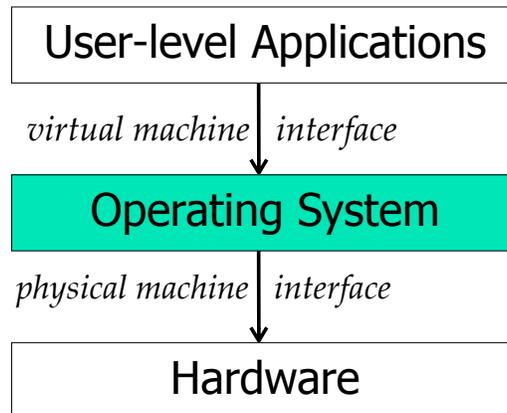
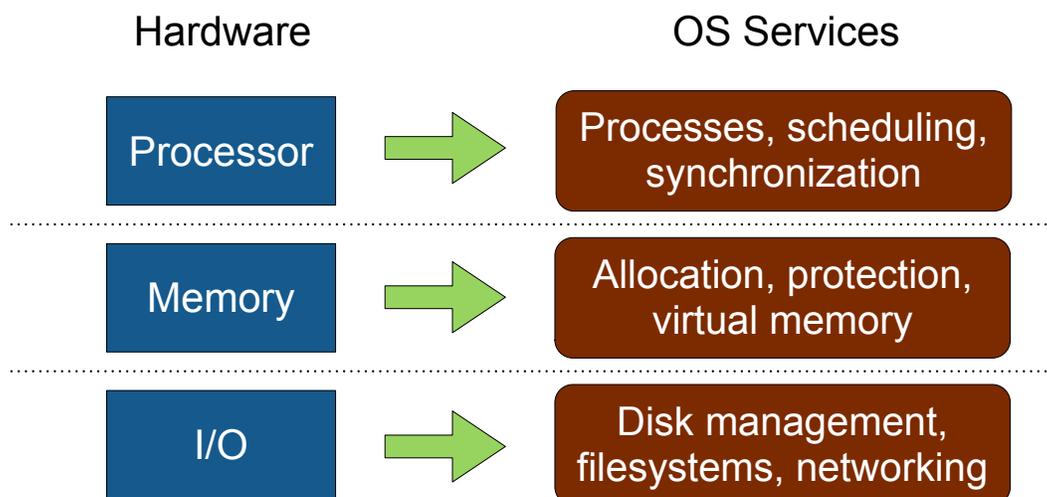


