



IT2758

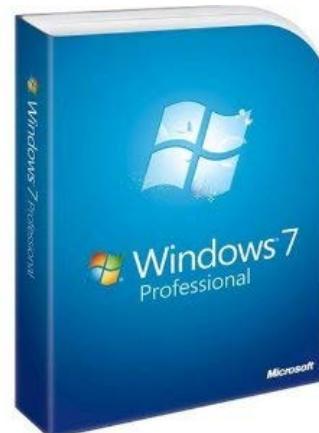
Lecture 2

OS Core Functions

Operating System Software

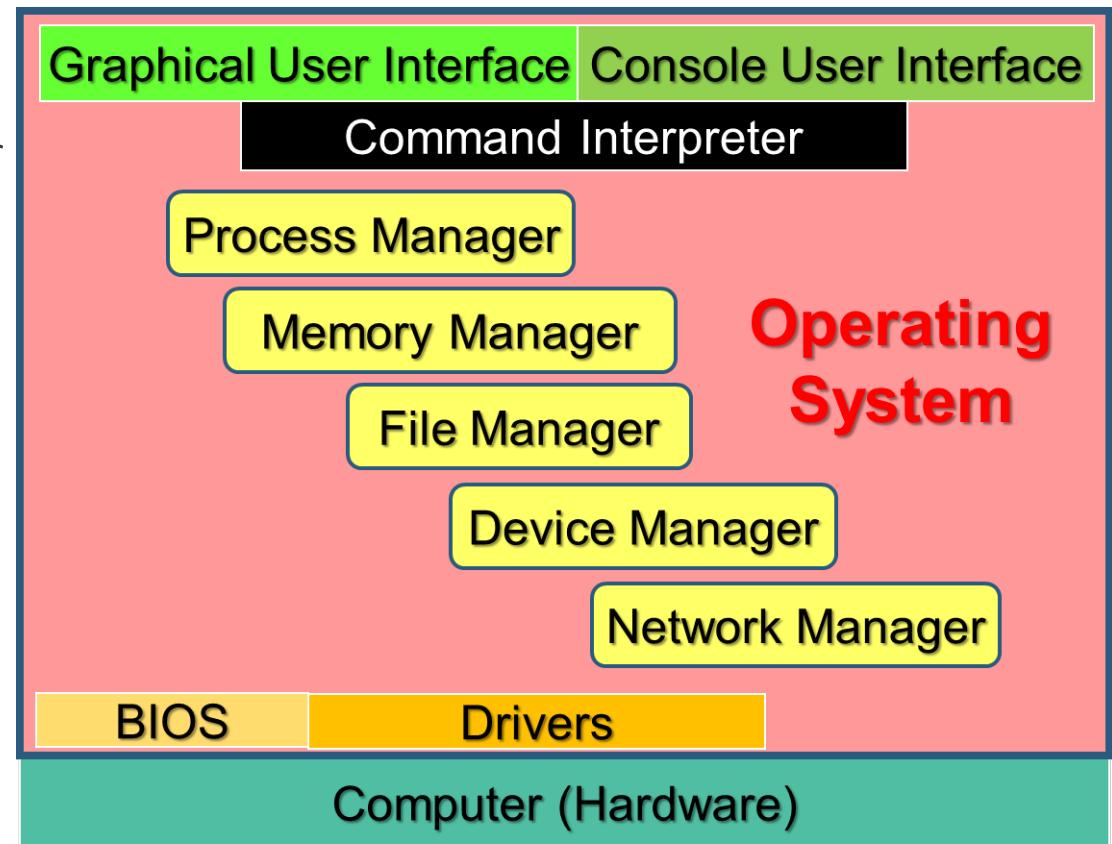
Software which manages the overall operation of the computer system including:

