

# comparepdfcmd version 2.5.0-pe (“perpetual edition”)

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# Introduction

The *comparepdfcmd* application is a command line program for comparing two PDF files or two folders of PDF files that runs in a console (i.e., in a Command Prompt window opened by running `cmd.exe`).<sup>\*</sup> The program can report the differences in several ways—for example, by showing the differences visually in PDF or PNG format, or by outputting a CSV, JSON, or XML file identifying words that have been inserted, deleted, or replaced.

The *comparepdfcmd* program provides three comparison modes: Words (word-by-word), Characters (character-by-character), and Appearance. The first two—the text modes—are concerned with the words or characters only, and ignore line wrapping and margins; the appearance mode compares the appearance of each pair of pages and so detects differences in layout, differences in graphics, and differences in colors and fonts.

For comparisons, *comparepdfcmd* uses sensible defaults for ease of use. In addition it also supports many options to support customization of the output it produces, as well as options to influence how comparisons are done.

# Examples

These examples (and those throughout this manual) make three assumptions:

1. That you are using *comparepdfcmd* version 2.5.0-pe (“perpetual edition”)
2. That you replace the paths used in the examples, e.g., `C:\Users\me` for home, `E:\pdfs` for a folder of PDF files, and the `E:\diff` folder for outputting difference reports, with your own equivalents.
3. That you have added *comparepdfcmd*’s folder to your `%PATH%` (see [Add \*comparepdfcmd\* to the PATH](#)), or your current directory is *comparepdfcmd*’s folder, or where you see “*comparepdfcmd*” in the examples, you actually precede this with its full path, e.g., `C:\Users\me\comparepdfcmd\comparepdfcmd.exe`.

Here’s how to return a value (`%errorlevel%`) to the operating system (e.g., for use in a `.bat` file):

```
C:\Users\mark>comparepdfcmd E:\pdfs\a1.pdf E:\pdfs\a2.pdf
```

To get some human-readable feedback use the verbose option (either `-v` or `--verbose`), e.g.:

```
C:\Users\mark>comparepdfcmd -v E:\pdfs\b1.pdf E:\pdfs\b2.pdf
Different
```

This will return a value to the operating system as described above, and will also output either “Same” or “Different” depending on whether the two PDFs have the same words or not. (Note that colors and font effects shown in the examples, have no significance—they are used purely to aid understanding.)

---

<sup>\*</sup> If you need a GUI PDF comparison application, try DiffPDF: [www.diffpdf.com/diffpdf.html](http://www.diffpdf.com/diffpdf.html).

If you want to see what the differences are, tell *comparepdfcmd* to output a difference report using the `-r` or `--report` option. For example:

```
C:\Users\mark>comparepdfcmd -v -s -r E:\diff\report.pdf E:\pdfs\c1.pdf E:\pdfs\c2.pdf
Wrote "E:\diff\report.pdf"
```

The `report.pdf` file will contain the different pages side-by-side and with the differences highlighted. In addition, due to the `-s` or `--show` option, the report will be shown in your PDF reader.

Incidentally, if `c1.pdf` and `c2.pdf` were the same, no report would be produced and the program would display “Same” rather than “Wrote `E:\diff\report.pdf`”. And, of course, no report would be shown in your PDF reader.

If you want to compare two *folders* of PDFs which have the same names, you can give the folder names instead of the names of two PDFs, e.g.:

```
C:\Users\mark>comparepdfcmd -f pdf -R E:\diff E:\pdfs\old E:\pdfs\new
"Result","PDF#1","PDF#2","Report or Error"
"Missing#1",,"E:\pdfs\new\only_in_new.pdf",
"Missing#2","E:\pdfs\old\only_in_old.pdf",,
"Same","E:\pdfs\old\one.pdf","E:\pdfs\new\one.pdf",
"Different","E:\pdfs\old\two.pdf","E:\pdfs\new\two.pdf","E:\diff\two.pdf"
"Different","E:\pdfs\old\tthree.pdf","E:\pdfs\new\tthree.pdf","E:\diff\tthree.pdf"
```

The `-f` or `--format` option specifies the format of the difference report files; here it is PDF format (see the [Report Format Option](#)). The `-R` or `--reportpath` option specifies where the reports should go (see the [Report Path Option](#)). These options are followed by the two folders to search for PDF files to compare. The program shows the results in CSV format on the console, although you can tell it to save the summary into a file instead using the `-S` or `--summary` option (see the [Report Summary Option](#)).

When, comparing two folders of PDFs, by default, *comparepdfcmd* will look in subfolders (down to a depth of 1000 subfolders). However, it is possible to limit the depth to just the folders specified by using the `-D` or `--maxdirdepth` option with a value of 1. (See the [Maximum Directory Depth Option](#).)

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Many more command line options are supported, including using passwords to access password-protected PDFs, as well as options to exclude margins from comparisons (e.g., to ignore timestamps in a header or footer), amongst others. Even more options can be set in `.ini` configuration files. All this is explained in the [Configuration](#) section.

# Installing

## System Requirements

The *comparepdfcmd* program runs desktops and laptops running 64-bit Windows 7, 10, or later. The machine must have an x86-compatible processor (i.e., most desktop and laptop computers).

Since PDF comparisons are computationally expensive, it is best to use a machine with a fast multicore processor, ideally with a processor speed of at least 2GHz that has at least two cores. *comparepdfcmd* will take advantage of all available cores, so in general will run twice as fast on a quad core machine than on a dual core machine with the same clock speed—and faster still on machines with more and faster cores.

The *comparepdfcmd* program makes use of the system's default PDF reader, e.g., to show this manual, to show the license, and to show PDF difference reports when told to. So, naturally, a PDF reader must be installed.\*

## Obtaining and Installing

The program is provided in a single .zip file, e.g., *comparepdfcmd-2.5.0-pe.zip* which is provided once payment is received.

Once the .zip has been downloaded, unzip it in any convenient folder. This is all that is required for installation—*comparepdfcmd* does not touch the Windows registry, and does not change the %PATH%. However, having *comparepdfcmd* in your %PATH% can be very convenient, so we recommend that you permanently add it. (See the [Add \*comparepdfcmd\* to the PATH](#) sidebar.) Once the software has been installed it will work as-is with no license key required. The software has no expiry date and is not tied to any particular physical or virtual computer.

## How to View the License

The program's license can be viewed with this command:

```
C:\Users\mark\>comparepdfcmd license
```

This will show the license in your PDF reader, or if it can't, it will output the license to the console. Or, you can read the license PDF from *comparepdfcmd*'s folder since it is included in the .zip file. The license file is *comparepdfcmd-license.pdf*.

---

\* We prefer *SumatraPDF* [www.sumatrapdfreader.org](http://www.sumatrapdfreader.org) but Acroread, Acrobat, Evince, or any other should work fine.

## Add *comparepdfcmd* to the PATH

Click the Start button, then click Control Panel. In the Search box, enter “path”. This should give you a link to “Edit environment variables for your account”. Click this link. This should pop up the Environment Variables dialog.

