NAME

opendir − open a directory / readdir − read a directory

SYNOPSIS

#include <sys/types.h>

#include <dirent.h>

DIR *opendir(const char *_name_);

struct dirent *readdir(DIR *_dir_);

DESCRIPTION opendir

The **opendir()** function opens a directory stream corresponding to the directory *name*, and returns a pointer to the directory stream. The stream is positioned at the first entry in the directory.

RETURN VALUE

The **opendir()** function returns a pointer to the directory stream or NULL if an error occurred.

DESCRIPTION readdir

The **readdir()** function returns a pointer to a dirent structure representing the next directory entry in the directory stream pointed to by *dir*. It returns NULL on reaching the end-of-file or if an error occurred.

The data returned by **readdir()** is overwritten by subsequent calls to **readdir()** for the same directory stream.

The *dirent* structure is defined as follows:

```
struct dirent {
    long           d_ino;          /* inode number */
    off_t          d_off;          /* offset to the next dirent */
    unsigned short d_reclen;       /* length of this record */
    unsigned char  d_type;      /* type of file */
    char           d_name[256];  /* filename */
};
```

RETURN VALUE

The **readdir()** function returns a pointer to a dirent structure, or NULL if an error occurs or end-of-file is reached.

ERRORS

EACCES
Permission denied.

EMFILE
Too many file descriptors in use by process.

ENFILE
Too many files are currently open in the system.

ENOENT
Directory does not exist, or *name* is an empty string.

ENOMEM
Insufficient memory to complete the operation.

ENOTDIR
name is not a directory.

SEE ALSO

open(2), **readdir**(3), **closedir**(3), **rewinddir**(3), **seekdir**(3), **telldir**(3), **scandir**(3)

NAME

stat, lstat − get file status

SYNOPSIS

#include <sys/types.h>
#include <sys/stat.h>
#include <unistd.h>

int stat(const char * *file_name*, **struct stat *** *buf* **);**
int lstat(const char * *file_name*, **struct stat *** *buf* **);**

DESCRIPTION

These functions return information about the specified file. You do not need any access rights to the file to get this information but you need search rights to all directories named in the path leading to the file.

stat stats the file pointed to by *file_name* and fills in *buf*.

lstat is identical to **stat**, except in the case of a symbolic link, where the link itself is stat-ed, not the file that it refers to.

They all return a *stat* structure, which contains the following fields:

```
struct stat {
    dev_t     st_dev;     /* device */
    ino_t     st_ino;     /* inode */
    mode_t    st_mode;    /* protection */
    nlink_t   st_nlink;   /* number of hard links */
    uid_t     st_uid;     /* user ID of owner */
    gid_t     st_gid;     /* group ID of owner */
    dev_t     st_rdev;    /* device type (if inode device) */
    off_t     st_size;    /* total size, in bytes */
    blksize_t st_blksize; /* blocksize for filesystem I/O */
    blkcnt_t  st_blocks;  /* number of blocks allocated */
    time_t    st_atime;   /* time of last access */
    time_t    st_mtime;   /* time of last modification */
    time_t    st_ctime;   /* time of last status change */
};
```

The field *st_atime* is changed by file accesses, e.g. by **execve**(2), **mknod**(2), **pipe**(2), **utime**(2) and **read**(2) (of more than zero bytes). Other routines, like **mmap**(2), may or may not update *st_atime*.

The field *st_mtime* is changed by file modifications, e.g. by **mknod**(2), **truncate**(2), **utime**(2) and **write**(2) (of more than zero bytes). Moreover, *st_mtime* of a directory is changed by the creation or deletion of files in that directory. The *st_mtime* field is *not* changed for changes in owner, group, hard link count, or mode.

The field *st_ctime* is changed by writing or by setting inode information (i.e., owner, group, link count, mode, etc.).

The following POSIX macros are defined to check the file type:

S_ISREG(m)	is it a regular file?
S_ISDIR(m)	directory?

RETURN VALUE

On success, zero is returned. On error, −1 is returned, and *errno* is set appropriately.

NAME

printf, fprintf, sprintf, snprintf, vprintf, vfprintf, vsprintf, vsnprintf − formatted output conversion
strcat, strncat − concatenate two strings

SYNOPSIS

#include <stdio.h>

int printf(const char * *format***, ...);**
int fprintf(FILE * *stream***, const char *** *format***, ...);**
int sprintf(char * *str***, const char *** *format***, ...);**
int snprintf(char * *str***, size_t** *size***, const char *** *format***, ...);**
char *strcat(char * *dest***, const char *** *src***);**
char *strncat(char * *dest***, const char *** *src***, size_t** *n***);**

...

