

## NAME

**diff** - differential file and directory comparator

## SYNOPSIS

```
diff [-aBbdipTtw] [-c | -e | -f | -n | -q | -u | -y] [--brief] [--color=when] [--changed-group-format GFMT]
  [--ed] [--expand-tabs] [--forward-ed] [--ignore-all-space] [--ignore-case] [--ignore-space-change]
  [--initial-tab] [--minimal] [--no-dereference] [--no-ignore-file-name-case] [--normal] [--rcs]
  [--show-c-function] [--starting-file] [--speed-large-files] [--strip-trailing-cr] [--tabsize number]
  [--text] [--unified] [-I pattern | --ignore-matching-lines pattern]
  [-F pattern | --show-function-line pattern] [-L label | --label label] file1 file2

diff [-aBbdilpTtw] [-I pattern | --ignore-matching-lines pattern]
  [-F pattern | --show-function-line pattern] [-L label | --label label] [--brief] [--color=when]
  [--changed-group-format GFMT] [--ed] [--expand-tabs] [--forward-ed] [--ignore-all-space]
  [--ignore-case] [--ignore-space-change] [--initial-tab] [--minimal] [--no-dereference]
  [--no-ignore-file-name-case] [--normal] [--paginate] [--rcs] [--show-c-function] [--speed-large-files]
  [--starting-file] [--strip-trailing-cr] [--tabsize number] [--text] [-C number | -context number]
  file1 file2

diff [-aBbdiltw] [-I pattern | --ignore-matching-lines pattern] [--brief] [--color=when]
  [--changed-group-format GFMT] [--ed] [--expand-tabs] [--forward-ed] [--ignore-all-space]
  [--ignore-case] [--ignore-space-change] [--initial-tab] [--minimal] [--no-dereference]
  [--no-ignore-file-name-case] [--normal] [--paginate] [--rcs] [--show-c-function] [--speed-large-files]
  [--starting-file] [--strip-trailing-cr] [--tabsize number] [--text] [-D string | --ifdef string] file1 file2

diff [-aBbdilpTtw] [-I pattern | --ignore-matching-lines pattern]
  [-F pattern | --show-function-line pattern] [-L label | --label label] [--brief] [--color=when]
  [--changed-group-format GFMT] [--ed] [--expand-tabs] [--forward-ed] [--ignore-all-space]
  [--ignore-case] [--ignore-space-change] [--initial-tab] [--minimal] [--no-dereference]
  [--no-ignore-file-name-case] [--normal] [--paginate] [--rcs] [--show-c-function] [--speed-large-files]
  [--starting-file] [--strip-trailing-cr] [--tabsize number] [--text] [-U number | --unified number]
  file1 file2

diff [-aBbdilNPprsTtw] [-c | -e | -f | -n | -q | -u] [--brief] [--color=when]
  [--changed-group-format GFMT] [--context] [--ed] [--expand-tabs] [--forward-ed]
  [--ignore-all-space] [--ignore-case] [--ignore-space-change] [--initial-tab] [--minimal] [--new-file]
  [--no-dereference] [--no-ignore-file-name-case] [--normal] [--paginate] [--rcs] [--recursive]
  [--report-identical-files] [--show-c-function] [--speed-large-files] [--strip-trailing-cr]
  [--tabsize number] [--text] [--unidirectional-new-file] [--unified]
  [-I pattern | --ignore-matching-lines pattern] [-F pattern | --show-function-line pattern]
  [-L label | --label label] [-S name | --starting-file name] [-X file | --exclude-from file]
  [-x pattern | --exclude pattern] dir1 dir2

diff [-aBbditwW] [--color=when] [--expand-tabs] [--ignore-all-space] [--ignore-blank-lines]
  [--ignore-case] [--minimal] [--no-dereference] [--no-ignore-file-name-case] [--strip-trailing-cr]
```

**[--suppress-common-lines] [--tabsize *number*] [--text] [--width] -y | --side-by-side *file1 file2***  
**diff [--help] [--version]**

## DESCRIPTION

The **diff** utility compares the contents of *file1* and *file2* and writes to the standard output the list of changes necessary to convert one file into the other. No output is produced if the files are identical.

Output options (mutually exclusive):

**-C *number* --context *number***

Like **-c** but produces a diff with *number* lines of context.

**-c** Produces a diff with 3 lines of context. With **-c** the output format is modified slightly: the output begins with identification of the files involved and their creation dates and then each change is separated by a line with fifteen \*'s. The lines removed from *file1* are marked with '-'; those added to *file2* are marked '+'. Lines which are changed from one file to the other are marked in both files with '!'. Changes which lie within 3 lines of each other are grouped together on output.

**-D *string* --ifdef *string***

Creates a merged version of *file1* and *file2* on the standard output, with C preprocessor controls included so that a compilation of the result without defining *string* is equivalent to compiling *file1*, while defining *string* will yield *file2*.

