Introduction to Unix System Programming

ITER, Bhubanewar

Text Books

Brain W. Kernighan, & Rob Pike

The Unix Programming Environment

PHI

Kay A. Robbins, & Steve Robbins

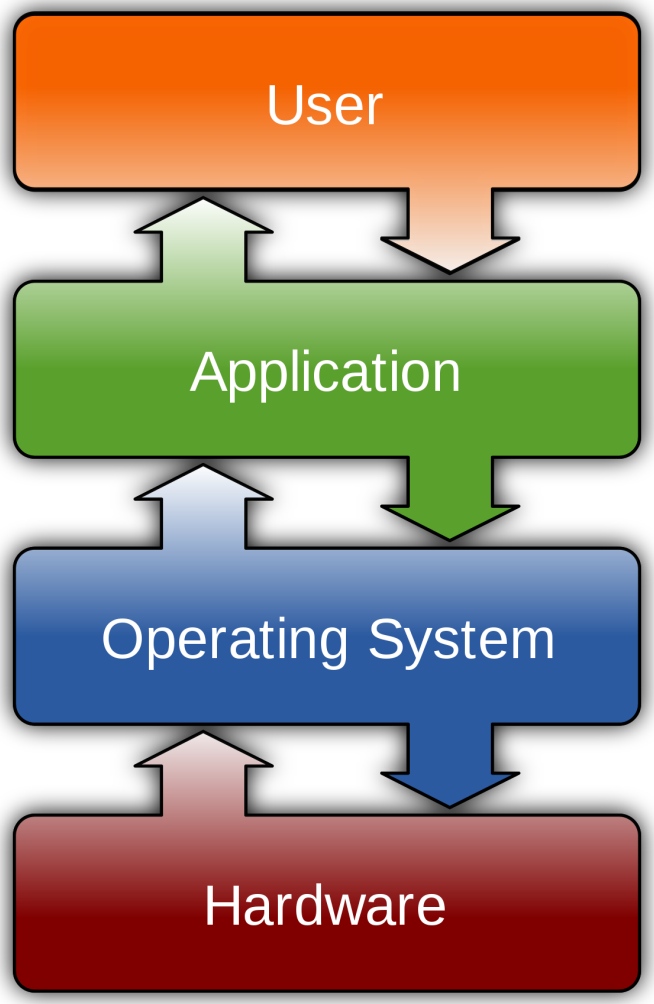
Unix™ Systems Programming

Communications, concurrency, and Treads

Pearson Education

Operating System

An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs.



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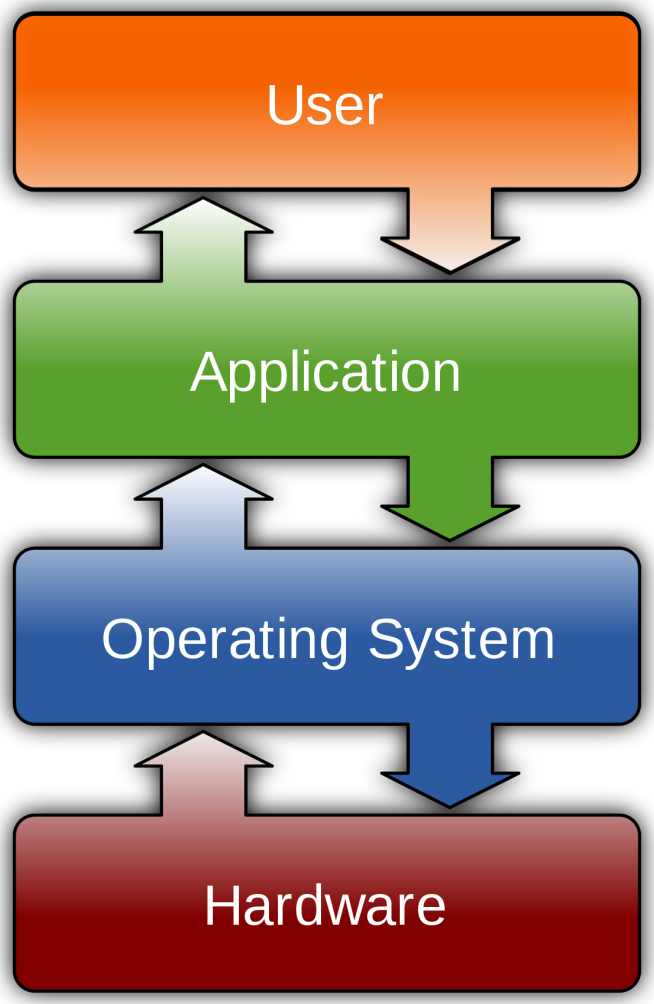
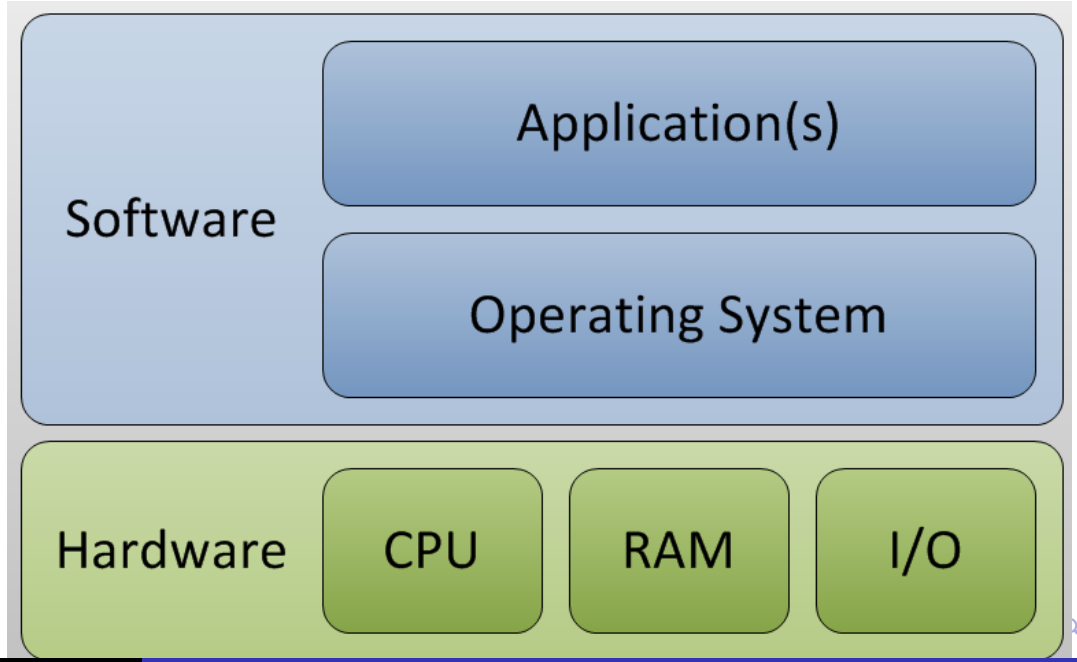




