Coherent PDF Command Line Tools

User Manual

Version 2.9.3 (October 2026)

Coherent Graphics Ltd

For bug reports, feature requests and comments, email
contact@coherentgraphics.co.uk

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Quickstart Examples

These examples demonstrate just a few of the facilities provided by the Coherent PDF Command Line Tools. See each chapter for more commands and full details.

Chapter 1: Basic Usage

```
cpdf in.pdf 1-3,6 -o out.pdf
```

Read `in.pdf`, select pages 1, 2, 3 and 6, and write those pages to `out.pdf`.

```
cpdf in.pdf even -o out.pdf
```

Select the even pages (2, 4, 6...) from `in.pdf` and write those pages to `out.pdf`.

```
cpdf -merge in.pdf in2.pdf AND -add-text "Copyright 2024"
     -o out.pdf
```

Using `AND` to perform several operations in order, here merging two files together and adding a copyright stamp to every page.

```
cpdf -args args.txt
```

Read `args.txt` and use its contents as the command line arguments for Cpdf.

Chapter 2: Merging and Splitting

```
cpdf -merge in.pdf in2.pdf -o out.pdf
```

Merge `in.pdf` and `in2.pdf` into one document, writing to `out.pdf`.

```
cpdf -split in.pdf -o Chunk%%%.pdf -chunk 10
```

Split `in.pdf` into ten-page chunks, writing them to `Chunk001.pdf`, `Chunk002.pdf` etc.

```
cpdf -split-bookmarks 0 in.pdf -utf8 -o @B.pdf
```

Split `in.pdf` on bookmark boundaries, writing each to a file whose name is the bookmark label.

```
cpdf -split-max 1Mb in.pdf -o %%%.pdf
```

Split `in.pdf` into files of 1Mb or less

```
cpdf -spray in.pdf -o a.pdf -o b.pdf -o c.pdf
```

Split `in.pdf`, writing pages 1,4,7... to `a.pdf`, 2,5,8... to `b.pdf` and 3,6,9... to `c.pdf`.

Chapter 3: Pages

```
cpdf -scale-page "2 2" in.pdf -o out.pdf
```

Scale both the dimensions and contents of `in.pdf` by a factor of two in x and y directions.

```
cpdf -scale-to-fit usletterportrait in.pdf -o out.pdf
```

Scale the pages in `in.pdf` to fit the US Letter page size, writing to `out.pdf`

```
cpdf -shift "26pt 18mm" in.pdf -o out.pdf
```

Shift the contents of the page by 26 pts in the x direction, and 18 millimetres in the y direction, writing to `out.pdf`

```
cpdf -rotate-contents 90 in.pdf -o out.pdf
```

Rotate the contents of the pages in `in.pdf` by ninety degrees and write to `out.pdf`.

```
cpdf -cropbox "0 0 600pt 400pt" in.pdf -o out.pdf
```

Crop the pages in `in.pdf` to a 600 pts by 400 pts rectangle.

Chapter 4: Encryption and Decryption

```
cpdf -encrypt AES256ISO fred joe in.pdf -o out.pdf
```

Encrypt `in.pdf` using AES 256 PDF encryption using the owner password `fred` and the user password `joe` and writing the encrypted file to `out.pdf`

```
cpdf -decrypt in.pdf owner=fred -o out.pdf
```

Decrypt `in.pdf` using the owner password, writing to `out.pdf`.

Chapter 5: Compression

```
cpdf -compress in.pdf -o out.pdf
```

Compress the data streams in `in.pdf`, writing the result to `out.pdf`.

```
cpdf -decompress in.pdf -o out.pdf
```

Decompress the data streams in `in.pdf`, writing to `out.pdf`.

```
cpdf -squeeze in.pdf -o out.pdf
```

Squeeze `in.pdf`, writing to `out.pdf`. Squeezing rearranges the structure of the PDF file to save space.

Chapter 6: Bookmarks

```
cpdf -list-bookmarks -utf8 in.pdf
```

List the bookmarks in `in.pdf`.

```
cpdf -add-bookmarks bookmarks.txt in.pdf -o out.pdf
```

Add bookmarks in the same form from a prepared file `bookmarks.txt` to `in.pdf`, writing to `out.pdf`. JSON alternatives are also available.

```
cpdf -table-of-contents in.pdf -o out.pdf
```

Typeset a table of contents from existing bookmarks and prepend to the document.

Chapter 7: Presentations

```
cpdf -presentation in.pdf 2-end -trans Split -duration 10
     -o out.pdf
```

Use the Split style to build a presentation from the PDF `in.pdf`, each slide staying 10 seconds on screen unless manually advanced. The first page, being a title does not move on automatically, and has no transition effect.

Chapter 8: Text and Stamps

```
cpdf -stamp-on watermark.pdf in.pdf -o out.pdf
```

Stamp the file `watermark.pdf` on to each page of `in.pdf`, writing the result to `out.pdf`.

```
cpdf -topleft 10 -font Courier
     -add-text "Page \%Page\nDate \%d-\%m-\%Y" in.pdf -o out.pdf
```

Add a page number and date to all the pages in `in.pdf` using the Courier font, writing to `out.pdf`.

Chapter 9: Multipage Facilities

```
cpdf -impose-xy "2 1" in.pdf -o out.pdf
```

Two up impose the file `in.pdf`, writing to `out.pdf`.

```
cpdf -pad-after in.pdf 1,3,4 -o out.pdf
```

Add extra blank pages after pages one, three and four of a document.

```
cpdf -chop "2 2" in.pdf -o out.pdf
```

Chop each page into four quarters, including each in the output.

Chapter 10: Annotations

```
cpdf -list-annotations-json in.pdf > out.json
```

List the annotations in a file `in.pdf` to standard output, redirecting to file `out.json`.

```
cpdf -set-annotations out.json in.pdf -o out.pdf
```

Add the annotations from a JSON annotations file to `in.pdf`, writing to `out.pdf`.

```
cpdf -remove-annotations in.pdf -o out.pdf
```

Remove the annotations from `in.pdf`, writing to `out.pdf`.

Chapter 11: Document Information and Metadata

```
cpdf -info -utf8 in.pdf
```

List document metadata for `in.pdf`.

```
cpdf -set-title "The New Title" -also-set-xmp in.pdf -o out.pdf
```

Set the document title of `in.pdf`, writing to `out.pdf`.

```
cpdf -hide-toolbar true in.pdf -o out.pdf
```

Set the document `in.pdf` to open with the PDF Viewer's toolbar hidden, writing to `out.pdf`.

```
cpdf -set-metadata metadata.xml in.pdf -o out.pdf
```

Set the metadata in a PDF `in.pdf` to the contents of the file `metadata.xml`, and write the output to `out.pdf`.

```
cpdf -set-page-layout TwoColumnRight in.pdf -o out.pdf
```

Set the document `in.pdf` to open in PDF Viewer showing two columns of pages, starting on the right, putting the result in `out.pdf`.

```
cpdf -set-page-mode FullScreen in.pdf -o out.pdf
```

Set the document `in.pdf` to open in PDF Viewer in full screen mode, putting the result in `out.pdf`.

```
cpdf -print-page-labels-json in.pdf
```

Show, in JSON format, the page labels in `in.pdf`.

```
cpdf -composition in.pdf
```

Show how much data in `in.pdf` is used for images, fonts etc.

Chapter 12: File Attachments

```
cpdf -attach-file sheet.xls in.pdf -o out.pdf
```

Attach the file `sheet.xls` to `in.pdf`, writing to `out.pdf`.

```
cpdf -remove-files in.pdf -o out.pdf
```

Remove any attachments from `in.pdf`, writing to `out.pdf`.

```
cpdf -dump-attachments in.pdf -o /home/fred/attachments
```

Dump attachments to file, given the directory to put them in.

Chapter 13: Images

```
cpdf -image-resolution 600 in.pdf
```

Identify and list any image used at less than 600dpi.

```
cpdf -extract-images in.pdf -im /usr/bin/magick -o output/%%%
```

Extract images from `in.pdf` to directory `output` (with the help of imagemagick).

```
cpdf -process-images -jpeg-to-jpeg 65 in.pdf -o out.pdf
```

Process JPEG images in `in.pdf` to 65% quality, writing the output to `out.pdf`.

```
cpdf -gs gs -rasterize in.pdf -o out.pdf
```

Rasterize PDF page content, creating new PDF.

```
cpdf -gs gs -output-image in.pdf 10-end -o image%%%.png
```

Rasterize PDF pages to PNG files.

Chapter 14: Fonts

```
cpdf -list-fonts in.pdf
```

List the fonts in use, and what pages they are used on.

```
cpdf -missing-fonts in.pdf
```

List missing fonts.

Chapter 15: PDF and JSON

```
cpdf in.pdf -output-json -utf8 -output-json-parse-content-streams
     -o out.json
```

Write the PDF in JSON format to the given file, parsing its content streams into individual JSON objects too.

```
cpdf -j in.json -o out.pdf
```

Load a PDF in JSON format, writing to an output PDF.

Chapter 16: Optional Content Groups

```
cpdf -ocg-list in.pdf
```

List the optional content groups by name.

```
cpdf -ocg-coalesce-on-name in.pdf -o out.pdf
```

Coalesce optional content groups after merging or stamping two files with OCGs with like names.

Chapter 17: Creating New PDFs

```
cpdf -create-pdf -create-pdf-pages 20
     -create-pdf-papersize usletterportrait -o out.pdf
```

Create a US Letter PDF of twenty pages.

```
cpdf -typeset file.txt -create-pdf-papersize a3portrait
     -font Courier -font-size 10 -o out.pdf
```

Typeset a text file as PDF on A3 paper with Courier 10 point font.

```
cpdf -jpeg pic.jpeg -png pic.png -o out.pdf
```

Make a two-page PDF, the first from a JPEG and the second from a PNG.

Chapter 18: Drawing on PDFs

```
cpdf -create-pdf AND -draw -to "100 100" -line "400 400"
     -line "400 100" -close -fill
     -o out.pdf
```

Create a new PDF and draw a filled triangle on it.

```
cpdf -create-pdf AND -draw -mtrans "100 200" -font-size 50
     -leading 55 -bt -text "This is" -nl -text "on multiple"
     -nl -text "lines" -et -o out.pdf
```

Create a new PDF and draw three lines of text on it.

```
cpdf -create-pdf AND -draw -bt -text "Page 1" -et -newpage
     -bt -text "Page 2" -et -o out.pdf
```

Create a new PDF and draw text on one page and then the next.

Chapter 19: Accessible PDFs with PDF/UA

```
cpdf -verify 'PDF/UA-1(matterhorn)' -json in.pdf
```

Verify `in.pdf` for conformance to PDF/UA-1 using the Matterhorn protocol, returning results in JSON format.

Chapter 20: Redaction

```
cpdf -redact-shape "100 200 200 300" in.pdf 1 -o out.pdf
```

Redact text on page one of `in.pdf`, writing to `out.pdf`.

