Booting

Booting is the process of loading the operating system from secondary memory to primary memory. In other words the procedure of starting a computer by loading the kernel is known as booting of the system.

Types of Boot Process

Boot process can be of two types:

1. Hard Boot / Hard Reboot / Cold Boot
2. Soft Boot / Soft Reboot / Warm Boot

Hard Boot / Hard Reboot / Cold Boot

- In this process the actual booting starts after POST (Power On Self Test) process which is used to diagnose hardware errors.
- When the power to the system is physically turned off and back on again causing an initial boot of the machine.
- Skipping file system synchronization and other activities that would occur on an orderly shutdown.

Soft Boot / Soft Reboot / Warm Boot

- In this process the POST can be avoided. So it is faster than cold booting.
- The system restarts without the need to interrupt the power.
- Executing the file system synchronisation and other activities that would occur on an orderly shutdown.

Bootstrap

A small piece of code known as the "***Bootstrap Program***" or "***Bootstrap Loader***" locates the kernel, load it into main memory after completion of POST and start its execution.

Steps of Booting

1. Power Up

The first step of any boot process is applying power to the machine. When the computer is turned on the control processor executes some start-up code in ROM.

2. POST

This test checks all connected hardware devices to be sure it is all functioning properly.

3. Find a boot Device

After POST the boot process searches the boot device list for a device with BIOS (Basic Input Output System) on it.

After finding the boot device, it finds the Stage-0 boot program from the boot device. The first sector of the boot device is known as the '*Boot Sector*' and contains the stage-1 boot program.

There is no guarantee the boot sector will contain a boot program. Before transferring control to the next state in boot process the current boot program will check at the end of the boot sector for a magic bit pattern which is used to indicate that the sector contains a valid boot program.

4. Load the OS

Stage-1 boot now reads the partition table and copies into memory the first sector of the active partition. The first sector of the active partition contains a stage-2 boot program; it loads the operating system into memory.

5. Transfer Control

After loading the OS boot process transfer the control to the OS. The OS then proceeds to execute any pre-configured start-up routines or application execution. At the end of the handoff the computer is ready for use.

Questions asked in semester exam:

Question: What is the role of bootstrap loader in system's booting process?

[2014-2015] [5 Marks]

Question: Describe the steps involved in booting.

[2010-2011] [5 Marks]