1. Describe the differences between Hard Disk Drive (HDD) and Solid State Drive (SSD).

**Answer:**

BothHard Disk Drives (HDD) and Solid State Drives (SSD) are data storage devices. Whereas HDDs are more traditional storage mechanisms, SSDs are newer and more sophisticated. The primary distinction between HDD and SSD is in how data is stored and accessed.

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| --- | --- |
| Hard Disk Drive (HDD) | Solid State Drive (SSD) |
| HDD contains moving mechanical parts, like the arm. | SSD does not contains mechanical parts, only electronical parts like ICs. |
| HDD has longer R/W time. | SSD has shorter R/W time. |
| HDD has higher latency. | SSD has lower latency. |
| HDD supports fewer I/O operations per second. | SSD supports more I/O operations per second. |
| In HDD the data transfer is sequential. | In SDD the data transfer is random access. |

2.What is storage area network? Explain the advantage and disadvantage of the SAN.

**Answer:**

A storage area network (SAN) is a specialized network that provides block-level access to storage devices, such as hard disk drives (HDDs), solid-state drives (SSDs), or tape libraries. SANs are designed to provide high-speed, low-latency storage access for servers or hosts, and they can be used to build complex storage infrastructures for enterprise data centers.

**Advantage**

SANs offer several advantages over other storage architectures. They can provide high-speed, low-latency access to storage devices, which can be critical for high- performance applications such as databases or virtualized environments.

**Disadvantage**

SANs can also be complex and expensive to implement and maintain, and they may require specialized skills and expertise to configure and manage. They also require a dedicated network infrastructure, which can add to the overall cast and complexity of the storage infrastructure.

3.What are the various File Attributes?

**Answer:**

A file has a name and data. Moreover, it also stores meta information like file creation date and time, current size, last modified date, etc. All this information is called the attributes of a file system.

File Attributes are used in OS:

* **Name**: It is the only information stored in a human-readable form.
* **Identifie**r: Every file is identified by a unique tag number within a file system known as an identifier.
* **Location**: Points to file location on device.
* **Type**: This information is required for systems that support various types of files.
* **Size**: Attribute used to display the current file size.
* **Protection**: This attribute assigns and controls the access rights of reading, writing, and executing the file.
* **Time, data and security**: It is used for protection, security, and also used for monitoring.

4. What is Directory? What are the operations performed on a directory in OS?

**Answer:**

A directory can be thought of as a folder. It is a collection of files on the storage device. In our computers, we always store various files like songs, images, videos, etc. All these files are stored in some directory. In this article, we shall see directory structures in OS.

The operations performed on a directory in OS:

* You can search for a file by typing it in.
* Create a file by clicking on it.
* File deletion is the process of removing a file from the computer.
* Make a directory of your website.
* The file should be renamed.
* Make sure the file system is in order.

5. Short questions.

(A). What is contiguous memory allocation?

**Answer:**

Contiguous memory allocation is a memory management technique used by operating systems to allocate a block of contiguous memory to a process. The allocation of contiguous memory to a process involves dividing the available memory into fixed-sized partitions or variable-sized partitions.

(B). What are the differences between external and internal fragmentation?

**Answer:**

External fragmentation occurs when there is enough total memory space to satisfy a request, but it is not contiguous. This happens when there are many small gaps in memory, resulting in the inability to allocate larger memory segments. This can lead to a significant decrease in system performance, as memory allocation requests take longer to process.

Internal fragmentation occurs when memory is allocated in fixed-size blocks, and the size of the allocated block is larger than the actual size of the data being stored. This results in wasted memory space, as the unused portion of the allocated block cannot be used by any other process.

(C). Define Seek Time and Latency Time.

**Answer:**

The time taken by the head to move to the appropriate cylinder or track is called seek time. Once the head is at right track, it must wait until the desired block rotates under the read-write head. This delay is latency time.

(D). Why are mass storage devices important?

**Answer:**

These devices are commonly used to store, back up, and transfer files between computers or other digital devices.

(E). What are the main types of mass storage?

**Answer:**

Common types of mass storage include the following:

* Solid-state drives (SSD)
* Hard drives
* External hard drives
* Optical drives
* Tape drives
* RAID storage
* USB storage
* Flash memory cards

(F). What are the most common schemes for defining the logical structure of a directory?

**Answer:**

* Single level directory
* Two level directory
* Tree structured directories
* Acyclic graph directories

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