

```
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
```

```
#define MAXPAROLA 30
#define MAXRIGA 80
```

```
int main(int argc, char *argv[])
```

```
{
    int freq[MAXPAROLA]; /* vettore di contatori
    delle frequenze delle lunghezze delle parole */
    char riga[MAXRIGA];
    int i, inizio, lunghezza;
    FILE *f;
```

```
for(i=0; i<MAXPAROLA; i++)
    freq[i]=0;
```

```
if(argc != 2)
```

```
{
    fprintf(stderr, "ERRORE, serve un parametro con il nome del file\n");
    exit(1);
}
```

```
f = fopen(argv[1], "r");
if(f==NULL)
```

```
{
    fprintf(stderr, "ERRORE, impossibile aprire il file %s\n", argv[1]);
    exit(1);
}
```

```
while( fgets( riga, MAXRIGA, f ) != NULL )
```

Operating Systems

Introduction to the Operating Systems Course

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Operating Systems course

Operating Systems (01JEZBV)

(6 credits, 60 hours)



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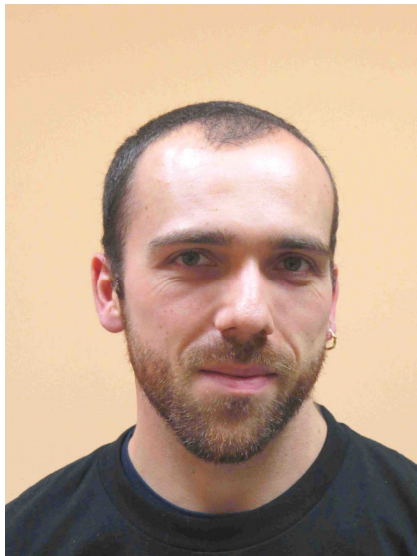
www: <https://www.skenz.it/ss>

(link to courses, CV, publications,
theses)

Assistants



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- ❖ 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/+rRJqH5Ofo0RiMTZk>

- ❖ 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: 3 block of 1.5 hours (see calendar)
 - Monday 16:30-17:30 from surname F to MA
 - Monday 17:30-19:00 from surname MB to MZ
 - Friday 17:30-19:00 from surname A to E
- 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
 - The introduction of one slot (i.e., Monday 16:30-17:30 or Monday 17:30-19:00 or Friday 17:30-19:00) of each laboratory will be transmitted on VC
 - which laboratory will be communicated later

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

Alternative
(+ concise,
+ technical)

- 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)

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 “exam” 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