Click the Path variable in the top list of user variables, then click the Edit button. Click the Variable value’s line editor, then press End to move the cursor to the very end. Now enter a semi-colon “;” followed by the drive and path to the folder you have unzipped *comparepdfcmd* into. For example, “;C:\Users\me\comparepdfcmd”. Then click OK, then close the Control Panel window.

## How to Get Support

It is worth reading this manual once through to become familiar with what *comparepdfcmd* can do. This manual covers every feature and configuration option that *comparepdfcmd* provides. However, if this manual doesn’t answer your question, then we’ll happily try to answer.

Email support is provided on a “best efforts” basis with no formal time limit, so long as Qtrac Ltd. is trading. The support email address is [support@qtrac.eu](mailto:support@qtrac.eu) — be sure to tell us what operating system you are using (e.g., “Windows 11”) and especially which version of *comparepdfcmd* you are using.

## How to Uninstall

To uninstall *comparepdfcmd*:

1. Delete *comparepdfcmd*’s folder;
2. Delete *comparepdfcmd.ini* from your home folder (if it exists);
3. Remove *comparepdfcmd* from your %PATH% (if you added it).

No other steps are needed since *comparepdfcmd* does not touch the Windows registry.

## Tips

By default, *comparepdfcmd* will compare PDFs using words mode. This will produce the best results for most Latin-based languages like English or Spanish. If you want to compare text written in a CJK—Chinese, Japanese, Korean—language, it is best to use chars (characters) mode. And if you want to compare colors, fonts, diagrams, images, or text layout, you should use appearance mode. See the [Comparison Mode Option](#).

If your PDFs have different numbers of pages or inserted or deleted pages, you can use page ranges to specify those pages from each PDF that correspond to each other. See the [Pages Options](#).

The default text comparison algorithm should produce good results for single column PDFs, but for multicolumn PDFs it is usually best to use the multicolumn comparison algorithm: see the [Text Comparison Algorithm Option](#).

It is also possible to tweak the comparison algorithm itself by setting the [Line Tolerance Option](#), and for the multicolumn algorithm, both the [Line Tolerance Option](#) and the [Column Tolerance Option](#). In particular, reducing the [Line Tolerance Option](#) from its default of 10 to 9 or 8 may help improve results for PDFs whose inter-line spacing is narrower than usual.

If any problems occur, have a look at the [Troubleshooting](#) section (which includes how to get support).

## Configuration

When *comparepdfcmd* runs it must be told which PDF files or folders to compare. And in most cases you'll want to specify extra options, for example, to say what kind of comparison you want done, and how to report differences. You may also want to change some of the defaults it uses. This can be done by creating a `comparepdfcmd.ini` configuration file and putting it in one of the locations that *comparepdfcmd* searches for configurations; or by creating a configuration file with any name you like and using the `-C` or `--config` option to tell *comparepdfcmd* where to find it (see the [Configuration File Option](#)). Here's how the configuration process works:

1. *comparepdfcmd* starts with every option set to a sensible default wherever possible;
2. Options are read from the file `COMPAREPDFCMD\comparepdfcmd.ini` if it exists (where `COMPAREPDFCMD` is the folder where `comparepdfcmd.exe` is located);
3. Options are read from the file `%USERPROFILE%\comparepdfcmd.ini` if it exists (i.e., in your home folder);
4. Options are read from the file `comparepdfcmd.ini` (i.e., in the current folder) if it exists;
5. If the `-C` or `--config` command line option is given, options are read from the file it specifies;
6. Any options given on the command line (apart from `-C` or `--config`) are read.

Once the options have been read and a final configuration is reached, *comparepdfcmd* then performs the comparison in accordance with the configuration.

## Exit Status Code

During the comparison, and when the comparison is complete, *comparepdfcmd* may output messages depending on the options that have been set. And at the end the program returns a value to the operating system (accessible as `%errorlevel%` in `.bat` files). The value will be 0 if there were no errors and no differences were found, 1 if there were no errors and differences were detected, or 2 if an error occurred.

## Setting Your Own Defaults

If you want to change any of *comparepdfcmd*'s defaults, create a plain text file called `comparepdfcmd.ini` and save it in the same folder as *comparepdfcmd*'s executable or in your home folder (%USERPROFILE%). For any default you want to change, put your preferred default in this file. For example, if you want *comparepdfcmd* to default to doing appearance mode comparisons, add these lines:

```
[general]
mode=appearance
```

Examples of how to change other defaults are given wherever applicable in the explanations of *comparepdfcmd*'s options that follow. You can also copy parts of the `example.ini` file that you'll find in *comparepdfcmd*'s folder and paste them into your own `comparepdfcmd.ini` file, editing them to suit your needs.

## Option Names and Values

Command line options are always specified Unix-style, e.g., `-v` or `--verbose`, *not* Windows-style (`/v`). Command line option names are case-sensitive.

In configuration files, blank lines are ignored, and so is any text that begins with a semi-colon. This makes it possible to add comments if you want. (For an example, see the `example.ini` file in *comparepdfcmd*'s folder.) Configuration file section names and key names are *not* case-sensitive.

Most option values are simple pieces of text or numbers, e.g., "words" or "30". Numbers that represent lengths or coordinates are assumed to be points ( $\frac{1}{72}$ " or about 0.353mm). The top-left of the page is point (0, 0), with positive *y* coordinates moving down, and positive *x* coordinates moving right.

Some option values are used to turn a feature on or off. For these, a value of "1", "true", "t", "yes", "y", or "on", will turn the feature on; and any other value will turn it off. (And no value at all will leave it at its default.)

Option values which represent colors can be specified by name or using HTML-style colors: see the [Color Options](#) section for details.

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Page numbers are always counted from 1, regardless of the page numbers used in the PDF itself (e.g., i, ii, iii, ..., 1, 2, 3, ...).

The most important option is the [Comparison Mode Option](#). This defaults to words mode, so doesn't even need to be set if that's the kind of comparison you want (and providing you haven't changed this default in a configuration file). If you want to *see* the differences, then you'll need to use the [Report Options](#). If the pages don't exactly correspond (e.g., due to inserted or deleted pages), or you only want to compare some specific pages, then you'll need to use the [Pages Options](#). And, of course, you must specify [The PDF Files or Folders to Compare](#).



## Alternative Options

It is possible to tell *comparepdfcmd* to provide some information or perform a special operation, without doing any comparisons at all. This involves using one of the alternative command line options. The most commonly used is `-h` or `--help`, e.g.,

```
E:\pdfs\>comparepdfcmd -h
```

This outputs to the console a summary of the standard and alternative command line options. Another useful alternative option, is `-m` or `--manual` or `manual`:

```
E:\pdfs\>comparepdfcmd -m
```

This shows *comparepdfcmd*'s manual in your PDF reader.

Especially when requesting support, the `-V` (*capital-V*) or `--version` option is useful:

```
E:\pdfs\>comparepdfcmd -V
```

This shows *comparepdfcmd*'s version.

The other alternative option, used individually, is `license` or `--license`. This was covered earlier in the [Installing](#) section and its subsections.

## Appearance Mode Options

These options only apply when appearance mode comparisons are made. (See also the [Comparison Mode Option](#).) To control the highlighting color used in this mode, see the [Color Options](#)' highlight option and the [Highlight Transparency Option](#).

