

NOTES ON THE FILE SYSTEM IN UNIX

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1. FILE HIERARCHY

The file system is grouped into directories and subdirectories. The standard way to organize this taxonomy of directories and subdirectories is specified by the File Hierarchy Standard [1]. We specifically have one directory everything lives in, we call this special directory the **root directory**. We denote it by `/` to emphasize in the absolute path there is nothing before it. In fact it *starts* all (absolute) paths.

The subdirectories of the root directories constitute the bulk of what we interact with.

In Minix, the file hierarchy is a toy version of what one would expect on a full blown Unix system. We'll consider the subdirectories in its root directory as a warm up:

- `/bin/` Most common system binaries (e.g. commands on the command line) are stored here.
- `/boot` Boot loader files (e.g. kernels, initrd, etc.); often this will be its own partition.
- `/dev/` Special file system for input/output devices.
- `/etc/` Miscellaneous system administration.
- `/lib/` Most common libraries are copied to here.
- `/minix` MINIX 3 kernel image.
- `/tmp/` Some utilities generate their temporary data here.
- `/usr/` Root of the user file system.
- `/usr/bin` System binaries are kept here.
- `/usr/include` System header files.
- `/usr/lib` Libraries, compiler passes, misc.
- `/usr/man` Manual pages are stored here, and looked up here.

The directory that is odd at first sight is the `/dev/` directory. No one really thinks of a device as a file, nor a file as a device. But think about it: you open, close, read from, and write to a file. Isn't that the same thing you do to the screen? Or to the hard disk? Or to a lot of devices for that matter.

On most Linux systems, the file hierarchy is far more than this. For example, there is `/usr/local/` which has the same subdirectories as `/usr/` except its role is different: it is there for quirky programs that are found on the web, or written by the user, that may not need to be patched up or looked after.

2. TEST SECTION

Algorithm 2.1 Calculate $y = x^n$

Input: $n \geq 0 \vee x \neq 0$

Output: $y = x^n$

$y \leftarrow 1$

if $n < 0$ **then**

$X \leftarrow 1/x$

$N \leftarrow -n$

else

$X \leftarrow x$

$N \leftarrow n$

end if

while $N \neq 0$ **do**

if N is even **then**

$X \leftarrow X \times X$

$N \leftarrow N/2$

else (N is odd)

$y \leftarrow y \times X$

$N \leftarrow N - 1$

end if

end while

REFERENCES

- [1] R. Russell, D. Quinlan, and C. Yeoh, *Filesystem Hierarchy Standard*. Filesystem Hierarchy Standard Group, 2004. <http://www.pathname.com/fhs/>.
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