- hardware (CPU, RAM, I/O)
- security
- system interface
- application interface

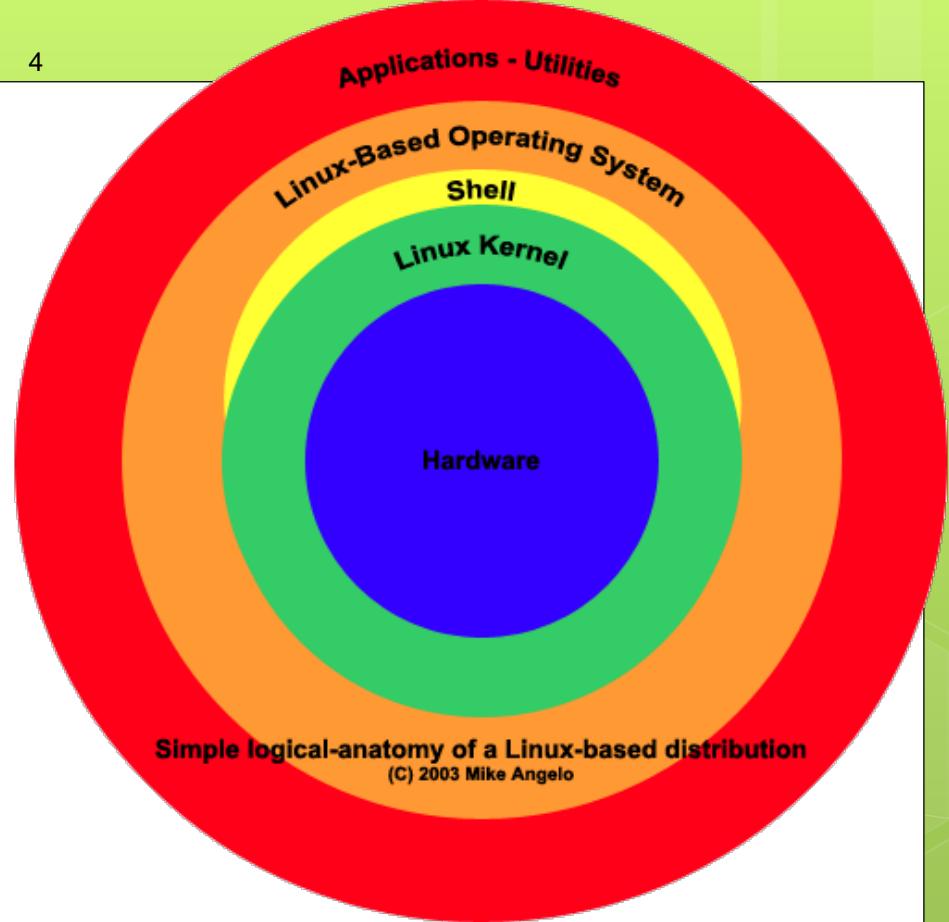


What is OS?

- System manager
 - Process
 - Memory
 - File
 - Device
 - Network



Kernel



- **Kernel** – The internal part of the operating system.
 - Those software components that perform the basic functions required by the computer.
 - File management
 - Memory management (RAM)
 - Security

