NAME

exec, execl, execv, execle, execve, execlp, execvp − execute a file

SYNOPSIS

#include <unistd.h>

int execl(const char ****path*, const char ****arg0***, . . ., const char ****argn***, char *** /*NULL*/**);**

int execv(const char ****path*, char *const** *argv[ ]***);**

int execle(const char ****path*,char *const** *arg0[ ]***, . . . , const char ****argn***, char *** /*NULL*/**, char *const** *envp[ ]***);**

int execve (const char ****path*, char *const** *argv[ ]* **char *const** *envp[ ]***);**

int execlp (const char * *file***, const char ****arg0***, . . ., const char ****argn***, char *** /*NULL*/**);**

int execvp (const char * *file***, char *const** *argv[ ]***);**

DESCRIPTION

Each of the functions in the **exec** family overlays a new process image on an old process. The new process image is constructed from an ordinary, executable file. This file is either an executable object file, or a file of data for an interpreter. There can be no return from a successful call to one of these functions because the calling process image is overlaid by the new process image.

When a C program is executed, it is called as follows:

int main (int argc, char ∗**argv[], char** ∗**envp[]);**

where *argc* is the argument count, *argv* is an array of character pointers to the arguments themselves, and *envp* is an array of character pointers to the environment strings. As indicated, *argc* is at least one, and the first member of the array points to a string containing the name of the file.

The arguments *arg0***,** . . .**,** *argn* point to null-terminated character strings. These strings constitute the argument list available to the new process image. Conventionally at least *arg0* should be present. The *arg0* argument points to a string that is the same as *path* (or the last component of *path*). The list of argument strings is terminated by a **(char** ∗**)0** argument.

The *argv* argument is an array of character pointers to null-terminated strings. These strings constitute the argument list available to the new process image. By convention, *argv* must have at least one member, and it should point to a string that is the same as *path* (or its last component). The *argv* argument is terminated by a null pointer.

The *path* argument points to a path name that identifies the new process file.

The *file* argument points to the new process file. If *file* does not contain a slash character, the path prefix for this file is obtained by a search of the directories passed in the **PATH** environment variable (see **environ**(5)).

File descriptors open in the calling process remain open in the new process.

Signals that are being caught by the calling process are set to the default disposition in the new process image (see **signal**(3C)). Otherwise, the new process image inherits the signal dispositions of the calling process.

RETURN VALUES

If a function in the **exec** family returns to the calling process, an error has occurred; the return value is **−1** and **errno** is set to indicate the error.

NAME

qsort − sorts an array

SYNOPSIS

#include <stdlib.h>

void qsort(void ****base*, size_t** *nmemb***, size_t** *size***,**
int(**compar***)(const void *, const void *));**

DESCRIPTION

The **qsort**() function sorts an array with *nmemb* elements of size *size*. The *base* argument points to the start of the array.

The contents of the array are sorted in ascending order according to a comparison function pointed to by *compar*, which is called with two arguments that point to the objects being compared.

The comparison function must return an integer less than, equal to, or greater than zero if the first argument is considered to be respectively less than, equal to, or greater than the second. If two members compare as equal, their order in the sorted array is undefined.

RETURN VALUE

The **qsort**() function returns no value.

SEE ALSO

sort(1), **alphasort**(3), **strcmp**(3), **versionsort**(3)

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/.

NAME

strcmp, strncmp − compare two strings

SYNOPSIS

#include <string.h>

int strcmp(const char ****s1*, const char ****s2***);**

int strncmp(const char ****s1*, const char ****s2***, size_t** *n***);**

DESCRIPTION

The **strcmp**() function compares the two strings *s1* and *s2*. It returns an integer less than, equal to, or greater than zero if *s1* is found, respectively, to be less than, to match, or be greater than *s2*.

The **strncmp**() function is similar, except it only compares the first (at most) *n* characters of *s1* and *s2*.

RETURN VALUE

The **strcmp**() and **strncmp**() functions return an integer less than, equal to, or greater than zero if *s1* (or the first *n* bytes thereof) is found, respectively, to be less than, to match, or be greater than *s2*.

CONFORMING TO

SVr4, 4.3BSD, C89, C99.

SEE ALSO

bcmp(3), **memcmp**(3), **strcasecmp**(3), **strcoll**(3), **strncasecmp**(3), **wcscmp**(3), **wcsncmp**(3)

NAME

wait, waitpid, waitid − wait for process to change state

SYNOPSIS

#include <sys/types.h>
#include <sys/wait.h>

pid_t wait(int ****status*);**

pid_t waitpid(pid_t *pid***, int ****status***, int** *options***);**

DESCRIPTION

All of these system calls are used to wait for state changes in a child of the calling process, and obtain information about the child whose state has changed. A state change is considered to be: the child terminated; the child was stopped by a signal; or the child was resumed by a signal. In the case of a terminated child, performing a wait allows the system to release the resources associated with the child; if a wait is not performed, then the terminated child remains in a "zombie" state (see NOTES below).

If a child has already changed state, then these calls return immediately.

The **wait**() system call suspends execution of the calling process until one of its children terminates. The **waitpid**() system call suspends execution of the calling process until a child specified by *pid* argument has changed state. By default, **waitpid**() waits only for terminated children, but this behavior is modifiable via the *options* argument, as described below.

The value of *pid* can be:

< −1 meaning wait for any child process whose process group ID is equal to the absolute value of *pid*.

−1 meaning wait for any child process.

0 meaning wait for any child process whose process group ID is equal to that of the calling process.

> 0 meaning wait for the child whose process ID is equal to the value of *pid*.

The value of *options* is an OR of zero or more of the following constants:

WNOHANG return immediately if no child has exited.

If *status* is not NULL, **wait**() and **waitpid**() store status information in the *int* to which it points. This integer can be inspected with the following macros (which take the integer itself as an argument, not a pointer to it, as is done in **wait**() and **waitpid**()!):

WIFEXITED(*status***)**
returns true if the child terminated normally, that is, by calling **exit**(3) or **_exit**(2), or by returning from main().

WEXITSTATUS(*status***)**
returns the exit status of the child. This consists of the least significant 8 bits of the *status* argument that the child specified in a call to **exit**(3) or **_exit**(2) or as the argument for a return statement in main(). This macro should only be employed if **WIFEXITED** returned true.

RETURN VALUE

wait(): on success, returns the process ID of the terminated child; on error, −1 is returned.

waitpid(): on success, returns the process ID of the child whose state has changed; if **WNOHANG** was specified and one or more child(ren) specified by *pid* exist, but have not yet changed state, then 0 is returned. On error, −1 is returned.