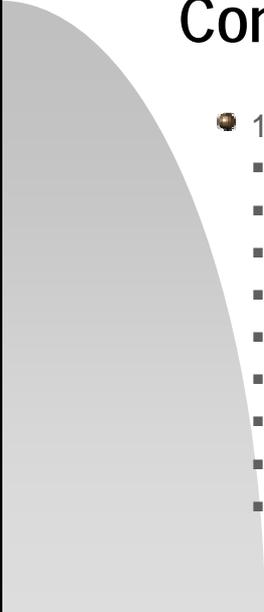


系統程式

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Contents

- 1. Preface/Introduction
 - Standardization and Implementation
 - File I/O
 - Standard I/O Library
 - Files and Directories
 - System Data Files and Information
 - Environment of a Unix Process
 - Process Control
 - Signals
 - Inter-process Communication

Preface

- Book
 - W. Richard Stevens, “Advanced Programming in the Unix Environment,” Addison-Wesley, 2001
- Grading
 - Mid-term, Final, Homework (bi-week)
- Prerequisites
 - Data Structures, C
- Sources used in the book
 - [ftp.uu.net](ftp://ftp.uu.net/published/books/stevens.advprog.tar.z)
published/books/stevens.advprog.tar.z

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Preface

- Program Turn-In
 - Web-site (to be announced)
 - ftp site (to be announced)
- Slides
 - <http://www.csie.ntu.edu.tw/~ktw/sysprog.htm>

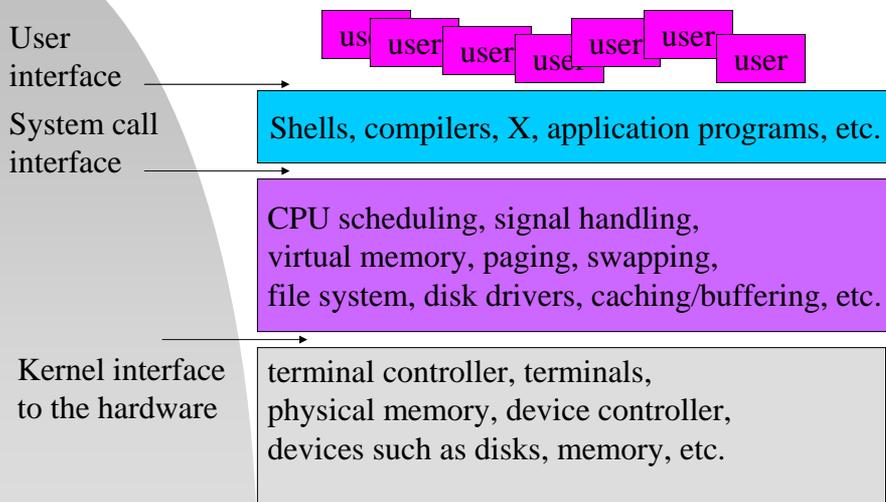
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Preface

- Goal
 - Programming Interface to the Unix
 - System calls, e.g., open
 - Functions in the standard C library, e.g., printf, fopen
 - Why ANSI standard for C
 - Proliferation of different Unix versions
 - Portability

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UNIX Architecture



UNIX

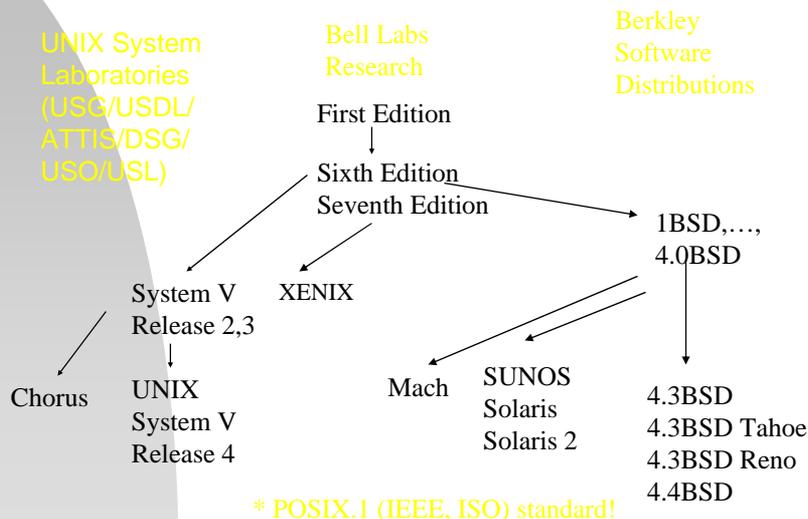
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UNIX

- Created by Ken Thompson & Dennis Ritchie at Bell Laboratories in 1969 & on PDP-7.
 - ACM Turing award winners for the design of UNIX in 1983.
 - C programming language inventor: Dennis Ritchie.
- Major Contributors:
 - Bell Laboratories, Computer Systems Research Group (CSRG) of the University of California at Berkley (released in BSD), UNIX System Laboratories (USG/USDL/ATTIS/DSG/USO/USL), etc.

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UNIX



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Standards/Implementations

- Related Implementations
 - 4.xBSD, SVR_x (ATT), SunOS
 - 4.3+BSD
 - cat /etc/motd
- Standards
 - POSIX.1
 - IEEE and ISO standard for the interface of Unix-like systems
 - ANSI C
 - XPG3 – X/Open Portability Guide, Issue 3

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UNIX

- Influence
 - fork() from Berkley's GINIE, 4.2 BSD file-mapping virtual memory interface from TENEX/TOPS-20, 4.4BSD virtual memory interface from MACH. fcntl system call from System V. Disk quotas and 4.3 BSD time-zone-handling package from the user community.
 - 4BSD job control, reliable signals, multiple file-access permission groups, and file system interface were adopted by AT&T UNIX System V, IEEE POSIX.1 standard, etc. 4BSD socket ported to AT&T System III. 4BSD implementation of TCP/IP networking protocol suite widely adopted!

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UNIX

- Distinguishing Features
 - Written nearly completely in a high-level language, i.e., C.
 - High portability!
 - Distributed in source form.
 - Contributions and bug fixing from everywhere!
 - Provide powerful primitives and functions such as concurrent processes.

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Design Principles

- Simple Algorithms for Implementation
- Replaceable Standard User Interface
 - Shell
- Time-Sharing
 - Simple Priority-Driven CPU Scheduling
- Demand-Paging Virtual Memory (4.3BSD)
 - Swapping
- Similar treatments of disk files and I/O devices

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Exercise

- Write a C program which reads a number of integers from a file in `argv[1]`, sorts them, and prints sorted integers out at `stdout`.
- Explain “variable-length argument lists”
 - `void minprintf(char *fmt, ...)`
 - `vastart(ap, fmt), va_end(ap), va_arg(ap, int), va_list, <stdarg.h>`