**-e --ed** Produces output in a form suitable as input for the editor utility, ed(1), which can then be used to convert *file1* into *file2*.

Extra commands are added to the output when comparing directories with **-e**, so that the result is a sh(1) script for converting text files which are common to the two directories from their state in *dir1* to their state in *dir2*.

**-f --forward-ed**

Identical output to that of the **-e** flag, but in reverse order. It cannot be digested by ed(1).

**--help** This option prints a summary to stdout and exits with status 0.

**-n** Produces a script similar to that of **-e**, but in the opposite order and with a count of changed lines on each insert or delete command. This is the form used by rcsdiff.

**-q --brief**

Just print a line when the files differ. Does not output a list of changes.

**-U *number* --unified *number***

Like **-u** but produces a diff with *number* lines of context.

**-u** Produces a *unified* diff with 3 lines of context. A unified diff is similar to the context diff produced by the **-c** option. However, unlike with **-c**, all lines to be changed (added and/or removed) are present in a single section.

**--version**

This option prints a version string to stdout and exits with status 0.

**-y --side-by-side**

Output in two columns with a marker between them. The marker can be one of the following:

space	Corresponding lines are identical.
' '	Corresponding lines are different.
'<'	Files differ and only the first file contains the line.
'>'	Files differ and only the second file contains the line.

Comparison options:

**-a --text**

Treat all files as ASCII text. Normally **diff** will simply print "Binary files ... differ" if files contain binary characters. Use of this option forces **diff** to produce a diff.

**-B --ignore-blank-lines**

Causes chunks that include only blank lines to be ignored.

**-b --ignore-space-change**

Causes trailing blanks (spaces and tabs) to be ignored, and other strings of blanks to compare equal.

**--color=[*when*]**

Color the additions green, and removals red, or the value in the DIFFCOLORS environment variable. The possible values of *when* are "**never**", "**always**" and "**auto**". **auto** will use color if the output is a tty and the COLORTERM environment variable is set to a non-empty string.

**-d --minimal**

Try very hard to produce a diff as small as possible. This may consume a lot of processing

power and memory when processing large files with many changes.

**-F *pattern*, --show-function-line *pattern***

Like **-p**, but display the last line that matches provided pattern.

**-I *pattern* --ignore-matching-lines *pattern***

Ignores changes, insertions, and deletions whose lines match the extended regular expression *pattern*. Multiple **-I** patterns may be specified. All lines in the change must match some pattern for the change to be ignored. See `re_format(7)` for more information on regular expression patterns.

**-i --ignore-case**

Ignores the case of letters. E.g., "A" will compare equal to "a".

**-l --paginate**

Pass the output through `pr(1)` to paginate it.

**-L *label* --label *label***

Print *label* instead of the first (and second, if this option is specified twice) file name and time in the context or unified diff header.

**-p --show-c-function**

With unified and context diffs, show with each change the first 40 characters of the last line before the context beginning with a letter, an underscore or a dollar sign. For C and Objective-C source code following standard layout conventions, this will show the prototype of the function the change applies to.

**-T --initial-tab**

Print a tab rather than a space before the rest of the line for the normal, context or unified output formats. This makes the alignment of tabs in the line consistent.

**-t --expand-tabs**

Will expand tabs in output lines. Normal or **-c** output adds character(s) to the front of each line which may screw up the indentation of the original source lines and make the output listing difficult to interpret. This option will preserve the original source's indentation.

**-w --ignore-all-space**

Is similar to **-b --ignore-space-change** but causes whitespace (blanks and tabs) to be totally ignored. E.g., "if ( a == b )" will compare equal to "if(a==b)".

**-W *number* --width *number***

Output at most *number* columns when using side by side format. The default value is 130.  
Note that unless

**-t** was specified, **diff** will always align the second column to a tab stop, so values of **--width** smaller than approximately five times the value of **--tabsize** may yield surprising results.

**--changed-group-format *GFMT***

Format input groups in the provided

the format is a string with special keywords:

%< lines from FILE1

%< lines from FILE2

**--ignore-file-name-case**

ignore case when comparing file names

**--no-dereference**

do not follow symbolic links

**--no-ignore-file-name-case**

do not ignore case when comparing file names (default)

**--normal**

default diff output

**--speed-large-files**

stub option for compatibility with GNU diff

**--strip-trailing-cr**

strip carriage return on input files

**--suppress-common-lines**

Do not output common lines when using the side by side format

**--tabsize *number***

Number of spaces representing a tab (default 8)

Directory comparison options:

**-N --new-file**

If a file is found in only one directory, act as if it was found in the other directory too but was of zero size.

**-P --unidirectional-new-file**

If a file is found only in *dir2*, act as if it was found in *dir1* too but was of zero size.

**-r --recursive**

Causes application of **diff** recursively to common subdirectories encountered.

**-S name --starting-file name**

Re-starts a directory **diff** in the middle, beginning with file *name*.