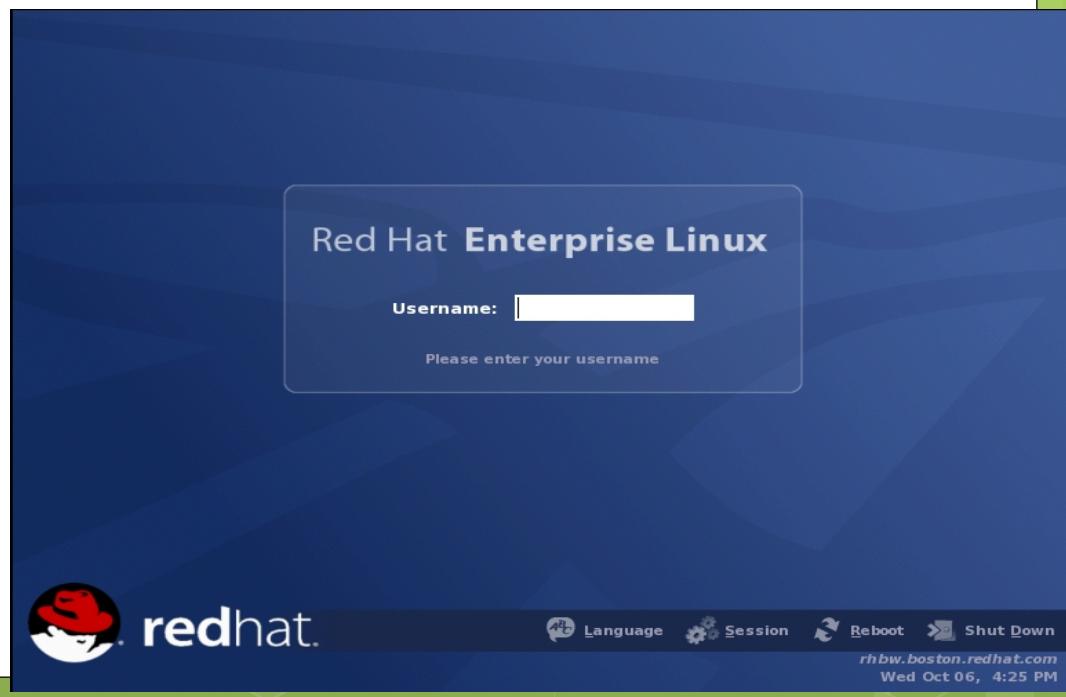
The kernel

The operating system software file (program) which is **copied into RAM**, usually from the hard disk drive, during the **boot-up**.

The kernel remains in RAM while the computer is on and is **in charge of the overall operation** of the computer system.

The kernel contains the “**internal programs**” for the most often used operations like copying files.

- kmem (Linux)
- command.exe (Microsoft)

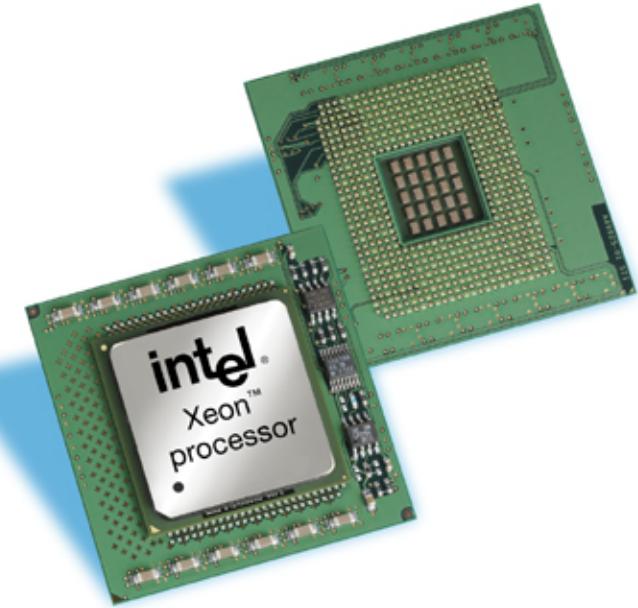


The functions of an operating system

1. Manages and Interacts with Computer Hardware
2. Provides and Manages System Security
3. Provides the System Interface
4. Provides the Interface for Application Software

