



CSE308 Operating Systems

System Booting

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SoC

SASTRA

Booting is the task of waking up the computer
from sleep



Need of Booting

- When the computer is powered on, the **OS** does not exist in main memory since RAM is **volatile memory**.
- OS is stored on the disk
- Hardware doesn't know where the operating system resides and how to load it.
- Need a special program to do this job – **Bootstrap loader**.
E.g. BIOS – Boot Input Output System.
- Bootstrap loader **locates the kernel**, loads it into main memory and starts its execution.
- In some systems, a simple bootstrap loader fetches a more complex boot program from disk, which in turn loads the kernel (two level booting)

Booting Process

- The Booting is a process involving 2 stages:
 - getting hardware up and running, and
 - getting the OS and other software up and running

Booting a Computer

- Power up; computer runs **POST**
- Boot sequence governed by BIOS ROM
- BIOS parameters stored in CMOS
- BIOS ROM may be password protected
- Control passes to the MBR (Master Boot Record) of the first bootable device detected
- MBR points to boot record of selected operating system
- Operating system takes control

POST

- power-on self-test -- one of the first processes that a computer undergoes when booting.
- POST tests the computer to ensure that it is working as it is supposed to.
- OST can detect some errors with the processor, motherboard, RAM and other memory, as well as the video card.
- Most BIOS chips use a system of beep codes to indicate the POST status to the user and each BIOS chipset uses a different code

BIOS

- Basic input/output system
- BIOS software stored permanently on a ROM chip on the motherboard.
- The first code run when a PC is powered on.
- Identify system devices.
- BIOS goes through a preconfigured list of devices until it finds one that is bootable. If it finds no such device, an error is given and the boot process stops.
- Initializes CPU registers, device controllers and contents of the main memory. After this, it loads the OS.

BIOS Setup

PhoenixBIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
<p>ATAPI CD-ROM Drive</p> <p>+Removable Devices</p> <p>+Hard Drive</p> <p>Network Boot</p>				<p>Item Specific Help</p> <p>Keys used to view or configure devices: <Enter> expands or collapses devices with a + or - <Ctrl+Enter> expands all <Shift + 1> enables or disables a device. <+> and <-> moves the device up or down. <n> May move removable device between Hard Disk or Removable Disk <d> Remove a device that is not installed.</p>	
F1	Help	↑↓	Select Item	-/+	Change Values
Esc	Exit	←	Select Menu	Enter	Select ► Sub-Menu
			F9	Setup Defaults	
			F10	Save and Exit	