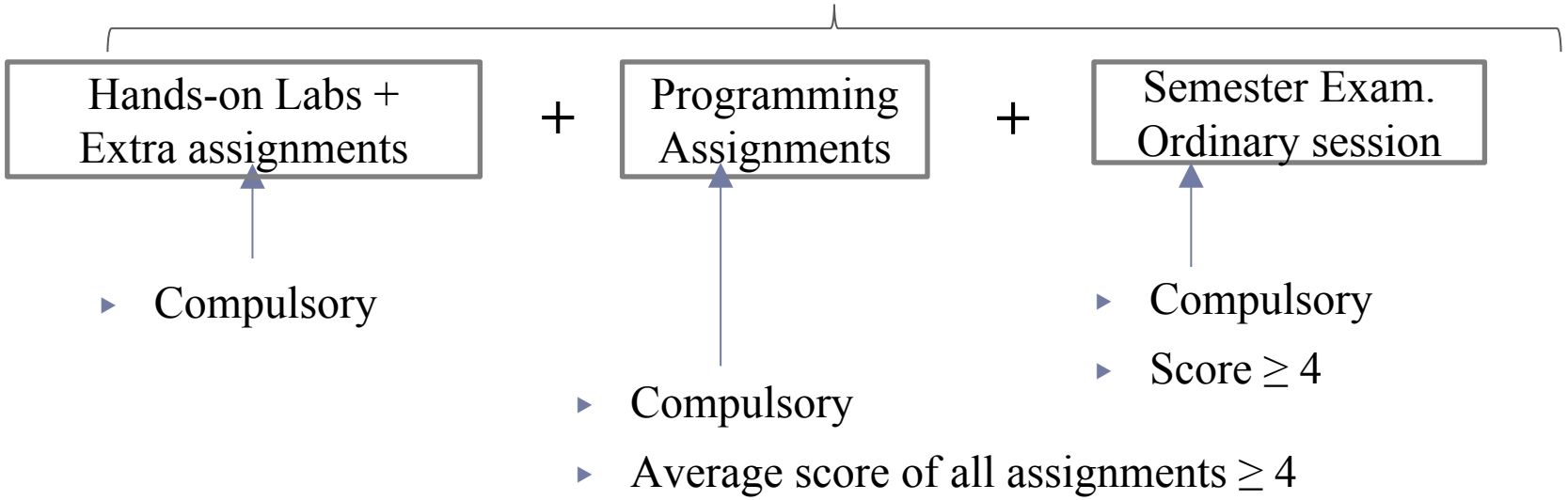
Semester Exam. Ordinary session

  - or through a final exam in the extraordinary session.