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### Accuracy Option

This tells *comparepdfcmd* how accurate appearance mode comparisons should be; it is ignored for text mode comparisons.

The default is 100 (i.e., 100%) which means that each pair of pages that are compared are only considered the same if they match pixel for pixel. The minimum accuracy is 80 (80%), and the maximum, 100.

Appearance mode comparisons are made by dividing each pair of pages into little squares and comparing each pair of corresponding squares. In some situations it is helpful to accept small differences (often ones that humans wouldn't even notice). This can be achieved by lowering the accuracy. For example, reducing the accuracy to 98% means that every pair of squares that are compared can be up to 2% different and still be considered "the same".

This option can be specified on the command line using the syntax `-A number` or `--accuracy=number`. Here are two equivalent examples.

```
E:\pdfs\>comparepdfcmd -a -A90 -r diff.pdf file1.pdf file2.pdf
```

```
E:\pdfs\>comparepdfcmd --appearance --accuracy=90 --report diff.pdf file1.pdf file2.pdf
```

Both specify appearance mode, and an accuracy of 90%, and tell *comparepdfcmd* that if there are differences it should create the difference report file, `diff.pdf`, containing each pair of different pages with their differences highlighted. (See the [Comparison Mode Option](#) and the [Report Filename Option](#).)

To set the default accuracy to, say, 95% for appearance mode comparisons, put these lines in a configuration file:

```
[appearance]
accuracy=95
```

Whatever the default is, it can always be overridden on the command line using the `-A` or `--accuracy` option.

See also the [Square Size Option](#).

## New Renderer Option

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*This is an advanced option that should not normally need to be changed.*

Whether to use the “new” renderer for appearance mode comparisons.

The “old” renderer is fast and accurate for almost all appearance mode comparisons. However, in some rare cases it may fail to correctly detect differences in some gradient fills or textures. In such cases, setting this option to `true` will solve the problem.

```
[appearance]
new-renderer=true
```

## Square Size Option

*This is an advanced option that should not normally need to be changed.*

The square size to use for appearance mode comparisons.

When a pair of pages is compared in appearance mode, i.e., pixel for pixel, the pages are divided into squares, and each corresponding square is compared. The default square size is 10 points, i.e., squares of size  $10 \times 10$  (100 pixels) are compared.

To change the default, put these lines in a configuration file, replacing `10` with your preferred default (minimum 4 points, maximum, 144 points):

```
[appearance]
square-size=10
```

See also the [Accuracy Option](#).

## Color Options

For reports output in PDF or PNG format, differences are indicated by highlighting them as if you'd drawn over them with a highlighter pen. This makes the differences stand out and at the same time allows the highlighted text or graphics to show through. The show through is controlled by the [Highlight Transparency Option](#).

If corners, margins, or rectangles are excluded, their outlines are drawn to indicate the excluded areas: see the [Exclude Options](#).

For text mode comparisons a colored vertical change bar is drawn in the left margin wherever changes are detected: see the [Change Bar Option](#).

Sensible defaults are used for all the colors, but you can override them by adding lines to a configuration file using this syntax:

```
[colors]
what=color
```

The *what* can be change-bar, exclusion-line, highlight, delete, insert, or replace. The highlight color is used for Appearance mode comparisons, and the delete, insert, and replace colors are used for text mode comparisons.

The *color* can be specified using any of the names listed in the [Appendix: Color Names](#), or an HTML-style hexadecimal color name with the form *#hhh* or *#hhhhh*, where each *h* is a hexadecimal digit.

For example:

```
[colors]
highlight=Teal
exclusion-line=#FF007F
replace=#EB5
```

Note that color names are *not* case-sensitive, so Teal, teal, and TEAL are all the same color.

## Comparison Mode Option

The comparison mode tells *comparepdfcmd* how to compare the PDF files. It can be specified on the command line or in a configuration file. The default is words mode unless you change this using a configuration file.

To specify appearance mode on the command line, you can use the syntax `-a` or `--appearance`. This will override the default. Here are two equivalent examples:

```
E:\pdfs\>comparepdfcmd -a file1.pdf file2.pdf
E:\pdfs\>comparepdfcmd --appearance file1.pdf file2.pdf
```

To make appearance mode the default, put these lines in a configuration file:

```
[general]
mode=appearance
```

To specify chars (characters) mode on the command line, you can use the syntax `-c` or `--chars`. This will override the default. Here are two equivalent examples:

```
E:\pdfs\>comparepdfcmd -c file1.pdf file2.pdf
E:\pdfs\>comparepdfcmd --chars file1.pdf file2.pdf
```

To make chars mode the default, put these lines in a configuration file:

```
[general]
mode=chars
```

The default is words mode, so if this is what you want to use there is normally no need to specify it at all. However, if a different mode has been set as the default in a `comparepdfcmd.ini` file, you can override it on the command line, e.g., using the syntax `-w` or `--words` to specify words mode:

```
E:\pdfs\>comparepdfcmd -w file1.pdf file2.pdf
```

Appearance comparisons (appearance mode) works by in effect taking a “photograph” of each pair of pages being compared, and then comparing these images pixel by pixel. By default, even a single pixel difference is considered significant. However, it is possible to use the [Accuracy Option](#) to make comparisons tolerant of small differences. Another option that affects appearance mode comparisons is the [Square Size Option](#).

Word-by-word comparison (words mode) is best for comparing documents’ texts—this mode is also the fastest.\* However, in some situations (perhaps when comparing documents written in CJK—Chinese, Japanese, Korean—languages), character-by-character comparisons (chars mode), may produce better results, but at the cost of being slower. Both words and chars modes (the “text” modes) only consider text: they ignore images, fonts, and layout (apart from the order of the characters or words). For complete comparisons—of text (including fonts and layout), and of images—use appearance mode. Text mode comparisons are affected by the various [Text Mode Options](#).

In addition, *all* comparisons are affected by the [Exclude Options](#) and the [Pages Options](#).

## Configuration File Option

This option accepts the name of a configuration file given on the command line. The options in this file override any defaults, but themselves may be overridden on the command line.

This option may only be specified on the command line using the syntax `-C configfile` or `--config=configfile`, where `configfile` is a filename and may include a path. Here are two equivalent examples:

---

\* In tests *comparepdfcmd*’s words mode comparisons were 2× – 4× faster than *DiffPDF* or *diffpdfc*. Furthermore, *comparepdfcmd* makes better use of processor cores, and uses less memory.

```
E:\pdfs\>comparepdfcmd -C E:\myconfig.ini file1.pdf file2.pdf
```

```
E:\pdfs\>comparepdfcmd --config E:\myconfig.ini file1.pdf file2.pdf
```

This is useful for overriding defaults that cannot be set on the command line, or for using a specific set of options for particular comparison tasks without changing the overall defaults.

To permanently set your own default options, see [Setting Your Own Defaults](#).

For an example configuration file, open `example.ini` in *comparepdfcmd*'s folder using a plain text editor.

## Highlight Transparency Option

1.1.4

Differences are indicated by highlighting them as if you'd drawn over them with a highlighter pen. This makes the differences stand out and at the same time allows the highlighted text or graphics to show through.