Chapter 21: Miscellaneous

```
cpdf -blacktext in.pdf -o out.pdf
```

Blacken all the text in `in.pdf`, writing to `out.pdf`.

```
cpdf -thinlines 2pt in.pdf -o out.pdf
```

Make sure all lines in `in.pdf` are at least 2pts wide, writing to `out.pdf`.

```
cpdf -print-dict-entry /URI in.pdf
```

List all URLs in annotation hyperlinks in `in.pdf`.

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Chapter 1

Basic Usage

```
-help / --help          -summary                -version
-o                      -i                      -idir <directory>
-idir-only-pdfs         -range                  -recrypt
-decrypt-force          -stdout                 -stdin
-stdin-user <password>  -stdin-owner <password> -producer <text>
-creator <text>         -keep-version           -change-id
-l                      -cpdflin <filename>     -keep-l
-no-preserve-objstm     -create-objstm          -args <filename>
-args-json <filename>   -utf8                   -stripped
-raw                    -gs                     -gs-malformed
-gs-malformed-force     -gs-quiet               -error-on-malformed
-progress               -revision               -revisions
-update
```

The Coherent PDF tools provide a wide range of facilities for modifying PDF files created by other means. There is a single command-line program Cpdf (`cpdf.exe` under Microsoft Windows). The rest of this manual describes the options that may be given to this program.

1.1 Documentation

The operation `-help / --help` gives pointers to sources of documentation. The operation `-summary` prints each operation and option together with a short description. The operation `-version` prints the Cpdf version string.

1.2 Input and Output Files

The typical pattern for usage is

```
cpdf [<operation>] <input file(s)> -o <output file>
```

and the simplest concrete example, assuming the existence of a file `in.pdf` is:

```
cpdf in.pdf -o out.pdf
```

This copies `in.pdf` to `out.pdf`. Of course, we should like to do more interesting things to the PDF file than that!

Files on the command line are distinguished from other input by their containing a period. If an input file does not contain a period, it should be preceded by `-i`. For example:

```
cpdf -i in -o out.pdf
```

A whole directory of files may be added (where a command supports multiple files) by using the `-idir` option:

```
cpdf -merge -idir myfiles -o out.pdf
```

The files in the directory `myfiles` are considered in alphabetical order. They must all be PDF files. If the names of the files are numeric, leading zeroes will be required for the order to be correct (e.g `001.pdf`, `002.pdf` etc).

To restrict cpdf to files ending in `.pdf` (in upper or lower or mixed case) add the option `-idir-only-pdfs` *before* `-idir`:

```
cpdf -merge -idir-only-pdfs -idir myfiles -o out.pdf
```

1.3 Input Ranges

An *input range* may be specified after each input file. This is treated differently by each operation. For instance

```
cpdf in.pdf 2-5 -o out.pdf
```

extracts pages two, three, four and five from `in.pdf`, writing the result to `out.pdf`, assuming that `in.pdf` contains at least five pages. Here are the rules for building input ranges:

- A number represents a page number
- A page label may be used in place of a number e.g `[iii]` represents the first page found which is labelled `iii`.

- A tilde (`~`) defines a page number counting from the end of the document rather than the beginning. Page `~1` is the last page, `~2` the penultimate page etc.
- A dash (`-`) defines ranges, e.g. `1-5` or `6-3`.
- A comma (`,`) allows one to specify several ranges, e.g. `1-2,4-5`.
- The word `end` represents the last page.
- The words `odd` and `even` can be used in place of or at the end of a page range to restrict to just the odd or even pages.
- The words `portrait` and `landscape` can be used in place of or at the end of a page range to restrict to just those pages which are portrait or landscape. Note that the meaning of "portrait" and "landscape" does not take account of any viewing rotation in place (use `-upright` from chapter 3 first, if required). A page with equal width and height is considered neither portrait nor landscape.
- The word `reverse` is the same as `end-1`.
- The word `all` is the same as `1-end`.
- A range must contain no spaces.
- Prepending `NOT` to a whole page range inverts it.
- Prepending `<n>DUP` to a whole page range duplicates each page of the range `<n>` times.
- The range `annotated` includes in the output just such pages as contain one or more annotations.
- The empty range is represented by `empty`.

For example:

```
cpdf in.pdf 1,2,7-end -o out.pdf
```

Remove pages three, four, five and six from a document.

```
cpdf in.pdf 1-16odd -o out.pdf
```

Extract the odd pages 1,3,...,13,15.

```
cpdf in.pdf landscape -rotate 90 -o out.pdf
```

Rotate all landscape pages by ninety degrees.

```
cpdf in.pdf 1,all -o out.pdf
```

Duplicate the front page of a document, perhaps as a fax cover sheet.

```
cpdf in.pdf ~3-~1 -o out.pdf
```

Extract the last three pages of a document, in order.

```
cpdf in.pdf 2DUP1-10 -o out.pdf
```

Produce the pages 1,1,2,2,....10,10.

Page ranges may refer to non-existent pages, except in the case where a PDF file with no pages would be produced - such a file is invalid.

If the file has a structure tree (a.k.a Tagged PDF), it will be preserved whole. To trim the structure tree to only include the output pages, and so save space, add `-process-struct-trees` to the command line.

1.4 Working with Encrypted Documents

In order to perform many operations, encrypted input PDF files must be decrypted. Some require the owner password, some either the user or owner passwords. Either password is supplied by writing `user=<password>` or `owner=<password>` following each input file requiring it (before or after any range). The document will *not* be re-encrypted upon writing. For example:

```
cpdf in.pdf user=charles -info
cpdf in.pdf owner=fred reverse -o out.pdf
```

To re-encrypt the file with its existing encryption upon writing, which is required if only the user password was supplied, but allowed in any case, add the `-recrypt` option:

```
cpdf in.pdf user=charles reverse -recrypt -o out.pdf
```

The password required (owner or user) depends upon the operation being performed. Separate facilities are provided to decrypt and encrypt files (See Section 4).

When appropriate passwords are not available, the option `-decrypt-force` may be added to the command line to process the file regardless.

For decryption with AES256, passwords may be Unicode. However the password, should it contain non-ASCII characters, must be normalized by applying the SASLPrep profile (RFC 4013) of the stringprep algorithm (RFC 3454) using the Normalize and BiDi options. It must then be converted to UTF8 and truncated to 127 bytes. Cpdf does not perform this pre-processing – it takes its passwords from the command line without processing.

1.5 Standard Input and Standard Output

Thus far, we have assumed that the input PDF will be read from a file on disk, and the output written similarly. Often it's useful to be able to read input from `stdin` (Standard Input) or write output to `stdout` (Standard Output) instead. The typical use is to join several programs together into a *pipe*, passing data from one to the next without the use of intermediate files. Use

`-stdin` to read from standard input, and `-stdout` to write to standard input, either to pipe data between multiple programs, or multiple invocations of the same program. For example, this sequence of commands (all typed on one line)

```
cpdf in.pdf reverse -stdout |
cpdf -stdin 1-5 -stdout |
cpdf -stdin reverse -o out.pdf
```

extracts the last five pages of `in.pdf` in the correct order, writing them to `out.pdf`. It does this by reversing the input, taking the first five pages and then reversing the result.

To supply passwords for a file from `-stdin`, use `-stdin-owner <password>` and/or `-stdin-user <password>`.

Using `-stdout` on the final command in the pipeline to output the PDF to screen is not recommended, since PDF files often contain compressed sections which are not screen-readable.

Several Cpdf operations write to standard output by default (for example, listing fonts). A useful feature of the command line (not specific to Cpdf) is the ability to redirect this output to a file. This is achieved with the > operator:

```
cpdf -info in.pdf > file.txt
```

Use the `-info` operation (See Section 11.1), redirecting the output to `file.txt`.

1.6 Doing Several Things at Once with AND

The keyword `AND` can be used to string together several commands in one. The advantage compared with using pipes is that the file need not be repeatedly parsed and written out, saving time.

To use `AND`, simply leave off the output specifier (e.g `-o`) of one command, and the input specifier (e.g filename) of the next. For instance:

```
cpdf -merge in.pdf in2.pdf AND -add-text "Label"
     AND -merge in3.pdf -o out.pdf
```

Merge `in.pdf` and `in2.pdf` together, add text to both pages, append `in3.pdf` and write to `out.pdf`.

To specify the range for each section, use `-range`:

```
cpdf -merge in.pdf in2.pdf AND -range 2-4 -add-text "Label"
     AND -merge in3.pdf -o out.pdf
```

1.7 Units

When measurements are given to Cpdf, they are in points (1 point = 1/72 inch). They may optionally be followed by some letters to change the measurement. The following are supported:

`pt`	Points (72 points per inch). The default.
`cm`	Centimeters
`mm`	Millimeters
`in`	Inches

For example, one may write `14mm` or `21.6in`. In addition, the following letters stand for various page dimensions:

`PW`	Page width
`PH`	Page height
`PMINX`	Page minimum x coordinate
`PMINY`	Page minimum y coordinate
`PMAXX`	Page maximum x coordinate
`PMAXY`	Page maximum y coordinate
`CW`	Crop box width
`CH`	Crop box height
`CMINX`	Crop box minimum x coordinate
`CMINY`	Crop box minimum y coordinate
`CMAXX`	Crop box maximum x coordinate
`CMAXY`	Crop box maximum y coordinate
`AW`	Art box width
`AH`	Art box height
`AMINX`	Art box minimum x coordinate
`AMINY`	Art box minimum y coordinate
`AMAXX`	Art box maximum x coordinate
`AMAXY`	Art box maximum y coordinate
`TW`	Trim box width
`TH`	Trim box height
`TMINX`	Trim box minimum x coordinate
`TMINY`	Trim box minimum y coordinate
`TMAXX`	Trim box maximum x coordinate
`TMAXY`	Trim box maximum y coordinate
`BW`	Bleed box width
`BH`	Bleed box height
`BMINX`	Bleed box minimum x coordinate
`BMINY`	Bleed box minimum y coordinate
`BMAXX`	Bleed box maximum x coordinate
`BMAXY`	Bleed box maximum y coordinate

For example, we may write `PMINX PMINY` to stand for the coordinate of the lower left corner of the page.

Simple arithmetic may be performed using the words `add`, `sub`, `mul` and `div` to stand for addition, subtraction, multiplication and division. For example, one may write `14in sub 30pt` or `PMINX mul 2`

1.8 Setting the Producer and Creator

The `-producer` and `-creator` options may be added to any Cpdf command line to set the producer and/or creator of the PDF file. If the file was converted from another format, the *creator* is the program producing the original, the *producer* the program converting it to PDF.

```
cpdf -merge in.pdf in2.pdf -producer MyMerger -o out.pdf
```

Merge `in.pdf` and `in2.pdf`, setting the producer to `MyMerger` and writing the output to `out.pdf`.

1.9 PDF Version Numbers

When an operation which uses a part of the PDF standard which was introduced in a later version than that of the input file, the PDF version in the output file is set to the later version (most PDF viewers will try to load any PDF file, even if it is marked with a later version number). However, this automatic version changing may be suppressed with the `-keep-version` option. If you wish to manually alter the PDF version of a file, use the `-set-version` operation described in Section 21.5.