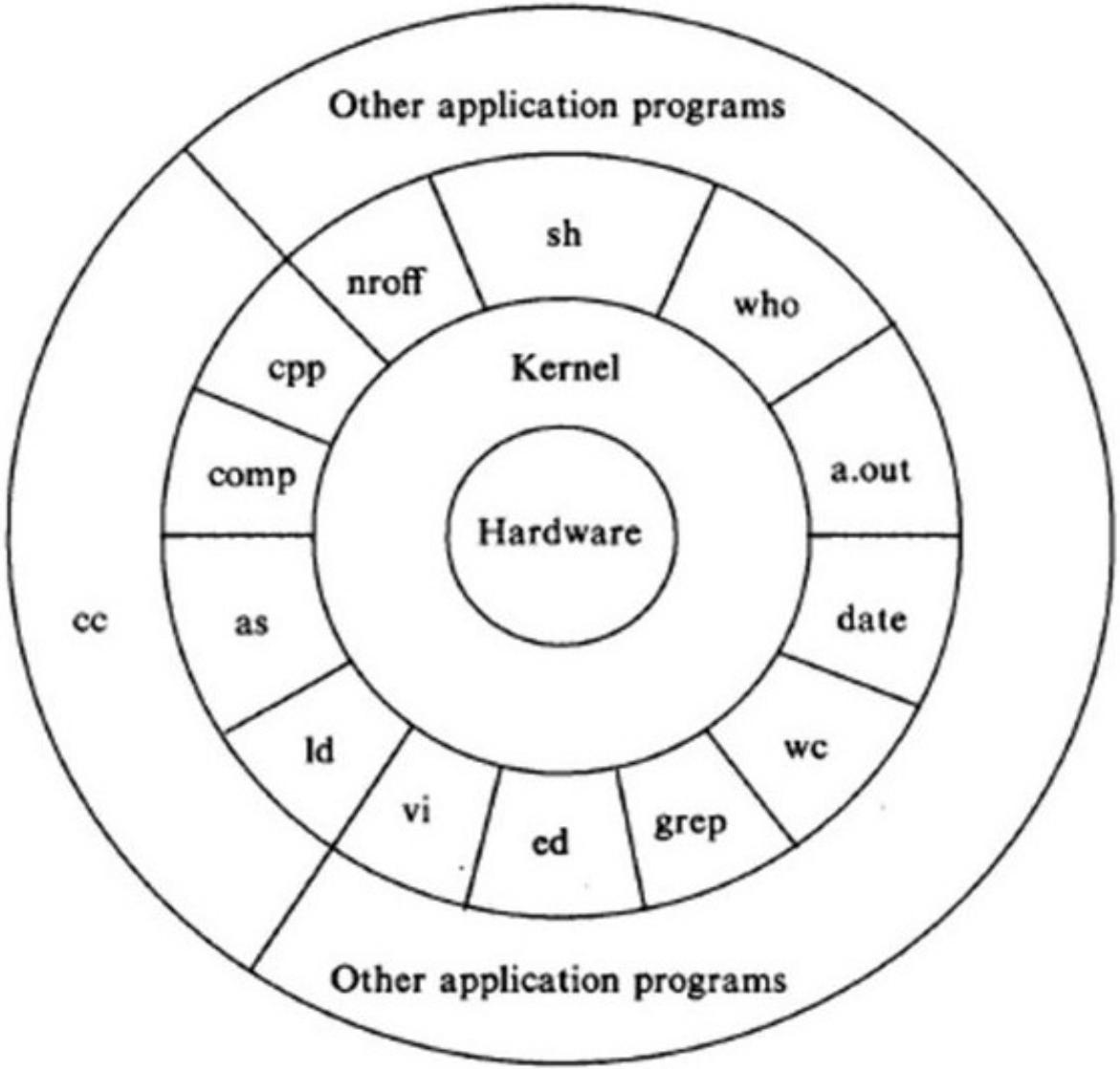
Evolution of Unix

Unix is a family of multitasking, multiuser computer operating systems that derive from the original AT&T Unix, development starting in the 1970s at the Bell Labs research center by Ken Thompson, Dennis Ritchie, and others.

- **Developer:** Ken Thompson, Dennis Ritchie, Brian Kernighan, Douglas McIlroy, and Joe Ossanna at Bell Labs