Semester Exam. Extraordinary session

Student evaluation

- The grading will be done either through:
  - a continuous evaluation process

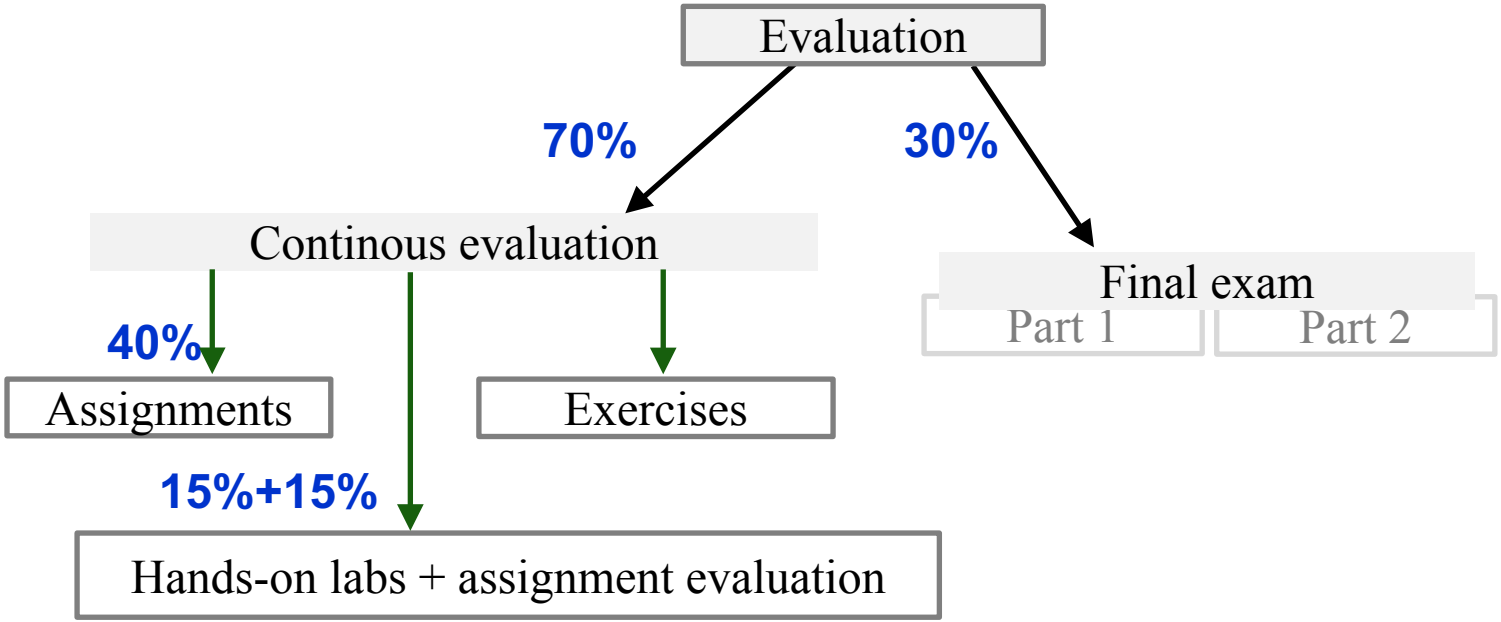


Student evaluation

1. Ordinary exam
   - With continuous evaluation
   - Without continuous evaluation
2. Extraordinary exam
   - With continuous evaluation
   - Without continuous evaluation
3. Anticipated exam
   - If aproved