The default is 80 (i.e., 80%). The minimum is 10 (10%) and the maximum is 90 (90%).

You can change the default if you want. For example, by reducing the transparency to, say, 70%, you can make the highlighting stronger, while still allowing the differences to be visible. This can be done by putting these lines in a configuration file:

```
[general]
highlight-transparency=70
```

You can change the underlying highlighting colors used by setting custom [Color Options](#).

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## Exclude Options

It is sometimes convenient to exclude a region of each page from comparisons. For example, you might want to exclude a header or footer that has a timestamp that is different for every PDF you compare, but which you don't want to affect the comparison.



The program can exclude corners, margins, and arbitrary rectangles.

Any text wholly within an excluded corner, margin, or rectangle, is ignored for text mode comparisons, and any part of the page within an excluded corner, margin, or rectangle, is ignored for appearance mode comparisons.

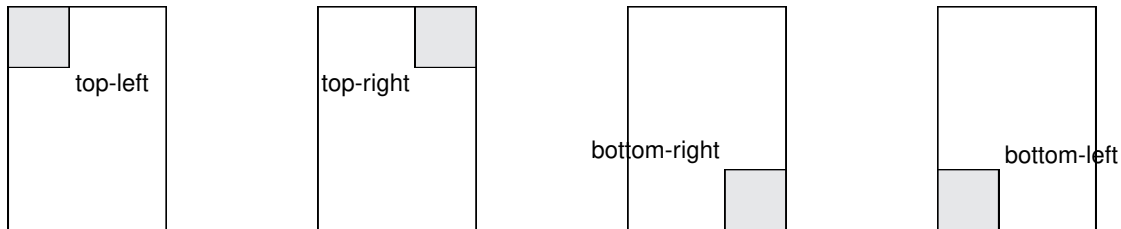
Coordinate (0,0) is the top-left corner; coordinate (612,792) is the bottom-right corner of a US-Letter size page, and coordinate (595,842) is the bottom-right of an A4 page, as illustrated above.

For PDF and PNG reports, exclusions are shown by dashed (PDF) or solid (PNG) red lines. To change the color used, see the [Color Options](#).

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## Exclude Corners Options

Excluded corners, if set at all, are set individually, and are specified as an  $x, y$  coordinate pair relative to their nearest corner.



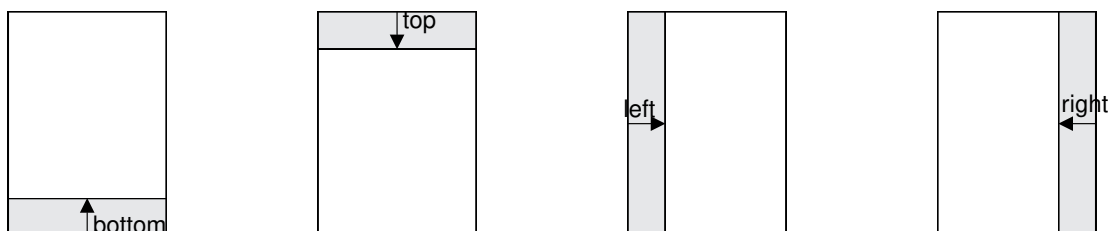
To exclude corners, add a corner exclusion section to a configuration file. For example, to exclude a one inch (25.4 mm) corner from the top-right of the PDFs being compared, add these lines:

```
[corners]
top-right=72,72
```

Corner coordinates may range from 0 to 300. You can specify up to four corners in a corners section, bottom-left, bottom-right, top-left, and top-right. The coordinates don't have to be the same—so you can exclude corner rectangles, not just squares.

## Exclude Margins Options

Excluded margins, if set at all, are set individually, and are specified as a length from their nearest edge.



Margins can be excluded using the command line with the syntax `--margin-which=number`, where *which* is left, right, top, or bottom. For example, `--margin-bottom=54`. You can use none, one, two, three, or all four of these options on the command line.

It is also possible to exclude margins using a configuration file. To do this, add a margin exclusion section to a configuration file. For example, to exclude a  $\frac{3}{4}$  inch (19 mm) margin from the bottom of the PDFs being compared, add these lines:

```
[margins]
bottom=54
```

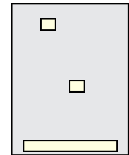
Margin coordinates may range from 0 to 300. You can specify up to four margins in a margins section, bottom, left, right, and top.

## Exclude Rectangles Options

Excluded rectangles, if set at all, are set individually, and are specified as coordinates  $x1, y1, x2, y2$ , where  $(x1, y1)$  is a rectangle's top-left corner, and  $(x2, y2)$  is its bottom right corner.

To exclude rectangles, add a rectangles exclusion section to a configuration file. For example, to exclude the three rectangles illustrated, add these lines:

```
[rectangles]
rectangle1=155,79,217,158
rectangle2=300,400,350,450
rectangle3=61,533,558,594
```



Each rectangle must be individually numbered (from rectangle1 to rectangle20). The numbers need not be consecutive and there can be gaps (e.g., rectangle9, then rectangle15); nor does their order within the rectangles section matter.

Although rectangles can be used to exclude corners and margins, as well as arbitrary rectangles, it is usually easier to specify corners and margins using the [Exclude Corners Options](#) and the [Exclude Margins Options](#).

## Pages Options

By default, *comparepdfcmd* compares all the pages in the first PDF with their corresponding pages in the second PDF.

For example, if you compare two PDF files, by default *comparepdfcmd* will compare both their page 1's with each other, both their pages 2's, both their page 3's, and so on.

In the case of PDF files that have different numbers of pages, or where you only want to compare particular pages, you can specify exactly which pages *comparepdfcmd* should compare using the command line `--pages1` and `--pages2` options. If neither option is given, *comparepdfcmd* will compare all the pages. If `--pages1` is given, but not `--pages2`, then the page set for `--pages1` will also be used for `--pages2`. And if both are specified, then *comparepdfcmd* will compare as specified.

Pages can be specified using the syntaxes `--pages1=pages` and `--pages2=pages` where *pages* is a set of comma-separated page numbers, or page ranges of the form *startpage-endpage*, or a mixture of both. Here are some examples:

```
E:\pdfs\>comparepdfcmd -r diff.pdf file1.pdf file2.pdf
```

```
E:\pdfs\>comparepdfcmd -r diff.pdf --pages1=1,3,5,7,11-18 file1.pdf file2.pdf
```

```
E:\pdfs\>comparepdfcmd -r diff.pdf --pages1=3-19 --pages2=5-21 file1.pdf file2.pdf
```

In the first example, all the pages are compared. In the second example pages 1, 3, 5, 7, 11, 12, 13, 14, 15, 16, 17, and 18 are compared. And in the third example file1.pdf's pages 3–19 are compared with file2.pdf's pages 5–21, i.e., 3 vs. 5, 4 vs. 6, 5 vs. 7, ..., 18 vs. 20, 19 vs. 21. In each case a difference report is written to the file diff.pdf; see the [Report Filename Option](#).