**-s --report-identical-files**

Causes **diff** to report files which are the same, which are otherwise not mentioned.

**-X file --exclude-from file**

Exclude files and subdirectories from comparison whose basenames match lines in *file*.

Multiple **-X** options may be specified.

**-x pattern --exclude pattern**

Exclude files and subdirectories from comparison whose basenames match *pattern*. Patterns are matched using shell-style globbing via `fnmatch(3)`. Multiple **-x** options may be specified.

If both arguments are directories, **diff** sorts the contents of the directories by name, and then runs the regular file **diff** algorithm, producing a change list, on text files which are different. Binary files which differ, common subdirectories, and files which appear in only one directory are described as such. In directory mode only regular files and directories are compared. If a non-regular file such as a device special file or FIFO is encountered, a diagnostic message is printed.

If only one of *file1* and *file2* is a directory, **diff** is applied to the non-directory file and the file contained in the directory file with a filename that is the same as the last component of the non-directory file.

If either *file1* or *file2* is '-', the standard input is used in its place.

## Output Style

The default (without **-e**, **-c**, or **-n --rcs** options) output contains lines of these forms, where *XX*, *YY*, *ZZ*, *QQ* are line numbers respective of file order.

<b>XXaYY</b>	At (the end of) line <i>XX</i> of <i>file1</i> , append the contents of line <i>YY</i> of <i>file2</i> to make them equal.
<b>XXaYY,ZZ</b>	Same as above, but append the range of lines, <i>YY</i> through <i>ZZ</i> of <i>file2</i> to line <i>XX</i> of <i>file1</i> .
<b>XXdYY</b>	At line <i>XX</i> delete the line. The value <i>YY</i> tells to which line the change would bring <i>file1</i> in line with <i>file2</i> .
<b>XX,YYdZZ</b>	Delete the range of lines <i>XX</i> through <i>YY</i> in <i>file1</i> .
<b>XXcYY</b>	Change the line <i>XX</i> in <i>file1</i> to the line <i>YY</i> in <i>file2</i> .
<b>XX,YYcZZ</b>	Replace the range of specified lines with the line <i>ZZ</i> .
<b>XX,YYcZZ,QQ</b>	Replace the range <i>XX,YY</i> from <i>file1</i> with the range <i>ZZ,QQ</i> from <i>file2</i> .

These lines resemble `ed(1)` subcommands to convert *file1* into *file2*. The line numbers before the action letters pertain to *file1*; those after pertain to *file2*. Thus, by exchanging **a** for **d** and reading the line in reverse order, one can also determine how to convert *file2* into *file1*. As in `ed(1)`, identical pairs (where `num1 = num2`) are abbreviated as a single number.

## ENVIRONMENT

**DIFFCOLORS** The value of this variable is the form *add:rm*, where *add* is the ASCII escape sequence for additions and *rm* is the ASCII escape sequence for deletions. If this is unset, **diff** uses green for additions and red for removals.

## FILES

*/tmp/diff.XXXXXXXXXX* Temporary file used when comparing a device or the standard input. Note that the temporary file is unlinked as soon as it is created so it will not show up in a directory listing.

## EXIT STATUS

The **diff** utility exits with one of the following values:

0	No differences were found.
1	Differences were found.
>1	An error occurred.

The **--help** and **--version** options exit with a status of 0.

## EXAMPLES

Compare *old\_dir* and *new\_dir* recursively generating an unified diff and treating files found only in one of those directories as new files:

```
$ diff -ruN /path/to/old_dir /path/to/new_dir
```

Same as above but excluding files matching the expressions `"*.h"` and `"*.c"`:

```
$ diff -ruN -x '*.h' -x '*.c' /path/to/old_dir /path/to/new_dir
```

Show a single line indicating if the files differ:

```
$ diff -q /boot/loader.conf /boot/defaults/loader.conf
Files /boot/loader.conf and /boot/defaults/loader.conf differ
```

Assuming a file named *example.txt* with the following contents:

```
FreeBSD is an operating system
Linux is a kernel
OpenBSD is an operating system
```

Compare stdin with *example.txt* excluding from the comparison those lines containing either "Linux" or "Open":

```
$ echo "FreeBSD is an operating system" | diff -q -I 'Linux|Open' example.txt -
```

## SEE ALSO

`cmp(1)`, `comm(1)`, `diff3(1)`, `ed(1)`, `patch(1)`, `pr(1)`, `sdiff(1)`

James W. Hunt and M. Douglas McIlroy, "An Algorithm for Differential File Comparison", *Computing Science Technical Report*, Bell Laboratories 41, June 1976.

## STANDARDS

The **diff** utility is compliant with the IEEE Std 1003.1-2008 ("POSIX.1") specification.

The flags `[-aDdlilLNnPpqSsTtwXxy]` are extensions to that specification.

## HISTORY

A **diff** command appeared in Version 6 AT&T UNIX.