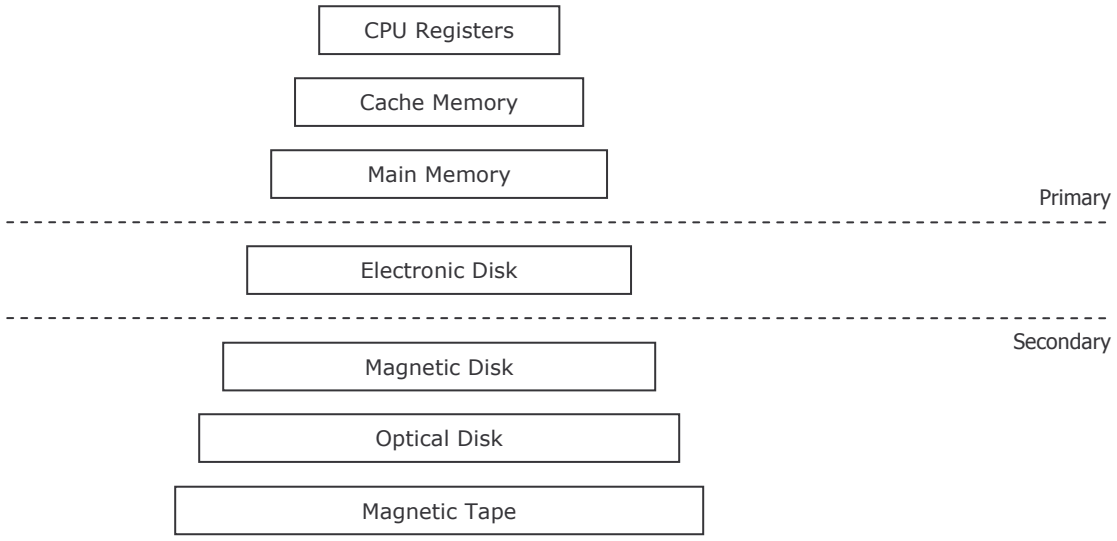
Bootstrap Process (con't)

On an embedded system, the OS may not be stored on a hard disk platter, but somewhere within the memory hierarchy.

Historically, the first process that is run is the kernel's init process.

Memory Hierarchy

All of the components along the system bus(ses) need to access the memory.
Ideal case: store all programs and all data in fast, chip-based memory.
Reality: chip-based memory is more expensive and is neither cost effective nor space effective.



Going down the pyramid:

- The **size** (number of bytes that can be stored) **increases**
- The **cost decreases**
- The **speed decreases**
    - Registers are the fastest because they are on the same chip as the CPU that uses them
    - Chip interface delay
    - Shared medium delay
    - Access time delay

Magnetic tape has no additional electronic components. It is simply a reel of magnetic coated material.

Electronic Disk

1. RAM + Mag Disk
2. Flash ROM
3. Non-volatile RAM (RAM + backup battery)

Polling – CPU controls every single event that occurs in time in the system. Thus, it would coordinate the disk controller through all its activity and IO with the drives.

Interrupt driven system paradigm

Independent system device controllers interrupt the CPU to announce completion of events or service requests

Categories / Types:
Based on the locality of the source generating the interrupt and the

1. Device generated
    a. Generally, a hardware interrupt
    b. Signal wires with voltages
2. Monitor calls (system calls)
    a. Generally, a software interrupt
    b. Operating system provides in the API
3. Software exception
    a. Generally, a software interrupt
    b. Divide by 0
    c. Overflow

Interrupt Service (sub)Routine (ISR)

- A subroutine that executes in response to an interrupt.
- "Services" the interrupt
- Characteristics of good ISRs: Short and fast