## Password Options

If one or both of the PDFs you want to compare is password-protected, you must tell *comparepdfcmd* what password(s) to use so that it can read the PDFs. Note that if you tell *comparepdfcmd* to provide a PDF differences report, the report will *not* be password-protected.

To specify the password for the first PDF to compare use the syntax `--password1=password1` and similarly, to specify the password for the second PDF use the syntax `--password2=password2`. For example:

```
E:\pdfs\>comparepdfcmd -r diff.pdf --password1=Abc5 pwd1.pdf file2.pdf
```

```
E:\pdfs\>comparepdfcmd -r diff.pdf --password2=XyZ6 file1.pdf pwd2.pdf
```

```
E:\pdfs\>comparepdfcmd -r diff.pdf --password1=Abc5 --password2=XyZ6 pwd1.pdf pwd2.pdf
```

In the first example, pwd1.pdf is password-protected with password “Abc5”, and compared with the unprotected file2.pdf. In the second example, unprotected file1.pdf is compared with pwd2.pdf which is password-protected with password “XyZ6”. And in the third example the two password-protected PDFs are compared to each other. Note that in every case, if the PDFs are different, the diff.pdf report will be *unprotected*.

## Report Options

To get a difference report when comparing two PDFs, use the `-r` or `--report` command line option (see [Report Filename Option](#)). To have *comparepdfcmd* show this report in your PDF reader, use the `-s` or `--show` option (see [Report Show Option](#)).

To get difference reports when comparing two *folders* of PDFs, use the `-R` or `--reportpath` option (see [Report Path Option](#)) and the `-f` or `--format` option (see [Report Format Option](#)). The other options described in this section are used to configure some aspects of the reports.

For PDF and PNG reports you can override the default colors used for the change bar, exclusions, and highlighting: see the [Color Options](#).



## Report Compact Option

2.0.0

If this option is false (the default), then JSON and XML reports will be output in a human-readable form with newlines and indentation. If this option is true, then JSON and XML reports will be output as compactly as possible.

To change the default to true, put these lines in a configuration file:

```
[report]
compact=true
```

See also the [Report Decimals Option](#).

## Report CSV Option

2.4.2

CSV reports can be output in one of two different formats. The default format is normal:

```
[report]
csv=normal
```

The normal format produces reports using one of these formats:

```
"File", "Page", "X1", "Y1", "X2", "Y2", "Text", "Change"
"File", "Page", "X1", "Y1", "X2", "Y2"
```

For CSV normal format, the differences in File #1 are shown, followed by the differences in File #2.

The first format is used for text mode comparisons and the second for appearance mode comparisons.

Alternatively, the special format can be used.

```
[report]
csv=special
```

The special format produces reports using one of these formats:

```
"File1", "Page", "X1", "Y1", "X2", "Y2", "Text", "Change", "File2", "Page", "X1", "Y1", "X2", "Y2", "Text", "Change"
"File1", "Page", "X1", "Y1", "X2", "Y2", "File2", "Page", "X1", "Y1", "X2", "Y2"
```

For CSV special format, all the differences in File #1 are shown, side-by-side with the differences in File #2.

Again, the first format is used for text mode comparisons and the second for appearance mode comparisons.

See also the [Report Filename Option](#).

## Report Decimals Option

This option is used to set how many digits to show after the decimal point in CSV, JSON, and XML reports. The default is 2.

To change the default, put these lines in a configuration file, replacing 2 with your preferred default (minimum 0, maximum, 4):

```
[report]
decimals=2
```

See also the [Report Compact Option](#), the [Report Filename Option](#), and the [Report Format Option](#).

## Report Filename Option

This option is used when comparing two PDFs to specify the filename of a difference report.

(If you are comparing two *folders* of PDFs, don't use this option, use the [Report Path Option](#) and the [Report Format Option](#) instead.)

There is no default for this option, so *comparepdfcmd* will not output any reports by default.

Five output formats are supported:

- CSV (comma-separated variable; .csv)—suitable for importing into a spreadsheet and for regression testing;
- JSON (JavaScript Object Notation; .json or .jsn)—suitable for regression testing; 1.1.5
- PDF (portable document format; .pdf)—containing each pair of differing pages with differences highlighted;
- PNG (portable network graphics; .png)—an image for each pair of pages that differ, with differences highlighted;
- XML (extensible markup language; .xml)—suitable for post-processing and regression testing. 2.0.0

If you output a PDF report, you can tell *comparepdfcmd* to show it in your PDF reader using the [Report Show Option](#).

This option can only be specified on the command line using the syntax `-r filename` or `--report=filename` where *filename* is the filename for the difference report. The *filename* may include a path, and *must* end with .csv, .json, .jsn, .pdf, .png, or .xml, depending on which report format you want. If you want reports in two or more formats, simply repeat this option once for each format.

Here is an example:

```
E:\pdfs>comparepdfcmd -v -r E:\diff\diff.pdf E:\pdfs\f1.pdf E:\pdfs\f2.pdf
Wrote "E:\diff\diff.pdf"
```

Here, two PDF files were compared and differences found which are shown in the `diff.pdf` file. If you give a report filename that includes a path, then what you have specified will be used. However, if you give a report filename without a path, the path specified by the [Report Path Option](#) will be used. The [Report Path Option](#) has no default, so if no path is given in the report filename and the [Report Path Option](#) isn't set, the report will be written to the current folder.\*

In the following example we assume that the [Report Path Option](#) has been set in a configuration file to, say, `E:\diff`.

```
E:\pdfs\>comparepdfcmd -v -r x.csv -r y.json -r z.pdf E:\pdfs\g1.pdf E:\pdfs\g2.pdf
Wrote "E:\diff\x.csv"
Wrote "E:\diff\y.json"
Wrote "E:\diff\z.pdf"
```

Because the [Report Path Option](#) has been set, *and* no path is specified by the `-r` or `--report` options, the [Report Path Option](#) has been used.

Here's one final example:

```
E:\pdfs\>comparepdfcmd -v -r E:\diff\pagesimage-.png E:\pdfs\h1.pdf E:\pdfs\h2.pdf
Wrote "E:\diff\pagesimage-09-09.png"
Wrote "E:\diff\pagesimage-11-11.png"
Wrote "E:\diff\pagesimage-12-12.png"
```

In this example, the two PDFs differ on pages 9, 11, and 12, and each pair of pages has been saved into its own PNG file using the report filename as the *pattern* which `comparepdfcmd` fills in as `name-page1-page2.png`. Naturally, the path could have been omitted if you wanted to save the images to the current folder, or to a folder specified by the [Report Path Option](#).

## Report Format Option

This option is used when comparing two *folders* of PDFs to specify the format to use for difference reports.

(If you are comparing just two PDFs, don't use this option, use the [Report Filename Option](#) instead.)

There is no default for this option, so `comparepdfcmd` will not output any reports by default when comparing two folders of PDFs.

