

→ According to me, B+ tree is the best suitable data structure for storing the data of file memory usage and the required operations on it. I chose B+ tree for my data structure design because:

- Searching for space used by a particular file/directory is easier given its absolute path because all data will be stored in the leaf nodes.
- B+ tree are balanced trees which makes traversing quicker.
- It supports having more than 1 child nodes which makes storing the data of multiple files of a directory easier.

→ Data structure design:

- The head of the tree can be the root directory which contains all its sub-directories.
- The sub-directories further contain all its files and sub-directories.
- The leaf nodes will contain the data of the space used by a file/directory.
- For finding the space used by a file given its absolute path, the application will traverse the tree to the file location and return the amount of space used.
- Similarly, for finding the space used by a directory given its absolute path, the application can add the amount of space used by all the files/subdirectories and return it.
- For finding the space used by all the files with a given their extension, the application will traverse the tree and add the amount of space used and return it.

