Systems programming

MEEC /MEAer – 2019/2020

Offering

- MEEC (Electrical Engineering)
  - 3rd / 4th year Computer's Major/Minor
- MEAer (Aerospace Engineering)
  - Avionic

Objectives

- Present concepts of systems programming
- Exercise direct interaction with the OS
- Increase knowledge on the organization and systems interface
- Explore tools and functionality for good SW development practices

Classes

- Theoretical
  - Presentation of course material
  - Resolution of some problems (with programming)
- Laboratories
  - Resolution of programming problems

Classes

- Theoretical
  - Monday 12:30.. 14:00 – EA2
  - Wednesday 11:00 – 12:30 - EA1
- Laboratories
  - SCDEEC
  - Tuesday – 9:30 .. 11:30
  - Tuesday – 11:30 .. 13:30
  - Friday – 15:30 – 17:30
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  - Wednesday – 14:00 – 16:00
  - Friday – 10:30 – 12:30

Teaching Staff

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Student profile

- Course
  - MEEC
  - MEAer
  - MEFT
  - MMA
- Previous knowledge
  - Programming language
    - C
  - Operating Systems (user level)
  - Networking sockets (not required)

Evaluation

- Project
  - 50% of final grade
  - Minimum grade – 10
  - Last week
    - presentation and discussion of projects
- Exam
  - 50% of final grade
  - Minimum grade - 9

Academic honesty

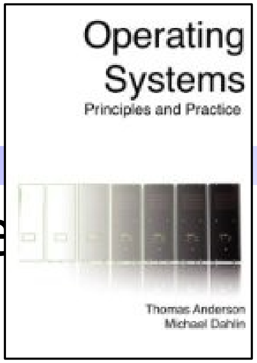
- In PSIS plagiarism includes:
  - Use of ideas, code or solutions from other students, person or source, without proper credit acknowledgement
- Students can discuss their problems with other colleagues, but should mention that in the submitted work. This discussion will not lower the grade
- BUT:
  - Students should not copy code from or provide solutions to other colleagues

Academic honesty

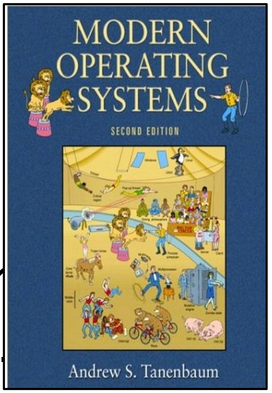
- Academic dishonesty also included copying in test or exams
- Exams are solved without any external help(communication of printed material)

- Academic dishonesty is considered fraud.
- The immediate consequence is the automatic fail in the evaluation where a copy of fraud was detected

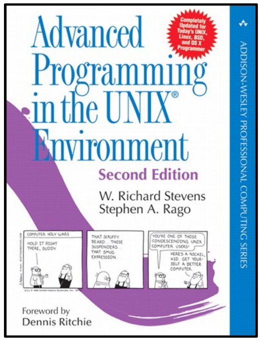
Bibliography



- Operating Systems: Principles and Practice
  - Michael Dahlin, Thomas Anderson



- Modern Operating Systems; A.S. Tanenbaum; Prentice-Hall
  - Theoretical classes
- Advanced Programming in the UNIX Environmen ; W. Richard Stevens, Stephen A. Rago; Addison-Wesley
  - Used in laboratory and project


Advanced Programming in the UNIX® Environment
Second Edition
W. Richard Stevens
Stephen A. Rago
Foreword by
Dennis Ritchie
ADDISON-WESLEY PROFESSIONAL COMPUTING SERIES

- Other
  - Papers, book chapters
  - Provided in the FENIX

System

- A system is a set of interacting or interdependent components forming an integrated whole.
- Delineated by its spatial and temporal boundaries,
- Surrounded and influenced by its environment
- Described by its structure and purpose
- Expressed in its functioning.

System Programming

- Understanding of a System
  - e.g. Operating System
- Use of a System
  - e.g. Operating System
- Development/implementation of a System
  - project

Systems programming

- Fundamental in the area of computer networks
  - And Distributed Systems / Internet
- Presents the interface and connection between:
  - Hardware (CPU/ memory/ peripherals)
  - Applications
- Relevant in other areas
  - Telecommunication
  - Control

Program

- Systems
- Architectures and patterns
- Operating System Architectures
- Operating System programming
  - Process management
  - Threads
  - Synchronization
- Communication
  - Shared memory
  - Inter-process communication
  - Data Interoperability
- Performance evaluation
- Event based programming
- Interoperability mechanism
- Introduction to Software engineering
  - Requirements
  - SYSML
- Software testing

- C review
- Processes and shared memory
- Threads and Synchronization
- IPC
- Performance evaluation
- Thrift/ProtocolBuffers/ Avro
- SW development tools
- Software testing