20. Files

20.1 File System Concepts

This section describes the Common Lisp interface to file systems. The model used by this interface assumes that *files* are named by *filenames*, that a *filename* can be represented by a *pathname object*, and that given a *pathname* a *stream* can be constructed that connects to a *file* whose *filename* it represents.

For information about opening and closing *files*, and manipulating their contents, see Section 21 (Streams).

The next figure lists some *operators* that are applicable to *files* and directories.

```
compile-file  file-length      open
delete-file   file-position    probe-file
directory     file-write-date  rename-file
file-author   load             with-open-file
```

Figure 20-1. File and Directory Operations

20.1.1 Coercion of Streams to Pathnames

A *stream associated with a file* is either a *file stream* or a *synonym stream* whose target is a *stream associated with a file*. Such streams can be used as *pathname designators*.

Normally, when a *stream associated with a file* is used as a *pathname designator*, it denotes the *pathname* used to open the *file*; this may be, but is not required to be, the actual name of the *file*.

Some functions, such as **truename** and **delete-file**, coerce *streams* to *pathnames* in a different way that involves referring to the actual *file* that is open, which might or might not be the file whose name was opened originally. Such special situations are always notated specifically and are not the default.

20.1.2 File Operations on Open and Closed Streams

Many *functions* that perform *file* operations accept either *open* or *closed streams* as *arguments*; see Section 21.1.3 (Stream Arguments to Standardized Functions).

Of these, the *functions* in the next figure treat *open* and *closed streams* differently.

```
delete-file  file-author      probe-file
directory    file-write-date  truename
```

Figure 20-2. File Functions that Treat Open and Closed Streams Differently

Since treatment of *open streams* by the *file system* may vary considerably between *implementations*, however, a *closed stream* might be the most reliable kind of *argument* for some of these functions---in particular, those in the next figure. For example, in some *file systems*, *open files* are written under temporary names and not renamed until *closed* and/or are held invisible until *closed*. In general, any code that is intended to be portable should use such *functions* carefully.

```
directory  probe-file  truename
```

Figure 20-3. File Functions where Closed Streams Might Work Best

20.1.3 Truenames

Many *file systems* permit more than one *filename* to designate a particular *file*.

Even where multiple names are possible, most *file systems* have a convention for generating a canonical *filename* in such situations. Such a canonical *filename* (or the *pathname* representing such a *filename*) is called a *truename*.

The *truename* of a *file* may differ from other *filenames* for the file because of symbolic links, version numbers, logical device translations in the *file system*, *logical pathname* translations within Common Lisp, or other artifacts of the *file system*.

The *truename* for a *file* is often, but not necessarily, unique for each *file*. For instance, a Unix *file* with multiple hard links could have several *truenames*.

20.1.3.1 Examples of Truenames

For example, a DEC TOPS-20 system with *files* `PS:<JOE>FOO.TXT.1` and `PS:<JOE>FOO.TXT.2` might permit the second *file* to be referred to as `PS:<JOE>FOO.TXT.0`, since the "`.0`" notation denotes "newest" version of several *files*. In the same *file system*, a "logical device" "`JOE:`" might be taken to refer to `PS:<JOE>`" and so the names `JOE:FOO.TXT.2` or `JOE:FOO.TXT.0` might refer to `PS:<JOE>FOO.TXT.2`. In all of these cases, the *truename* of the file would probably be `PS:<JOE>FOO.TXT.2`.

If a *file* is a symbolic link to another *file* (in a *file system* permitting such a thing), it is conventional for the *truename* to be the canonical name of the *file* after any symbolic links have been followed; that is, it is the canonical name of the *file* whose contents would become available if an *input stream* to that *file* were opened.

In the case of a *file* still being created (that is, of an *output stream* open to such a *file*), the exact *truename* of the file might not be known until the *stream* is closed. In this case, the *function* **truename** might return different values for such a *stream* before and after it was closed. In fact, before it is closed, the name returned might not even be a valid name in the *file system*---for example, while a file is being written, it might have version `:newest` and might only take on a specific numeric value later when the file is closed even in a *file system* where all files have numeric versions.