System Rebels File System - Trayn

Trayn is a file system that is built while keeping easy usability and performance in mind. Trayn uses a pointer system to keep track of files, directories, and memory on the disk. Trayn segments the disk into bit blocks and uses 0 or 1 to keep track of used and unused memory. All these segments are stored in one large linked list with a pointer to the head.

To keep track of free blocks on the disk a list of pointers is maintained that points to the head of the free memory block where it is stored in the main linked list and this free memory list links all free blocks together.

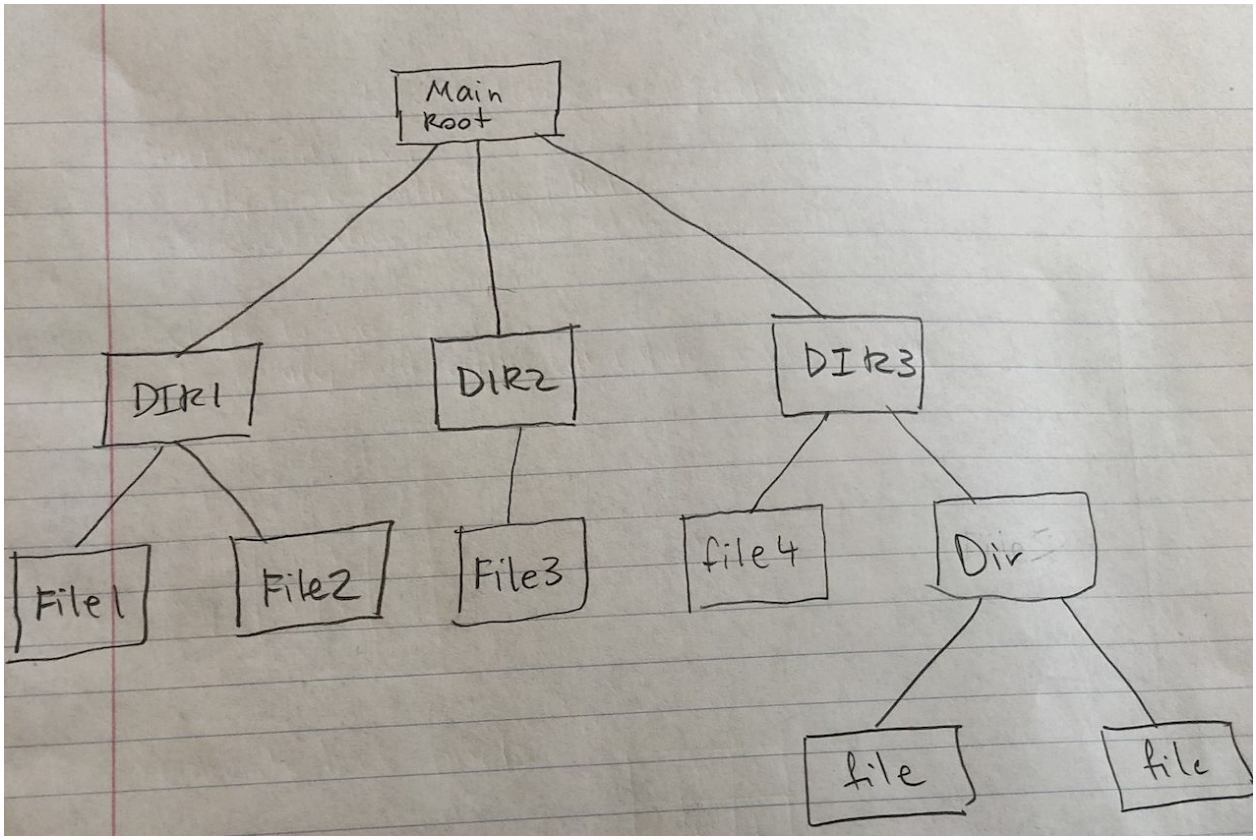
File Memory Management is also done using pointers. A main pointer points to the head of the memory block for that file on the main disk list and the nodes connect all the way to what memory is consumed by the file.

