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 quirkier 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 I: 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 CHMOS 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鈥檚 Manual

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Questions or comments regarding 6.828? Send e-mail to the TAs at *6828-staff@lists.csail.mit.edu*.