1.10 File IDs

PDF files contain an ID (consisting of two parts), used by some workflow systems to uniquely identify a file. To change the ID, behavior, use the `-change-id` operation. This will create a new ID for the output file.

```
cpdf -change-id in.pdf -o out.pdf
```

Write `in.pdf` to `out.pdf`, changing the ID.

Setting the environment variable `CAMLPDF_REPRODUCIBLE_IDS` to `true` will use a standard value instead of generating one.

1.11 Linearization

Linearized PDF is a version of the PDF format in which the data is held in a special manner to allow content to be fetched only when needed. This means viewing a multipage PDF over a slow connection is more responsive. By default, Cpdf does not linearize output files. To make it do so, add the `-l` option to the command line, in addition to any other command being used. For example:

```
cpdf -l in.pdf -o out.pdf
```

Linearize the file `in.pdf`, writing to `out.pdf`.

This requires the existence of an external linearize such as `qpdf`. If you are unable to install the linearizer, you must use `-cpdflin` to let Cpdf know where to find it:

```
cpdf.exe -cpdflin "C:\\qpdf.exe" -l in.pdf -o out.pdf
```

Linearize the file `in.pdf`, writing to `out.pdf`.

In extremis, you may place the linearizer and its resources in the current working directory, though this is not recommended.

To keep the existing linearization status of a file (produce linearized output if the input is linearized and the reverse), use `-keep-l` instead of `-l`.

1.12 Object Streams

PDF 1.5 introduced a new mechanism for storing objects to save space: object streams. by default, Cpdf will preserve object streams in input files, creating no more. To prevent the retention of existing object streams, use `-no-preserve-objstm`:

```
cpdf -no-preserve-objstm in.pdf -o out.pdf
```

Write the file `in.pdf` to `out.pdf`, removing any object streams.

To create new object streams if none exist, or augment the existing ones, use `-create-objstm`:

```
cpdf -create-objstm in.pdf -o out.pdf
```

Write the file `in.pdf` to `out.pdf`, preserving any existing object streams, and creating any new ones for new objects which have been added.

To create wholly new object streams, use both options together:

```
cpdf -create-objstm -no-preserve-objstm in.pdf -o out.pdf
```

Write the file `in.pdf` to `out.pdf` with wholly new object streams.

Files written with object streams will be set to PDF 1.5 or higher, unless `-keep-version` is used (see above).

1.13 Malformed Files

There are many malformed PDF files in existence, including many produced by otherwise-reputable applications. Cpdf attempts to correct these problems silently.

Grossly malformed files will be reconstructed. The reconstruction progress is shown on `stderr` (Standard Error):

```
$cpdf in.pdf -o out.pdf
couldn't lex object number
Attempting to reconstruct the malformed pdf in.pdf...
Read 5530 objects
Malformed PDF reconstruction succeeded!
```

In the unlikely event that Cpdf cannot reconstruct a malformed file, it is able to use the `gs` program to try to reconstruct the PDF file, if you have it installed. For example, if `gs` is installed and in your path, we might try:

```
cpdf -gs gs -gs-malformed in.pdf -o out.pdf
```

To suppress the output of `gs` use the `-gs-quiet` option. If the malformity lies inside an individual page of the PDF, rather than in its gross structure, Cpdf may appear to succeed in reconstruction, only to fail when processing a page (e.g when adding text). To force the use of `gs` to pre-process such files so cpdf cannot fail on them, use `-gs-malformed-force`:

```
cpdf in.pdf -gs gs -gs-malformed-force -o out.pdf [-gs-quiet]
```

The command line for `-gs-malformed-force` must be of *precisely* this form. Sometimes, on the other hand, we might wish Cpdf to fail immediately on any malformed file, rather than try its own reconstruction process. The option `-error-on-malformed` achieves this.

Note: Use of these commands with `-gs` is a last resort; they may strip some metadata from PDF files.

Sometimes old, pre-ISO standardisation files can be technically well-formed but use inefficient PDF constructs. If you are sure the input files you are using are modern ISO-compliant PDFs, the `-fast` option may be added to the command line (or, if using `AND`, to each section of the command line). This will use certain shortcuts which speed up processing, but would fail on a minority of pre-ISO files. The `-fast` option may be used with:

Chapter 3
```
-rotate-contents -upright -vflip -hflip
-shift -scale-page -scale-to-fit -scale-contents -center-to-fit -stretch
-show-boxes -hard-box -trim-marks
```

Chapter 8
```
-add-text -add-rectangle
-stamp-on -stamp-under -combine-pages
```

Chapter 9
```
-impose -impose-xy -twoup -twoup-stack
```

If problems occur, refrain from using `-fast`.

1.14 Error Handling

When Cpdf encounters an error, it exits with code 2. An error message is displayed on `stderr` (Standard Error). In normal usage, this means it is displayed on the screen. When a bad or inappropriate password is given, the exit code is 1.

1.15 Control Files

```
cpdf -args <filename>
cpdf -args-json <filename>
```

Some operating systems have a limit on the length of a command line. To circumvent this, or simply for reasons of flexibility, a control file may be specified from which arguments are drawn.

Using `-args` or will perform direct textual substitution of the file into the command line, prior to any other processing.

Using `-args-json` will read arguments from a JSON file consisting of a single array of strings. For example:

```
["-merge",
 "hello.pdf",
 "cpdfmanual.pdf",
 //Cpdf's JSON parser allows C-style comments
 "-o",
 /* The output file name: */
 "out.pdf"]
```

1.16 String Arguments

Command lines are handled differently on each operating system. Some characters are reserved with special meanings, even when they occur inside quoted string arguments. To avoid this problem, Cpdf performs processing on string arguments as they are read.

A backslash is used to indicate that a character which would otherwise be treated specially by the command line interpreter is to be treated literally. For example, Unix-like systems attribute a special meaning to the exclamation mark, so the command line

```
cpdf -add-text "Hello!" in.pdf -o out.pdf
```

would fail. We must escape the exclamation mark with a backslash:

```
cpdf -add-text "Hello\!" in.pdf -o out.pdf
```

It follows that backslashes intended to be taken literally must themselves be escaped (i.e. written `\\`).

1.17 Text Encodings

Some Cpdf commands write text to standard output, or read text from the command line or configuration files. These are:

```
-info
-list-bookmarks
-set-author et al.
-list-annotations
-dump-attachments
```

There are three options to control how the text is interpreted:

```
-utf8
-stripped
-raw
```

Add `-utf8` to use Unicode UTF8, `-stripped` to convert to 7 bit ASCII by dropping any high characters, or `-raw` to perform no processing. The default unless specified in the documentation for an individual operation is `-stripped`.

In modern usage, `-utf8` is almost always the sensible option. But for historical reasons it would be the default.

1.18 Line Endings

For historical reasons, Cpdf uses the Unix line ending character (LF) when writing text files on Microsoft Windows. For example, bookmark files.

1.19 Showing Progress

Adding `-progress` to any Cpdf command will show progress on Standard Error:

```
$ cpdf -add-text Private in.pdf -o out.pdf -progress
*** Operation AddText
<<< Reading cpdfmanual.pdf
1.2.3.4.5.6.7.8.9.10.11.12.13.14.15.16.17.18.19.20.21
>>> Writing out.pdf
```

For page-by-page operations the page number is printed when the operation begins, the period when it ends. The `-progress` option, when combined with `AND`, shows progress for all operations after it is specified.

1.20 Incremental update

A PDF can contain multiple revisions. These are created when, for example, an annotation is added in Adobe Reader, or when some other programs edit files. They are also an important part of the PDF mechanisms for digital signatures. We can find out how many revisions are in a PDF:

```
$ cpdf -revisions in.pdf
3
```

We can retrieve any revision we like. The most recent is revision 1, the next back revision 2, and so on:

```
cpdf in.pdf -revision 2 -o out.pdf
```

Note that this extracts exactly revision 2, not a PDF with revisions 2..n. Note also that `-revision` must come after the filename.

We can incrementally update a PDF by adding `-update` to a Cpdf command:

```
cpdf in.pdf -rotate 90 -update -o in.pdf
```

Note the filename is specified twice.

Chapter 2

Merging and Splitting

```
cpdf -merge in1.pdf [<range>] in2.pdf [<range>] [<more names/ranges>]
     [-collate] [-collate-n <n>] [-retain-numbering]
     [-merge-add-bookmarks [-merge-add-bookmarks-use-titles]]
     [-remove-duplicate-fonts] [-process-struct-trees]
     [-subformat <subformat>]
     -o out.pdf

cpdf -portfolio in.pdf -pf <filename> [-pfd <string>]
     [-pfr <relationship>] [-pf ...] -o out.pdf

cpdf -split in.pdf [-chunk <chunksize>] [-process-struct-trees]
     [-utf8] -o <format>

cpdf -split-bookmarks <level> in.pdf [-utf8] [-process-struct-trees]
     -o <format>

cpdf -split-max <file size> in.pdf [-utf8] [-process-struct-trees]
     -o <format>

cpdf -spray in.pdf [-utf8] [-process-struct-trees]
     -o a.pdf [-o b.pdf [-o ...]]
```

2.1 Merging

The `-merge` operation allows the merging of several files into one. Ranges can be used to select only a subset of pages from each input file in the output. The output file consists of the concatenation of all the input pages in the order specified on the command line. Actually, the `-merge` can be omitted, since this is the default operation of Cpdf.

```
cpdf -merge a.pdf 1 b.pdf 2-end -o out.pdf
```

Take page one of `a.pdf` and all but the first page of `b.pdf`, merge them and produce `out.pdf`.

```
cpdf -merge -idir files -o out.pdf
```

Merge all files from directory `files`, producing `out.pdf`.

Merge maintains and merges bookmarks, named destinations, annotations, tagged PDF information, and so on. PDF features which cannot be merged are retained if they are from the document which first exhibits that feature.

The `-collate` option collates pages: that is to say, it takes the first page from the first document and its range, then the first page from the second document and its range and so on. When all first pages have been taken, it begins on the second from each range, and so on. To collate in chunks use, for example, `-collate -n 2`.

The `-retain-numbering` option keeps the PDF page numbering labels of each document intact, rather than renumbering the output pages from 1.

The `-remove-duplicate-fonts` option ensures that fonts used in more than one of the inputs only appear once in the output.

The `-merge-add-bookmarks` option adds a top-level bookmark for each file, using the filename. Any existing bookmarks are retained. The `-merge-add-bookmarks-use-titles`, when used in conjunction with `-merge-add-bookmarks`, will use the title from each PDF's metadata instead of the filename.

The `-process-struct-trees` option will merge structure trees (the data which forms the logical structure of the PDF). In its absence, the structure tree from the first PDF only is preserved. When merging two or more PDF/UA files, we can add `-subformat PDF/UA-2` to tell Cpdf to add a top-level Document structure tree element, to conform to the PDF/UA-2 standard.

2.2 PDF Portfolios

A PDF portfolio is a special kind of PDF with contains other documents (PDF and otherwise) within it. Support is mostly limited to Adobe products at time of writing. To create a portfolio from a PDF file and and a JPEG:

```
cpdf -create-pdf AND -portfolio -pf one.pdf -pf two.jpeg -o out.pdf
```

Build a PDF portfolio with two files: `one.pdf` and `two.jpeg`, writing to `out.pdf`.