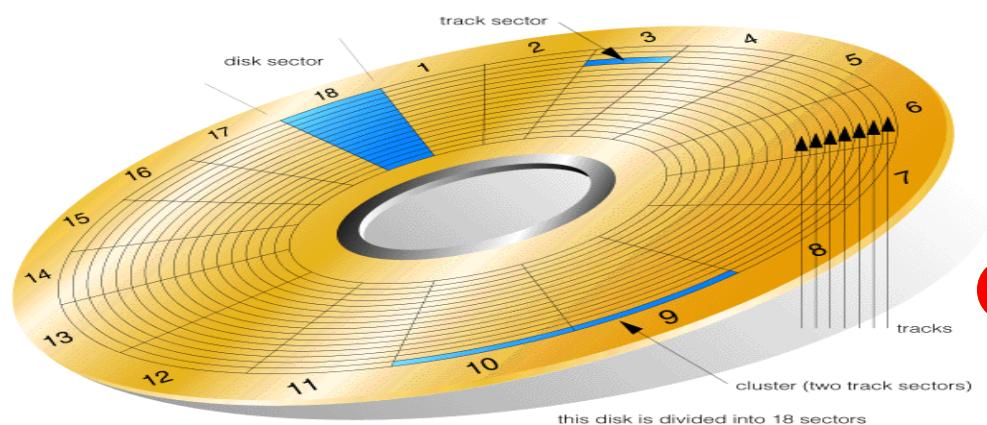
1. Manages and Interacts with Computer Hardware

- Manages the CPU
 - What software programs the CPU works on and when
- Manages RAM
 - What is stored in RAM and where it is stored
 - Virtual memory
 - OS will send message when RAM is full



1. Manages and Interacts with Computer Hardware (continued)

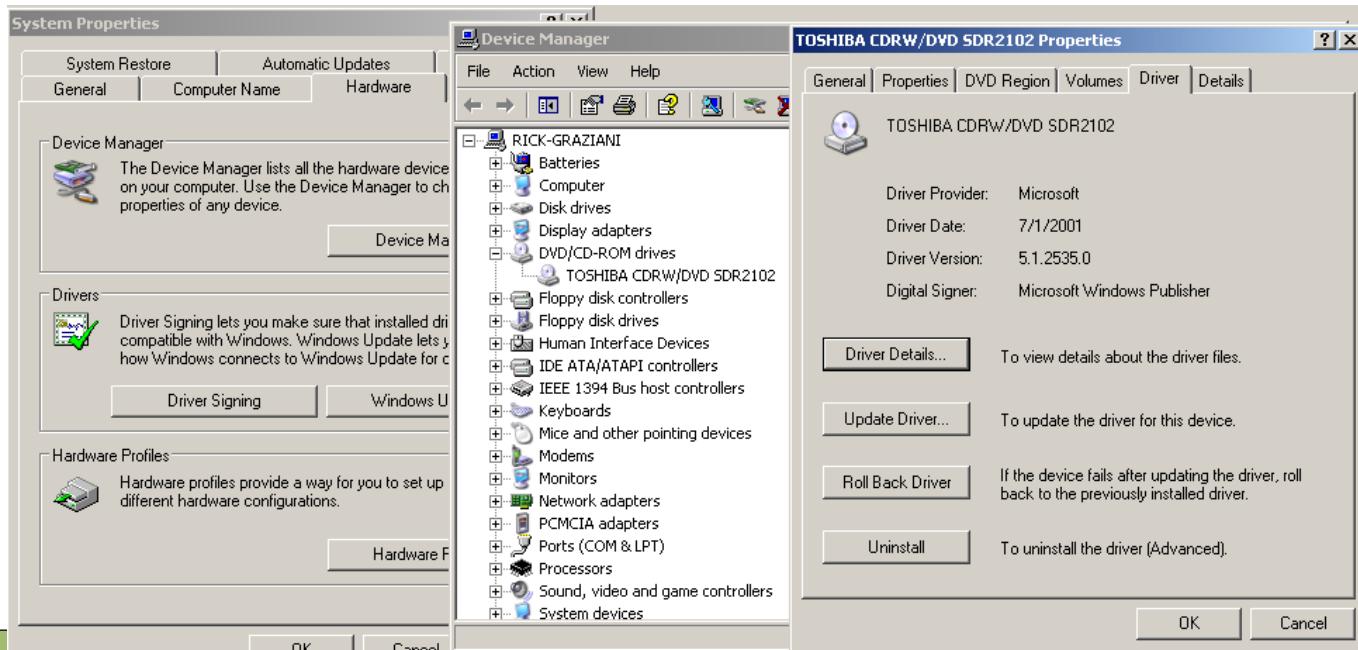
- Provides the interface for **storage devices** and manages how data is stored on those devices
 - in charge of formatting disks
 - creates sectors and clusters
 - creates F.A.T. or V.T.O.C.
 - sends message when disk is full or there is some other problem with writing data to the disk
 - virtual memory
 - CD-ROM, DVD-ROM
 - Flash drive