The same five output formats as the [Report Filename Option](#) are supported. (JSON support was added in version 1.1.5; XML support was added in version 2.0.0)

1.1.5

2.0.0

This option can be set on the command line using the syntax `-f format` or `--format=format` where *format* is `csv`, `jsn`, `json`, `pdf`, `png`, or `xml`. For example:

---

\* Note that if the current folder is `C:\`, Windows will normally *silently ignore* requests to write to it.

```
E:\pdfs>comparepdfcmd -f pdf -R E:\diff E:\pdfs\old E:\pdfs\new
"Result","PDF#1","PDF#2","Report or Error"
"Missing#1",,"E:\pdfs\new\only_in_new.pdf",
"Missing#2","E:\pdfs\old\only_in_old.pdf",,
"Same","E:\pdfs\old\one.pdf","E:\pdfs\new\one.pdf",
"Different","E:\pdfs\old\two.pdf","E:\pdfs\new\two.pdf","E:\diff\two.pdf"
"Different","E:\pdfs\old\three.pdf","E:\pdfs\new\three.pdf","E:\diff\three.pdf"
```

Here the report format has been set to PDF using `-f pdf` and a path for the reports has been specified using `-R E:\diff` (i.e., using the [Report Path Option](#)).

In general we recommend always using this option and the [Report Path Option](#) together, unless they are both set in configuration files.

To change the default of no format (i.e., no reports output when comparing folders), put these lines in a configuration file:

```
[report]
format=pdf
```

Naturally, you could set the format to csv, json, png, or xml, if you preferred one of them to PDF format for reports of PDFs that differ when comparing folders.

## Report Output Option

*This is an advanced option that should not normally need to be changed.*

By default PDF and PNG reports show each pair of differing pages side-by-side with differences highlighted. However, if you only want to see the pages in the first PDF (or first folder's PDFs when comparing folders of PDFs), you can tell `comparepdfcmd` to only output these pages with differences highlighted. Similarly, you can tell `comparepdfcmd` to only output the pages of the second PDF (or second folder's PDFs).

To change the default of showing pairs of pages side-by-side, put these lines in a configuration file:

```
[report]
output=one
```

This will only output the first PDF's different pages (or the first folder's PDFs). If you prefer the second, then use `output=two` instead. To get the default, just delete this line or use `output=both`.

## Report Path Option

Use this option to specify the folder to use for reports when comparing two PDFs using the [Report Filename Option](#) (in which case the report filenames do not need to have paths since they'll be given the path specified by this option). And use this option when comparing two folders of PDFs—in conjunction with the [Report Format Option](#).

This option can be set on the command line using the syntax `-R path` or `--reportpath=path`. For an example, see the [Report Format Option](#), page 20.

To change the default of no default report path, put lines like these in a configuration file:

```
[report]
path=E:\diff
```

Naturally, you would use the path relevant to your system rather than the `E:\diff` shown here.

### Report Path in Title Option

1.1.7

Use this option to specify whether to include the full path to the compared PDFs in report titles.

To change the default of including the full path of compared PDFs in report titles, put lines like these in a configuration file:

```
[report]
path-in-title=false
```

### Report Scale Option

1.1.6

Use this option to scale PNG reports.

By default PNG reports are output at 100% scale (i.e., at 72 DPI). However, it can sometimes be useful to use higher resolutions, especially for very small PDFs.

To change the default of 100 (100%), put lines like these in a configuration file:

```
[report]
scale=150
```

The minimum is 100 (the default), and the maximum is 800 (800%). To find the best scale, try 150, then 200, and so on.

Higher resolution output takes more time (although this may not be noticeable for small PDFs).

### Report Scalable PDF Option

2.3.0

Use this option to switch off scalable PDF reports.

By default, PDF reports are output in scalable form.

However, in some very rare cases this fails to work correctly. In such cases set this option to false in a configuration file:

```
[report]
scalablepdf=false
```

If the resultant PDF report is too grainy, increase the report scale (e.g., to 150% or 200%; see [Report Scale Option](#)).

## Report Show Option

Use this option to show *comparepdfcmd*'s PDF report if two PDFs are different.

This option can only be set on the command line using the syntax `-s` or `--show`. It only applies when comparing two PDF files (*not* two folders), *and* when the [Report Filename Option](#) is used to specify a PDF report.

For example:

```
E:\pdfs\>comparepdfcmd -v -s -r E:\diff\report.pdf E:\pdfs\k1.pdf E:\pdfs\k2.pdf
Wrote "E:\diff\report.pdf"
```

If the two PDFs are the same, the output will be the text “Same” on the console and no further action will be taken.

However, if the two PDFs are different (as in the example), the text “Wrote “E:\diff\report.pdf”” will be output, *and*, due to the `-s` or `--show` option, the report will be shown in your PDF reader application.

## Report Show Field Content Option

2.1.1

Use this option to specify whether to include the content of form fields in PDF reports. (This is done automatically for other report formats.)

The default is not to do this since it involves extra processing. To change the default, put lines like these in a configuration file:

```
[report]
show-field-content=true
```

## Report Summary Option

When comparing two *folders* of PDFs, *comparepdfcmd* will output a summary of the results to the console. For an example, see the [Report Format Option](#), page 20. When the summary is output to the console, the [Verbose Option](#) is ignored.

The summary can be sent to a file instead of the console (in which case the [Verbose Option](#) is respected), using the syntax `-S filename.csv` or `--summary=filename.csv`. For example:

```
E:\pdfs\>comparepdfcmd -v -S E:\summary.csv -f pdf -R E:\diff E:\pdfs\old E:\pdfs\new
Same
Wrote "E:\diff\two.pdf"
Wrote "E:\diff\three.pdf"
Wrote "E:\summary.csv"
```

## Text Mode Options

These options only apply when text mode comparisons are made, i.e., words and chars modes. (See also the [Comparison Mode Option](#).) To control the highlighting colors used in these modes, see the [Color Options](#)' change-bar, delete, insert, and replace options, and the [Highlight Transparency Option](#).

2.0.0

### Change Bar Option

This tells *comparepdfcmd* whether to show a red vertical change bar in pages' left margins wherever there are changes highlighted in the text. This option only applies to text mode comparisons and is ignored for appearance mode comparisons.

The default is true, i.e., to show change bars.

To change the default, i.e., to switch them off, put these lines in a configuration file:

```
[text]
bar=false
```

To change the change bar's color, see the [Color Options](#).

2.0.0

### Column Tolerance Option

*This is an advanced option that should not normally need to be changed.*

This option only applies to text mode comparisons that use the multicolumn algorithm. (See the [Comparison Mode Option](#) and the [Text Comparison Algorithm Option](#).)

The default is 108. The allowed range is 10–300. If the default isn't satisfactory, try these values: 72, then 36, then 144, then 176.

To change the default, put these lines in a configuration file (with 108 changed to the default you want):

```
[text]
column-tolerance=108
```

### Ignore Hyphens Option

By default, hyphens are treated like regular characters. If this option is used, hyphens are ignored. When hyphens are ignored it means that, for example, *one-two* is treated as *onetwo*. This works even if *two* is on the next line.

The default is not to ignore hyphens, but this can be overridden for any particular comparison on the command line using the syntax `--ignore-hyphens`. Or, you can make ignoring hyphens the default by adding these lines to a configuration file:

```
[text]
ignore-hyphens=true
```

If you use this option, we recommend that you also normalize hyphens (which is the default behavior). See the [Normalize Hyphens Option](#).