When opened in a supporting PDF viewer, such as Adobe Reader, a navigation pane is shown, allowing each file to be viewed. There are two columns of interest: the Description and the Relationship. By default, Cpdf uses the file name for the description, and "Unspecified" for the Relationship. We can specify the description by adding `-pfd "The description"` after the relevant `-pf`, and the relationship by adding `-pfr RelationshipName`.

2.3 Splitting

The `-split` operation splits a PDF file into a number of parts which are written to file, their names being generated from a *format*. The optional `-chunk` option allows the number of pages written to each output file to be set.

```
cpdf -split a.pdf -o out%%%.pdf
```

Split `a.pdf` to the files `out001.pdf`, `out002.pdf` etc.

```
cpdf a.pdf even AND -split -chunk 10 -o dir/out%%%.pdf
```

Split the even pages of `a.pdf` to the files `out001.pdf`, `out002.pdf` etc. with at most ten pages in each file. The directory (folder) `dir` must exist.

If the output format does not provide enough numbers for the files generated, the result is unspecified. The following format operators may be used:

`%, %%, %%% etc.`	Sequence number padded to the number of percent signs
`@F`	Original filename without extension
`@N`	Sequence number without padding zeroes
`@S`	Start page of this chunk
`@E`	End page of this chunk
`@B`	Bookmark name at this page, if any.
`@b<w>@`	Bookmark name at this page, if any, truncated to `<w>` characters.

Numbers padded to a fixed width field by zeroes may be obtained for `@S` and `@E` by following them with more `@` signs e.g `@E@@@` for a fixed width of three.

2.4 Splitting on Bookmarks

The `-split-bookmarks <level>` operation splits a PDF file into a number of parts, according to the page ranges implied by the document's bookmarks. These parts are then written to file with names generated from the given format.

Level 0 denotes the top-level bookmarks, level 1 the next level (sub-bookmarks) and so on. So `-split-bookmarks 1` creates breaks on level 0 and level 1 boundaries.

```
cpdf -split-bookmarks 0 a.pdf -o out%%%.pdf
```

Split `a.pdf` to the files `out001.pdf`, `out002.pdf` on bookmark boundaries.

There may be many bookmarks on a single page (for instance, if paragraphs are bookmarked or there are two subsections on one page). The splits calculated by `-split-bookmarks` ensure that each page appears in only one of the output files. It is possible to use the `@` operators above, including operator `@B` which expands to the text of the bookmark:

```
cpdf -split-bookmarks 0 a.pdf -o @B.pdf
```

Split `a.pdf` on bookmark boundaries, using the bookmark text as the filename.

The bookmark text used for a name has the following characters are removed, in addition to any character with ASCII code less than 32 or equal to 126. In addition, names beginning with `.` are not produced.

```
/ ? < > \ : * | " ^ + =
```

The bookmark may be truncated by using the `@b` variant:

```
cpdf -split-bookmarks 0 a.pdf -o @b10@.pdf
```

Split `a.pdf` on bookmark boundaries, using the first 10 characters of bookmark text as the filename.

2.5 Splitting to Maximum Size

The `-split-max` operation splits a file into chunks of no more than the given size, starting at the beginning. The suffixes kB, KiB, MB, MiB, GB, and GiB may be used to give the size. For example:

```
cpdf -split-max 100kB in.pdf -o out%%%.pdf
```

Split `in.pdf` into parts of no more than 100kB, if possible.

Should the operation not be possible for the given size, an error message is printed and no output (not even partial output) is produced.

2.6 Spraying

Spraying is a sort of de-collation. It takes one input file, and writes pages in turn to one or more outputs:

```
cpdf -spray in.pdf -o a.pdf -o b.pdf
```

Place odd pages of the input file in one file, and the even in another.

This is the only time more than one `-o` is allowed.

2.7 Encrypting with Split operations

The encryption parameters described in Chapter 4 may be added to the command line to encrypt each split PDF. Similarly, the `-recrypt` switch described in Chapter 1 may by given to re-encrypt each file with the existing encryption of the source PDF.

2.8 Splitting and structure trees

The `-process-struct-trees` option used in conjunction with any splitting command will trim the structure tree (the data which forms the logical structure of the PDF) for each output file. In its absence, the structure tree is preserved wholesale in each output file. Its use can be important when, for example, producing PDF/UA files.

Chapter 3

Pages

```
cpdf -scale-page "<scale x> <scale y>" [-fast] [<position>]
     in.pdf [<range>] -o out.pdf
cpdf -scale-to-fit "<x size> <y size>" [-fast] [-prerotate] [<position>]
     [-scale-to-fit-scale <scale>]
     [-scale-to-fit-rotate-clockwise] [-scale-to-fit-rotate-anticlockwise]
     in.pdf [<range>] -o out.pdf
cpdf -stretch "<x size> <y size>" [-fast] in.pdf [<range>] -o out.pdf
cpdf -center-to-fit "<x size> <y size>" [-fast] in.pdf [<range>] -o out.pdf
cpdf -scale-contents [<scale>] [<position>] [-fast]
     in.pdf [<range>] -o out.pdf
cpdf -shift "<shift x> <shift y>" [-fast] in.pdf [<range>] -o out.pdf
cpdf -shift-boxes "<shift x> <shift y>" in.pdf [<range>] -o out.pdf
cpdf -rotate <angle> in.pdf [<range>] -o out.pdf
cpdf -rotateby <angle> in.pdf [<range>] -o out.pdf
cpdf -upright [-fast] in.pdf [<range>] -o out.pdf
cpdf -rotate-contents <angle> [-fast] in.pdf [<range>] -o out.pdf
cpdf -hflip [-fast] in.pdf [<range>] -o out.pdf
cpdf -vflip [-fast] in.pdf [<range>] -o out.pdf
cpdf -[media|crop|art|trim|bleed]box <boxspec> in.pdf [<range>] -o out.pdf
cpdf -remove-[crop|art|trim|bleed]box in.pdf [<range>] -o out.pdf
cpdf -frombox <boxname> -tobox <boxname> [-mediabox-if-missing]
     in.pdf [<range>] -o out.pdf
cpdf -hard-box <boxname> [-fast] in.pdf [<range>]
     [-mediabox-if-missing] -o out.pdf
cpdf -show-boxes [-fast] in.pdf [<range>] -o out.pdf
```

```
cpdf -trim-marks [-fast] in.pdf [<range>] -o out.pdf
```

3.1 Page Sizes

Any time when a page size is required, instead of writing, for instance `"210mm 197mm"` one can instead write `a4portrait`. Here is a list of supported page sizes:

```
a0portrait        a1portrait        a2portrait
a3portrait        a4portrait        a5portrait
a6portrait        a7portrait        a8portrait
a9portrait        a10portrait

a0landscape       a1landscape       a2landscape
a3landscape       a4landscape       a5landscape
a6landscape       a7landscape       a8landscape
a9landscape       a10landscape

usletterportrait  usletterlandscape
uslegalportrait   uslegallandscape
```

Note that this also works when four numbers are required: for example, when setting the mediabox `"0 0 a3landscape"` will suffice.

3.2 Scale Pages

The `-scale-page` operation scales each page in the range by the X and Y factors given. This scales both the page contents, and the page size itself. It also scales any Crop Box and other boxes (Art Box, Trim Box etc). As with several of these commands, remember to take into account any page rotation when considering what the X and Y axes relate to.

```
cpdf -scale-page "2 2" in.pdf -o out.pdf
```

Convert an A4 page to A2, for instance.

The `-scale-to-fit` operation scales each page in the range to fit a given page size, preserving aspect ratio and centring the result. If a crop box is present, it is preferred to the media box.

```
cpdf -scale-to-fit "297mm 210mm" in.pdf -o out.pdf
cpdf -scale-to-fit a4portrait in.pdf -o out.pdf
```

Scale a file's pages to fit A4 portrait.

To avoid centring, supply `-top 0`, `-bottom 0`, `-left 0` or `-right 0` as appropriate. The scale can optionally be set to a proportion of the available area, instead of filling it:

```
cpdf -scale-to-fit a4portrait -scale-to-fit-scale 0.9 in.pdf -o out.pdf
```

Scale a file's pages to fit A4 portrait, scaling the page 90% of its possible size.

To automatically calculate one or other dimension, use an asterisk:

```
cpdf -scale-to-fit "297mm *" in.pdf -o out.pdf
```

Scale a file's pages to fit 297mm width, maintaining proportion.

To automatically rotate pages to maximise use of area on the output size, add the option `-scale-to-fit-rotate-[anti]clockwise`.

The `-stretch` operation scales the contents to the given size without regard to aspect ratio:

```
cpdf -stretch a4landscape in.pdf -o out.pdf
```

Scale a file's pages and their content to fit A4 landscape.

The `-center-to-fit` operation changes the page size without scaling the contents. It centers the old page on the new page.

```
cpdf -center-to-fit a3portrait in.pdf -o out.pdf
```

Set a file's pages to the given size and center the content.

Sizes with asterisks like `"* 500pt"` may also be used here.

The `-scale-contents` operation scales the contents about the center of the crop box (or, if absent, the media box), leaving the page dimensions (boxes) unchanged.

```
cpdf -scale-contents 0.5 in.pdf -o out.pdf
```

Scale a file's contents on all pages to 50% of its original dimensions.

To scale about a point other than the center, one can use the positioning commands described in Section 8.2.4. For example:

```
cpdf -scale-contents 0.5 -topright 20 in.pdf -o out.pdf
```

Scale a file's contents on all pages to 50% of its original dimensions about a point 20pts from its top right corner.

3.3 Shift Page Contents

The `-shift` operation shifts the contents of each page in the range by X points horizontally and Y points vertically.

```
cpdf -shift "50 0" in.pdf even -o out.pdf
```

Shift pages to the right by 50 points (for instance, to increase the binding margin).

The `-shift-boxes` operation has the same effect, but operates by moving the page boxes only, avoiding processing the page contents. It is therefore faster. Of course, the numbers must be inverted, since it is the boxes being moved not the page:

```
cpdf -shift-boxes "-50 0" in.pdf even -o out.pdf
```

Shift pages to the right by 50 points (for instance, to increase the binding margin).

3.4 Rotating Pages

There are two ways of rotating pages: (1) setting a value in the PDF file which asks the viewer (e.g. Acrobat) to rotate the page on-the-fly when viewing it (use `-rotate` or `-rotateby`) and (2) actually rotating the page contents and/or the page dimensions (use `-upright` (described elsewhere in this chapter) afterwards or `-rotate-contents` to just rotate the page contents).

The possible values for `-rotate` and `-rotate-by` are 0, 90, 180 and 270, all interpreted as being clockwise. Any value may be used for `-rotate-contents`.

The `-rotate` operation sets the viewing rotation of the selected pages to the absolute value given.

```
cpdf -rotate 90 in.pdf -o out.pdf
```

Set the rotation of all the pages in the input file to ninety degrees clockwise.

