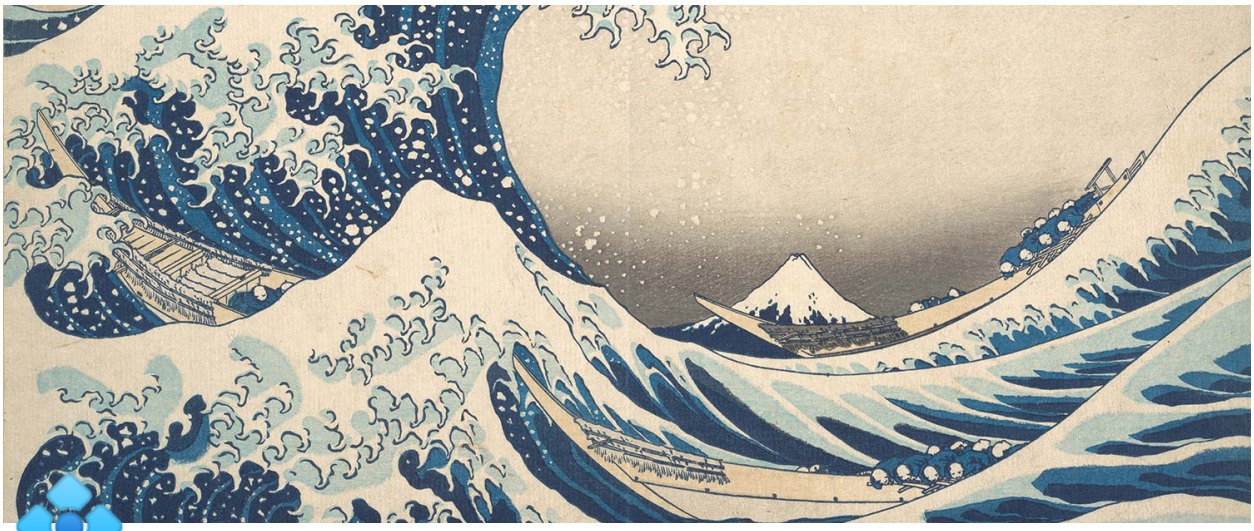
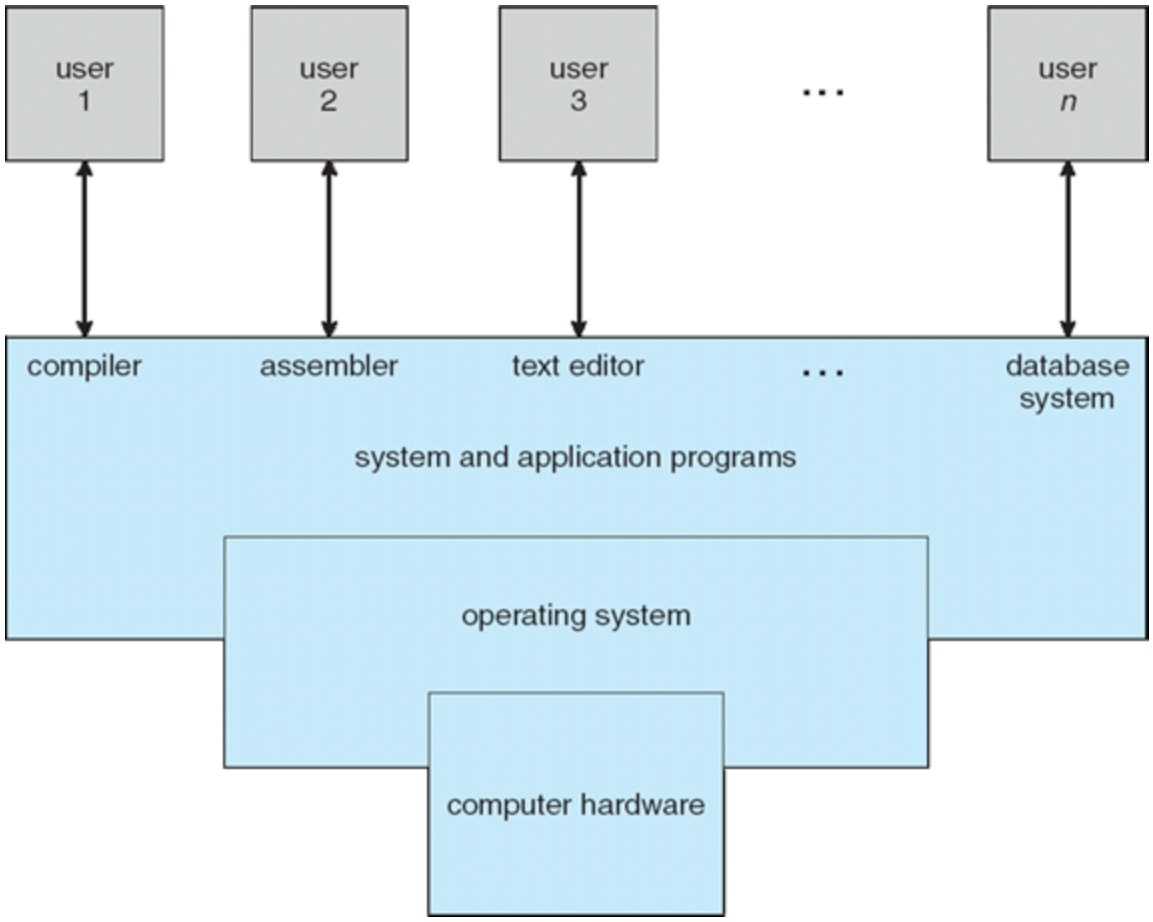


