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COMPUTER SCIENCE

GROUP: ZERO ODD

Assignment Questions

1. What is a file system and why is it important
2. Explain the technical structure of each file system in detail.
3. Present comparison in tabular format

**A.**

**What is a file system?**

A file system can be thought of as an index or database containing the physical location of every piece of data on the device. The data is usually organized in folders called directories, which can contain other folders and files.

Any place that a computer or other electronic device stores data employs some type of file system. This includes your Windows computer, your Mac, your smartphone, your bank's ATM—even the computer in your car!

**Importance of file system?**

The file system helps keep the storage device organized allowing the operating system to be able to efficiently access and retrieve which ever chunk of data we have in our storage devices.

File systems also helps with space management, metadata, data encryption, file access control, and data integrity.

B.

The following are the different types of file systems.

1. FAT File System
2. FAT32 File System
3. NTFS File System
4. ExFAT File System
5. HFS+ File System
6. APFS File System

The Technical Structure of each file system.

1. FAT: stands for **“File Allocation Table”**. The file allocation table is used by the operating system to locate files on a disk. A file may be divided into many sections and scattered around the disk due to fragmentation. FAT keeps track of all pieces of a file. In DOS systems, FAT is stored after the boot sector. The file system has been used since the advent of PC.
2. FAT32: is an advanced version of the FAT file system. It can be used on drives from 512 MB to 2TB in size. One of the most important features of FAT and FAT32 is that they offer compatibility with operating systems other than Windows 2000 also. FAT32 increases the number of bits used to address clusters. A cluster is a set of sectors. It reduces the size of each cluster. It supports a larger disk (up to 2TB) and better storage efficiency.
3. NFTS: stands for **“New Technology File System”**. Windows 2000 professional fully supports NTFS. File names can be up to 255 characters

File names can contain most characters except “ / < > \* | :

File names are not case sensitive.

The NTFS partition and file sizes are much bigger than FAT partitions and files. The maximum size of an NTFS partition or file can be 16 [Exabyte](https://byte-notes.com/bit-byte-nibble-kilobyte). However, the practical limitation is two Terabytes. The file size can be in the range of 4GB to 64GB.

1. ExFAT:  is a file system designed exclusively for flash memory by Microsoft. ExFAT is pre-formatted on all high-capacity SDXC cards, but it is not strictly required the card be used. ExFAT files up to 64 ZB and up to 16 EB are supported by all currently available Windows versions, including Vista SP1 and XP SP2. ACLs are used to manage access control instead of FAT32, where clusters can grow up to 32 MB. In addition to improving delete performance, free space bitmaps allocate capacity. When compared with NTFS, which overwrites deleted data, this is extremely important to maximize write performance.
2. HFS+ File System: A nod must go to HFS+ for its relevance. You’ll find a number of SSD reviews we run in the US lab feature a number of SSDs benchmarked standard set of benchmarks, which is not required to benchmark it.