- **Initial release date:** 3 November 1971
- **License:** Varies; some versions are proprietary, others are free/open-source software
- **Default user interface:** Command-line interface and Graphical
- **Written in:** C, Assembly language

System Structure

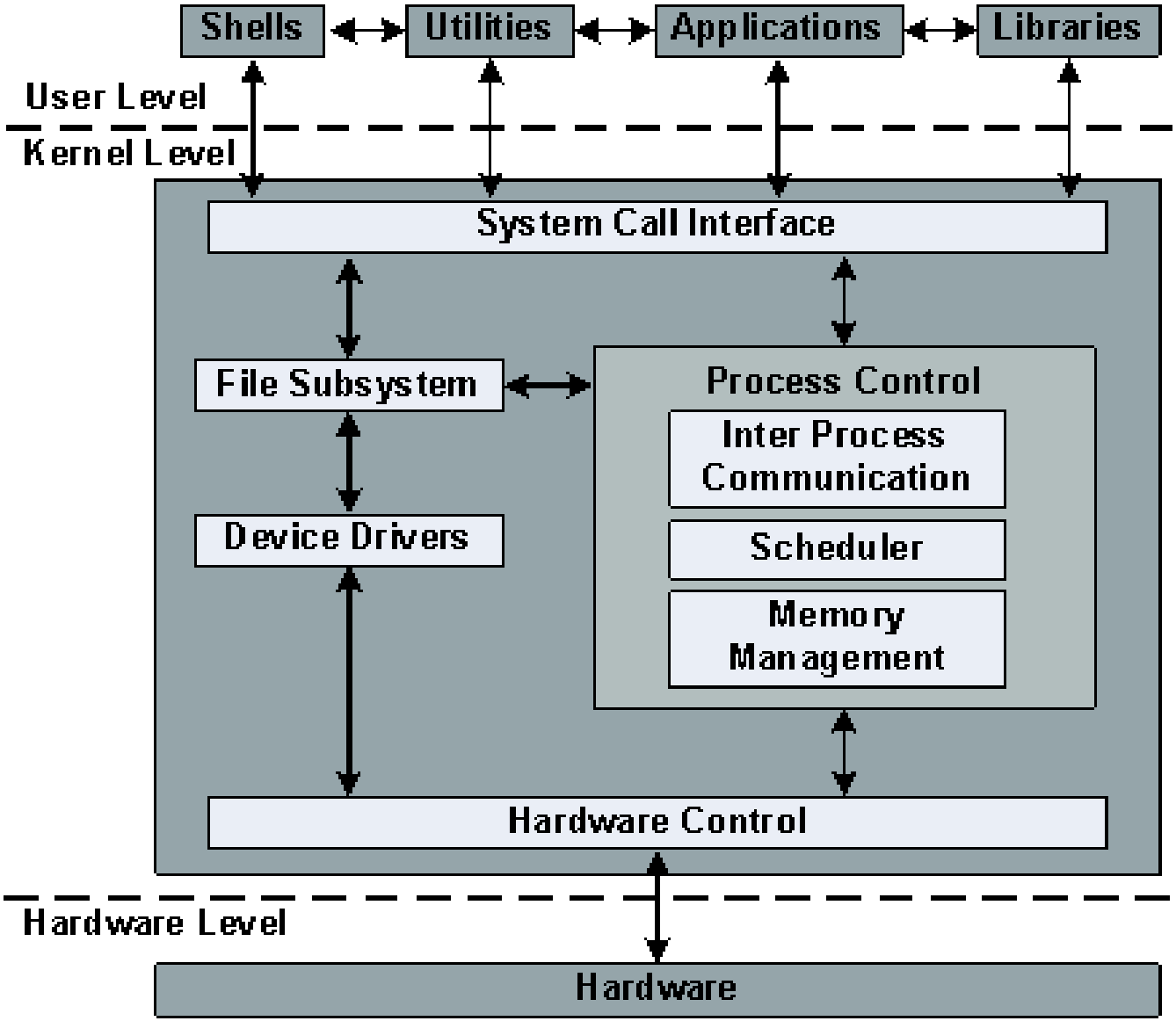
The high-level architecture of the unix system:



