

cs5460/6460 Operating Systems

Lecture 00 – Logistics

Anton Burtsev

Welcome to cs5460/6460

- Mixed undergrad/grad class
 - 107 students
- Instructor: Anton Burtsev
 - <https://mars-research.github.io/aburtsev/>
- Class web page:
 - <https://mars-research.github.io/cs5460/>

Short intro

- I build operating systems
- Clean slate
 - Atmosphere: formally verified microkernel in Rust
 - <https://mars-research.github.io/projects/atmo/>
 - RedLeaf: language safety of Rust for isolation
 - <https://mars-research.github.io/projects/redleaf/>
- Extensions to Linux
 - LXDs/LVDs/Ksplit: isolation of device drivers in the Linux kernel
 - <https://mars-research.github.io/projects/ksplit/>
- Extensions to Xen
 - XenTT: deterministic replay of virtual machines

This course

- Inspired by
 - MIT 6.828: Operating System Engineering
 - <https://pdos.csail.mit.edu/6.828/2018/>
- Adapted for undergraduate students
- We will use xv6
 - Relatively simple OS kernel (only 9K lines of code)
 - Reasonably complete UNIX kernel
 - Started at MIT <https://pdos.csail.mit.edu/6.1810/2025/xv6.html>

This course

- MIT moved to the RISC-V-based class
- We will use x86-64 bit version
- xv6 comes with a book
 - <https://xv6-64.gitlab.io/xv6-64-book/xv6-64-book.pdf>
- Another book we're going to use:
 - “Operating Systems: Three Easy Pieces” (OSTEP) Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau
 - Free online version <http://pages.cs.wisc.edu/~remzi/OSTEP/>

Course organization

- Live lectures
 - High level concepts and abstractions
 - Recorded
- Reading
 - Xv6 book + source code
 - Bits of OSTEP book
 - Other materials
- Homeworks
 - Coding real parts of the xv6 kernel
- Weekly quizzes
 - Help to keep on track

Grading

- Your grade
 - Homework: 30%
 - In-class activities: 10%
 - Weekly quizzes 15%
 - Midterm exam: 20%
 - Final exam: 25%
- You can submit late homework 3 days after the deadline for 60% of your grade

More details

- 5-6 homework assignments
 - Build a shell
 - Build an ELF loader
 - Setup QEMU debugging environment and boot into “hello world”
 - Implement new system calls in xv6
 - Implement changes to the xv6 file system, maybe threading
- A weekly quiz
 - Assigned on Friday, due Monday
- In class PollEV

Exams

- Exams are on paper
 - Open book (you can print anything you like)
 - Closed computers

Plagiarism

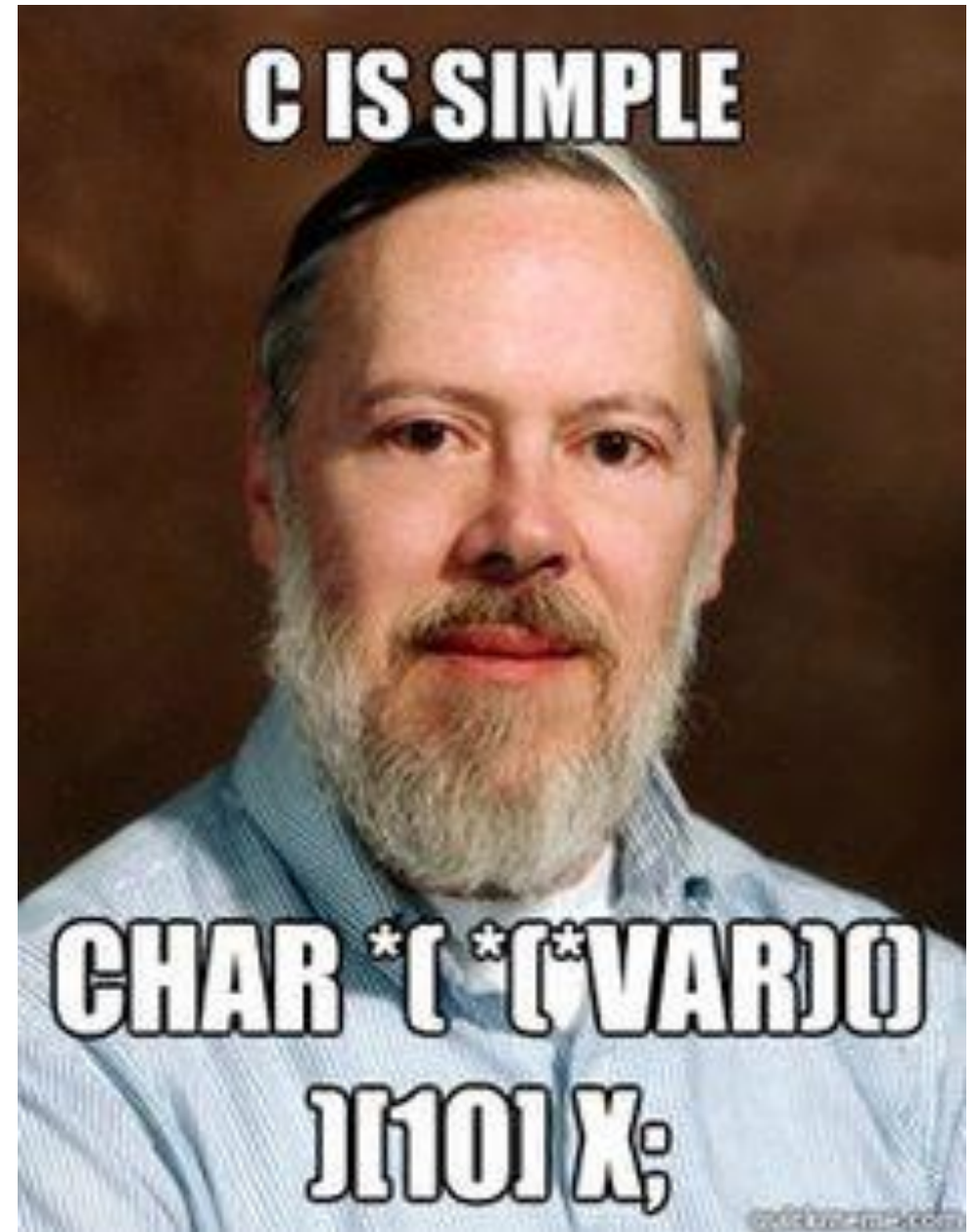
- All work should be your own
 - You can discuss approaches to any assignments
 - Ask questions on Piazza

AI Use

- This year we plan on using Codex + VS code
 - Students are using AI anyway...
 - We are trying to find a creative way of letting you to use it

Prerequisites

- Solid C coding skills
 - Xv6 is written in C
 - You need to read, code, and debug
 - AI can help explaining the code but still
- All homeworks are in C
 - Many questions will require explaining xv6 code
- Be able to work and code in Linux/UNIX
- Some assembly skills



How to succeed?

- Read the source
 - This is the ultimate skill of any systems researcher

How to succeed (continued)?

- Don't get scared
 - The class is hard
 - The goal is to teach you how real OS works, and it's non-trivial
- Homework assignments and exams are challenging
 - AI helps for homeworks but don't overdo it
 - Exams will require in-depth understanding of all homework assignments

Thank you!



Hey, you can't use AI on the exam

I don't even have a screen