

Introduction

Indian Statistical Institute

Administrative details

Textbook: Operating System Concepts (9th ed.) — *Silberschatz, Galvin, Gagne*

Other references:

- 1 [Vahalia] Unix Internals The New Frontiers — *Uresh Vahalia* (Pearson Education Asia/LPE)
- 2 [Bach] The Design of the UNIX Operating System — *M.J. Bach* (Prentice Hall)
- 3 [ULK] Understanding the Linux Kernel — *Bovet, Cesati* (O'Reilly)
- 4 [LKD] Linux Kernel Development — *Love* (Addison-Wesley)
- 5 [APUE] Advanced Programming in the UNIX Environment — *W. Richard Stevens* (Addison-Wesley), 1992.
- 6 [UNP] UNIX Network Programming — *W. Richard Stevens* (Prentice Hall), 1990.

Slides: Available from <http://www.isical.ac.in/~mandar/courses.html#os>

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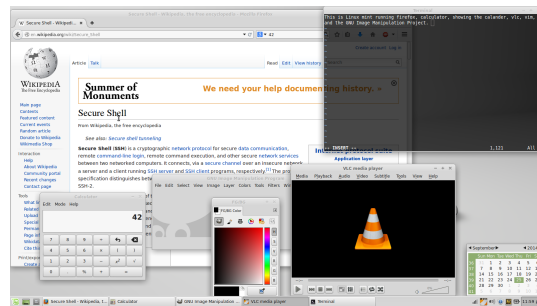
Introduction

1/6

An unadorned section number given as a **Reference:** refers to the 9th edition of the textbook (Operating System Concepts). Please use the Table of Contents to locate the material in your (hopefully recent) edition of the book. The Dean's Library should have several copies of this text, so you do not need to buy it.

If you need/want to buy only one of the above, [Vahalia] would be a good choice. [Bach] is also excellent, though very old.

What does an OS do?



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Introduction

2/6

What does an OS do?

Incomplete list of random things that an OS takes care of

- Multi-tasking: run multiple programs 'simultaneously' / concurrently
- Operate various devices
- Protection/security

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Introduction

3/6

Why do we need an OS?

- *Convenience*
 - mediates access to hardware by providing convenient abstractions (not easy to use hardware directly)
 - provides environment + services needed to run user programs in a convenient way
- *Resource sharing* between multiple users / processes
- *Protection/security*: prevent different users / processes from interfering with each other
- *Communication*: coordinate operation of different processes

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Introduction

4/6

NOTES: While *convenience* and *resource sharing* are facilities / features provided by the OS that help user programs to do some work (easily), *protection* is different: it must **prevent** user programs from doing some types of work. For this to work, the underlying hardware must also be designed to prevent certain operations. More about this later.

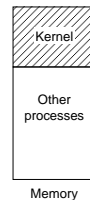
What is an OS?

a library of functions + set of programs

Definition

Software that manages a computer's hardware resources for its users and their applications

- Kernel: core library that provides functions for basic operations (e.g., process creation / destruction) + interface to hardware via **API** (Application Programming Interface)
- Processes / programs (we will distinguish between these terms later)
 - system processes – daemons/servers (httpd, lpd, sendmail, etc.)
 - user processes – shell, editor, compiler, utilities



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Introduction

5/6

Things to manage

- CPU (processes)
- RAM (memory management)
- Hard discs (file systems)
- Keyboard, monitor (I/O devices)