

File input/output

C

File input/output

The `<stdio.h>` header provides generic file operation support and supplies functions with narrow character input/output capabilities.

The `<wchar.h>` header supplies functions with wide character input/output capabilities.

I/O streams are denoted by objects of type `FILE` that can only be accessed and manipulated through pointers of type `FILE*`. Each stream is associated with an external physical device (file, standard input stream, printer, serial port, etc).

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Types

Defined in header `<stdio.h>`

`FILE` object type, capable of holding all information needed to control a C I/O stream (typedef)

`fpos_t` non-array complete object type, capable of uniquely specifying a position and multibyte parser state in a file (typedef)

Predefined standard streams

Defined in header `<stdio.h>`

	expression of type <code>FILE*</code> associated with the input stream
<code>stdin</code>	expression of type <code>FILE*</code> associated with the output stream
<code>stdout</code>	expression of type <code>FILE*</code> associated with the error output stream
<code>stderr</code>	(macro constant)

Functions

File access

Defined in header `<stdio.h>`

`fopen`
`fopen_s`

(C11)

`freopen`
`freopen_s`

(C11)

`fclose`

`fflush`

`setbuf`

`setvbuf`

Defined in header `<wchar.h>`

`fwide`

(C95)

Direct input/output

Defined in header `<stdio.h>`

`fread`

`fwrite`

Unformatted input/output

Narrow character

Defined in header `<stdio.h>`

`fgetc`
`fgetc`

`fgets`

opens a file (function)
open an existing stream with a different name (function)
closes a file (function)
synchronizes an output stream with the actual file (function)
sets the buffer for a file stream (function)
sets the buffer and its size for a file stream (function)
switches a file stream between wide character I/O and narrow character I/O (function)
reads from a file (function)
writes to a file (function)
gets a character from a file stream (function)
gets a character string from a file stream (function)

[fputcputc](#)

writes a character to a file stream
(function)

[fputs](#)

writes a character string to a file stream
(function)

[getchar](#)

reads a character from [stdin](#)
(function)

[getsgets_s](#)

reads a character string from `stdin`
(function)

(removed in C11)(C11)

[putchar](#)

writes a character to `stdout`
(function)

[puts](#)

writes a character string to [stdout](#)
(function)

[ungetc](#)

puts a character back into a file stream
(function)

Wide character

Defined in header `<wchar.h>`

[fgetwcgetwc](#)

gets a wide character from a file stream
(function)

(C95)

[fgetws](#)

gets a wide string from a file stream
(function)

(C95)

[fputwcputwc](#)

writes a wide character to a file stream
(function)

(C95)

[fputws](#)

writes a wide string to a file stream
(function)

(C95)

[getwchar](#)

reads a wide character from `stdin`
(function)

(C95)

[putwchar](#)

writes a wide character to [stdout](#)
(function)

(C95)

[ungetwc](#)

puts a wide character back into a file stream
(function)

(C95)

Formatted input/output

Narrow character

Defined in header `<stdio.h>`

[scanfscanfsscanfscanf_sfscanf_sscanf_s](#)

reads formatted input from

(C11)(C11)(C11)

[vscanfvfscanfvsscanfvscanf_svscanf_svsscanf_s](#)

(C99)(C99)(C99)(C11)(C11)(C11)

[printfprintfsprintfsnprintfprintf_sprintf_ssnprintf_s](#)

(C99)(C11)(C11)(C11)(C11)

[vprintfvprintfvsprintfvsprintfvprintf_svprintf_svsnprintf_s](#)

(C99)(C11)(C11)(C11)(C11)

Wide character

Defined in header `<wchar.h>`

[wscanfwscanfswscanfscanf_sscanf_sswscanf_s](#)

(C95)(C95)(C95)(C11)(C11)(C11)

[vwscanfvwscanfvwscanfvwscanf_svfwscanf_vswscanf_s](#)

(C99)(C99)(C99)(C11)(C11)(C11)

[wprintfwprintfswprintfwprintf_swprintf_sswprintf_ssnwprintf_s](#)

(C95)(C95)(C95)(C11)(C11)(C11)(C11)

[vwprintfvwprintfvwprintfvwprintf_svfwprintf_vswprintf_vsnwprintf_s](#)

(C95)(C95)(C95)(C11)(C11)(C11)(C11)

File positioning

Defined in header `<stdio.h>`

[ftell](#)

[fgetpos](#)

[fseek](#)

