System Programming

Eunji Lee
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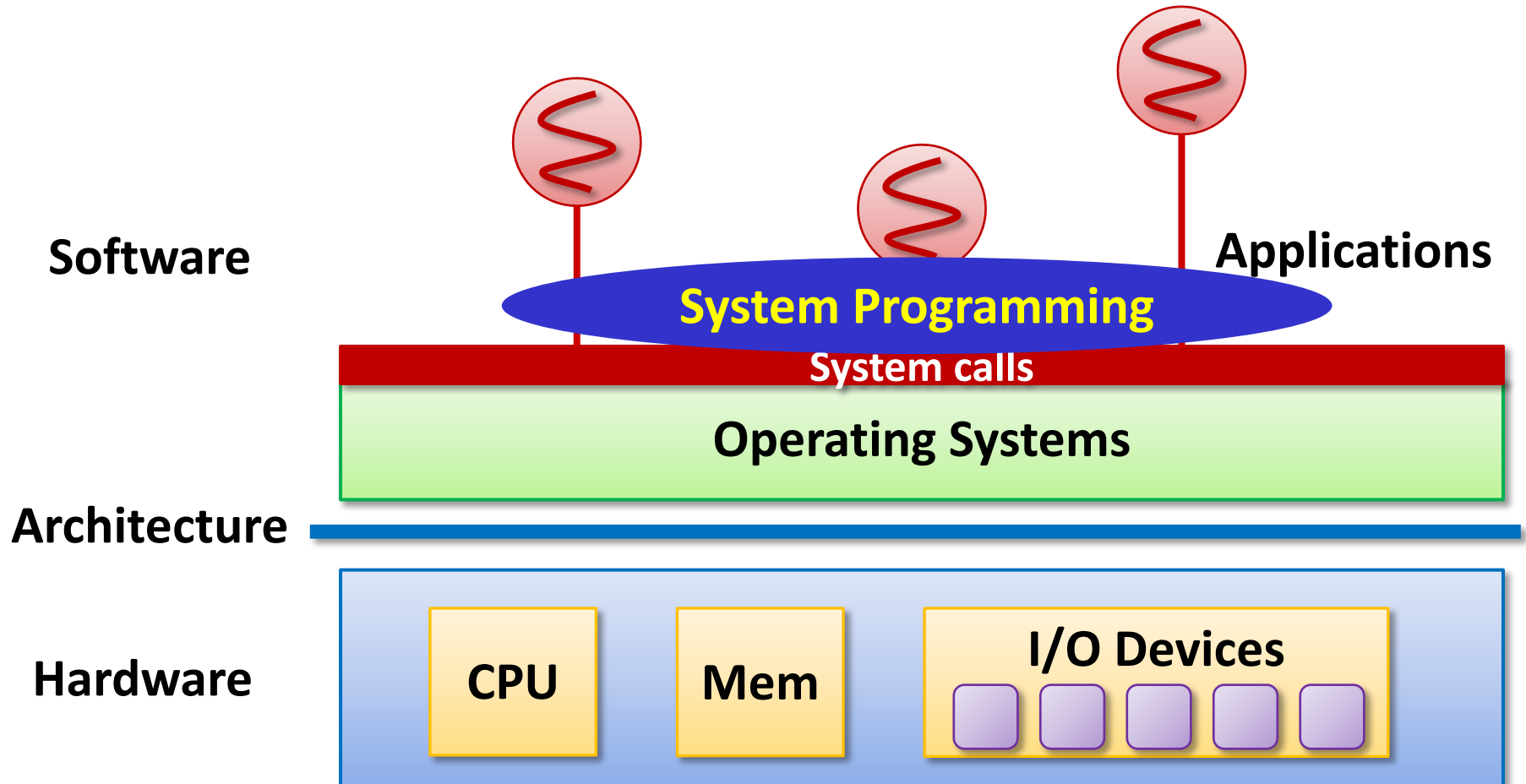
Hello!

- **Instructor**
  - **Prof. Eunji Lee** (벤처관 504호, ejlee@ssu.ac.kr)
    - Senior researcher in Samsung Electronics
    - Researcher at Univ. of Wisconsin-Madison
  - **DATOS Lab**
    - Data Analytics and Computing Systems Laboratory

- **Major research area – Computer Systems**
  - Data systems
  - Operating systems
  - Distributed storage systems
  - Cloud systems

What is System Programming

- **Computer systems internals**

Software   **Applications**

System Programming

System calls

Operating Systems

Architecture

Hardware   **CPU**   **Mem**   **I/O Devices**

Textbook

- **Computer Systems: A Programmer's Perspective (3rd edition)**
  - Randal Bryan and David O'Hallaron
  - Pearson