The `-rotateby` operation changes the viewing rotation of all the given pages by the relative value given.

```
cpdf -rotateby 90 in.pdf -o out.pdf
```

Rotate all the pages in the input file by ninety degrees clockwise.

The `-rotate-contents` operation rotates the contents of the page by the given relative value.

```
cpdf -rotate-contents 90 in.pdf -o out.pdf
```

Rotate all the page contents in the input file by ninety degrees clockwise. Does not change the page dimensions.

The `-upright` operation does whatever combination of `-rotate` and `-rotate-contents` is required to change the rotation of the document to zero without altering its appearance. In addition, it makes sure the media box has its origin at (0,0), changing other boxes to compensate. This is important because some operations in CPDF (such as scale-to-fit), and in other PDF-processing programs, work properly only when the origin is (0, 0).

```
cpdf -upright in.pdf -o out.pdf
```

Make pages upright.

3.5 Flipping Pages

The `-hflip` and `-vflip` operations flip the contents of the chosen pages horizontally or vertically. No account is taken of the current page rotation when considering what "horizontally" and "vertically" mean, so you may like to use `-upright` (see above) first.

```
cpdf -hflip in.pdf even -o out.pdf
```

Flip the even pages in `in.pdf` horizontally.

```
cpdf -vflip in.pdf -o out.pdf
```

Flip all the pages in `in.pdf` vertically.

3.6 Boxes and Cropping

All PDF files contain a *media box* for each page, giving the dimensions of the paper. To change these dimensions (without altering the page contents in any way), use the `-mediabox` operation.

```
cpdf -mediabox "0pt 0pt 500pt 500pt" in.pdf -o out.pdf
```

Set the media box to 500 points square.

The four numbers are minimum x, minimum y, width, height. x coordinates increase to the right, y coordinates increase upwards. To use absolute numbers rather than width and height we may add an initial question mark and write, for example, `?100pt 200pt 300pt 400pt` which represents the rectangle with lower-left corner (100pt, 200pt) and upper-right corner (300pt, 400pt).

PDF files can also optionally contain a *crop box* for each page, defining to what extent the page is cropped before being displayed or printed. A crop box can be set, changed and removed, without affecting the underlying media box. To set or change the crop box use `-cropbox`. To remove any existing crop box, use `-remove-cropbox`.

```
cpdf -cropbox "0pt 0pt 200mm 200mm" in.pdf -o out.pdf
```

Crop pages to the bottom left 200-millimeter square of the page.

```
cpdf -remove-cropbox in.pdf -o out.pdf
```

Remove cropping.

Note that the crop box is only obeyed in some viewers. Similar operations are available for the bleed, art, and trim boxes (`-art`, `-remove-bleed` etc.)

```
cpdf -frombox <boxname> -tobox <boxname> [-mediabox-if-missing]
     in.pdf [<range>] -o out.pdf
```

Copy the contents of one box to another.

This operation copies the contents of one box (Media box, Crop box, Trim box etc.) to another. If `-mediabox-if-missing` is added, the media box will be substituted when the 'from' box is not set for a given page. For example

```
cpdf -frombox /TrimBox -tobox /CropBox in.pdf -o out.pdf
```

copies the Trim Box of each page to the Crop Box of each page. The possible boxes are `/MediaBox`, `/CropBox`, `/BleedBox`, `/TrimBox`, `/ArtBox`.

A hard box (one which clips its contents by inserting a clipping rectangle) may be created with the `-hard-box` operation:

```
cpdf -hard-box /TrimBox in.pdf -o out.pdf
```

This means the resultant file may be used as a stamp without contents outside the given box reappearing. The `-mediabox-if-missing` option may also be used here.

3.7 Showing Boxes and Printer's Marks

The `-show-boxes` operation displays the boxes present on each page as method of debugging. Since boxes may be coincident, they are shown in differing colours and dash patterns so they may be identified even where they overlap. The colours are:

Media box	Red
Crop box	Green
Art box	Blue
Trim box	Orange
Bleed box	Pink

The `-trim-marks` operation adds trim marks to a PDF file. The trim box must be present.

Chapter 4

Encryption and Decryption

```
cpdf -encrypt <method> [-pw=]<owner> [-pw=]<user>
     [-no-encrypt-metadata] <permissions> in.pdf -o out.pdf
cpdf -decrypt [-decrypt-force] in.pdf owner=<owner password> -o out.pdf
```

4.1 Introduction

PDF files can be encrypted using various types of encryption and attaching various permissions describing what someone can do with a particular document (for instance, printing it or extracting content). There are two types of person:

The **User** can do to the document what is allowed in the permissions.

The **Owner** can do anything, including altering the permissions or removing encryption entirely.

There are five kinds of encryption:

- 40-bit encryption (method `40bit`) in Acrobat 3 (PDF 1.1) and above – *this is insecure – do not use for new documents*
- 128-bit encryption (method `128bit`) in Acrobat 5 (PDF 1.4) and above – *this is insecure – do not use for new documents*
- 128-bit AES encryption (method `AES`) in Acrobat 7 (PDF 1.6) and above
- 256-bit AES encryption (method `AES256`) in Acrobat 9 (PDF 1.7) – *this is deprecated – do not use for new documents*
- 256-bit AES encryption (method `AES256ISO`) in Acrobat 9 (PDF 1.7) and later. Also suitable for PDF 2.0.

All encryption supports these kinds of permissions:

`-no-edit`	Cannot change the document
`-no-print`	Cannot print the document
`-no-copy`	Cannot select or copy text or graphics
`-no-annot`	Cannot add or change form fields or annotations

In addition, 128-bit encryption (Acrobat 5 and above) and AES encryption supports these:

`-no-forms`	Cannot edit form fields
`-no-extract`	Cannot extract text or graphics
`-no-assemble`	Cannot merge files etc.
`-no-hq-print`	Cannot print high-quality

Add these options to the command line to prevent each operation.

Note: Adobe Acrobat and Adobe Reader may show slightly different permissions in info dialogues – this is a result of policy changes and not a bug in Cpdf. *You may need to experiment.*

4.2 Encrypting a Document

To encrypt a document, the owner and user passwords must be given (here, `fred` and `charles` respectively):

```
cpdf -encrypt AES fred charles -no-print in.pdf -o out.pdf
cpdf -encrypt AES fred charles -no-extract in.pdf -o out.pdf
cpdf -encrypt AES256ISO fred "" -no-edit -no-copy in.pdf -o out.pdf
```

A blank user password is common. In this event, PDF viewers will typically not prompt for a password for when opening the file or for operations allowable with the user password.

```
cpdf -encrypt AES256ISO fred "" -no-forms in.pdf -o out.pdf
```

In addition, the usual method can be used to give the existing owner password, if the document is already encrypted.

The optional `-pw=` preface may be given where a password might begin with a - and thus be confused with a command line option.

When using AES encryption, the option is available to refrain from encrypting the metadata. Add `-no-encrypt-metadata` to the command line.

4.3 Decrypting a Document

To decrypt a document, the owner password is provided.

```
cpdf -decrypt in.pdf owner=fred -o out.pdf
```

The user password cannot decrypt a file.

When appropriate passwords are not available, the option `-decrypt-force` may be added to the command line to process the file regardless.

Chapter 5

Compression

```
cpdf -decompress [-just-content] [-jbig2dec <path>] in.pdf -o out.pdf

cpdf -compress in.pdf -o out.pdf

cpdf -squeeze in.pdf [-squeeze-log-to <filename>]
     [-squeeze-no-recompress] [-squeeze-no-pagedata] -o out.pdf

cpdf -remove-article-threads in.pdf -o out.pdf
cpdf -remove-page-piece in.pdf -o out.pdf
cpdf -remove-web-capture in.pdf -o out.pdf
cpdf -remove-procsets in.pdf -o out.pdf
cpdf -remove-output-intents in.pdf -o out.pdf
```

Cpdf provides facilities for decompressing and compressing PDF streams, and for losslessly reprocessing the whole file to 'squeeze' it. For lossy recompression of images within a PDF, see Chapter 13.

5.1 Decompressing a Document

To decompress the streams in a PDF file, for instance to manually inspect the PDF, use:

```
cpdf -decompress in.pdf -o out.pdf
```

If Cpdf finds a compression type it can't cope with, the stream is left compressed. To decompress only page content streams, add `-just-content`.

When using `-decompress`, object streams are not removed. It may be easier for manual inspection to also remove object streams, by adding the `-no-preserve-objstm` option to the command.

To decompress JBIG2-compressed streams Cpdf needs the help of the external `jbig2dec` program. Use `-jbig2dec` to specify it, or leave it unspecified to leave these streams compressed.

5.2 Compressing a Document

To compress the streams in a PDF file, use:

```
cpdf -compress in.pdf -o out.pdf
```

Cpdf compresses any streams which have no compression using the **FlateDecode** method, with the exception of Metadata streams, which are left uncompressed.

5.3 Squeezing a Document

To *squeeze* a PDF file, reducing its size by an average of about twenty percent (though sometimes not at all), use:

```
cpdf -squeeze in.pdf -o out.pdf
```

Adding `-squeeze` to the command line when using another operation will *squeeze* the file or files upon output.

The `-squeeze` operation writes some information about the squeezing process to standard output. The squeezing process involves several processes which losslessly attempt to reduce the file size. It is slow, so should not be used without thought.

```
$ ./cpdf -squeeze in.pdf -o out.pdf
Initial file size is 238169 bytes
Beginning squeeze: 123847 objects
Squeezing... Down to 114860 objects
Squeezing... Down to 114842 objects
Squeezing page data
Recompressing document
Final file size is 187200 bytes,  78.60% of original.
```

The `-squeeze-log-to <filename>` option writes the log to the given file instead of to standard output. Log content is appended to the end of the log file, preserving existing contents.

The option `-squeeze-no-pagedata` avoids the reprocessing of page data, which avoids problems in case of malformed files, and makes the process much faster at the cost of a little less compression. The option `-squeeze-no-recompress` is deprecated as of version 2.6 and has no effect.

5.4 Other Lossless Compression

Chapter 13 describes `-process-images`, which supports the lossless re-compression of images within a PDF, depending on the options given.

5.5 Lossy Compression

We have discussed only methods of compression which do not remove content or metadata. Cpdf also provides some functions for stripping out unwanted metadata:

`-remove-article-threads` Removes article threads, which contain information on the logical order of a document's parts.

`-remove-page-piece` Removes page-piece information, which is a kind of private PDF information found in PDFs saved from image editors or converted from other formats.

`-remove-web-capture` Removes web capture data, a now-deprecated way of saving additional metadata in PDFs originating as web content.

`-remove-procsets` Removes ProcSets, a now-irrelevant data structure often in early PDFs

`-remove-output-intents` Removes Output Intents, a colour-matching system for documents intended to be printed.

For each operation, the command looks like this:

```
cpdf -remove-* in.pdf -o out.pdf
```

Throughout this manual a number of other functions are described which could be characterised as lossy compression, depending upon the circumstance. We list and briefly describe each here for convenience:

`-remove-annotations` Chapter 10. Removes annotations from a PDF.

`-remove-metadata` Chapter 11. Remove main XMP metadata.

