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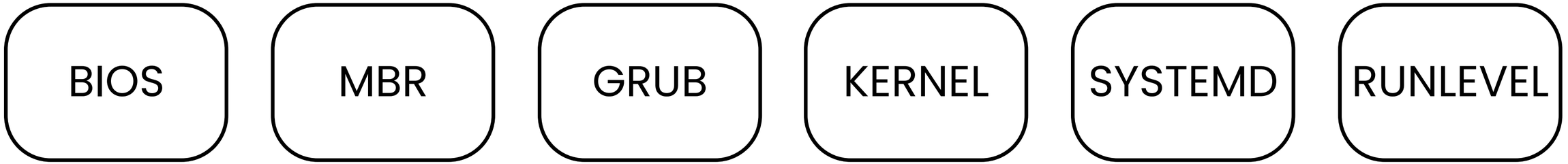
UNDERSTANDING THE BOOT PROCESS

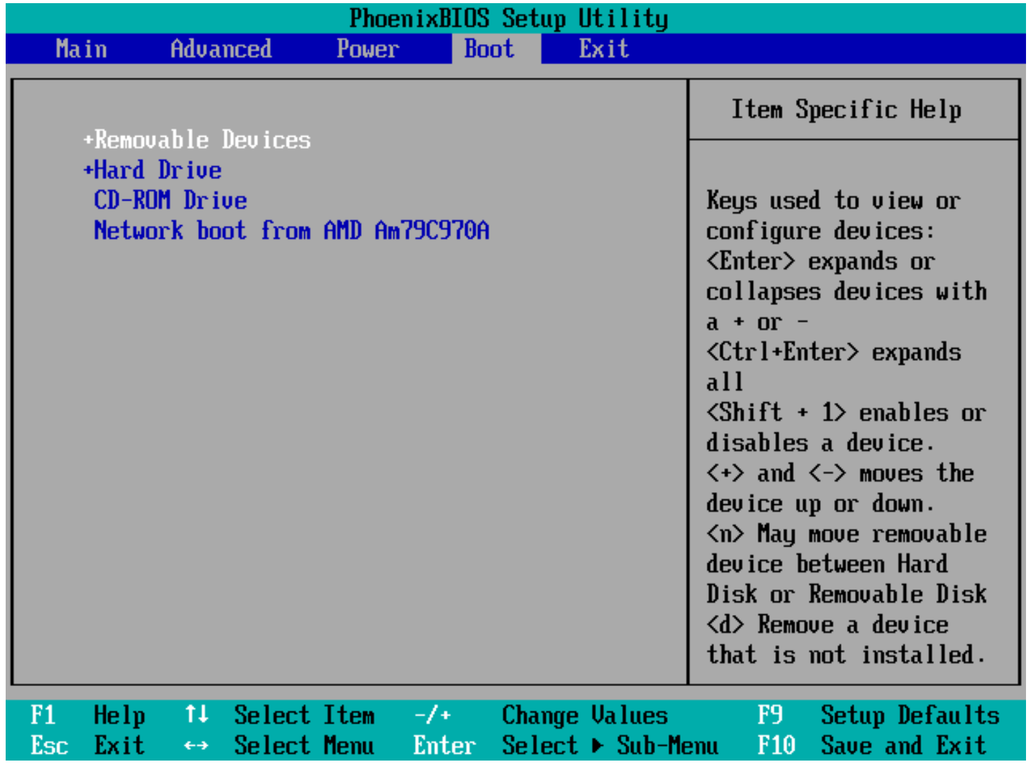
OVERVIEW OF THE BOOT PROCESS



BIOS

BASIC INPUT OUTPUT SYSTEM

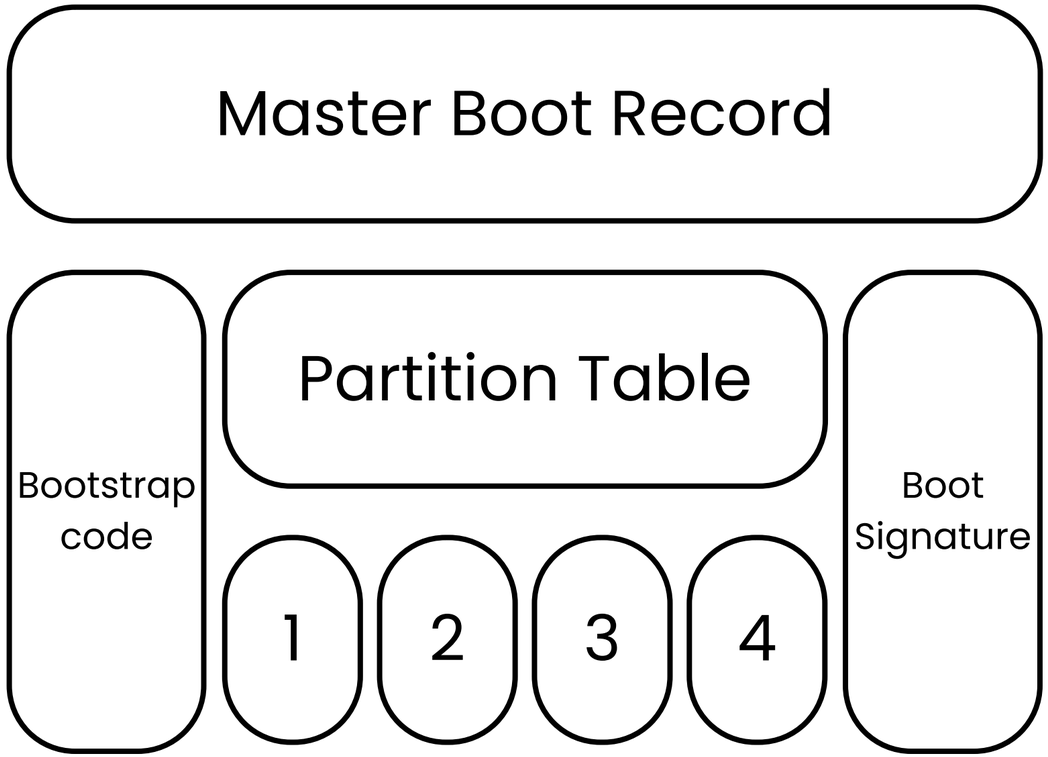
- Perform the **POST** (Power-on self-test) which run some system integrity checks of hardware and peripherals.
