Lecture Note 0: Course Introduction

March 2, 2022
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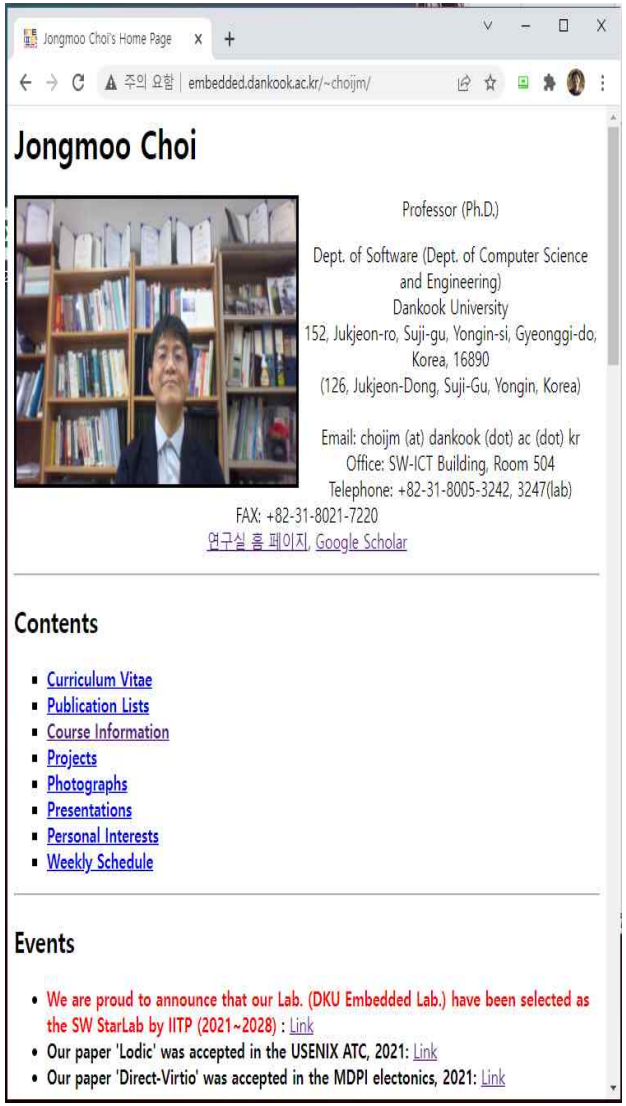
How to access lecture contents?

- Lecture site



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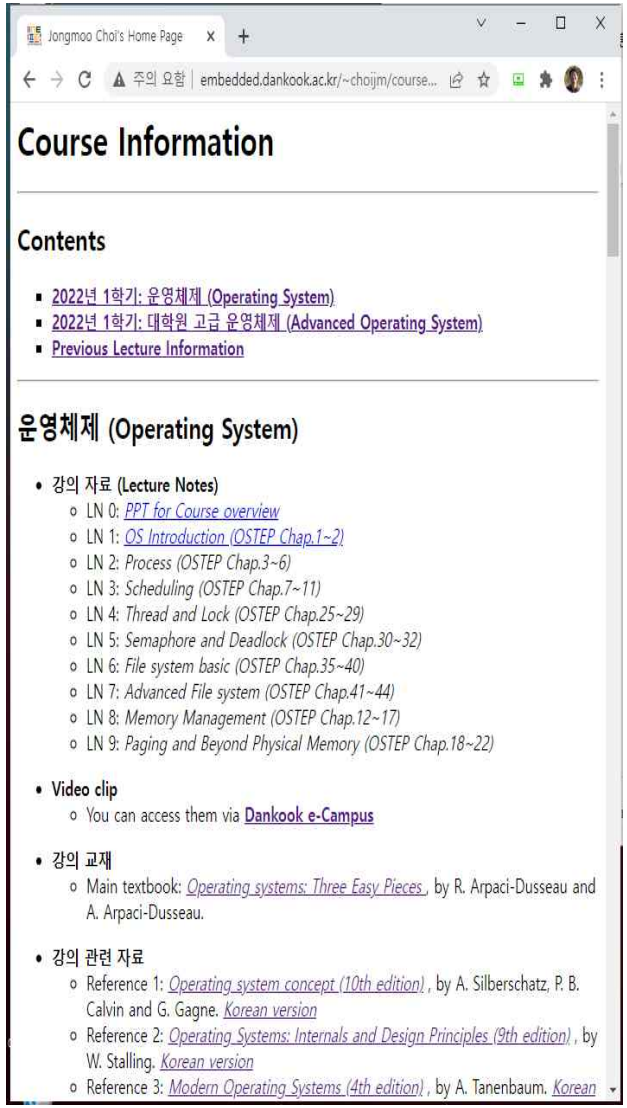

