

# DT271C - Operating Systems reading guide

## Introduction

Since I took over this course there was a need for an updated reading instruction/study guide. This will be it. My general recommendation is to read as much as you can in the book, MIT has two courses online covering topics that are related and interesting to our Operating Systems (OS) course coming from both a undergrad and systems point of view and a more advanced course covering even more of the actual programming than the textbook covers. I, of course, recommend these resources and others provided by the multitudes of Universities covering OS from different point of views.

I however understand that time is a rare resource for us all and therefore I will write a more concise instruction covering what the lectures cover and more in-line with what comes on the exam. Great for reading before lectures, great for reading before exams and/or when little time can be found.

I would also suggest that you read the summary of a chapter before and after reading the chapter. Before to increase understanding of why they teach that particular thing in that sub-chapter and after for memory retention.

Good luck!

# 1 Lecture 1 - Introduction

## 1.1 Intended learning outcome

- Understanding of what an Operating System (OS) is and its place in the computer system.
- System services.
- Kernels and dual-mode

## 1.2 Chapter 1

Recommended sections of chapter 1 are:

- Chapter 1.1 to 1.6

Over that I feel is advanced material but the chapter of Linux kernel data structure is a fun one, especially if you have done some kind of data structure/algorithm course there is a real value to it.

## 1.3 Chapter 2

Recommended sections of chapter 2 are:

- Chapter 2.1 to 2.4
- Chapter 2.7 to 2.10

The chapter 2.5 and 2.6 is of interest for general computer science I think, 2.5 especially if you like C.

# 2 Lecture 2 - Processes and CPU scheduling

## 2.1 Intended learning outcome

- Concept of a process
- Process states and context switching
- Scheduling algorithms

## 2.2 Chapter 3 Processes

Recommended sections of chapter 3 are:

- Chapter 3.1 to 3.6

## **2.3 Chapter 5 CPU scheduling**

Recommended sections of chapter 5 are:

- Chapter 5.1 to 5.3
- Chapter 5.8 to 5.8.1

If you have the time the real life examples and the multiprocessor scheduling is fascinating.

## **3 Lecture 3 - Threads and concurrency**

### **3.1 Intended learning outcome**

- Understanding multi-threaded processes
- The difference between parallelism and concurrency
- How threads are used in real life

### **3.2 Chapter 4 Threads and concurrency**

Recommended sections of chapter 4 are:

- Chapter 4.1 to 4.4
- Chapter 4.7

## **4 Lecture 4 - Synchronization**

### **4.1 Intended learning outcome**

- The critical section problem, definition and problems it causes
- Semaphores and Mutexes as signals for solving the critical section problem

### **4.2 Chapter 6 Synchronization Tools**

Recommended sections of chapter 6 are:

- Chapter 6.1 to 6.7

If you have the time reading the evaluation (chapter 6.9) is time well spent too.

## 5 Lecture 5 - Synchronization and deadlock

### 5.1 Intended learning outcome

- Deadlocks and their criteria
- Dining Philosophers problem
- Methods for dealing with deadlocks

### 5.2 Chapter 8 Deadlock

Recommended sections of chapter 8 are:

- Chapter 8.1 to 8.6

From the end of the chapter the 8.7 and 8.7 are interesting, but won't be checked on exam.

*Recommended exercises: 8.3 , 8.9*

## 6 Lecture 6 and 7 - Memory Management

### 6.1 Intended learning outcome

- Physical vs virtual memory
- Paging (pages and frames)
- Page swapping algorithms

### 6.2 Chapter 9 Main Memory

Recommended sections of chapter 10 are:

- Chapter 9.1 to 9.4

### 6.3 Chapter 10 Virtual Memory

Recommended sections of chapter 10 are:

- Chapter 10.1 to 10.4

With some emphasis on the end of chapter 10 where the basis of seminar 3 is described.

*Recommended exercises: First from lectures then 9.4, 9.7, 9.9, 10.20, 10.24*

## 7 Lecture 9 - Storage management

This lecture will map towards chapter 11 and 12 in the book. To be updated.

## 8 Lecture 10 - File System

This lecture will map towards chapter 13, 14 and 15 in the book. To be updated.