ch1 Introduce

Computer System Structure

- 讓使用者妥善地使用軟硬體資源的系統程式
- 電腦系統的**四個組成要素**
    1. **Hardware** - 提供基礎的運算資源。eg : CPU , memory ,I/O devices
    2. Operating system (**作業系統) -** 負責控制並協調分配硬體資源給各個使用者，管理系統內的硬體 軟體 資料
    3. Application programs (應用程式)
    4. User - people , machines , other computers



Common functions Of interrupt

- Interrupt transfers control to the interrupt service routine generally, through the **interrupt vector ,**which contains the addresses of all the service routines
- Interrupt architecture must save the address of the interrupted instruction
- A trap or exception is a software-generated interrupt caused either by an error or a user request
- An operating system is interrupt driven

Direct Memory Access Structure

- Used for high-speed I/O devices able to transmit information at close to memory speeds

- Device controller transfers blocks of data from buffer storage directly to main memory without CPU intervention
- Device controller transfers blocks of data from buffer storage directly to main memory without CPU intervention

Storage Structure

- Main memory – only large storage media that the CPU can access directly and two characteristic
    1. Random access
    2. Typically volatile
- Secondary storage – extension of main memory that provides large nonvolatile storage capacity
- Magnetic disks – rigid metal or glass platters covered with magnetic recording material
    1. Disk surface is logically divided into tracks, which are subdivided into sectors
    2. The disk controller determines the logical interaction between the device and the computer
- Solid-state disks – faster than magnetic disks, nonvolatile
    1. Various technologies
    2. Becoming more popular

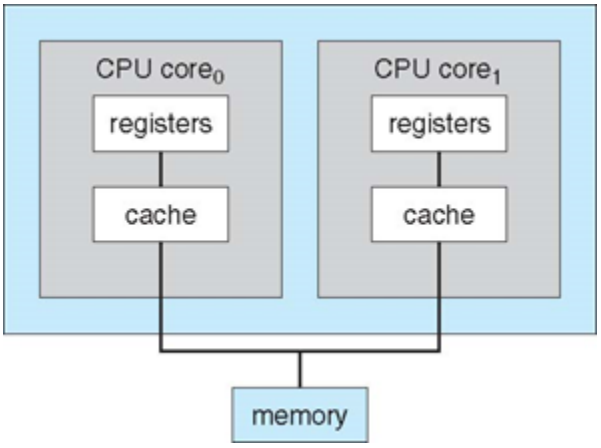
Caching

- Important principle, performed at many levels in a computer (in hardware, operating system, software)
- Information in use copied from slower to faster storage temporarily
- Faster storage (cache) checked first to determine if information is there
    - If it is, information used directly from the cache (fast)
    - If not, data copied to cache and used there

- Cache smaller than storage being cached
  - Cache management important design problem
  - Cache size and replacement policy

A Dual-Core Design

- UMA and NUMA architecture variations
- Multi-chip and multicore
- Systems containing all chips vs. blade servers
  - Chassis containing multiple separate systems



Computing Environments - Virtualization

- Use cases involve laptops and desktops running multiple OSes for exploration or compatibility
  - Developing apps for multiple OSes without having multiple systems
  - QA testing applications without having multiple systems
  - Executing and managing compute environments within data centers
- VMM can run natively, in which case they are also the host
  - There is no general purpose host then (VMware ESX and Citrix XenServer