DESCRIPTION (printf)

The functions in the **printf**() family produce output according to a *format* as described below. The functions **printf**() and **vprintf**() write output to *stdout*, the standard output stream; **fprintf**() and **vfprintf**() write output to the given output *stream*; **sprintf**(), **snprintf**(), **vsprintf**() and **vsnprintf**() write to the character string *str*.

The functions **snprintf**() and **vsnprintf**() write at most *size* bytes (including the trailing null byte ('\0')) to *str*.

The functions **vprintf**(), **vfprintf**(), **vsprintf**(), **vsnprintf**() are equivalent to the functions **printf**(), **fprintf**(), **sprintf**(), **snprintf**(), respectively, except that they are called with a *va_list* instead of a variable number of arguments. These functions do not call the *va_end* macro. Because they invoke the *va_arg* macro, the value of *ap* is undefined after the call. See **stdarg**(3).

These eight functions write the output under the control of a *format* string that specifies how subsequent arguments (or arguments accessed via the variable-length argument facilities of **stdarg**(3)) are converted for output.

Return value

Upon successful return, these functions return the number of characters printed (not including the trailing '\0' used to end output to strings).

The functions **snprintf**() and **vsnprintf**() do not write more than *size* bytes (including the trailing '\0'). If the output was truncated due to this limit then the return value is the number of characters (not including the trailing '\0') which would have been written to the final string if enough space had been available. Thus, a return value of *size* or more means that the output was truncated. (See also below under NOTES.)

If an output error is encountered, a negative value is returned.

Format of the format string

The format string is a character string, beginning and ending in its initial shift state, if any. The format string is composed of zero or more directives: ordinary characters (not **%**), which are copied unchanged to the output stream; and conversion specifications, each of which results in fetching zero or more subsequent arguments. Each conversion specification is introduced by the character **%**, and ends with a *conversion specifier*. In between there may be (in this order) zero or more *flags*, an optional minimum *field width*, an optional *precision* and an optional *length modifier*.

The arguments must correspond properly (after type promotion) with the conversion specifier. By default, the arguments are used in the order given, where each '*' and each conversion specifier asks for the next argument (and it is an error if insufficiently many arguments are given). One can also specify explicitly which argument is taken, at each place where an argument is required, by writing "%m$" instead of '%' and "*m$" instead of '*', where the decimal integer m denotes the position in the argument list of the desired argument, indexed starting from 1. Thus,


```
printf("%*d", width, num);
```

and

```
printf("%2$*1$d", width, num);
```

are equivalent. The second style allows repeated references to the same argument. The C99 standard does not include the style using '$', which comes from the Single Unix Specification. If the style using '$' is used, it must be used throughout for all conversions taking an argument and all width and precision arguments, but it may be mixed with "%%" formats which do not consume an argument. There may be no gaps in the numbers of arguments specified using '$'; for example, if arguments 1 and 3 are specified, argument 2 must also be specified somewhere in the format string.

For some numeric conversions a radix character ("decimal point") or thousands' grouping character is used. The actual character used depends on the **LC_NUMERIC** part of the locale. The POSIX locale uses '.' as radix character, and does not have a grouping character. Thus,

```
printf("%'.2f", 1234567.89);
```

results in "1234567.89" in the POSIX locale, in "1234567,89" in the nl_NL locale, and in "1.234.567,89" in the da_DK locale.

The conversion specifier

A character that specifies the type of conversion to be applied. An example for a conversion specifier is:

s The *const char* * argument is expected to be a pointer to an array of character type (pointer to a string). Characters from the array are written up to (but not including) a terminating null byte ('\0'); if a precision is specified, no more than the number specified are written. If a precision is given, no null byte need be present; if the precision is not specified, or is greater than the size of the array, the array must contain a terminating null byte.

DESCRIPTION (strcat)

The **strcat**() function appends the *src* string to the *dest* string, overwriting the null byte ('\0') at the end of *dest*, and then adds a terminating null byte. The strings may not overlap, and the *dest* string must have enough space for the result.

The **strncat**() function is similar, except that

* it will use at most *n* characters from *src*; and
* *src* does not need to be null terminated if it contains *n* or more characters.

As with **strcat**(), the resulting string in *dest* is always null terminated.

If *src* contains *n* or more characters, **strncat**() writes *n+1* characters to *dest* (*n* from *src* plus the terminating null byte). Therefore, the size of *dest* must be at least *strlen(dest)+n+1*.

SEE ALSO

printf(1), **asprintf**(3), **dprintf**(3), **scanf**(3), **setlocale**(3), **wcrtomb**(3), **wprintf**(3), **locale**(5)

COLOPHON

This page is part of release 3.05 of the Linux *man-pages* project. A description of the project, and information about reporting bugs, can be found at http://www.kernel.org/doc/man-pages/.