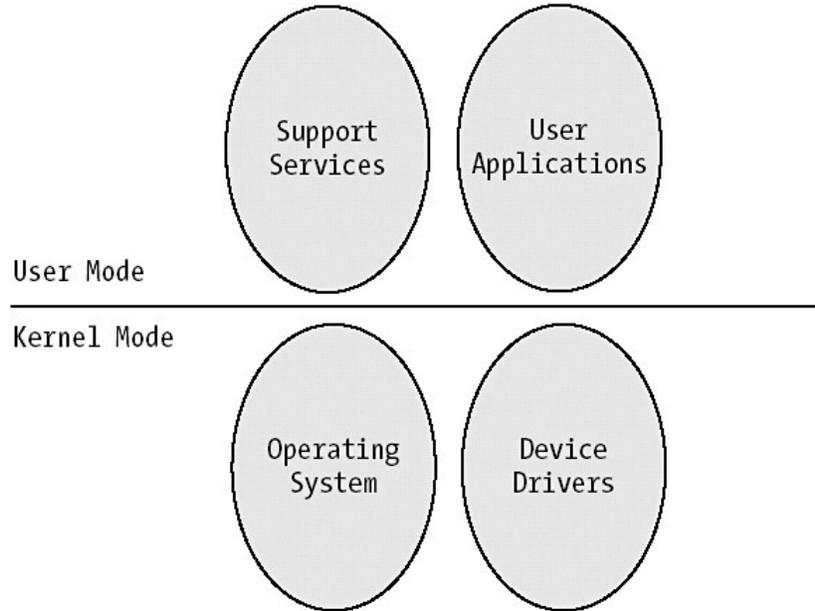
Recap: The OS Abstraction



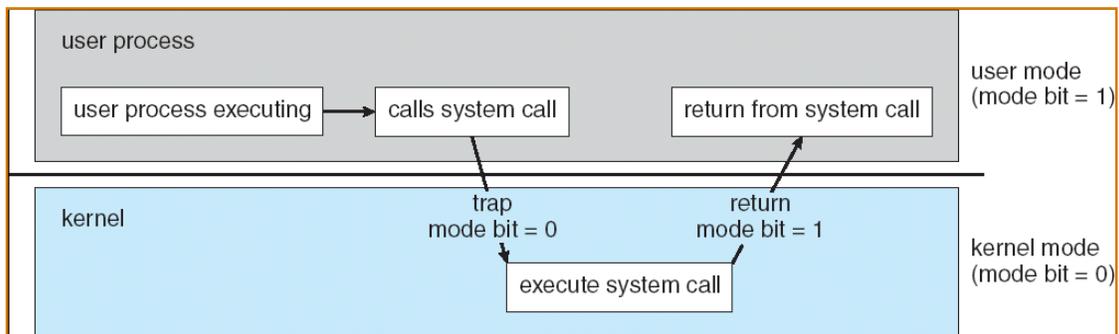
OS Resource Management



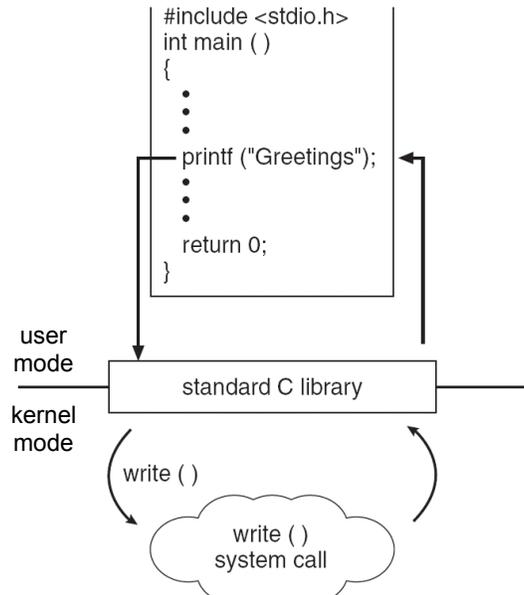
Protection: User and Kernel Mode



System Calls



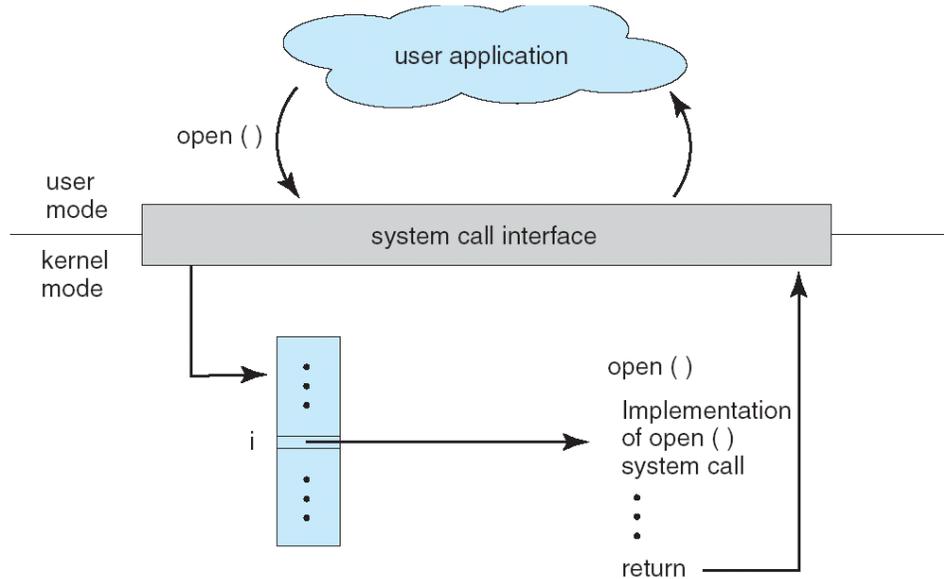
Making a System Call



Example System Calls

| | Windows | Unix |
|-------------------------|---|--|
| Process Control | CreateProcess() ExitProcess() WaitForSingleObject() | fork() exit() wait() |
| File Manipulation | CreateFile() ReadFile() WriteFile() CloseHandle() | open() read() write() close() |
| Device Manipulation | SetConsoleMode() ReadConsole() WriteConsole() | ioctl() read() write() |
| Information Maintenance | GetCurrentProcessID() SetTimer() Sleep() | getpid() alarm() sleep() |