`-remove-all-metadata` Chapter 11. Remove all XMP metadata.

`-remove-files` Chapter 12. Removes attached files from a PDF.

`-process-images` Chapter 13. Lossy (and lossless) reprocessing of images within PDFs.

`-remove-fonts` Chapter 14. Remove embedded fonts from a PDF.

`-remove-all-text` Chapter 21. Remove text from a PDF.

`-draft` Chapter 21. Remove images from a PDF.

To find out what is in a PDF, use `-composition[-json]` from Chapter 11.

Chapter 6

Bookmarks

```
cpdf -list-bookmarks [-utf8] in.pdf

cpdf -list-bookmarks-json [-preserve-actions] in.pdf

cpdf -remove-bookmarks in.pdf -o out.pdf

cpdf -add-bookmarks <bookmark file> in.pdf -o out.pdf

cpdf -add-bookmarks-json <bookmark file> in.pdf -o out.pdf

cpdf -bookmarks-open-to-level <n> in.pdf -o out.pdf

cpdf -table-of-contents [-toc-title] [-toc-no-bookmark] [-toc-dot-leaders]
     [-font <font>] [-font-size <size>] [-embed-std14 /path/to/fonts]
     [-process-struct-trees] [-subformat <subformat>]
     in.pdf -o out.pdf
```

PDF bookmarks (properly called the *document outline*) represent a tree of references to parts of the file, typically displayed at the side of the screen. The user can click on one to move to the specified place. Cpdf provides facilities to list, add, and remove bookmarks. The format used by the list and add operations is the same, so you can feed the output of one into the other, for instance to copy bookmarks.

6.1 List Bookmarks

The `-list-bookmarks` operation prints (to standard output) the bookmarks in a file. The first column gives the level of the tree at which a particular bookmark is. Then the text of the bookmark in quotes. Then the page number which the bookmark points to. Then (optionally) the word ”open” if the bookmark should have its children (at the level immediately below) visible when the file is loaded. Then the destination (see below). For example, upon executing

```
cpdf -list-bookmarks doc.pdf
```

the result might be:

```
0 "Part 1" 1 open
1 "Part 1A" 2 "[2 /XYZ 200 400 null]"
1 "Part 1B" 3
0 "Part 2" 4
1 "Part 2a" 5
```

If the page number is 0, it indicates that clicking on that entry doesn't move to a page.

By default, Cpdf converts unicode to ASCII text, dropping characters outside the ASCII range. To prevent this, and return unicode UTF8 output, add the `-utf8` option to the command. To prevent any processing, use the `-raw` option. See Section 1.17 for more information. A newline in a bookmark is represented as `"\n"`.

By using `-list-bookmarks-json` instead, the bookmarks are formatted as a JSON array, in order, of dictionaries formatted thus:

```
{ "level": 0,
  "text": "1 Basic Usage",
  "page": 17,
  "open": false,
  "target":
    [ { "I": 17 },
      { "N": "/XYZ" },
      { "F": 85.039 },
      { "F": 609.307 },
      null ]
  "colour": [ 0.0, 0.0, 0.0 ],
  "italic": false,
  "bold": false
}
```

Note that the colour (RGB each from 0.0 to 1.0) and shape of the text (bold, italic, or both) can be read and set with the JSON format.

The `-preserve-actions` option will give the target in its original PDF form, rather than resolving it to a destination (see below).

See Chapter 15 for more details of Cpdf's JSON formatting. There are two differences here: bookmark text is always UTF8, and the numbers for `level` and `page` are plain, rather than begin surrounded with `{ "I": }`.

6.1.1 Destinations

The destination is an extended description of where the bookmark should point to (i.e it can be more detailed than just giving the page). For example, it may point to a section heading halfway down a page. Here are the possibilities:

Format	Description
[*p* /XYZ *left top zoom*]	Display page number *p* with (*left*, *top*) positioned at upper-left of window and magnification of *zoom*. Writing "null" for any of *left*, *top* or *zoom* specifies no change. A *zoom* of 0 is the same as "null".
[*p* /Fit]	Display page number *p* so as to fit fully within the window.
[*p* /FitH *top*]	Display page number *p* with vertical coordinate *top* at the top of the window and the page magnified so its width fits the window. A null value for *top* implies no change.
[*p* /FitV *left*]	Display page number *p* with horizontal coordinate *left* at the left of the window, and the page magnified so its height fits the window. A null value for *left* implies no change.
[*p* /FitR *left bottom right top*]	Display page number *p* magnified so as to fit entirely within the rectangle specified by the other parameters.
[*p* /FitB]	As for /Fit but with the page's bounding box (see below).
[*p* /FitBH *top*]	As for /FitH but with the page's bounding box (see below).
[*p* /FitBV *left*]	As for /FitV but with the page's bounding box (see below).

The *bounding box* is the intersection of the page's crop box and the bounding box of the page contents. Some other kinds of destination may be produced by `-list-bookmarks`. They will be preserved by `-add-bookmarks` and may be edited as your risk.

6.2 Remove Bookmarks

The `-remove-bookmarks` operations removes all bookmarks from the file.

```
cpdf -remove-bookmarks in.pdf -o out.pdf
```

6.3 Add Bookmarks

The `-add-bookmarks` file adds bookmarks as specified by a *bookmarks file*, a text file in ASCII or UTF8 encoding and in the same format as that produced by the `-list-bookmarks` operation. If there are any bookmarks in the input PDF already, they are discarded. For example, if the file `bookmarks.txt` contains the output from `-list-bookmarks` above, then the command

```
cpdf -add-bookmarks bookmarks.txt in.pdf -o out.pdf
```

adds the bookmarks to the input file, writing to `out.pdf`. An error will be given if the bookmarks file is not in the correct form (in particular, the numbers in the first column which specify the level must form a proper tree with no entry being more than one greater than the last).

Bookmarks in JSON format (see above) may be added with `-add-bookmarks-json`:

```
cpdf -add-bookmarks-json bookmarks.json in.pdf -o out.pdf
```

Remember that strings in JSON bookmark files are in UTF8.

Note that, if `-preserve-actions` is used with `-list-bookmarks-json`, it will not be feasible to use `-add-bookmarks-json` to add these bookmarks to a different or modified file. They may be round-tripped to the same, unmodified file, of course.

6.4 Opening bookmarks

As an alternative to extracting a bookmark file and manipulating the open-status of bookmarks, mass manipulation may be achieved by the following operation:

```
cpdf -bookmarks-open-to-level <level> in.pdf -o out.pdf
```

A level of 0 will close all bookmarks, level 1 will open just the top level, closing all others etc. To open all of them, pick a sufficiently large level.

6.5 Making a Table of Contents

Cpdf can automatically generate a table of contents from existing bookmarks, adding it to the beginning of the document.

```
cpdf -table-of-contents in.pdf -o out.pdf
```

The page(s) added will have the same dimensions, media and crop boxes as the first page of the original file. The default title is “Table of Contents”, though this may be changed:

```
cpdf -table-of-contents -toc-title "Contents" in.pdf -o out.pdf
```

An empty title removes the title. The sequence `\n` may be used to split the title into lines. The default font is 12pt Times Roman (and 24pt for the title). The base font and size may be changed with `-font` and `-font-size` (see Section 8.2.5 for full details):

```
cpdf -table-of-contents -font "Courier-Bold" -font-size 8
     in.pdf -o out.pdf
```

Dot leaders may be added with `-toc-dot-leaders`:

```
cpdf -table-of-contents -toc-dot-leaders in.pdf -o out.pdf
```

By default, an entry for the new table of contents will be added to the document's bookmarks. To suppress this behaviour, add `-toc-no-bookmark`:

```
cpdf -table-of-contents -toc-no-bookmark in.pdf -o out.pdf
```

To create a structure tree for the table of contents, and merge it with the existing one (for example, when adding a table of contents to a PDF/UA file), add `-process-struct-trees` to the command. For PDF/UA-2, add also `-subformat "PDF/UA-2"`. You may also need `-embed-std14` as described in chapter 8, since fully-embedded fonts are a requirement of some PDF subformats.

Chapter 7

Presentations

```
cpdf -presentation in.pdf [<range>] -o out.pdf
                    [-trans <transition-name>] [-duration <float>]
                    [-vertical] [-outward] [-direction <int>]
                    [-effect-duration <float>]
```

The PDF file format, starting at Version 1.1, provides for simple slide-show presentations in the manner of Microsoft Powerpoint. These can be played in Acrobat and possibly other PDF viewers, typically started by entering full-screen mode. The `-presentation` operation allows such a presentation to be built from any PDF file.

The `-trans` option chooses the transition style. When a page range is used, it is the transition *from* each page named which is altered. The following transition styles are available:

Split Two lines sweep across the screen, revealing the new page. By default the lines are horizontal. Vertical lines are selected by using the `-vertical` option.

Blinds Multiple lines sweep across the screen, revealing the new page. By default the lines are horizontal. Vertical lines are selected by using the `-vertical` option.

Box A rectangular box sweeps inward from the edges of the page. Use `-outward` to make it sweep from the center to the edges.

Wipe A single line sweeps across the screen from one edge to the other in a direction specified by the `-direction` option.

Dissolve The old page dissolves gradually to reveal the new one.

Glitter The same as **Dissolve** but the effect sweeps across the page in the direction specified by the `-direction` option.

To remove a transition style currently applied to the selected pages, omit the `-trans` option.

The `-effect-duration` option specifies the length of time in seconds for the transition itself. The default value is one second.

The `-duration` option specifies the maximum time in seconds that the page is displayed before the presentation automatically advances. The default, in the absence of the `-duration` option, is for no automatic advancement.

The `-direction` option (for **Wipe** and **Glitter** styles only) specifies the direction of the effect. The following values are valid:

0 Left to right

90 Bottom to top (**Wipe** only)

180 Right to left (**Wipe** only)

270 Top to bottom

315 Top-left to bottom-right (**Glitter** only)

For example:

```
cpdf -presentation in.pdf 2-end -trans Split -duration 10 -o out.pdf
```

The **Split** style, with vertical lines, and each slide staying ten seconds unless manually advanced. The first page (being a title) does not move on automatically, and has no transition effect.

To use different options on different page ranges, run Cpdf multiple times on the file using a different page range each time.