this disk is divided into 18 sectors

1. Manages and Interacts with Computer Hardware (continued)

- Provides the Interface for **Input and Output Devices**
 - keyboard, mouse, printer,
 - device drivers** = software programs which allow the hardware device to be used by the operating system and by application software



2. Provides and Manages System Security

Single-user Operating Systems

- minimal security
- user has full authority

Server Operating Systems

- login and password capability
- protection of user's data stored on the server's central hard disk drives
- protection and security for software programs



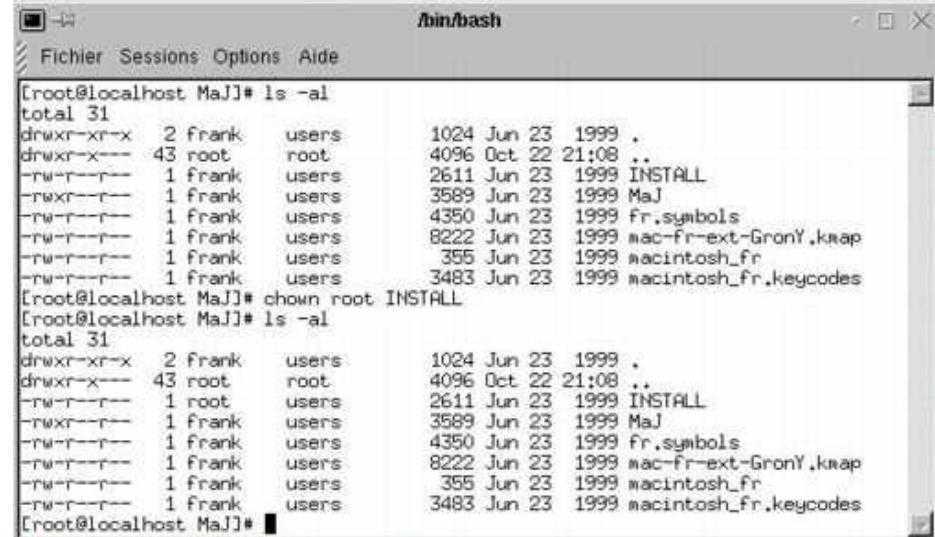
3. Provides the System Interface

System Interface or shell =
the interface between
the user and the
computer

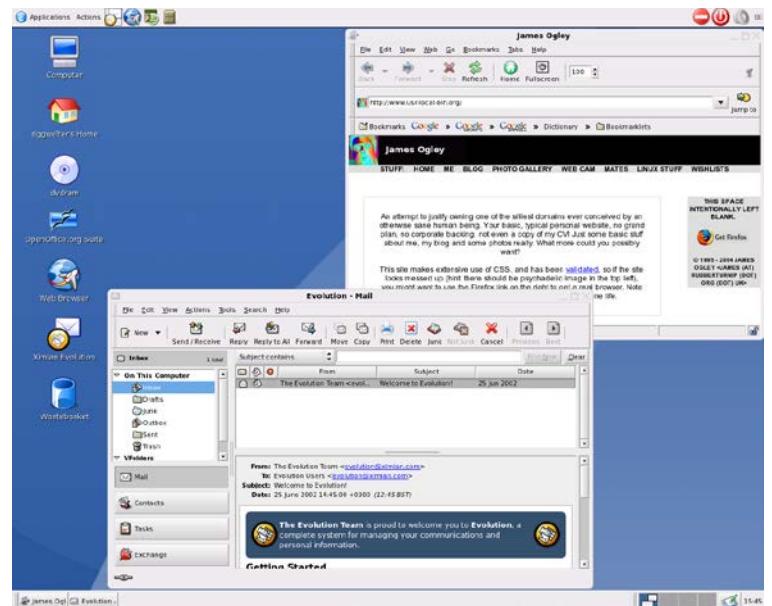
Command Line Interface (CLI)