| Communication | CreatePipe() CreateFileMapping() MapViewOfFile() | pipe() shmget() mmap() |
| Protection | SetFileSecurity() InitializeSecurityDescriptor() SetSecurityDescriptorGroup() | chmod() umask() chown() |

System Call Implementation



Traps

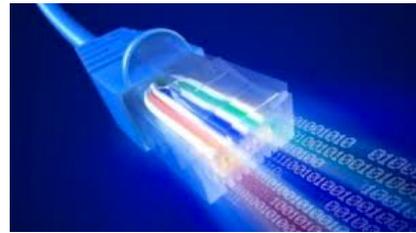


Memory Addresses

| | |
|---------------|------------------|
| 0: 0x00080000 | Illegal address |
| 1: 0x00100000 | Memory violation |
| 2: 0x00100480 | Division by zero |
| 3: 0x00123010 | System call |
| ⋮ | |

Trap Vector

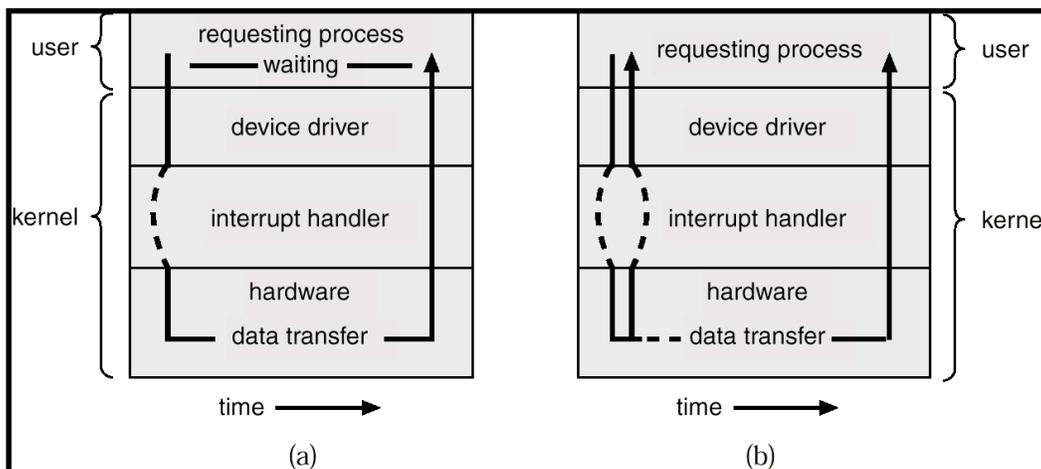
I/O Control & Interrupts



Interrupt
Vector

| | |
|----------------|----------|
| 0: 0x2ff080000 | keyboard |
| 1: 0x2ff100000 | mouse |
| 2: 0x2ff100480 | timer |
| 3: 0x2ff123010 | disk 1 |