Chapter 8

Text and Stamps

```
cpdf -stamp-on source.pdf
     [-scale-stamp-to-fit] [<positioning command>]
     [-relative-to-[crop|trim|art|bleed]box]
     [-process-struct-trees] in.pdf [<range>] [-fast] -o out.pdf

cpdf -stamp-under source.pdf
     [-scale-stamp-to-fit] [<positioning command>]
     [-relative-to-[crop|trim|art|bleed]box]
     [-process-struct-trees] in.pdf [<range>] [-fast] -o out.pdf

cpdf -combine-pages over.pdf under.pdf
     [-fast] [-prerotate] [-no-warn-rotate] [-process-struct-trees]
     [-underneath] [-stamp-scale-to-fit] -o out.pdf

cpdf ([-add-text <text-format> | -add-rectangle <size>])
      [-font <fontname>]           [-font-size <size-in-points>]
      [-load-ttf <name>=<file>]    [-embed-std14]
      [-color <color>]             [-line-spacing <number>]
      [-outline]                   [-linewidth <number>]
      [-underneath]                [-relative-to-[crop|trim|art|bleed]box]
      [-prerotate]                 [-no-warn-rotate]
      [-bates <number>]            [-bates-at-range <number>]
      [-bates-pad-to <number>]     [-opacity <number>]
      [-midline]                   [-topline]
      [-fast]                      [-process-struct-trees]
      [-url-border]                [-text-90 | -text-180 | -text-270]
      in.pdf [<range>] -o out.pdf
```

See also positioning commands below.

```
cpdf -remove-text in.pdf [<range>] -o out.pdf

cpdf -prepend-content <content> in.pdf [<range>] -o out.pdf

cpdf -postpend-content <content> in.pdf [<range>] -o out.pdf
```

```
cpdf -stamp-as-xobject stamp.pdf in.pdf [<range>] -o out.pdf
```

NB: See discussion of `-fast` in Section 1.13.

8.1 Add a Watermark or Logo

The `-stamp-on` and `-stamp-under` operations stamp the first page of a source PDF onto or under each page in the given range of the input file. For example,

```
cpdf -stamp-on logo.pdf in.pdf odd -o out.pdf
```

stamps the file `logo.pdf` onto the odd pages of `in.pdf`, writing to `out.pdf`. A watermark should go underneath each page:

```
cpdf -stamp-under topsecret.pdf in.pdf -o out.pdf
```

The position commands in Section 8.2.4 can be used to locate the stamp more precisely (they are calculated relative to the crop box of the stamp). Or, preprocess the stamp with `-shift` first.

The `-scale-stamp-to-fit` option can be added to scale the stamp to fit the page before applying it. The use of positioning commands together with `-scale-stamp-to-fit` is not recommended.

The `-relative-to-[crop|trim|art|bleed]box` option takes the positioning command to be relative to the given box of each page rather than the media box.

To maintain Tagged PDF, for example with PDF/UA, add `-process-struct-trees`. The main file will keep its structure; the stamp will be marked as an artifact.

The `-combine-pages` operation takes two PDF files and stamps each page of one over each page of the other. The length of the output is the same as the length of the "under" file. For instance:

```
cpdf -combine-pages over.pdf under.pdf -o out.pdf
```

Page attributes (such as the display rotation) are taken from the "under" file. For best results, remove any rotation differences in the two files using `-upright` first, or by adding `-prerotate` to the command.

To maintain Tagged PDF, for example with PDF/UA, add `-process-struct-trees`. The "under" file will keep its structure; the "over" file will be marked as an artifact.

To reverse the order of combination (to have "over" under "under") add `-underneath`. To scale the "over" file to fit, add `-scale-stamp-to-fit`.

8.2 Stamp Text, Dates and Times.

The `-add-text` operation allows text, dates and times to be stamped over one or more pages of the input at a given position and using a given font, font size and color.

```
cpdf -add-text "Copyright 2014 ACME Corp." in.pdf -o out.pdf
```

The default is black 12pt Times New Roman text in the top left of each page. The text can be placed underneath rather than over the page by adding the `-underneath` option.

Text previously added by Cpdf may be removed by the `-remove-text` operation.

```
cpdf -remove-text in.pdf -o out.pdf
```

NB: Cpdf can only use characters available in the font specified. If necessary, supply your own font with `-load-ttf` (see below). Times Roman as used in the preceding example refers to the Standard PDF font Times Roman, not the Times Roman which is likely to be supplied with your computer system – which may have more characters available.

8.2.1 Page Numbers and other Special Codes

There are various special codes to include the page number in the text:

`%Page`	Page number in arabic notation (1, 2, 3...)
`%PageDiv2`	Page number in arabic notation divided by two
`%roman`	Page number in lower-case roman notation (i, ii, iii...)
`%Roman`	Page number in upper-case roman notation (I, II, III...)
`%EndPage`	Last page of document in arabic notation
`%Label`	The page label of the page
`%EndLabel`	The page label of the last page
`%filename`	The full file name of the input document
`%URL[text|URL]`	Add `text`, which links to `URL`. Add `-url-border` to show link area.
`%Bookmark<n>`	Bookmark text at level n (0, 1, 2, 3, 4)

For example, the format `"Page %Page of %EndPage"` might become "Page 5 of 17".

NB: In some circumstances (e.g in batch files) on Microsoft Windows, `%` is a special character, and must be escaped (written as `%%`). Consult your local documentation for details.

Bookmark text refers to the first bookmark of the given level on the stamped page or, if none, the last bookmark text of that level before that page, so long as uninterrupted by a bookmark of lower level. In other words, these specials are suitable for adding running heads to a document.

8.2.2 Date and Time Formats

`%a` Abbreviated weekday name (Sun, Mon etc.)
`%A` Full weekday name (Sunday, Monday etc.)
`%b` Abbreviated month name (Jan, Feb etc.)
`%B` Full month name (January, February etc.)
`%d` Day of the month (01–31)
`%e` Day of the month (1–31)
`%H` Hour in 24-hour clock (00–23)
`%I` Hour in 12-hour clock (01–12)
`%j` Day of the year (001–366)
`%m` Month of the year (01–12)
`%M` Minute of the hour (00–59)
`%p` ”a.m” or ”p.m”
`%S` Second of the minute (00–61)
`%T` Same as `%H:%M:%S`
`%u` Weekday (1–7, 1 = Sunday)
`%w` Weekday (0–6, 0 = Sunday)
`%Y` Year (0000–9999)
`%%` The % character.

8.2.3 Bates Numbers

Unique page identifiers can be specified by putting `%Bates` in the format. The starting point can be set with the `-bates` option. For example:

```
cpdf -add-text "Page ID: %Bates" -bates 23745 in.pdf -o out.pdf
```

To specify that bates numbering begins at the first page of the range, use `-bates-at-range` instead. This option must be specified after the range is specified. To pad the bates number up to a given number of leading zeros, use `-bates-pad-to` in addition to either `-bates` or `-bates-at-range`.

8.2.4 Position

The position of the text may be specified in absolute terms:

`-pos-center "200 200"`

Position the center of the baseline text at (200pt, 200pt)

`-pos-left "200 200"`

Position the left of the baseline of the text at (200pt, 200pt)

`-pos-right "200 200"`

Position the right of the baseline of the text at (200pt, 200pt)

Position may be set relative to certain common points:

`-top 10`	Center of baseline 10 pts down from the top center
`-topleft 10`	Left of baseline 10 pts down and in from top left
`-topleft "10 20"`	Left of baseline 10 pts down and 20 pts in from top left
`-topright 10`	Right of baseline 10 pts down and left from top right
`-topright "10 20"`	Right of baseline 10 pts down and 20 pts left from top right
`-left 10`	Left of baseline 10 pts in from center left
`-bottomleft 10`	Left of baseline 10 pts in and up from bottom left
`-bottomleft "10 20"`	Left of baseline 10 pts in and 20 pts up from bottom left
`-bottom 10`	Center of baseline 10 pts up from bottom center
`-bottomright 10`	Right of baseline 10 pts up and in from bottom right
`-bottomright "10 20"`	Right of baseline 10 pts up and 20 pts in from bottom right
`-right 10`	Right of baseline 10 pts in from the center right
`-diagonal`	Diagonal, bottom left to top right, centered on page
`-reverse-diagonal`	Diagonal, top left to bottom right, centered on page
`-center`	Centered on page

No attempt is made to take account of the page rotation when interpreting the position, so `-prerotate` may be added to the command line if the file contains pages with a non-zero viewing rotation (to silence the rotation warning, add `-no-warn-rotate` instead) This is equivalent to pre-processing the document with `-upright` (see chapter 3).

NB: The use of `-midline` with `-diagonal` and `-reverse-diagonal` is typical for proper placement.

The `-relative-to-[crop|trim|art|bleed]box` modifier can be added to the command line to make these measurements relative to the given box instead of the media box. The `-midline` option may be added to specify that the positioning commands above are to be considered relative to the midline of the text, rather than its baseline. Similarly, the `-topline` option may be used to specify that the position is taken relative to the top of the text.

The options `-text-90`, `-text-180` and `-text-270` may be added to rotate the text.

8.2.5 Font and Size

The standard PDF fonts may be set with the `-font` option. They are:

Times-Roman
Times-Bold
Times-Italic
Times-BoldItalic
Helvetica
Helvetica-Bold
Helvetica-Oblique
Helvetica-BoldOblique
Courier
Courier-Bold
Courier-Oblique
Courier-BoldOblique

For example, page numbers in Times Italic can be achieved by:

```
cpdf -add-text "-%Page-" -font "Times-Italic" in.pdf -o out.pdf
```

The font size can be altered with the `-font-size` option, which specifies the size in points:

```
cpdf -add-text "-%Page-" -font-size 36 in.pdf -o out.pdf
```

Adding `-embed-std14 <directory>`, given a directory holding the URW Base35 free fonts, will embed subsetted font files in the PDF for any of the Standard fonts used. These free fonts may be downloaded from `https://github.com/ArtifexSoftware/urw-base35-fonts`. This is important, for example, for PDF/A or PDF/UA documents, which must have their fonts embedded.

The standard fonts cover only the Latin characters, and are limiting. Other TrueType fonts may be introduced with the `-load-ttf` option, giving a name for, and the file name of the font. For example:

```
cpdf -load-ttf A=NotoSans-Black.ttf -font A -add-text "-%Page-" -o out.pdf
```

Here we have used the Noto Sans font from Google. This and other Google fonts contain characters for a huge number of scripts, and are available free from `https://fonts.google.com/noto/`. But you may use any TrueType font.

See Section 14.3 for how to use an existing font from the source document.

8.2.6 Colors

The `-color` option takes an RGB (3 values), CMYK (4 values), or Grey (1 value) color. Components range between 0 and 1. All the standard web colours `https://www.w3.org/wiki/CSS/Properties/color/keywords` are provided as RGB components, and may be selected by name.

```
cpdf -add-text "Hullo" -color darkgrey in.pdf -o out.pdf
cpdf -add-text "Hullo" -color "0.5 0.5 0.5" in.pdf -o out.pdf
cpdf -add-text "Hullo" -color "0.75" in.pdf -o out.pdf
cpdf -add-text "Hullo" -color "0.5 0.5 0.4 0.9" in.pdf -o out.pdf
```

Partly-transparent text may be specified using the `-opacity` option. Wholly opaque is 1 and wholly transparent is 0. For example:

```
cpdf -add-text "DRAFT" -color "red" -opacity 0.3 -o out.pdf
```

8.2.7 Outline Text

The `-outline` option sets outline text. The line width (default 1pt) may be set with the `-linewidth` option. For example, to stamp documents as drafts:

```
cpdf -add-text "DRAFT" -diagonal -outline in.pdf -o out.pdf
```

8.2.8 Multi-line Text

The code `\n` can be included in the text string to move to the next line. In this case, the vertical position refers to the baseline of the first line of text (if the position is at the top, top left or top right of the page) or the baseline of the last line of text (if the position is at the bottom, bottom left or bottom right).

```
cpdf -add-text "Specification\n%Page of %EndPage"
     -topright 10 in.pdf -o out.pdf
```

The `-midline` option may be used to make these vertical positions relative to the midline of a line of text rather than the baseline, as usual.