- Linux, UNIX, DOS, older OS's

Graphical User Interface (GUI)



```
[root@localhost Maj]# ls -al
total 31
drwxr-xr-x  2 Frank   users          1024 Jun 23 1999 .
drwxr-x--- 43 root    root           4096 Oct 22 21:08 ..
-rw-r--r--  1 Frank   users          2611 Jun 23 1999 INSTALL
-rw-r--r--  1 Frank   users          3589 Jun 23 1999 Maj
-rw-r--r--  1 Frank   users          4350 Jun 23 1999 fr.symbols
-rw-r--r--  1 Frank   users          8222 Jun 23 1999 mac-fr-ext-GronY.knab
-rw-r--r--  1 Frank   users          355  Jun 23 1999 macintosh_fr
-rw-r--r--  1 Frank   users          3483 Jun 23 1999 macintosh_fr.keycodes
[root@localhost Maj]# chown root INSTALL
[root@localhost Maj]# ls -al
total 31
drwxr-xr-x  2 Frank   users          1024 Jun 23 1999 .
drwxr-x--- 43 root    root           4096 Oct 22 21:08 ..
-rw-r--r--  1 root    users          2611 Jun 23 1999 INSTALL
-rw-r--r--  1 Frank   users          3589 Jun 23 1999 Maj
-rw-r--r--  1 Frank   users          4350 Jun 23 1999 fr.symbols
-rw-r--r--  1 Frank   users          8222 Jun 23 1999 mac-fr-ext-GronY.knab
-rw-r--r--  1 Frank   users          355  Jun 23 1999 macintosh_fr
-rw-r--r--  1 Frank   users          3483 Jun 23 1999 macintosh_fr.keycodes
[root@localhost Maj]#
```



Command Line Interface

```
C:\>dir
 Volume in drive C has no label.
 Volume Serial Number is 3DB0-2A46

 Directory of C:\

10/10/2001  06:41 AM    <DIR>          I386
10/10/2001  06:41 AM    <DIR>          BACKUP
10/10/2001  06:41 AM    <DIR>          WINNT
06/24/2004  12:53 PM           21 du_trace.log
03/15/2002  08:02 PM           0 CONFIG.SYS
10/16/2001  11:58 AM    <DIR>          FOUND.000
12/17/2001  02:58 PM           76,080 comreads.dbg
12/17/2001  02:58 PM           72,909 comused.dbg
11/21/2001  04:41 PM    <DIR>          UPN304
```