## Line Tolerance Option

*This is an advanced option that should not normally need to be changed.*

To do sensible text comparisons *comparepdfcmd* needs to work out where the lines of text are on each page. This can be tricky when the lines are very close together. This option can be used to fine-tune how *comparepdfcmd* works out the lines.

The default is 10, but for PDFs that have lines very close together a setting of 9 or even 8 might produce better results. Changing the default can be done by adding lines like these to a configuration file:

```
[text]
line-tolerance=9
```

The minimum is 1 and the maximum is 27, but only 8, 9, and 10 are recommended.

## Normalize Hyphens Option

*This is an advanced option that should not normally need to be changed.*

By default *comparepdfcmd* normalizes hyphens and a few other characters. This means that all kinds of hyphens (i.e., all hyphens in the Unicode “punctuation dash” character category, such as plain hyphens, minus signs, non-breaking hyphens, and en-dashes and em-dashes) are treated as if they were the same. In addition to normalizing hyphens, non-standard double quotes (Unicode code points U+0093 and U+0094 that are used in some PDF files) are considered to be identical to U+201C (“) and U+201D (”) for the purposes of comparison.\*

If you don’t want hyphen normalization, you can turn it off on the command line using the syntax `--no-normalize-hyphens`. Or, you can make not normalizing hyphens the default by adding these lines to a configuration file:

```
[text]
normalize-hyphens=false
```

## Normalize Ligatures Option

By default, a ligature is considered to be different from its spelled out form, for example, **fi** ≠ **fi**, and **fl** ≠ **fl**. If you want ligatures and their spelled out forms to be considered the same during comparisons, you can tell *comparepdfcmd* to normalize ligatures.

Ligature normalization can be turned on, on the command line, using the syntax `--normalize-ligatures`. Or, you can make normalizing ligatures the default by adding these lines to a configuration file:

---

\* Note that *comparepdfcmd* always normalizes whitespace, that is, any kind of whitespace (space, non-breaking space, etc.), is treated as a space (i.e., as a word separator).



```
[text]
normalize-ligatures=true
```

## Text Comparison Algorithm Option

Three text mode comparison algorithms are provided. The default is the standard algorithm which gives good results in almost every case. For multicolumn PDFs using the multicolumn algorithm may produce better results. And in rare cases the special algorithm may be best.

You can change the default by adding lines like these to a configuration file:

```
[text]
algorithm=multicolumn
```

Naturally, if you prefer to use the special algorithm, you can set `algorithm=special`. And to restore the default either delete these lines or set `algorithm=standard`.

All three algorithms can be tuned using the [Line Tolerance Option](#). And the multicolumn algorithm can be further tuned using the [Column Tolerance Option](#).

## Verbose Option

By default *comparepdfcmd* does not output anything to the console when comparing two PDF files. And when comparing two *folders* of PDFs *comparepdfcmd* outputs a summary to the console unless the [Report Summary Option](#) is used. (Of course, if errors occur, these are always reported, no matter what this option is set to.)

If you want *comparepdfcmd* to tell you the outcome of comparisons and what reports it has written, you can tell it to be verbose. This option can only be specified on the command line, using the syntax `-v` or `--verbose`.

## Maximum Directory Depth Option

When, comparing two folders of PDFs, by default, *comparepdfcmd* will look in subfolders (down to a depth of 1000 subfolders). However, it is possible to limit the depth to just the folders specified by using the `-D` or `--maxdirdepth` option with a value of 1.

2.1.6

You can change the default by adding lines like these to a configuration file:

```
[general]
maxdirdepth=1
```

You can set other depths, for example, use 2 to look in the folders specified and their immediate subfolders.

## The PDF Files or Folders to Compare

After any command line options have been specified, two PDF filenames (with paths if needed) or two folders *must* be given. If two PDF filenames are specified, these two PDFs will be compared. If two folders are specified, then *comparepdfcmd* will look inside each folder. For every PDF file it finds in both folders (and their subfolders, and so on), *comparepdfcmd* will compare those PDF files. For every PDF file that is in one folder but not the other, *comparepdfcmd* will report the nonexistent PDF as “missing”. And any non-PDF files will be ignored.

See also the [Maximum Directory Depth Option](#).

2.1.6

## Troubleshooting

Note that [www.qtrac.eu](http://www.qtrac.eu) and [www.diffpdf.com](http://www.diffpdf.com) are synonymous, as are [support@qtrac.eu](mailto:support@qtrac.eu) and [support@qtrac.eu](mailto:support@qtrac.eu).

### Invalid PDF Report Output

In some very rare cases *comparepdfcmd*'s high quality scalable PDF output fails to work correctly. If this occurs, switch off scalability using the [Report Scalable PDF Option](#).

### Failed to Merge Error

In some rare cases *comparepdfcmd* cannot produce a PDF report and instead outputs a “failed to merge” error message. *comparepdfcmd* produces PDF reports by copying each pair of pages from the original PDFs into a new PDF, but unfortunately, in these rare cases, copying the original pages doesn't work.

The solution is to output .PNG report files since these are created by in effect *photographing* the page pairs rather than copying them.

### False Positives

In some circumstances, *comparepdfcmd* will report differences that are not visible to the human eye. In some cases these are genuine differences (for example, two different kinds of hyphens that look the same), and in some cases these are false positives.

By default *comparepdfcmd* normalizes hyphens (i.e., treats all the different hyphen kinds as the same), but does not normalize ligatures (although it will if you tell it to). To control these, see the [Normalize Hyphens Option](#) and the [Normalize Ligatures Option](#).

False positives are usually caused by very narrow inter-line spacing, or by text which mixes Latin text (e.g., English) with non-Latin text (e.g., Japanese), and in some cases by tables. In many cases these false positives can be eliminated—or minimized—by reducing the [Line Tolerance Option](#). For example, try reducing the line tolerance from the default of 10 to 9 or 8, or try the special algorithm with these line tolerances (see the [Text Comparison Algorithm Option](#)).

# Appendix: Color Names

To use custom colors, see the [Color Options](#). Note that the colors highlight, delete, insert, and replace will appear lighter than the colors shown here due to the [Highlight Transparency Option](#). Note that very light colors may be difficult to see.