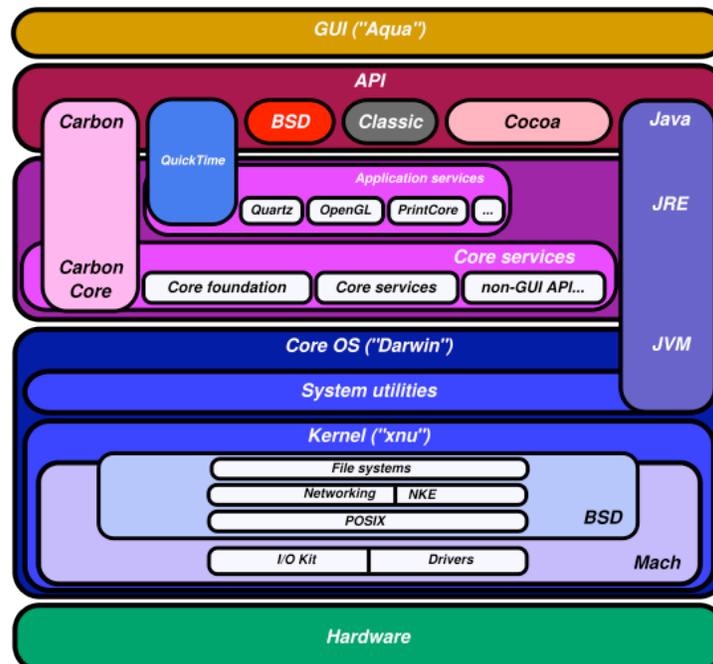
Synchronous & Asynchronous I/O



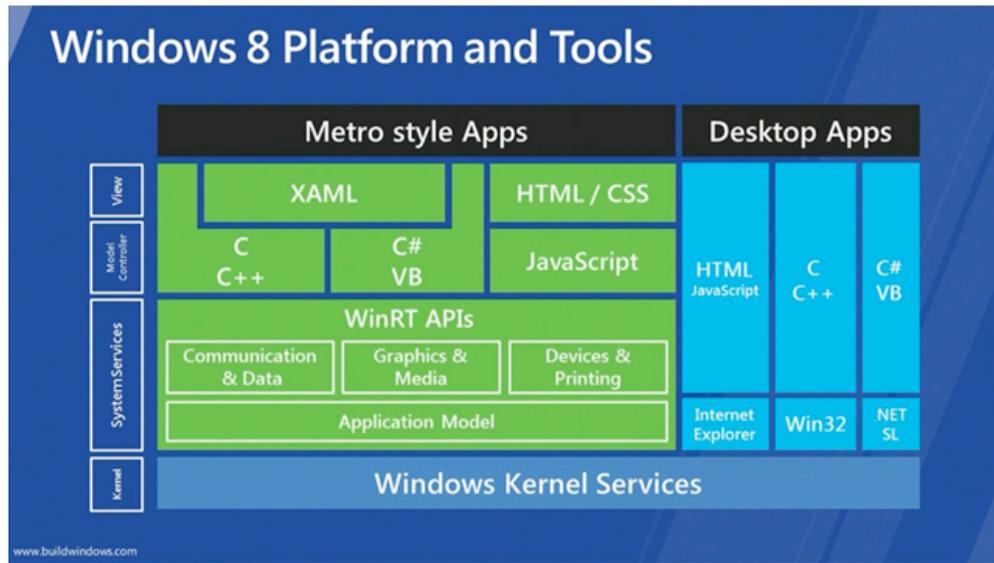
Hardware Timer



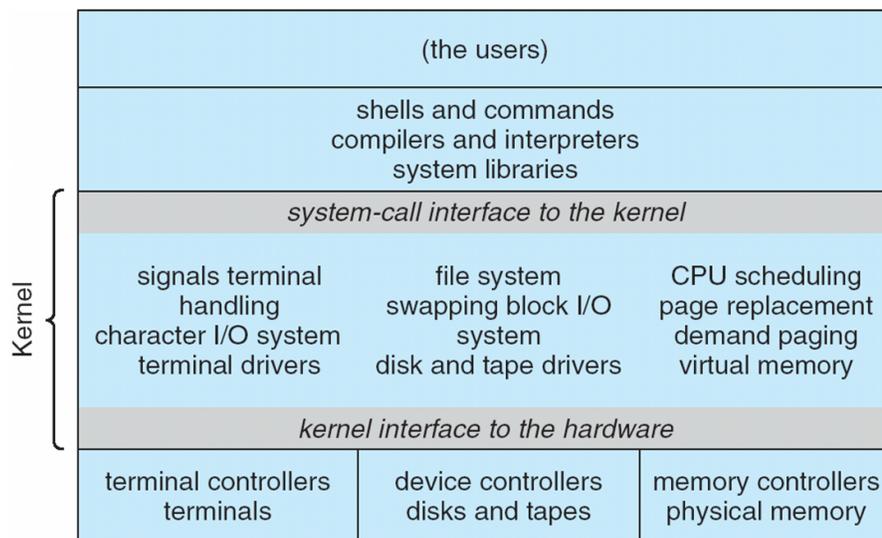
OS Architecture: Mac OS X



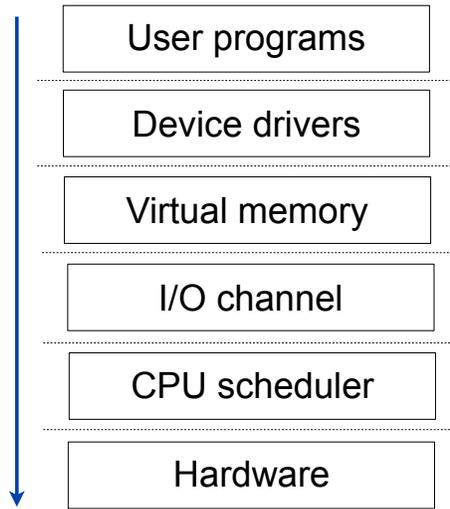