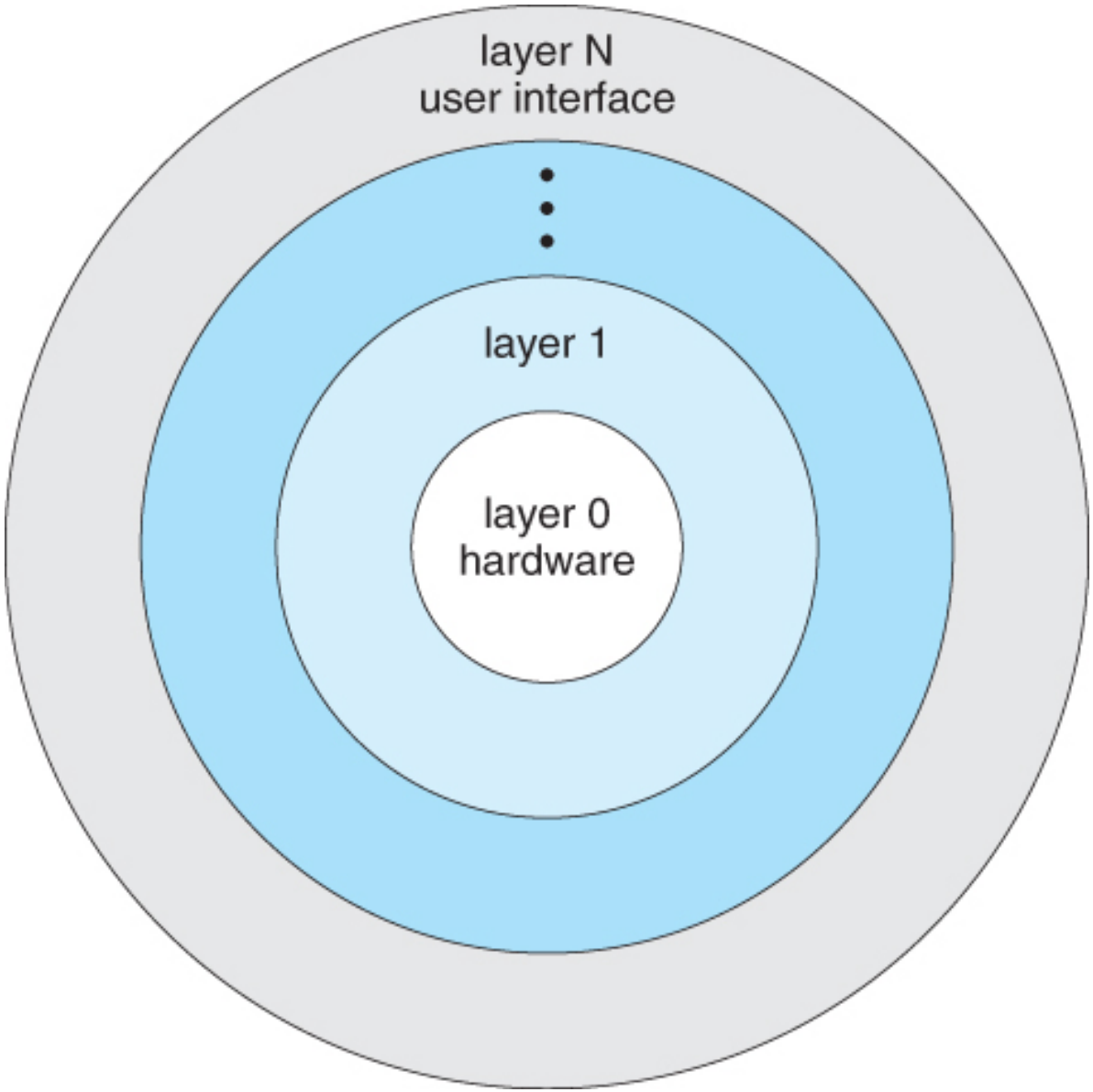
Description of the High-level architecture

- The hardware at the center of the diagram provides the operating system with basic services.
- The operating system interacts directly with the hardware, providing common services to programs.
- The operating system is commonly called the **system kernel**, or **kernel**, emphasizing its isolation from user programs.
- The user programs are independent of the underlying hardware.
- It is easy to move user programs between UNIX systems running on different hardware if the programs do not make assumptions about the underlying hardware.

