*A picture containing text

Description automatically generated*

Reliability: File systems must be reliable and stable at all costs. A file system should be able to detect corrupted files (prevent it, if possible) and should be able to recover from hardware failures. Checksums can be used for checking for corruption while atomic transaction can be used to prevent inconsistencies.

Naming: Directories and files make organizing a file system human readable. Through this feature a user/program can navigate and access/organize their own data easily.

Controlled sharing: File systems should be able to associate a file to an owner and store file read/write/execute privileges. This prohibits unauthorized file access and improves a file system’s overall security.

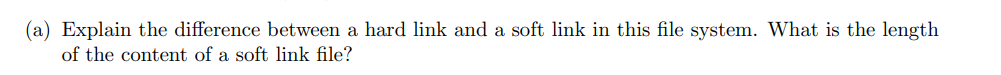
Performance: Since moving a disk arm or erasing a block of solid state memory is expensive in terms of speed, file systems try to make up for this by grouping placement of data so that such operations access large, sequential ranges of storage.



A files metadata includes information about the file such as its owner, security information (read/write/execute privileges of owner/other users), size, modification time etc.

Text

Description automatically generated with medium confidence



The mapping between a name and the underlying file name is called a hard link. A hard link acts as a mirror copy of the original file while a soft link acts as a pointer to the original file. A hard link is useful when duplicating a file is not satisfactory and you want changes on the hard linked files to be synchronized but deleting the original file doesn’t remove the hard linked file. A soft link acts as a shortcut and allows you to link between directories and can cross the file system (across disks, partitions etc.), unlike hard links which work on the same file system. The length of the soft link file is as long as the path the soft link is pointing towards (needs no other information than the path it’s pointing towards).



Two is the minimum number of references for any given folder because you need one reference for the pathname that is mapped to an index number and another for