(lecture page)

(e-Campus (LMS))

What is Operating System?

- Definition (from wikipedia.org)

Jongmoo Choi's Home | Operating system - Wiki

안전함 https://en.wikipedia.org/wiki/Operating_system

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Operating system

From Wikipedia, the free encyclopedia

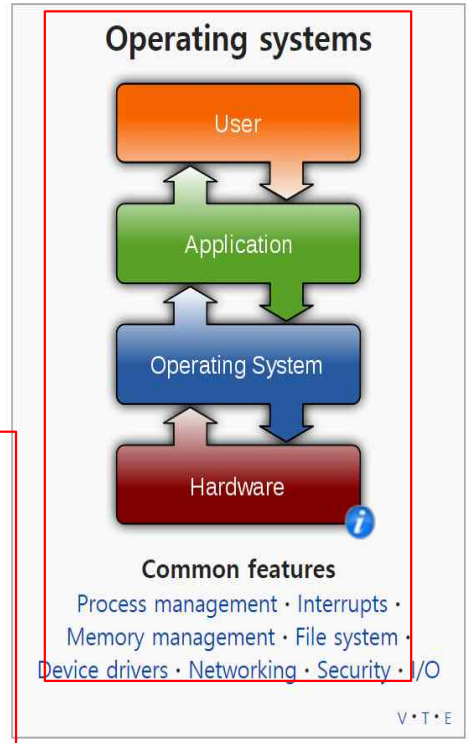
An **operating system** (**OS**) is system software that manages computer hardware and software resources and provides common services for computer programs.

Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing, and other resources.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware,[1][2] although the application code is usually executed directly by the hardware and frequently makes system calls to an OS function or is interrupted by it. Operating systems are found on many devices that contain a computer – from cellular phones and video game consoles to web servers and supercomputers.

The dominant desktop operating system is Microsoft Windows with a market share of around 82.74%. macOS by Apple Inc. is in second place (13.23%), and the varieties of Linux are collectively in third place (1.57%).[3] In the mobile (smartphone and tablet combined) sector, use in 2017 is up to 70% of Google's Android[4] and according to third quarter 2016 data, Android on smartphones is dominant with 87.5 percent and a growth rate 10.3 percent per year, followed by Apple's iOS with 12.1 percent and a per year decrease in market share of 5.2 percent, while other operating systems amount to just 0.3 percent.[5] Linux distributions are dominant in the server and supercomputing sectors. Other specialized classes of operating systems, such as embedded and real-time systems, exist for many applications.