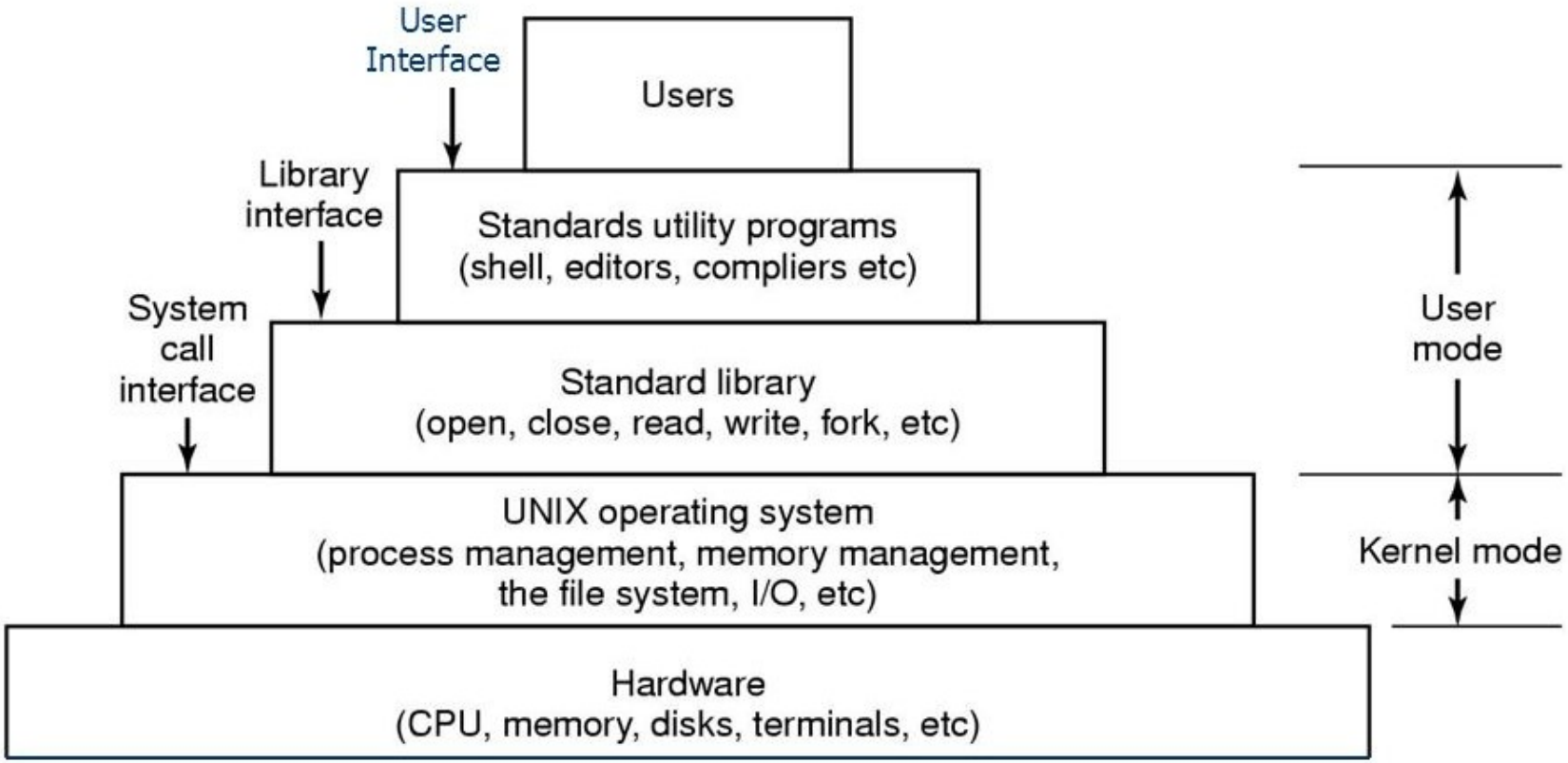
System Structure Contd...