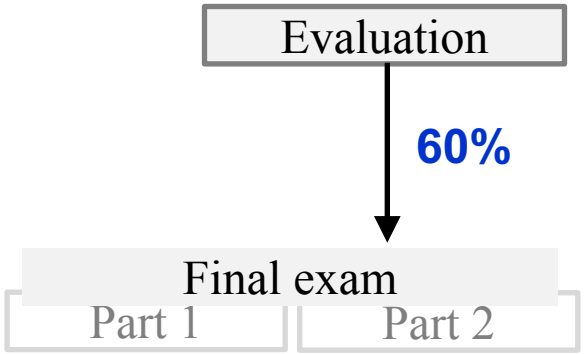
Student evaluation

1. Ordinary exam (1/2):
   - With continuous evaluation



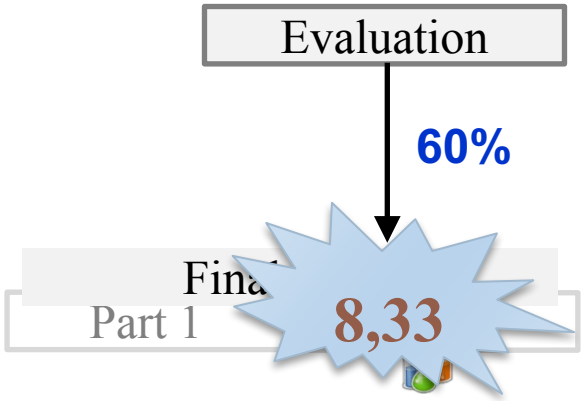
Student evaluation

1. Ordinary exam (2/2):
   - Without continuous evaluation



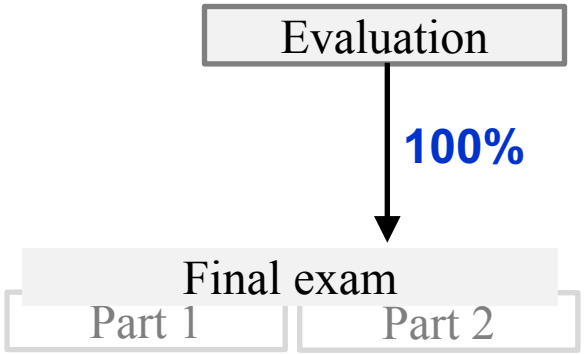
Student evaluation

1. Ordinary exam (2/2):
   - Without continuous evaluation



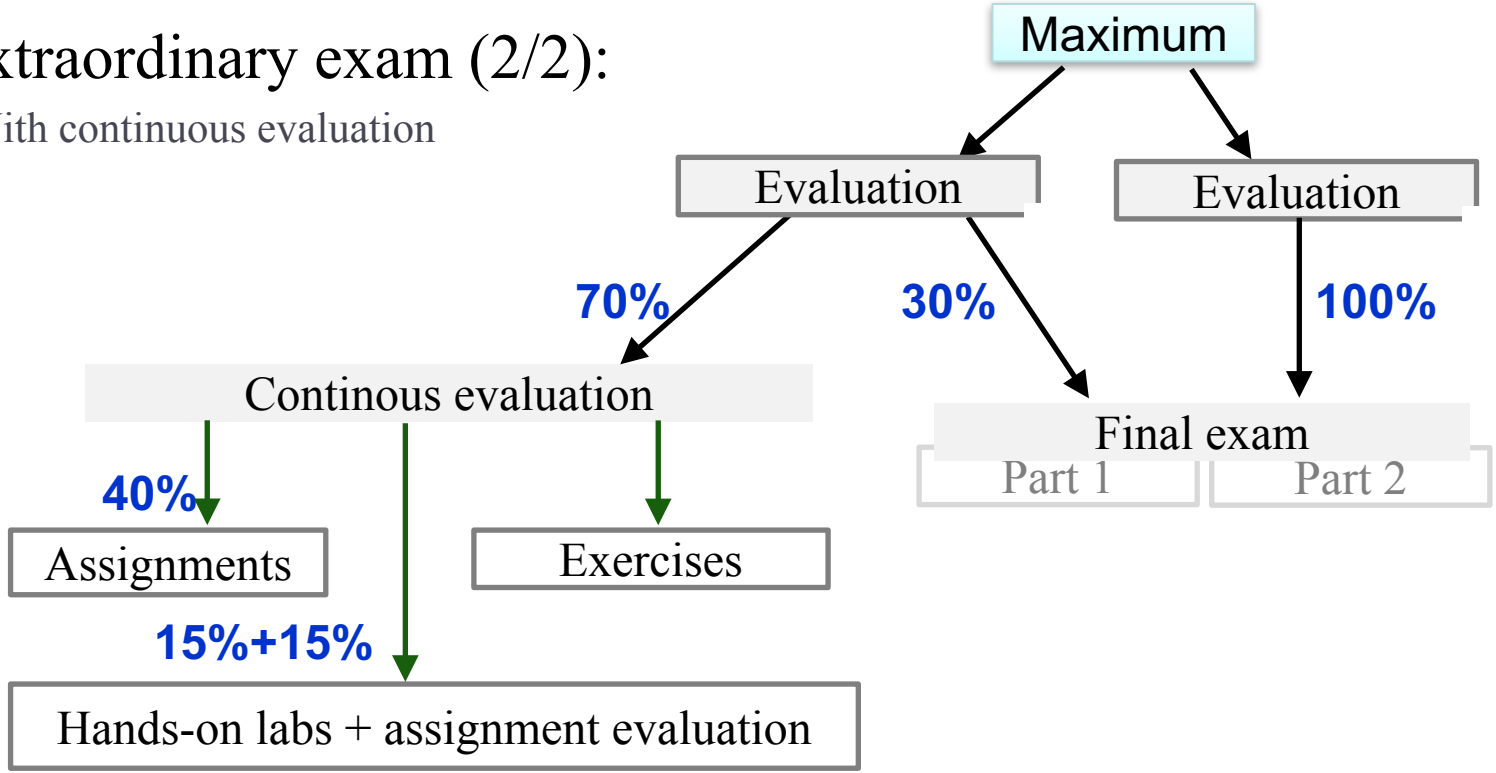
Student evaluation

2. Extraordinary exam (1/2):
   - Without continuous evaluation



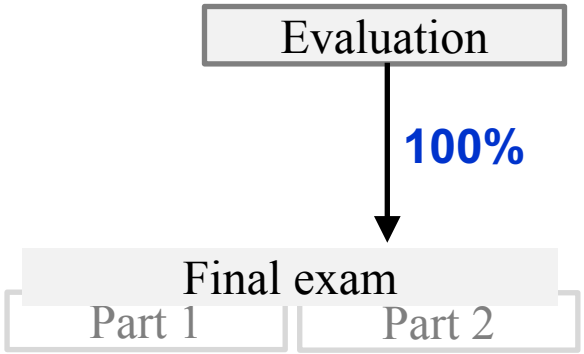
Student evaluation

2. Extraordinary exam (2/2):
   - With continuous evaluation



Student evaluation

3. Anticipated exam
   - Has to be approved according to university rules



Questions?

THANK YOU!