Contents [hide]
1 Types of operating systems

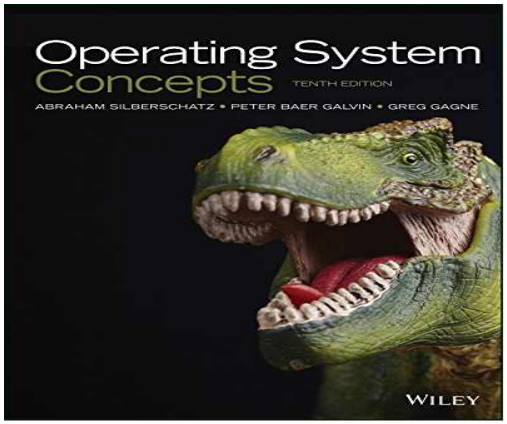


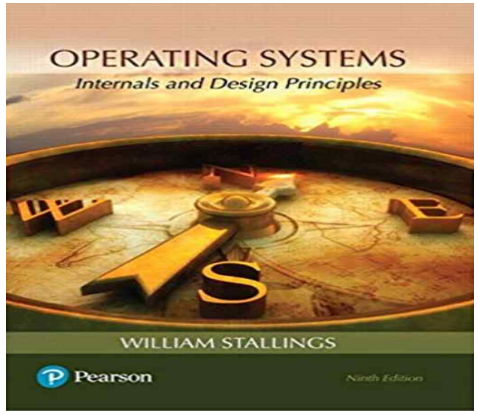
Course Objectives

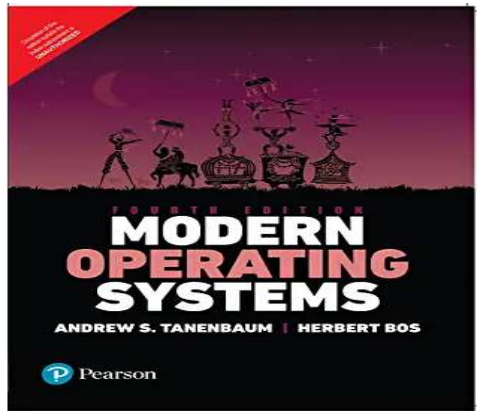
- Understand the definition, role and goal of OS
  - ✓ Resource manager, computing environments, …
- Know the existing operating systems
  - ✓ UNIX, Windows, Apple OS X, Linux, Android, iOS, WebOS, Mach, …
- Learn the internal structure of OS
  - ✓ Process, Virtual memory, File system, Driver, Protocol, Interrupt, …
- Comprehend the policies and mechanisms used by OS
  - ✓ CPU scheduling, Demand paging, LRU, inode, System call, …
- Grasp the idea of abstraction
  - ✓ Information Hiding, Illusion, Interface, Layered architecture, …
- Demonstrate what we have learned
  - ✓ Lab. project

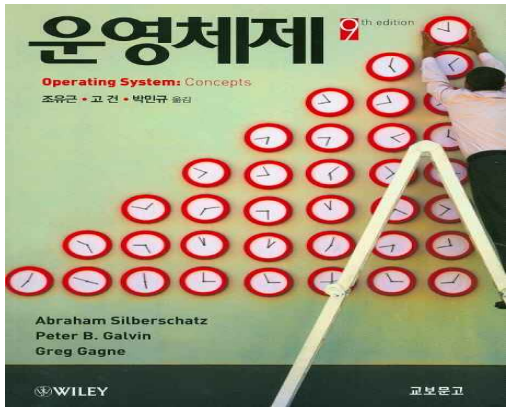
Traditional Textbook

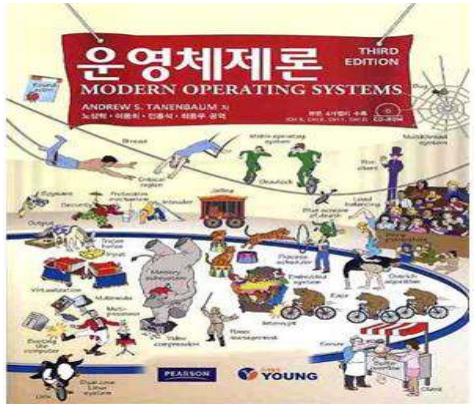
- Three representative textbooks for operating system course
  - ✓ Operating Systems Concepts (10th edition), by A. Silberschatz, P. Galvin and G. Gagne
  - ✓ Operating Systems: Internals and Design Principles (9th edition), by W. Stalling
  - ✓ Modern Operating Systems (5th edition), by A. Tanenbaum and H. Bos