 Snow	 GhostWhite	 WhiteSmoke	 Gainsboro
 FloralWhite	 OldLace	 Linen	 AntiqueWhite
 PapayaWhip	 BlanchedAlmond	 Bisque	 PeachPuff
 NavajoWhite	 Moccasin	 Cornsilk	 Ivory
 LemonChiffon	 Seashell	 Honeydew	 MintCream
 Azure	 AliceBlue	 Lavender	 LavenderBlush
 MistyRose	 White	 Black	 Silver
 DarkSlateGray	 DarkSlateGrey	 DimGray	 DimGrey
 SlateGray	 SlateGrey	 LightSlateGray	 LightSlateGrey
 Gray	 Grey	 WebGray	 WebGrey
 LightGray	 LightGrey	 DarkGray	 DarkGrey
 DarkBlue	 MidnightBlue	 Navy	 CornflowerBlue
 DarkSlateBlue	 SlateBlue	 MediumSlateBlue	 LightSlateBlue
 MediumBlue	 RoyalBlue	 Blue	 DodgerBlue
 DeepSkyBlue	 SkyBlue	 LightSkyBlue	 SteelBlue
 LightSteelBlue	 LightBlue	 PowderBlue	 Teal
 PaleTurquoise	 DarkTurquoise	 MediumTurquoise	 Turquoise
 DarkCyan	 Cyan	 LightCyan	 CadetBlue
 MediumAquaMarine	 AquaMarine	 Olive	 DarkGreen
 DarkOliveGreen	 DarkSeaGreen	 SeaGreen	 MediumSeaGreen
 LightSeaGreen	 LightGreen	 PaleGreen	 SpringGreen
 LawnGreen	 Green	 WebGreen	 Chartreuse
 MediumSpringGreen	 GreenYellow	 LimeGreen	 YellowGreen
 ForestGreen	 OliveDrab	 DarkKhaki	 Khaki
 PaleGoldenrod	 LightGoldenrodYellow	 LightYellow	 Yellow
 Gold	 LightGoldenrod	 Goldenrod	 DarkGoldenrod
 RosyBrown	 IndianRed	 SaddleBrown	 Sienna
 Peru	 Burlywood	 Beige	 Wheat
 SandyBrown	 Tan	 Chocolate	 Firebrick
 Brown	 DarkSalmon	 Salmon	 LightSalmon

 Orange	 DarkOrange	 Coral	 LightCoral
 Tomato	 OrangeRed	 Crimson	 DarkRed
 Red	 HotPink	 DeepPink	 Pink
 LightPink	 PaleVioletRed	 Maroon	 WebMaroon
 MediumVioletRed	 VioletRed	 DarkMagenta	 Magenta
 Violet	 Plum	 Indigo	 Orchid
 MediumOrchid	 DarkOrchid	 DarkViolet	 BlueViolet
 RebeccaPurple	 Purple	 WebPurple	 MediumPurple
 Thistle	 Snow2	 Snow3	 Snow4
 Seashell2	 Seashell3	 Seashell4	 AntiqueWhite1
 AntiqueWhite2	 AntiqueWhite3	 AntiqueWhite4	 Bisque2
 Bisque3	 Bisque4	 PeachPuff2	 PeachPuff3
 PeachPuff4	 NavajoWhite2	 NavajoWhite3	 NavajoWhite4
 LemonChiffon2	 LemonChiffon3	 LemonChiffon4	 Cornsilk2
 Cornsilk3	 Cornsilk4	 Ivory2	 Ivory3
 Ivory4	 Honeydew2	 Honeydew3	 Honeydew4
 LavenderBlush2	 LavenderBlush3	 LavenderBlush4	 MistyRose2
 MistyRose3	 MistyRose4	 Azure2	 Azure3
 Azure4	 SlateBlue1	 SlateBlue2	 SlateBlue3
 SlateBlue4	 RoyalBlue1	 RoyalBlue2	 RoyalBlue3
 RoyalBlue4	 Blue2	 DodgerBlue2	 DodgerBlue3
 DodgerBlue4	 SteelBlue1	 SteelBlue2	 SteelBlue3
 SteelBlue4	 DeepSkyBlue2	 DeepSkyBlue3	 DeepSkyBlue4
 SkyBlue1	 SkyBlue2	 SkyBlue3	 SkyBlue4
 LightSkyBlue1	 LightSkyBlue2	 LightSkyBlue3	 LightSkyBlue4
 SlateGray1	 SlateGray2	 SlateGray3	 SlateGray4
 LightSteelBlue1	 LightSteelBlue2	 LightSteelBlue3	 LightSteelBlue4
 LightBlue1	 LightBlue2	 LightBlue3	 LightBlue4
 LightCyan2	 LightCyan3	 LightCyan4	 PaleTurquoise1
 PaleTurquoise2	 PaleTurquoise3	 PaleTurquoise4	 CadetBlue1
 CadetBlue2	 CadetBlue3	 CadetBlue4	 Turquoise1
 Turquoise2	 Turquoise3	 Turquoise4	 Cyan2
 Cyan3	 DarkSlateGray1	 DarkSlateGray2	 DarkSlateGray3
 DarkSlateGray4	 Aquamarine2	 Aquamarine4	 DarkSeaGreen1
 DarkSeaGreen2	 DarkSeaGreen3	 DarkSeaGreen4	 SeaGreen1

 SeaGreen2	 SeaGreen3	 PaleGreen1	 PaleGreen3
 PaleGreen4	 SpringGreen2	 SpringGreen3	 SpringGreen4
 Green2	 Green3	 Green4	 Chartreuse2
 Chartreuse3	 Chartreuse4	 OliveDrab1	 OliveDrab2
 OliveDrab4	 DarkOliveGreen1	 DarkOliveGreen2	 DarkOliveGreen3
 DarkOliveGreen4	 Khaki1	 Khaki2	 Khaki3
 Khaki4	 LightGoldenrod1	 LightGoldenrod2	 LightGoldenrod3
 LightGoldenrod4	 LightYellow2	 LightYellow3	 LightYellow4
 Yellow2	 Yellow3	 Yellow4	 Gold2
 Gold3	 Gold4	 Goldenrod1	 Goldenrod2
 Goldenrod3	 Goldenrod4	 DarkGoldenrod1	 DarkGoldenrod2
 DarkGoldenrod3	 DarkGoldenrod4	 RosyBrown1	 RosyBrown2
 RosyBrown3	 RosyBrown4	 IndianRed1	 IndianRed2
 IndianRed3	 IndianRed4	 Sienna1	 Sienna2
 Sienna3	 Sienna4	 Burlywood1	 Burlywood2
 Burlywood3	 Burlywood4	 Wheat1	 Wheat2
 Wheat3	 Wheat4	 Tan1	 Tan2
 Tan4	 Chocolate1	 Chocolate2	 Chocolate3
 Firebrick1	 Firebrick2	 Firebrick3	 Firebrick4
 Brown1	 Brown2	 Brown3	 Brown4
 Salmon1	 Salmon2	 Salmon3	 Salmon4
 LightSalmon2	 LightSalmon3	 LightSalmon4	 Orange2
 Orange3	 Orange4	 DarkOrange1	 DarkOrange2
 DarkOrange3	 DarkOrange4	 Coral1	 Coral2
 Coral3	 Coral4	 Tomato2	 Tomato3
 Tomato4	 OrangeRed2	 OrangeRed3	 OrangeRed4
 Red2	 Red3	 DeepPink2	 DeepPink3
 DeepPink4	 HotPink1	 HotPink2	 HotPink3
 HotPink4	 Pink1	 Pink2	 Pink3
 Pink4	 LightPink1	 LightPink2	 LightPink3
 LightPink4	 PaleVioletRed1	 PaleVioletRed2	 PaleVioletRed3
 PaleVioletRed4	 Maroon1	 Maroon2	 Maroon3
 Maroon4	 VioletRed1	 VioletRed2	 VioletRed3
 VioletRed4	 Magenta2	 Magenta3	 Orchid1
 Orchid2	 Orchid3	 Orchid4	 Plum1

