

## Operating systems – survival guide for Erasmus students

*This document covers additional information regarding the course "Operating systems" for English-speaking students.*

*The information below is relevant for the academic year 2017./2018.*

### Required Reading

1. Silberschatz, A., P.B. Galvin, G. Gagne, „Operating Systems Concepts“, John Wiley&Sons, 2012 (9th edition)

### Exams

- two exams: midterm, final exam
- "required reading" material included in midterm:
  - Chapter 13, I/O (only 13.1, 13.2, 13.5)
    - exercises: 2, 5, 8
  - Chapter 3, Processes (except 3.6)
    - exercises: 1, 2, 5, 12, 13, 14, 17
  - Chapter 4, Threads (except 4.5 and 4.6)
    - exercises: 1, 4, 8, 10, 11, 15, 17, 21, 22
  - Chapter 5, Process Synchronization (except 5.9 and 5.10)
    - exercises: 3, 4, 5, 6, 7, 8 (without proof), 10, 14, 15, 19, 20, 21, 23, 32, 35, 41
  - Chapter 7, Deadlocks (only 7.1-7.4)
    - exercises: 10, 11, 13, 17, 25, 26
- the final exam includes material of the midterm exam and
  - Chapter 6, Scheduling (only 6.2, 6.3.1-6.3.5, 6.8, 6.9)
  - Chapter 8, Main Memory (only 8.1-8.5, 8.6.1)
  - Chapter 9, Virtual Memory (only 9.1, 9.2, 9.4)
  - Chapter 10, Mass-Storage Structure (only 10.1, 10.4)
  - Chapter 11, File-System Interface (only 11.1, 11.2)

### Homework assignments and laboratory exercises

- to be implemented using any programming language (C is preferred) and any operating system environment (Linux is preferred)
- to implement the assignments, we suggest using the virtual machine prepared by the book authors: <http://people.westminstercollege.edu/faculty/ggagne/osc/vm/index.html>
- [VirtualBox tool](#)
- How to prepare a USB with a virtual machine:
  - [how to create a virtual machine](#)
  - [xubuntu](#)
  - [how to export a virtual machine to USB](#)

### Homework 1: Interrupts and Signals

Interrupt routine simulation by using signals (chapter 13). The exercise is given at course web page ([http://www.fer.unizg.hr/\\_download/repository/lab1.htm](http://www.fer.unizg.hr/_download/repository/lab1.htm)) .

## Homework 2: Multithreading and Multiprocessing

Synchronization of

- a) two threads
- b) two processes

by using Peterson's synchronization algorithm (section 5.3). Let the critical section just output thread/process id data each second for 3 seconds.

## Homework 3: Synchronization

- a) Solve the bounded-buffer problem (chapter 5.7.1) by using semaphores (as described on pg. 253, Project 3)
- b) Solve the dining-philosophers problem (chapter 5.7.3) by using monitors (chapter 5.8) as described on pg. 252 (Project 2)

## Homework 4: Memory Management

Simulation of page replacement mechanisms (chapter 9.4). Write a program that simulates exercise 9.8 interactively (show frame contents step by step for each algorithm, each new page is read from the keyboard). Allow variable frame numbers (user choice).

## Grading

- overall grading defined at the web page (<http://www.fer.unizg.hr/en/course/os>)
- changes for English-speaking students: no points for Attendance and Quizzes (10 given), but 40 points for midterm exam (instead of 30)