

Toggle navigation

## 6.828: Operating System Engineering

- **Schedule**
- **Class**
  - [Overview](#)
  - [Administrivia](#)
  - [Related classes](#)
  - [6.828 2016](#)
- **Labs**
  - [Tools](#)
  - [Lab guide](#)
  - [Lab 1](#)
  - [Lab 2](#)
  - [Lab 3](#)
  - [Lab 4](#)
  - [Lab 5](#)
  - [Lab 6](#)
  - [Lab 7](#)
- **xv6**
  - [xv6](#)
  - [xv6 printout](#)
  - [xv6 book](#)
- **References**
- **Piazza**

2017

## Reading materials

---

### Selection of Operating System Papers

Available on [the 6.828 schedule](#).

### UNIX

- [Youtube Unix intro](#)
- [The UNIX Time-Sharing System](#), [Dennis M. Ritchie](#) and [Ken L. Thompson](#),. Bell System Technical Journal 57, number 6, part 2 (July-August 1978) pages 1905-1930. [\(local copy\)](#) You read this paper in 6.033.
- [The Evolution of the Unix Time-sharing System](#), Dennis M. Ritchie, 1979.
- *The C programming language (second edition)* by Kernighan and Ritchie. Prentice Hall, Inc., 1988. ISBN 0-13-110362-8, 1998.

### x86 Emulation

- [QEMU](#) - A fast and popular x86 platform and CPU emulator.
  - [User manual](#)
- [Bochs](#) - A more mature, but quirlier and much slower x86 emulator. Bochs is generally a more faithful emulator of real hardware than QEMU.
  - [User manual](#)
  - [Debugger reference](#)

### x86 Assembly Language

- [PC Assembly Language](#), Paul A. Carter, November 2003. ([local copy](#))
- [Intel 80386 Programmer's Reference Manual](#), 1987 (HTML). ([local copy - PDF](#)) ([local copy - HTML](#))  
Much shorter than the full current Intel Architecture manuals below, but describes all processor features used in 6.828.
- [IA-32 Intel Architecture Software Developer's Manuals](#), Intel, 2007. Local copies:
  - [Volume 1: Basic Architecture](#)
  - [Volume 2A: Instruction Set Reference, A-M](#)
  - [Volume 2B: Instruction Set Reference, N-Z](#)
  - [Volume 3A: System Programming Guide, Part 1](#)
  - [Volume 3B: System Programming Guide, Part 2](#)
- Multiprocessor references:
  - [MP specification](#)
  - [IO APIC](#)
- [AMD64 Architecture Programmer's Manual](#).  
Covers both the "classic" 32-bit x86 architecture and the new 64-bit extensions supported by the latest AMD and Intel processors.
- Writing inline assembly language with GCC:
  - [Brennan's Guide to Inline Assembly](#), Brennan "Mr. Wacko" Underwood
  - [Inline assembly for x86 in Linux](#), Bharata B. Rao, IBM
  - [GCC-Inline-Assembly-HOWTO](#), Sandeep.S
- Loading x86 executables in the ELF format:
  - [Tool Interface Standard \(TIS\) Executable and Linking Format \(ELF\)](#).  
The definitive standard for the ELF format.
  - [Wikipedia page](#) has a short description.

## PC Hardware Programming

- General PC architecture information
  - [Phil Storrs PC Hardware book](#), Phil Storrs, December 1998.
  - [Bochs technical hardware specifications directory](#).
- General BIOS and PC bootstrap
  - [BIOS Services and Software Interrupts](#), Roger Morgan, 1997.
  - ["El Torito" Bootable CD-ROM Format Specification](#), Phoenix/IBM, January 1995.
- VGA display - kern/console.c
  - [VESA BIOS Extension \(VBE\) 3.0](#), [Video Electronics Standards Association](#), September 1998. ([local copy](#))
  - VGADOC, Finn Thøgersen, 2000. ([local copy - text](#)) ([local copy - ZIP](#))
  - [Free VGA Project](#), J.D. Neal, 1998.
- Keyboard and Mouse - kern/console.c
  - [Adam Chapweske's resources](#).
- 8253/8254 Programmable Interval Timer (PIT) - inc/timerreg.h
  - [82C54 CMOS Programmable Interval Timer](#), Intel, October 1994. ([local copy](#))
  - [Data Solutions 8253/8254 Tutorial](#), Data Solutions.
- 8259/8259A Programmable Interrupt Controller (PIC) - kern/picirq.\*
  - [8259A Programmable Interrupt Controller](#), Intel, December 1988.
- Real-Time Clock (RTC) - kern/kclock.\*
  - [Phil Storrs PC Hardware book](#), Phil Storrs, December 1998. In particular:
    - [Understanding the CMOS](#)
    - [A list of what is in the CMOS](#)
  - [CMOS Memory Map](#), Padgett Peterson, May 1996.
  - [M48T86 PC Real-Time Clock](#), ST Microelectronics, April 2004. ([local copy](#))
- 16550 UART Serial Port - kern/console.c
  - [PC16550D Universal Asynchronous Receiver/Transmitter with FIFOs](#), National Semiconductor, 1995.
  - [Technical Data on 16550](#), Byterunner Technologies.
  - [Interfacing the Serial / RS232 Port](#), Craig Peacock, August 2001.
- IEEE 1284 Parallel Port - kern/console.c
  - [Parallel Port Central](#), Jan Axelson.
  - [Parallel Port Background](#), Warp Nine Engineering.
  - [IEEE 1284 - Updating the PC Parallel Port](#), National Instruments.
  - [Interfacing the Standard Parallel Port](#), Craig Peacock, August 2001.
- IDE hard drive controller - fs/ide.c
  - [AT Attachment with Packet Interface - 6 \(working draft\)](#), ANSI, December 2001.
  - [Programming Interface for Bus Master IDE Controller](#), Brad Hosler, Intel, May 1994.

- [The Guide to ATA/ATAPI documentation](#), Constantine Sapuntzakis, January 2002.
  - Sound cards (not supported in 6.828 kernel, but you're welcome to do it as a challenge problem!)
    - [Sound Blaster Series Hardware Programming Guide](#), Creative Technology, 1996.
    - [8237A High Performance Programmable DMA Controller](#), Intel, September 1993.
    - [Sound Blaster 16 Programming Document](#), Ethan Brodsky, June 1997.
    - [Sound Programming](#), Inverse Reality.
  - E100 Network Interface Card
    - [Intel 8255x 10/100 Mbps Ethernet Controller Family Open Source Software Developer Manual](#)
    - [82559ER Fast Ethernet PCI Controller Datasheet](#)
  - E1000 Network Interface Card
    - [PCI/PCI-X Family of Gigabit Ethernet Controllers Software Developer's Manual](#)
- 

Questions or comments regarding 6.828? Send e-mail to the TAs at [6828-staff@lists.csail.mit.edu](mailto:6828-staff@lists.csail.mit.edu).



[Top](#) // [6.828 home](#) // Last updated Wednesday, 29-Nov-2017 17:21:59 EST