Course Name: O Level (2nd Sem)   **Subject: ICT**
**Topic: Windows Booting Procedure**   **Date: 25-03-20**

Booting

Booting is just the process of starting or resetting the computer. There are two types of booting: cold booting and warm booting. **Cold booting** is the booting process happening when we first turn on computer and **warm booting** is the processes happening when we reset the computer. During the booting process the computer loads the operating system to its memory and prepares it for use.

When the booting process takes place, it copies kernel and important instructions of an operating system from hard disk to main memory (RAM). The kernel is the most important part of the operating system that manages memory and devices, maintains computerclock, and starts applications. It assigns compute resources like devices, programs, data, and information also. The kernel also remains in memory permanently when the computer starts.

Steps In the Booting Process:

WINDOWS BOOTING PROCEDURE
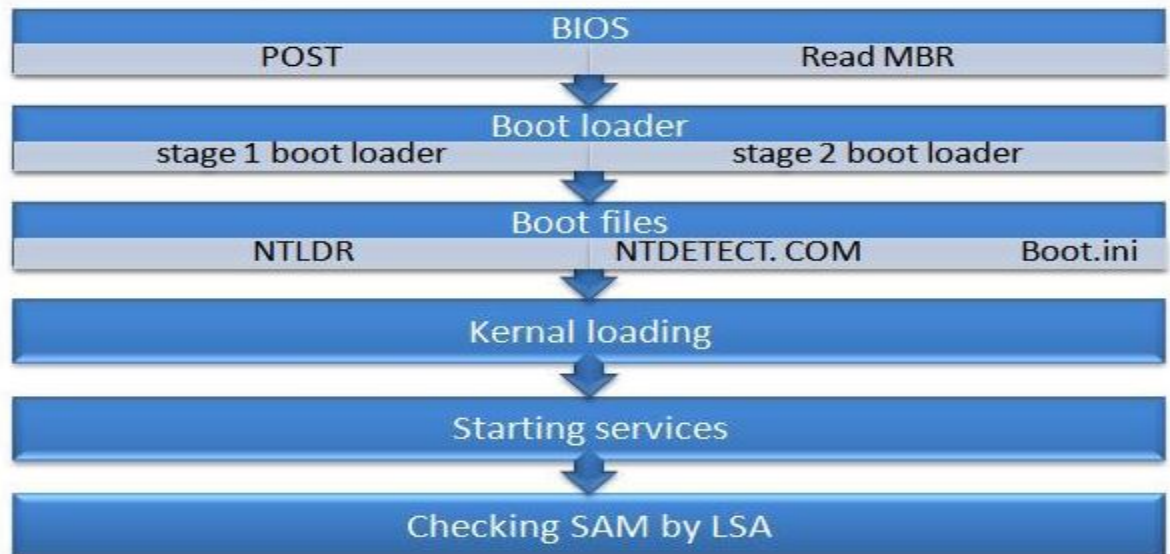
BIOS (basic input/output system): the part of the system software that includes the instructions that the computer uses to accept input and output

POST - POST stands for Power On Self Test: POST checks all the hardware devices connected to a computer like RAM, hard disk etc and make sure that the system can run smoothly with those hardware devices. If the POST is a failure the system halts with a beep sound.

Now BIOS checks the boot priority. We can set the boot priority as CD drive, hard disk or floppy drive.

MBR:The next duty of BIOS is to read the MBR. MBR stands for Master Boot Record and its the first sector on a hard disk. MBR contains the partition table and boot loader.

Functions of Boot loader: Now BIOS has passed the control to boot loader and boot loader is a small program which loads kernel to computers memory. Actually there are two stages of boot loaders, stage 1 boot loader and stage 2 boot loader. MBR contains the stage 1 boot loader and stage 1 boot loader is a link to the stage 2 boot loader. The stage 2 boot loader resides in the boot partition and it loads the kernel to memory.

Boot files and functions

There are three boot files in a Windows operating system and they are NTLDR, NTDETECT.COM and Boot.ini. The boot files are found in the active partition of hard disk and its normally C drive in a Windows machine.

NTLDR - NTLDR stands for NT Loader and its the second stage bootloader.

Boot.ini - Boot.ini contains the configuration files of NTLDR. When the operating system is loaded we cannot pass any arguments to kernal, so those arguments are passed through boot.ini.

NTDETECT.COM - This file detects hardware and passes information to NTLDR. Using the collected information the NTLDR creates a hardware key and this key is used to detect hardware's. A new hardware key is generated after each reboot of the operating system and that's why system asks to reboot after installation of a new hardware.

Kernel and its functions

After executing the functions of boot files the control is passed to Kernel. ntoskrnal.exe is the kernel file in a Windows machine Kernel acts as a layer between software and hardware.The library file (hal.dll) helps Kernel to interact with hardware's. HAL stands for Hardware Abstraction Layer and this hal.dll file is machine specific. Now the drivers for hardware's are loaded from the file system and the Kernel is loaded to primary memory.

Services and log in procedure: When kernel is loaded in the primary memory services for each process is started Winlogon.exe is the last service started during this process. Winlogon.exe starts the log in procedures of windows machine. It first calls the library file msgina.dll .MSGINA stands for Microsoft Graphics Identification and Authentication and it provides the log in window. Now msginal.dll passes the control to LSA (Local Security Authority), it verifies the username and password from the SAM file. SAM (Security Accounts Manager) contains the information about all users created in a Windows operating system.

Now the booting procedure is over and we have reached the desktop of Windows operating system.