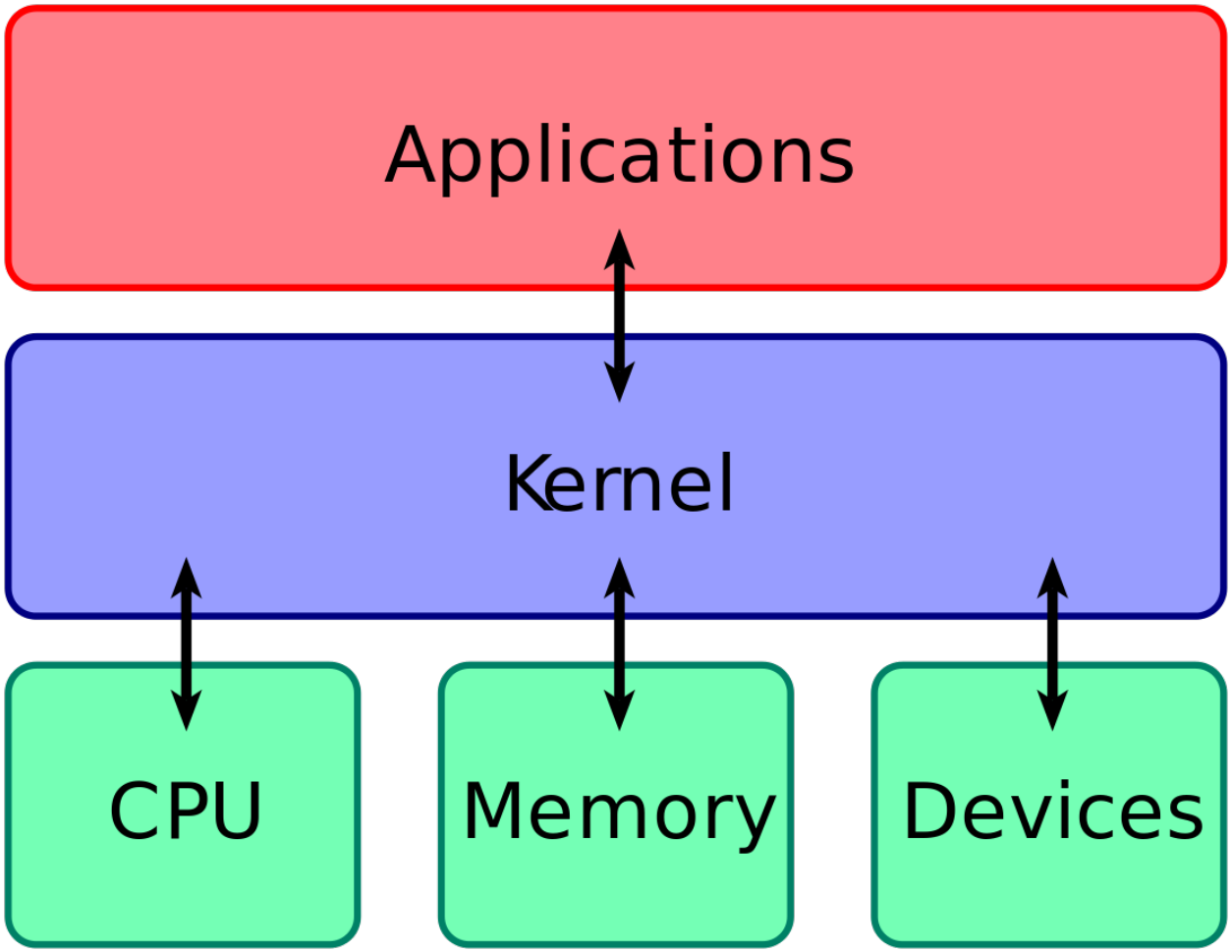
Unix as Layered Architecture



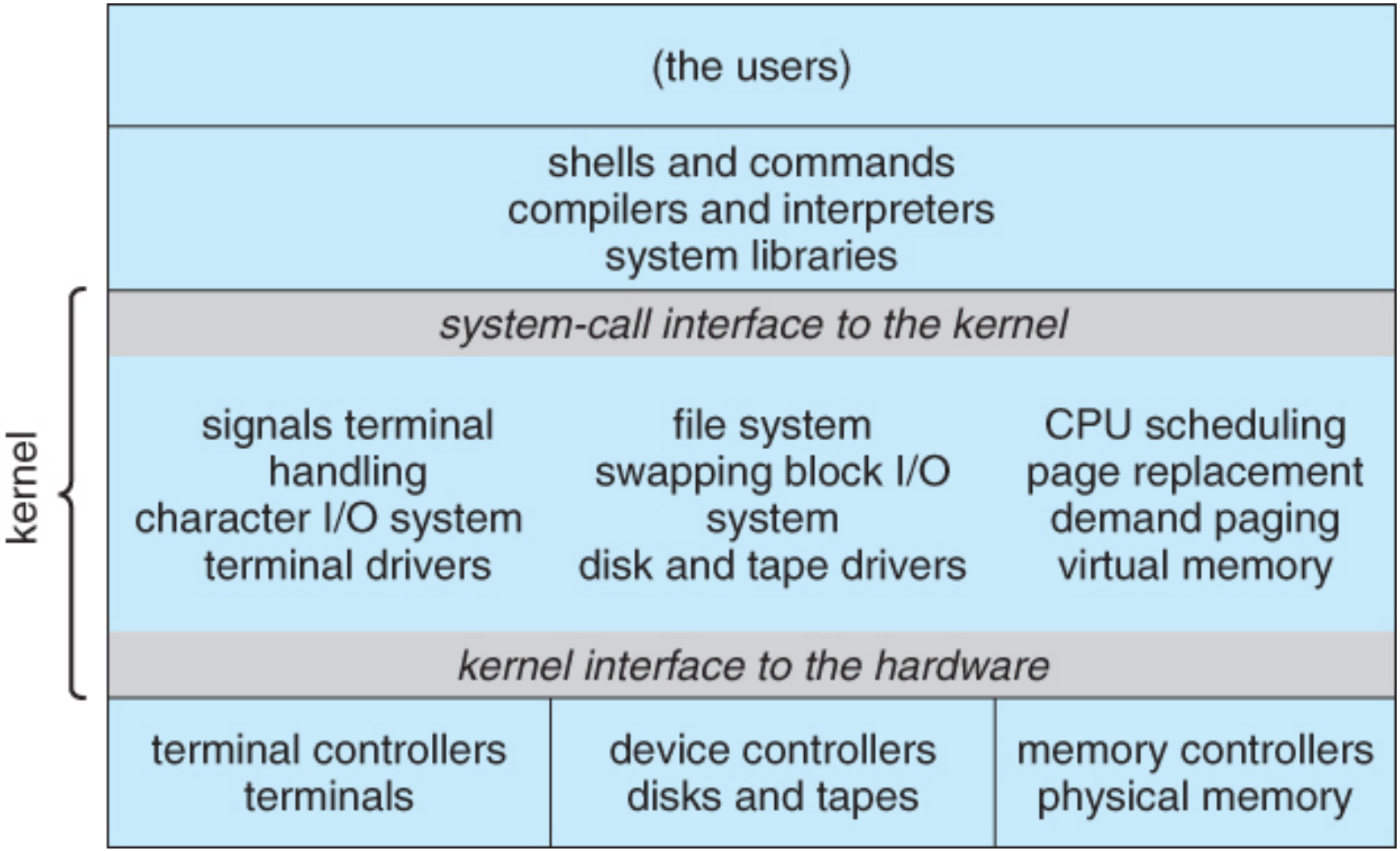
Layers of a UNIX System



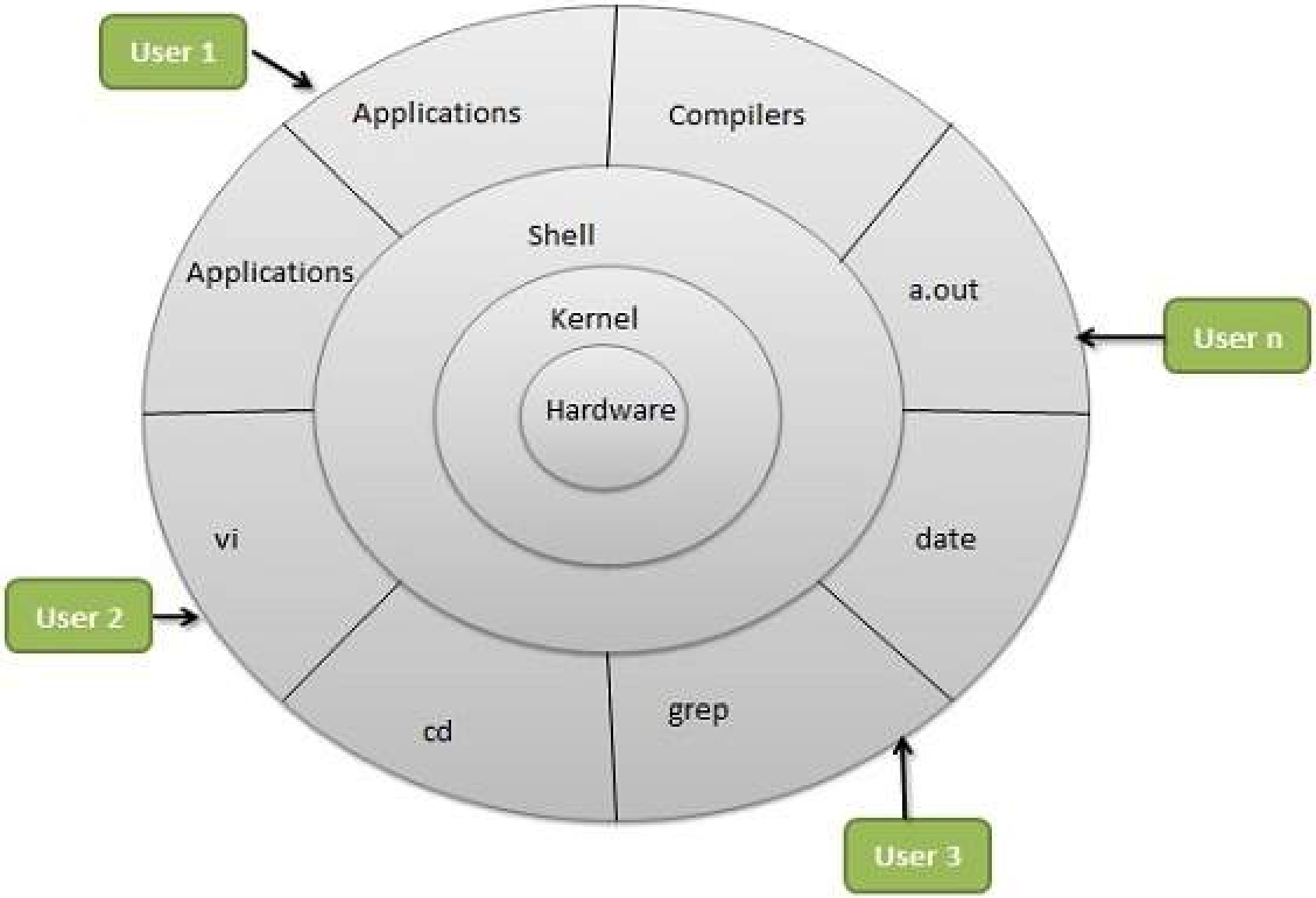
The Kernel Position



OS Structure



The Unix System Simplified



Topics to be covered

- Chapters form text book-1 :: ① ➔ ⑤

- Chapters form text book-2 :: 1-16, 18-19

Basic Unix Commands

1. Unix is collection of commands
2. **Command:** A command is a specific instruction given to computer application to perform a partcular task or function
3. A command;
   (a) case-sensitive
   (b) alphabets lower case only
   (c) no unnecessary charactes should not be given
   (d) keywords or reserved words
4. **Few Examples:**
   (a) who
   (b) whoami
   (c) who am i
   (d) date, cal
   (e) ls, ls-l
   (f) ed, cat
   (g) :

Practice:: Unix Commands

0. Use **`pwd`** command to know where you are.
1. Create a directory named as **`Registration number`**
2. Change to the directory, you have created.
3. Over the directory **`Registration number`**, create one more directory **`Branch`**
4. Store few files such as graphics, ZIP, C-program and a.out, audio, onto the directory named **`Registration number`** through browsing from the window to the directory.