- Searches, loads, and executes the boot loader program, which can be found in the **MBR**.
- Once the boot loader program is detected and loaded into the memory, BIOS gives the control to it.



MBR

MASTER BOOT RECORD

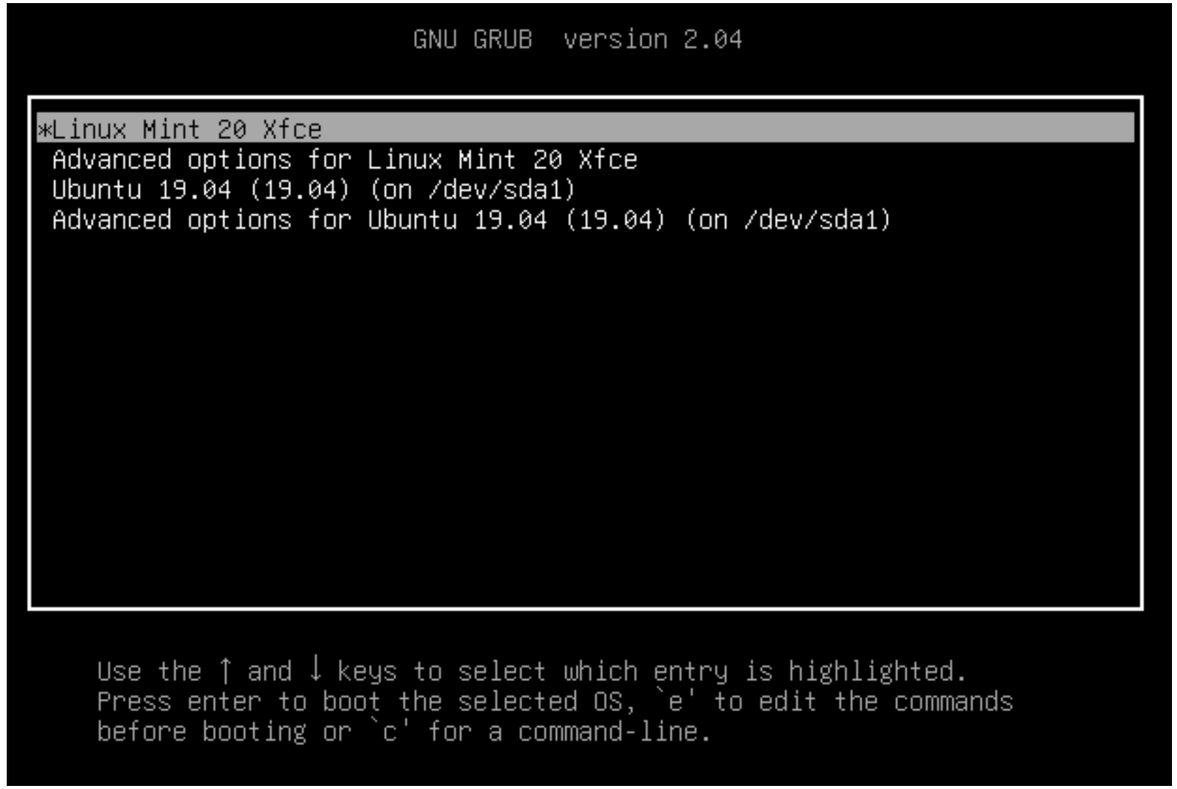
- Responsible for loading and executing the **GRUB** boot loader.
- Located in the first sector of a hard disk or a removable drive.
- Contains details about the partitions and their locations.