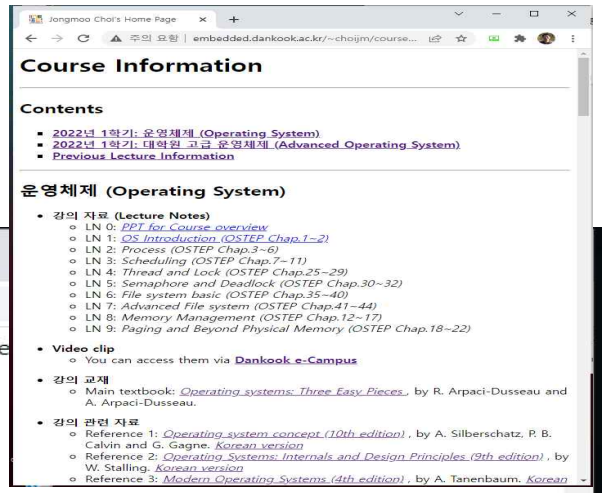






Textbook in this course

- Remzi's OSTEP (OS Three Easy Pieces)
  - ✓ http://pages.cs.wisc.edu/~remzi/OSTEP/


Jongmoo Choi's Home Page

Course Information

Contents

- 2022년 1학기: 운영체제 (Operating System)
- 2022년 1학기: 대학원 고급 운영체제 (Advanced Operating System)
- Previous Lecture Information

운영체제 (Operating System)

- 강의 자료 (Lecture Notes)
  - LN 0: PPT for Course overview
  - LN 1: OS Introduction (OSTEP Chap.1~2)
  - LN 2: Process (OSTEP Chap.3~6)
  - LN 3: Scheduling (OSTEP Chap.7~11)
  - LN 4: Thread and Lock (OSTEP Chap.25~29)
  - LN 5: Semaphore and Deadlock (OSTEP Chap.30~32)
  - LN 6: File system basic (OSTEP Chap.35~40)
  - LN 7: Advanced File system (OSTEP Chap.41~44)
  - LN 8: Memory Management (OSTEP Chap.12~17)
  - LN 9: Paging and Beyond Physical Memory (OSTEP Chap.18~22)
- Video clip
  - You can access them via Dankook e-Campus
- 강의 교재
  - Main textbook: Operating systems: Three Easy Pieces , by R. Arpaci-Dusseau and A. Arpaci-Dusseau.
- 강의 관련 자료
  - Reference 1: Operating system concept (10th edition) , by A. Silberschatz, P. B. Calvin and G. Gagne. Korean version
  - Reference 2: Operating Systems: Internals and Design Principles (9th edition) , by W. Stalling. Korean version
  - Reference 3: Modern Operating Systems (4th edition) , by A. Tanenbaum. Korean

Operating Systems: Three Easy

pages.cs.wisc.edu/~remzi/OSTEP/

Another way to help the book out: cite it! Here is the BiBTeX entry (seen below); you can also link to the site on the market.

Operating Systems: Three Easy Pieces
Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau
Arpaci-Dusseau Books
August, 2018 (Version 1.00)

And now, the free online form of the book, in chapter-by-chapter form (now with chapter numbers!):

Intro	Virtualization		Concurrency	Persistence	Security
Preface	3 *Dialogue*	12 *Dialogue*	25 *Dialogue*	35 *Dialogue*	52 *Dialogue*
TOC	4 Processes	13 Address Spaces code	26 Concurrency and Threads code	36 I/O Devices	53 *Intro Security*
1 *Dialogue*	5 Process API code	14 Memory API	27 Thread API code	37 Hard Disk Drives	54 *Authentication*
2 Introduction code	6 Direct Execution	15 Address Translation	28 Locks code	38 Redundant Disk Arrays (RAID)	55 *Access Control*
	7 CPU Scheduling	16 Segmentation	29 Locked Data Structures	39 Files and Directories	56 *Cryptography*
	8 Multi-level Feedback	17 Free Space Management	30 Condition Variables code	40 File System Implementation	57 *Distributed*
	9 Lottery Scheduling code	18 Introduction to Paging	31 Semaphores code	41 Fast File System (FFS)	
	10 Multi-CPU Scheduling	19 Translation Lookaside Buffers	32 Concurrency Bugs	42 FSCK and Journaling	**Appendices**
	11 *Summary*	20 Advanced Page Tables	33 Event-based Concurrency	43 Log-structured File System (LFS)	*Dialogue*
		21 Swapping: Mechanisms	34 *Summary*	44 Flash-based SSDs	Virtual Machines
		22 Swapping: Policies		45 Data Integrity and Protection	*Dialogue*
		23 Complete VM Systems		46 *Summary*	Monitors
		24 *Summary*		47 *Dialogue*	*Dialogue*
				48 Distributed Systems	Lab Tutorial
				49 Network File System (NFS)	Systems Labs
				50 Andrew File System (AFS)	xv6 Labs
				51 *Summary*	