[stdin](#), a file stream or a buffer
(function)
reads formatted input from [stdin](#), a file stream or a buffer
using variable argument list
(function)
prints formatted output to [stdout](#), a file stream or a buffer
(function)
prints formatted output to [stdout](#), a file stream or a buffer
using variable argument list
(function)

reads formatted wide character input from [stdin](#), a file stream or a buffer
(function)
reads formatted wide character input from [stdin](#), a file stream or a buffer using variable argument list
(function)
prints formatted wide character output to [stdout](#), a file stream or a buffer
(function)
prints formatted wide character output to [stdout](#), a file stream or a buffer using variable argument list
(function)

returns the current file position indicator
(function)
gets the file position indicator
(function)
moves the file position

fsetpos	indicator to a specific location in a file (function) moves the file position indicator to a specific location in a file (function)
rewind	moves the file position indicator to the beginning in a file (function)
Error handling	
Defined in header <code><stdio.h></code>	
clearerr	clears errors (function)
feof	checks for the end-of-file (function)
ferror	checks for a file error (function)
perror	displays a character string corresponding of the current error to stderr (function)
Operations on files	
Defined in header <code><stdio.h></code>	
remove	erases a file (function)
rename	renames a file (function)
tmpfile tmpfile_s	returns a pointer to a temporary file (function)
(C11)	
tmpnam tmpnam_s	returns a unique filename (function)
(C11)	
Macro constants	
Defined in header <code><stdio.h></code>	
EOF	integer constant expression of type <code>int</code> and negative value (macro constant)
FOPEN_MAX	maximum number of files that can be open simultaneously (macro constant)
FILENAME_MAX	size needed for an array of <code>char</code> to hold the longest supported file name (macro constant)
BUFSIZ	size of the buffer used by setbuf (macro constant)
_IOFBF _IOLBF _IONBF	argument to setvbuf indicating fully buffered I/O

	argument to setvbuf indicating line buffered I/O
	argument to setvbuf indicating unbuffered I/O
	(macro constant)
	argument to fseek indicating seeking from beginning of the file
SEEK_SETSEEK_CURSEEK_END	argument to fseek indicating seeking from the current file position
	argument to fseek indicating seeking from end of the file
	(macro constant)
TMP_MAXTMP_MAX_S	maximum number of unique filenames that can be generated by tmpnam
(C11)	maximum number of unique filenames that can be generated by tmpnam_s
	(macro constant)
L_tmpnamL_tmpnam_s	size needed for an array of char to hold the result of tmpnam
(C11)	size needed for an array of char to hold the result of tmpnam_s
	(macro constant)

References

- C23 standard (ISO/IEC 9899:2024):
 - 7.21 Input/output <stdio.h> (p: TBD)
 - 7.29 Extended multibyte and wide character utilities <wchar.h> (p: TBD)
 - 7.31.11 Input/output <stdio.h> (p: TBD)
 - 7.31.16 Extended multibyte and wide character utilities <wchar.h> (p: TBD)
 - K.3.5 Input/output <stdio.h> (p: TBD)
- C17 standard (ISO/IEC 9899:2018):
 - 7.21 Input/output <stdio.h> (p: TBD)
 - 7.29 Extended multibyte and wide character utilities <wchar.h> (p: TBD)
 - 7.31.11 Input/output <stdio.h> (p: TBD)
 - 7.31.16 Extended multibyte and wide character utilities <wchar.h> (p: TBD)
 - K.3.5 Input/output <stdio.h> (p: TBD)
- C11 standard (ISO/IEC 9899:2011):
 - 7.21 Input/output <stdio.h> (p: 296-339)
 - 7.29 Extended multibyte and wide character utilities <wchar.h> (p: 402-446)
 - 7.31.11 Input/output <stdio.h> (p: 456)

- 7.31.16 Extended multibyte and wide character utilities <wchar.h> (p: 456)
- K.3.5 Input/output <stdio.h> (p: 586-603)
- C99 standard (ISO/IEC 9899:1999):
 - 7.19 Input/output <stdio.h> (p: 262-305)
 - 7.24 Extended multibyte and wide character utilities <wchar.h> (p: 348-392)
 - 7.26.9 Input/output <stdio.h> (p: 402)
 - 7.26.12 Extended multibyte and wide character utilities <wchar.h> (p: 402)
- C89/C90 standard (ISO/IEC 9899:1990):
 - 4.9 INPUT/OUTPUT <stdio.h>
 - 4.13.6 Input/output <stdio.h>

See also

[C++ documentation](#) for C-style file input/output