

# What happen when power loss or system crash?

- ✓ Sectors (but not a block) are **written atomically** by the hard drive device
- ⦿ But an FS operation might modify several sectors
  - modify metada blocks (free bitmaps and inodes)
  - modify data blocks
- ➡ Crash-consistency problem  
a crash has a high chance of corrupting the file system

# Solution 1 - Unix fsck (File System Checker)

When system boot, check system looking for inconsistencies  
e.g. inode pointers and bitmaps, directory entries and inode reference counts

➡ Try to fix errors automatically

- ⦿ Cannot fix all crash scenarios
- ⦿ Poor performance
  - Sometimes takes hours to run on large disk volumes
  - Does fsck have to run upon every reboot?
- ⦿ Not well-defined consistency