Attributes:

- Pointer to first memory block on the disk blocks
- File Name
- Author
- Permissions
    - What user has permission to write, read and execute.
- Size
- Date Created
- Location
- Type of File

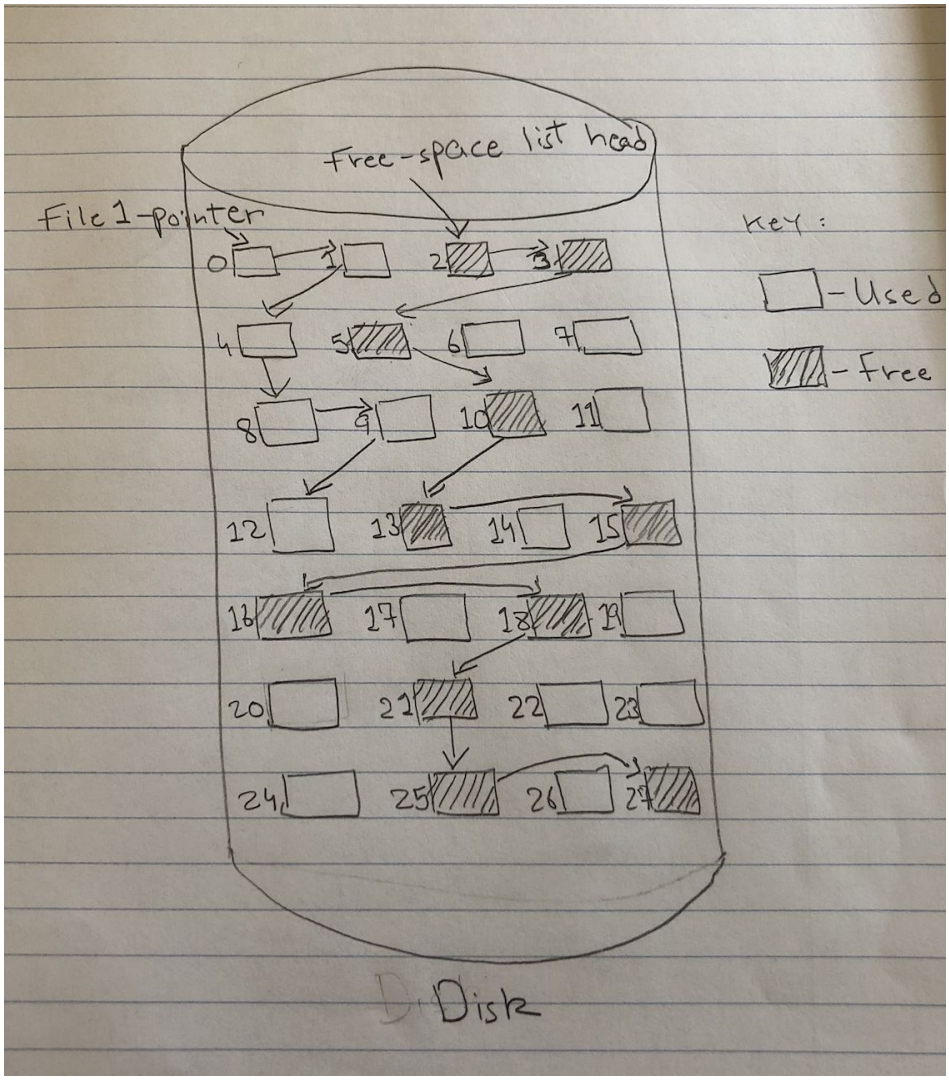
Directory Structure:

- Directory is a special kind of file that stores file attributes of children
- Main root directory holds pointers to sub directories and files.
- Sub directories will have pointer to its files and sub directories and so on



LBA's:

- Free
    - Once a file is deleted, the last node for the free-space linked list is connected to the head of the first memory block for the file that was deleted.
- Used
    - When a file is created the head of the free-space linked list becomes the head of the new file and it goes to next nodes making them 1's for used until it has allocated enough space after which it assigns the next most node as the head for the free space linked list.



Error Handler:

- Detecting bad sectors - On start up, the file system will commence a check for bad sector so the file system knows to quarantine this area and not let access to it.
- Corrupted files (Need Concurrency handling)

Handler that knows what is being accessed and by who:

- Definition of Handler: Handler is basically a middle man that ensures the right users have access to the file. This can help prevent corruption and erroneous behavior caused by multiple users accessing the file. A user can ask the handler for a file and the handler will check if this user has permission or not.
- The user goes through this handler if they want to access a file and if it is not locked allow the user to access the file and put a lock on it. (Handle concurrency)

Functions:

- Create - Find space within the file system to store the new file and then assigning it an entry in a directory.
- Move - copying a file to a new location and deleting the old file. Therefore, the file has simply moved from one location to another.
- Write - Opening file up to edit
- Read - Opening file up for read
- Delete- Remove unwanted/duplicate files within the storage