GRUB

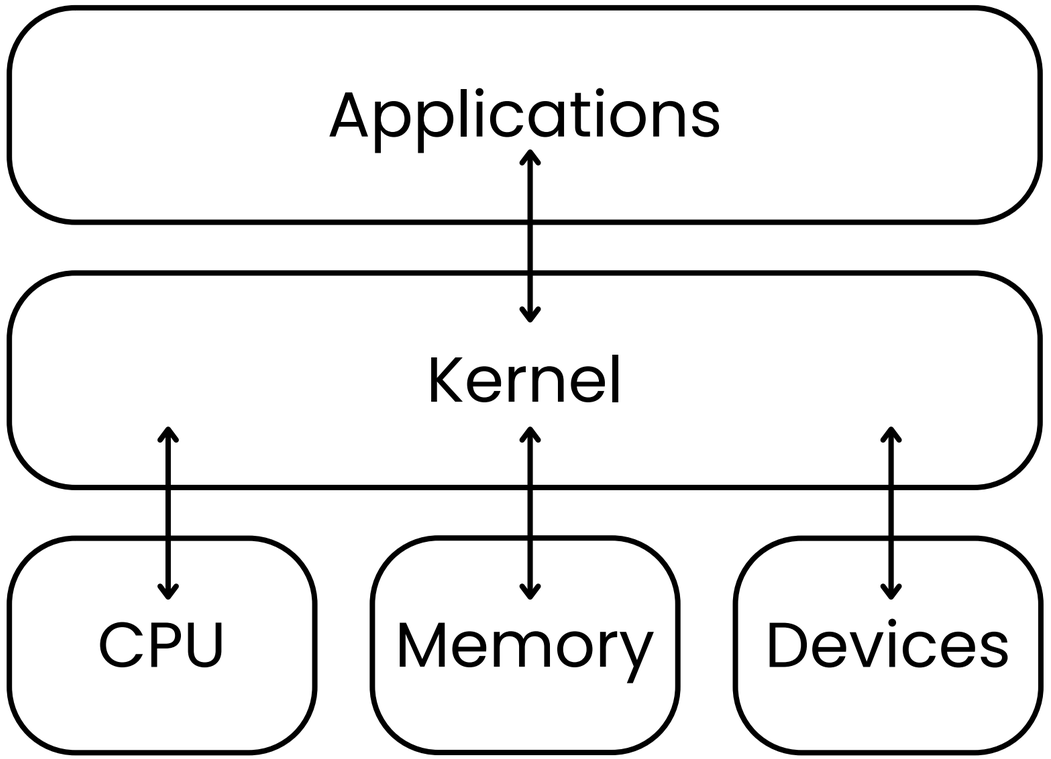
GNU GRAND UNIFIED BOOTLOADER

- **LILO** (Linux Loader) in very old system.
- If you have multiple kernel images installed on your system, you can choose which one to be executed.
- GRUB configuration file is:
  - **/boot/grub/grub.conf**
  - **/etc/grub.conf**
- Insert kernel into memory and turns control of the system over to the kernel.



KERNEL

- Core of any operating system and has complete control over everything in your system.
- Follows a predefined procedure:
  - decompress itself in place (vmlinuz vs vmlinux)
  - perform hardware checks
  - gain access to vital peripheral hardware
  - run the init process



SYSTEMD

- The parent process when the kernel initiates the init process.
- Replaces the old **SysVinit** process.
- Performs a range of tasks:
  - probe all remaining hardware
  - mount filesystems
  - initiate and terminate services
  - manage essential system processes like user login
  - run a desktop environment

RUNLEVEL

- Stands for the current state of the operating system, defining which system services are running.
- Previously, **SysVinit** identified run levels by number. However, .target files now replace run levels in **Systemd**.

Let’s check our default target:

$ sudo systemctl get-default

To change boot target :

$ sudo systemctl set-default <target>

RUNLEVEL

- You can change the target (run level) while the system runs.

For example, to switch to run level 3 from run level 5, we can run the following command:

$ sudo systemctl isolate multi-user.target

Then, to take the system to run level 5, let's run the command:

$ sudo systemctl isolate graphical.target

poweroff.target	run level 0	turn off (shut down) the computer
rescue.target	run level 1	initiate a rescue shell process
multi-user.target	run level 3	configure the system as a non-graphical (console) multi-user environment
graphical.target	run level 5	establish a graphical multi-user interface with network services
reboot.target	run level 6	restart the machine