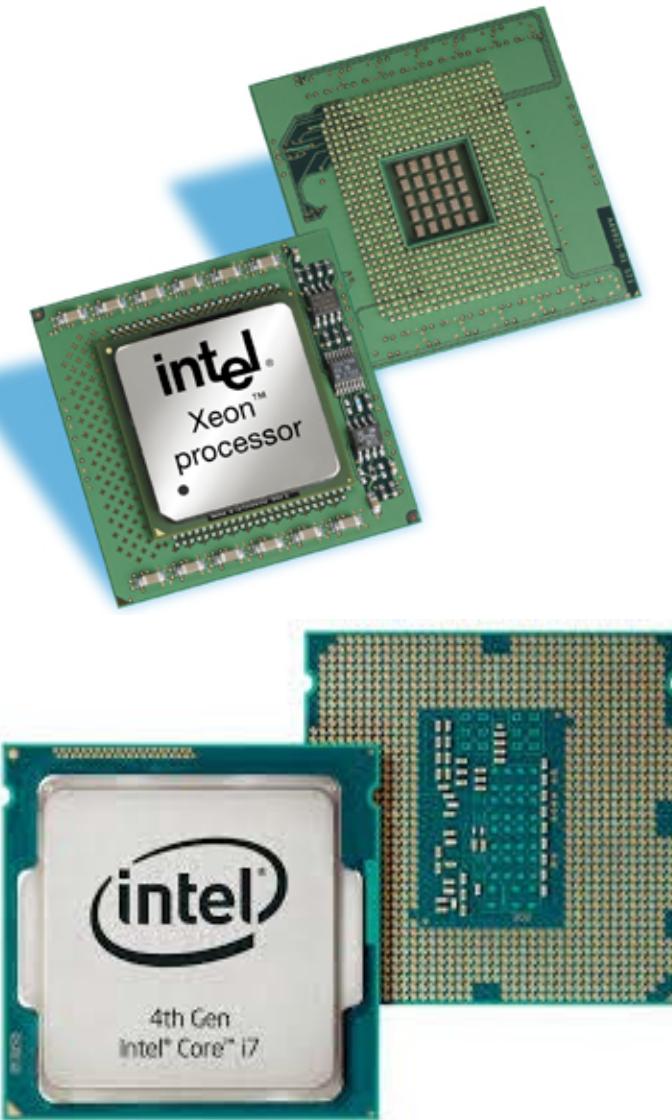
```
flute01.cisco.com - PuTTY

[flute01:~ 501]
$ ls
archives/      hai_linux_settings.zip   src/          upgrade_inprogress@
ats/          lib/                  svn/          temp/
bin/          naturaldocs/          testscripts@
cshrc_sample  naturaldocs.zip*        upgrade_inprogress@
```

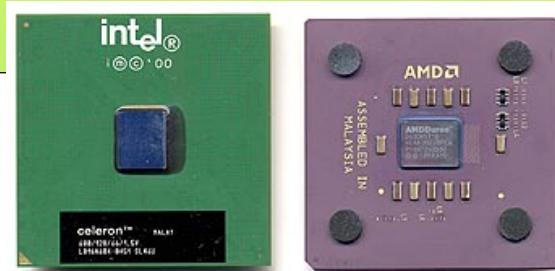
```
[flute01:~ 502]
$
```

4. Provides the Interface for Application Software

- Operating systems are software
- Operating systems are designed and developed for a specific CPU or "family of CPUs"



OS & Processors



OS & CPU couples (optimised):

1. Windows - Intel/AMD (Wintel)
2. Solaris – UltraSparc
3. Irix – MIPS
4. Mac – PowerPC, Intel
5. iOS – A10x
6. Unico – Cray
7. Android – Snapdragon, Tegra, Exynos



4. Provides the Interface for Application Software (continued)

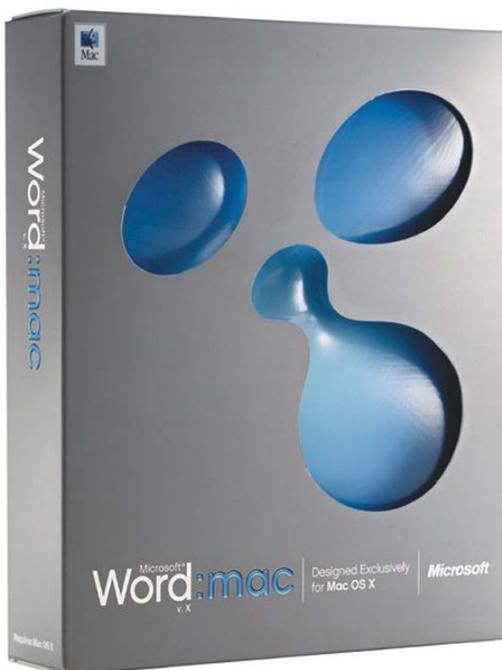
- Application software is developed for an operating system

MS Word for Windows XP

- Windows XP
- Intel CPU

MS Word for the Macintosh

- Macintosh OS X
- Gx CPU or Intel CPU



Microsoft Office Microsoft's working programs Microsoft 2003