Operating Systems

Introduction to the Operating Systems Course

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Operating Systems course

Stefano Scanzio

skenz.it/ss

Operating Systems (01JEZBV)

(6 credits, 60 hours)

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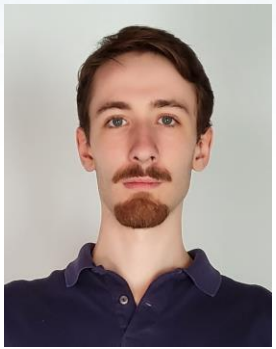
www: https://www.skenz.it/ss

(link to courses, CV, publications, theses)

Assistants



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Material

- Slides, information, programs, tutorials, previous exam texts, labs assignments and solutions, can be found at the address:

  https://www.skenz.it/os

- Slides:
  - u = unit
  - s = section
  - e = exercise

(Available progressively during the course)

Communication

- Telegram group:
  - https://t.me/+n65bvsfLHGg1Y2Fk

- Open to other communication services.

Introduction

- Organization
  - Schedule
    - Lesson/Practice: 1 block of 4.5 hours (Wednesday)
      - not always used, see https://www.skenz.it/os for the updated calendar
    - Laboratory: 4 block of 1.5 hours (see calendar)
      - Friday 13:00-14:30 from surname A to D
      - Friday 13:00-14:30 from surname E to K
      - Monday 13:00-14:30 from surname L to Q
      - Tuesday 14:30-16:00 from surname R to Z
  - There is no formal distinction between teaching and practice hours
    - Theory is introduced, and examples and exercises can be illustrated in the same block

Introduction

- Organization
  - Lesson/Practice
    - In classroom
      - Concurrently transmitted in VC (try to attend in classroom)
        - Not guaranteed in case of technical problems
        - Not guaranteed the possibility to ask questions remotely
        - Recorded lectures will be provided as backup lessons (if too many students will not attend the lectures, they will be provided at the end of the course)
  - Laboratories
    - In-person in the LAIB

Laboratories

- Laboratory (**really important complement to theory**)
  - Practice with Linux operating system
  - Application of the theoretical aspects on Linux
  - Script programming (bash)

- Some other informations:
  - Possibility to use virtual machines (VM) running remotely at Polito
    - Guide to run VM will be provided in the course website

Introduction

- Topics
  - Introduction to Operating Systems
  - Processes (concept, control, signals, IPC, etc.)
  - Thread (concept, Pthread library, etc.)
  - Synchronization (s/w, h/w, semaphores, etc.)
  - Deadlock
  - Linux environment
    - Commands and system administration
    - Shell (UNIX/Linux command interpreter)
    - Scripting languages (bash)

Introduction

- Topics
  - Linux useful in many aspects of working life (systems engineers, web servers, scripting, data analysis, machine learning, ...)
  - *Preparing for Google Technical Internship Interviews*
    - *...*
    - *Operating systems*
      - *You should understand processes, threads, concurrency issues, locks, mutexes, semaphores, monitors and how they all work. Understand deadlock, livelock and how to avoid them. Know what resources a process needs and a thread needs. Understand how context switching works, how it's initiated by the operating system and underlying hardware. Know a little about scheduling. The world is rapidly moving towards multi-core, so know the fundamentals of "modern" concurrency constructs*

Textbooks

- Textbooks
  - Theoretical aspects
    - A. Silberschatz, P. Baer, and G. Gagne, Operating System Concepts, Ninth Edition, John Wiley & Sons Inc., 919 pages, 2012, ISBN 978-1-118-06333-0
    - Andrew S. Tanenbaum, Modern Operating Systems, Third Edition, Prentice Hall, 1076 pages, 2009, ISBN 978-0-136-00663-3
  - UNIX/Linux environment
    - W. R. Stevens, and S. A. Rago, Advanced programming in the UNIX Environment, Third Edition, Addison-Wesley Publishing Company, 927 pages, 2013, ISBN 978-0-321-63773-4

Chapters 1-7, 11, 12 (9 chapters out of 17)

Alternative (+ concise, + technical)

In addition to the **slides**, most answers can be found on the **Internet**

Exam rules

- Exam rules
  - Using the university platform "Exam"
    - In classroom using your own PCs
  - It consists in 6 to 18 open or close questions
    - About topics presented in the lectures or developed during the classroom and laboratory practices
  - Test lasts about 120 minutes
  - Written test evaluated 36/30 points
    - Marks larger or equal to 32 or 33 (depending on the exam)
    - Converted in "30 with honor"

Exam rules

- Exam rules
  - Books and notes are not allowed
  - Cellular phones etc. are forbidden
  - The reference material provided if necessary
    - Directly in the "esami" platform
    - Such as 3 cheat sheets related to: shell commands, BASH and threads

Exam rules

- Exam rules
  - All students have to read the University regulations related to the exams
  - Obtain the necessary hardware and software tools needed for it (remember to check internet connection)
  - In case of irregularities, professors reserve the right to perform an oral verification