- **Lecture notes will be uploaded at class.ssu.ac.kr**
  - *Some of slides for this lecture are based on materials provided by the textbook publisher*
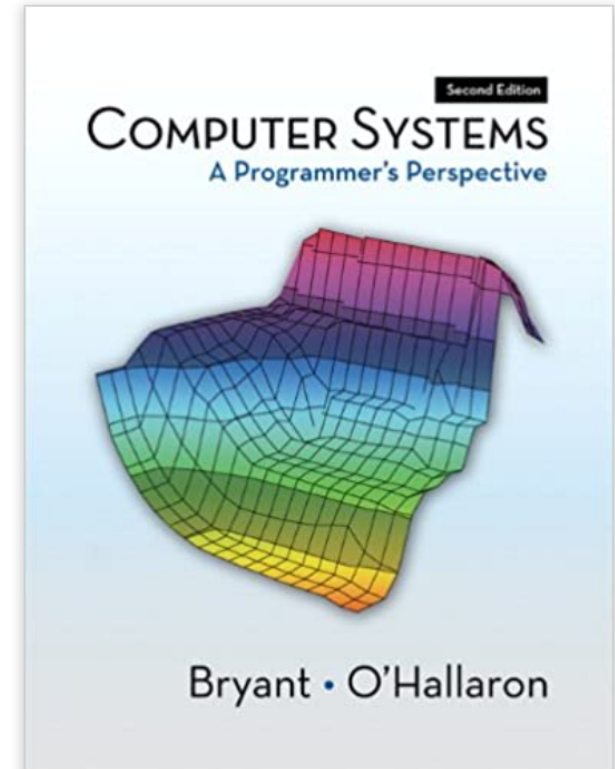
Course Schedule

Week	Contents	Lab
1. 9/5 (T) / 9/7(TH)	Ch1. Overview / CH2-3. Bits, Bytes, and Integers	
2. 9/12(T) / 9/14(TH)	Ch2. Bits, Bytes, and Integers	Build tools
3. 9/19(T) / 9/21(TH)	Ch2. Float Point	Bit manipulation
4. 9/26(T) / 9/28(TH)*	Ch5. Optimizing Program Performance	Program profiling perf / cgroup / GPU
5. 10/3(T)* / 10/5(TH)	Ch6. Memory Hierarchy	NUMA
6. 10/10(T) / 10/12(TH)	Ch7. Linking	Static / dynamic library
7. 10/17(T) / 10/19(TH)	Ch7. Linking	Docker
8. 10/24(T) / 10/26(TH)	중간고사 (10/26, 18:00)	
9. 10/31(T) / 11/2(TH)	Ch 8. Exceptional Control Flow	Shell
10. 11/7(T) / 11/9(TH)	Ch 8. Exceptional Control Flow	Signal
11. 11/14(T) / 11/16(TH)	Ch 10. System-Level I/O	File I/O
12. 11/21(T) / 11/23(TH)	Ch 10. System-Level I/O	File I/O
13. 11/28(T) / 11/30(TH)	Ch 11. Network Programming	Socket programming
14. 12/5(T) / 12/7(TH)	Ch 12. Concurrent Programming	Web server
15. 12/12(T) / 12/14(TH)	기말고사 (12/12, 18:00)	

The above content is subject to change.

Prerequisites

- **Courses**
  - C/C++ Programming
  - Data Structure

- **Required skills**
  - Fluent C programming
  - Intel x86 architecture & assembly programming
  - Basic knowledge of Unix/Linux systems
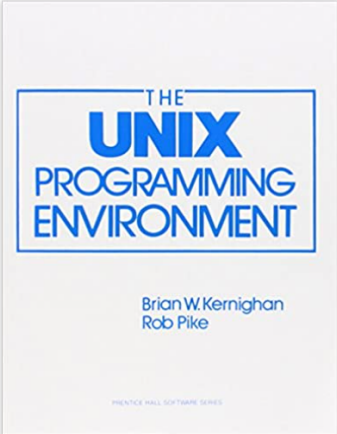 - Reading a large, complex program

Reference

- ■ **The Unix Programming Environment**

The Unix Programming Environment (Prentice-Hall Software Series) 1st Edition
by Brian W. Kernighan ⌄ (Author), Rob Pike ⌄ (Author)
★★★★★ ⌄   127 ratings

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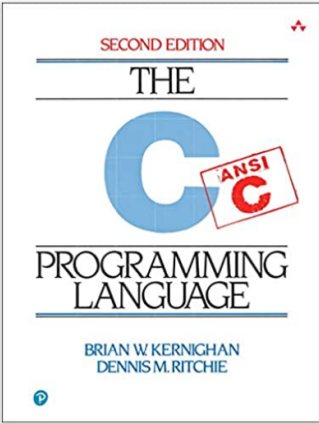
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Reference

■ **The C Programming Language**

평가방법

- **중간고사 30%**
- **기말고사 30%**
- **과제 / 프로젝트 / 실습 활동 30%**
- **출석 10%**

- **모든 과제 및 프로젝트는 지연 제출 허용하지 않음**
- **6회 이상 결석 시 F학점 부여**
- **중간/기말고사 미출석 시 F학점 부여**

Engaged Learning 교과목

- **성취 기반 절대평가제**
- **스스로 정의하는 프로젝트 부여 예정**
- **시스템 분야 최신 기술 발표**

Cheating

- **What is cheating?**
  - Sharing code with friends: by copying, retyping, looking at, or supplying a file
  - Coaching: helping your friend to write a lab, line by line

- **What is NOT cheating?**
  - Explaining how to use systems or tools
  - Helping others with high-level design issues
  - *Searching web pages on WWW*

- **Penalty for cheating**
  - Removal from course with failing grade

Getting Help

- **Mail to us:**
  - Eunji Lee (instructor): ejlee@ssu.ac.kr
  - Seungmin Shin (TA): seungminshin2@gmail.com