

UNIX File Types

There are four types of files in UNIX

- Ordinary files
- Directory files
- Special files
- Links

Ordinary files: Ordinary files can contain text, **data**, or program information. An ordinary file cannot contain another file, or directory. An ordinary file can be a text file or a binary file. A text file contains lines of printable characters where every line is terminated with a newline character. A binary file can contain any of the ASCII characters. Most of the UNIX commands are binary files

Directory files: Directories are containers that can hold files, and other directories. A directory is actually implemented as a file that has one line for each item contained within the directory. Each line in a directory file contains only the name of the item, and a numerical reference to the location of the item. The reference is called an i-number, and is an index to a table known as the i-list. The i-list is a complete list of all the **storage space** available to the file system.

Special files: Special files represent input/output devices, like a tty (terminal), a disk drive, or a printer. Because UNIX treats such devices as files, some of the commands used to access ordinary files will also work with device files. This allows for **more efficient** use of software. Special files can be either character special files, which deal with streams of characters, or block special files, that operate on larger blocks of data. Typical block sizes are 512 bytes, 1024 bytes, and 2048 bytes.

Links: A link is a pointer to another file. Since a directory is a list of the names and i-numbers of files, a directory entry can be a hard link, in which the i-number points directly to another file. A hard link to a file cannot be distinguished from the file itself. When a hard link is made, then the i-numbers of two different directory file entries point to the same inode. Hence, hard links cannot span across file systems. A soft link or a symbolic link provides an indirect pointer to a file. A soft link is implemented as a directory file entry containing a pathname. Soft links are distinguishable from files, and can span across file systems. Soft links are not supported in all versions of UNIX.

***Note:** In EECS2031, we work with only ordinary files and directories.*