OS Architecture: Windows 8



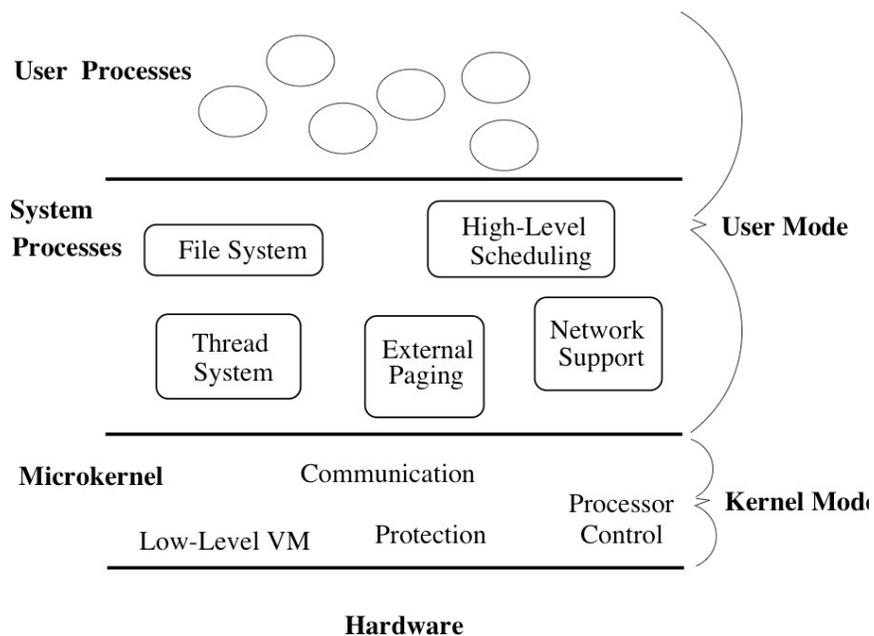
Monolithic Kernel Design



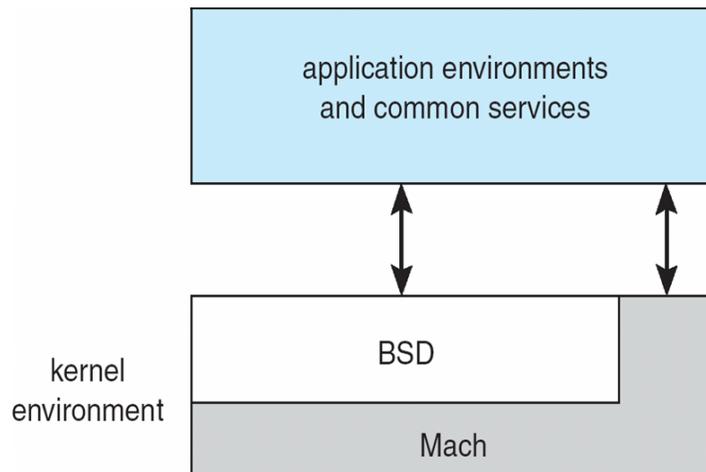
Layered OS Design



Microkernel Design



Hybrid Design in Mac OS X



Modular Design