5. Visit to the directory **`Registration number`** from the command prompt.
6. Use **`ls`** command to view the related information stored on the directory **`Registration number`**. carefully watch the **colors** related to the files, directory is used under UNIX.

Assignment-1

1. Create a directory named **04012018**[command: mkdir], change the directory to **04012018**[cd]
2. Create two files named **Junk** and **Temp** using the line editor **ed**.
   - The content of Junk as

     ```
     The Unix system if full duplex: The character you type on the keyboard are sent to the system, which sends them back to the terminal to be printed on the screen.
     ```
   - The content of temp as

     ```
     Normally, this echo process copies the characters directly to the screen, so you can see what you are typing, but some times, such as when you are typing a secret password, the echo is turned of so the characters do not appear on the screen
     ```
3. Create two different file of your own that will contain at least 5 line each.

Assignment-1 contd...

4. use **`ls`** command to lists the names of files.
5. **`ls`** has options; try **`ls -t`**, **`ls -l`**

   `ls -t`: causes the files to be listed in time order; the order in which they are last changed, most recent first

   The **`ls -l`**: gives long listing that provides more information about each file.
6. use the command **`ls -l <anyfilename>`**, write the description of the output.
7. **options can be grouped:** Try the command: **`ls -lt`**, Note the output
8. To print index number of each file **`ls -i`**

   For more options visit man page
9. Display the content of the file Junk and temp using **`cat`** command
10. Use **`cat <file-1 file-2 file-3 ...>`**. Observer the output
11. use **`cat -n filename`**. Output?

More on ed

1. Invoke ed editor: $ **ed**
2. Dispaly line 1, 2 of Junk file
3. Append two new line after line no 4 of Jubk [n a]
4. Insert a text ITER CSE Sec-b before line 5 [n i]
5. change lines 2 throgh 5 in Junk [m,n c]

Unix File Colors

Color	File Type
Blue or dark blue	Directory
Green	Executable or recognized data file
Sky blue	Linked file
Yellow with black background	Device file
Pink	Graphics or image file
Red	Archive file or Zip file