INSTRUCTORS: If you are using these free chapters, **please just link to them directly** (instead of making a copy locally); we make little improvements frequently, and thus would like to provide the latest to whomever is using it. Also, we have made our own class preparation notes available to those of

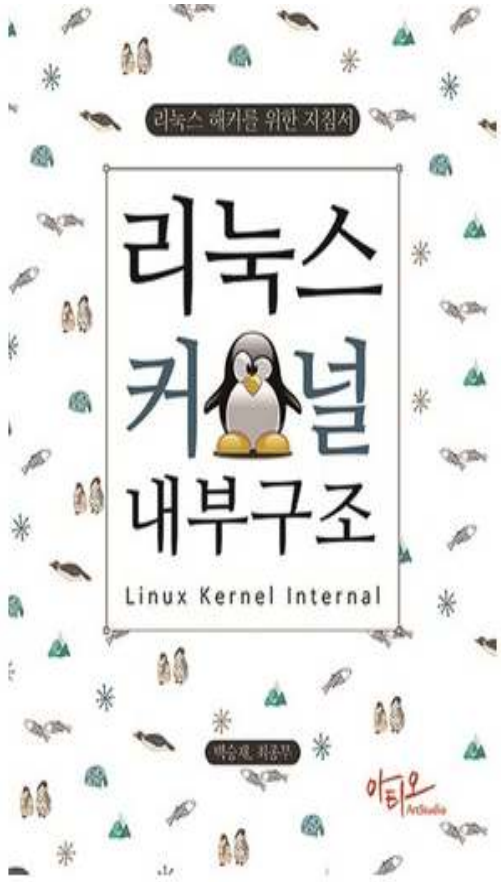
Textbook in this course

- TOC (Table of Contents) of OSTEP

Contents

Reference

- Linux Kernel Internals (리눅스 커널 내부 구조)
  - ✓ 1장. 리눅스 소개
  - ✓ 2장. 리눅스 커널 구조
  - ✓ 3장. 태스크 관리
  - ✓ 4장. 메모리 관리
  - ✓ 5장. 파일시스템과 가상 파일시스템
  - ✓ 6장. 인터럽트와 트랩 그리고 시스템 호출
  - ✓ 7장. 리눅스 모듈 프로그래밍
  - ✓ 8장. 디바이스 드라이버
  - ✓ 9장. 네트워킹
  - ✓ 10장. 운영체제 관련 실습
  - ✓ 부록1. 리눅스와 가상화 그리고 XEN
  - ✓ 부록2. MTD와 YAFFS



Teaching Method

- Mainly Lecturing
  - ✓ Discussion (Q&A) during the course is quite important
- Homework
  - ✓ Reading assignment
    - 2 or 3 times
  - ✓ Lab. Project (Programming or Analysis)
    - Lab1: scheduling
    - Lab2: concurrency
    - Lab3: file system

- Grading
  - ✓ Exam(45%) + Lab. Project (35%) + Assignment/Discussion (10%) + Attendance/Quiz/Discussion (10%) ➔ can be changed later
  - ✓ Absence more than 5 times or Mid or Final Exam. score below 20 or No lab. Project ➔ F
  - ✓ Roughly, 20% students are expected to get the A grade.

Discussion

- Any questions? Ask at "문의 게시판" or Send an email to me: choijm@dankook.ac.kr

Quiz for 1th-Week 1st-Lesson

- Quiz
  - ✓ 1. What are the difference between Operating Systems (e.g. MS Windows or Linux) and Applications (e.g. MS Word or Chrome)?. Explain the difference using the word “mode”.
  - ✓ 2. There is a Confucian philosopher, Xunzi, in Chapter 1, “A Dialog on the Book”, of the OSTEP (our main text book). Explain what he said.
  - ✓ Due: until 6 PM Friday of this week (4th, March)

(Source: Google Image)

Operating Systems: Three Easy

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