The `-line-spacing` option can be used to increase or decrease the line spacing, where a spacing of 1 is the standard.

```
cpdf -add-text "Specification\n%Page of %EndPage"
     -topright 10 -line-spacing 1.5 in.pdf -o out.pdf
```

Justification of multiple lines is handled by the `-justify-left`, `-justify-right` and `-justify-center` options. The defaults are left justification for positions relative to the left hand side of the page, right justification for those relative to the right, and center justification for positions relative to the center of the page. For example:

```
cpdf -add-text "Long line\nShort" -justify-right in.pdf -o out.pdf
```

NB: The `-justify-` option must be after the position (e.g `-top-left`) option since positions will reset default justification. Diagonal text is always center-justified.

8.2.9 Special Characters

If your command line allows for the inclusion of unicode characters, the input text will be considered as UTF8 by Cpdf. Special characters which exist in the PDF WinAnsiEncoding Latin 1 code (such as many accented characters) will be reproduced in the PDF. This does not mean, however, that every special character can be reproduced – it must exist in the font. When using a custom font, Cpdf will attempt to convert from UTF8 to the encoding of that font automatically.

8.2.10 Preserving structure information

To maintain Tagged PDF, for example with PDF/UA, add `-process-struct-trees`. The main file will keep its structure; the stamped text will be marked as an artifact.

8.3 Stamping Rectangles

A rectangle may be placed on one or more pages by using the `-add-rectangle <size>` command. Most of the options discussed above for text placement apply in the same way. For example:

```
cpdf -add-rectangle "200 300" -pos-right 30 -color red -outline
                    in.pdf -o out.pdf
```

This can be used to blank out or highlight part of the document. The following positioning options work as you would expect: `-topleft`, `-top`, `-topright`, `-right`, `-bottomright`, `-bottom`, `-bottomleft`, `-left`, `-center`. When using the option `-pos-left "x y"`, the point (x, y) refers to the bottom-left of the rectangle. When using the option `-pos-right "x y"`, the point (x, y) refers to the bottom-right of the rectangle. When using the option `-pos-center "x y"`, the point (x, y) refers to the center of the rectangle. The options `-diagonal` and `-reverse-diagonal` have no meaning.

8.4 Low-level facilities

These two operations add content directly to the beginning or end of the page data for a page. You must understand the PDF page description language to use these.

```
cpdf -prepend-content <content> in.pdf [<range>] -o out.pdf

cpdf -postpend-content <content> in.pdf [<range>] -o out.pdf
```

The `-fast` option may be added (see Chapter 1). The `-stamp-as-xobject` operation puts a file in another as a Form XObject on the given pages. You can then use `-prepend-content` or `-postpend-content` to use it.

```
cpdf -stamp-as-xobject stamp.pdf in.pdf [<range>] -o out.pdf
```

Chapter 9

Multipage Facilities

```
cpdf -pad-before in.pdf [<range>] [-pad-with pad.pdf] -o out.pdf

cpdf -pad-after in.pdf [<range>] [-pad-with pad.pdf] -o out.pdf

cpdf -pad-every [<integer>] in.pdf [-pad-with pad.pdf] -o out.pdf

cpdf -pad-multiple [<integer>] in.pdf -o out.pdf

cpdf -pad-multiple-before [<integer>] in.pdf -o out.pdf

cpdf [-impose <pagesize> | impose-xy "<x> <y>"]
     [-impose-columns] [-impose-rtl] [-impose-btt]
     [-impose-margin <margin>] [-impose-spacing <spacing>]
     [-impose-linewidth <width>] [-fast]
     [-process-struct-trees]
     in.pdf -o out.pdf

cpdf -twoup-stack [-fast] [-process-struct-trees] in.pdf -o out.pdf

cpdf -twoup [-fast] [-process-struct-trees] in.pdf -o out.pdf

cpdf -chop "<x> <y>" [-chop-columns] [-chop-rtl] [-chop-btt]
     in.pdf [<range>] -o out.pdf

cpdf [-chop-h <y> | -chop-v <x>] [-chop-columns]
     in.pdf [<range>] -o out.pdf
```

9.1 Inserting Blank Pages

Sometimes, for instance to get a printing arrangement right, it's useful to be able to insert blank pages into a PDF file. Cpdf can add blank pages before a given page or pages, or after. The pages in question are specified by a range in the usual way:

```
cpdf -pad-before in.pdf 1 -o out.pdf
```

Add a blank page before page 1 (i.e. at the beginning of the document.)

```
cpdf -pad-after in.pdf 2,16,38,84,121,147 -o out.pdf
```

Add a blank page after pages 2, 16, 38, 84, 121 and 147 (for instance, to add a clean page between chapters of a document.)

The dimensions of the padded page are derived from the boxes (media box, crop box etc.) of the page after or before which the padding is to be applied.

The `-pad-every n` operation places a blank page after every n pages, excluding any last one. For example on a 9 page document this command adds a blank page after pages 3 and 6:

```
cpdf -pad-every 3 in.pdf -o out.pdf
```

Add a blank page after every three pages

In all three of these operations, one may specify `-pad-with` providing a (usually one-page) PDF file to be used instead of a blank page. For example, a page saying "This page left intentionally blank".

The `-pad-multiple n` operation adds blank pages so the document has a multiple of `n` pages. For example:

```
cpdf -pad-multiple 8 in.pdf -o out.pdf
```

Add blank pages to `in.pdf` so it has a multiple of 8 pages.

The `-pad-multiple-before n` operation adds the padding pages at the beginning of the file instead.

9.2 Imposition

Imposition is the act of putting two or more pages of an input document onto each page of the output document. There are two operations provided by Cpdf:

- the `-impose` operation which, given a page size fits multiple pages into it; and
- the `-impose-xy` operation which, given an x and y value, builds an output page which fits x input pages horizontally and y input pages vertically.

```
cpdf -impose a0landscape in.pdf -o out.pdf
```

Impose as many pages as will fit on to new A0 landscape pages.

```
cpdf -impose-xy "3 4" in.pdf -o out.pdf
```

Impose 3 across and 4 down on to new pages of 3 times the width and 4 times the height of the input ones.

The x value for `-impose-xy` may be set to zero to indicate an infinitely-wide page; the y value to indicate an infinitely-long one. In both cases, the pages in the input file are assumed to be of the same dimensions.

The following options may be used to modify the output:

- `-impose-columns` Lay the pages out in columns rather than rows.
- `-impose-rtl` Lay the pages out right-to-left.
- `-impose-btt` Lay the pages out bottom-to-top.
- `-impose-margin <margin>` Add a margin around the edge of the page of the given width. When using `-impose-xy` the page size increases; with `-impose` the pages are scaled.
- `-impose-spacing <spacing>` Add spacing between each row and column. When using `-impose-xy` the page size increases; with `-impose` the pages are scaled.
- `-impose-linewidth <width>` Add a border around each input page. With `-impose` the pages are scaled after the border is added, so you must account for this yourself.

To impose with rotated pages, for example to put two A4 portrait pages two-up on an A3 landscape page, rotate them prior to imposition.

Two other ways of putting multiple pages on a single page remain from earlier versions of Cpdf which lacked a general imposition operation. The `-twoup-stack` operation puts two logical pages on each physical page, rotating them 90 degrees to do so. The new mediabox is thus larger. The `-twoup` operation does the same, but scales the new sides down so that the media box is unchanged.

```
cpdf -twoup in.pdf -o out.pdf
```

Impose a document two-up, keeping the existing page size.

```
cpdf -twoup-stack in.pdf -o out.pdf
```

Impose a document two-up on a larger page by rotation.

NB: For all imposition options, see also discussion of `-fast` in Section 1.13. The option `-process-struct-trees` will mark the file's content as an artifact for the purpose of imposition.

9.3 Chopping up pages

The `-chop` operation cuts up a page into multiple pages, according to the chosen grid, and those pages replace the originals in the PDF. It is a sort of de-imposition. For example:

```
cpdf -chop "2 3" in.pdf -o out.pdf
```

Chop each page into six.

The crop box is used if present; if not, the media box. By default, the pieces are arranged in the output file row by row, and from left to right on each row. To alter this, add one or more of `-chop-columns`, `-chop-rtl` (right to left), and `-chop-btt` (bottom to top).

As an alternative, pages can be chopped into two at a given position, horizontally with `-chop-h` or vertically with `-chop-v`:

```
cpdf -chop-h 400 in.pdf -o out.pdf
```

Chop each page into two, top and bottom, at 400pt mark.

To reverse the order of pages in the output, specify `-chop-columns` in addition.

Chapter 10

Annotations

```
cpdf -list-annotations in.pdf [<range>]

cpdf -list-annotations-json in.pdf [-annot-type <type>] [<range>]

cpdf -set-annotations <filename> [-underneath]
     in.pdf [<range>] -o out.pdf

cpdf -copy-annotations from.pdf to.pdf [<range>] -o out.pdf

cpdf -remove-annotations in.pdf [<range>] -o out.pdf

cpdf -flatten-annotations in.pdf [<range>]
     [-annot-type <subtypes> | -annot-no-type <subtypes>] -o out.pdf
```

10.1 Listing Annotations

The `-list-annotations` operation prints the textual content of any annotations on the selected pages to standard output. Each annotation is preceded by the page number and followed by a newline. The output of this operation is always UTF8.

```
cpdf -list-annotations in.pdf > annots.txt
```

Print annotations from `in.pdf`, redirecting output to `annots.txt`.

More information can be obtained by listing annotations in JSON format:

```
cpdf -list-annotations-json in.pdf > annots.json
```

Print annotations from `in.pdf` in JSON format, redirecting output to `annots.json`.

This produces an array of (page number, object number, annotation) triples giving the PDF structure of each annotation. Destination pages for page links will have page numbers in place

of internal PDF page links, but the content is otherwise unaltered. Here is an example entry for an annotation with object number 102 on page 10:

```
[
10, 102
{ "/H": { "N": "/I" },
  "/Border": [ { "I": 0 }, { "I": 0 }, { "I": 0 } ],
  "/Rect": [
    { "F": 89.88023 }, { "F": 409.98401 }, { "F": 323.90561 }, {
      "F": 423.32059 } ],
  "/Subtype": { "N": "/Link" },
  "/Type": { "N": "/Annot" },
  "/A": {
    "/S": { "N": "/URI" },
    "/URI": { "U" : "http://www.google.com/" },
  "/StructParent": { "I": 10 } }
]
```

Extra objects required for annotations, but which are not annotations themselves are also extracted. They omit the page number, being just a pair of the object number and object. The CPDFJSON format is described on page 89. There is an additional object, -1, which gives the Cpdf annotation format version, currently 1.

To list only one or more certain types of annotation, add `-annot-type`:

```
cpdf -list-annotations-json in.pdf -annot-type /Link/Highlight > annots.json
```

Print link and highlight annotations from `in.pdf` in JSON format, redirecting output to `annots.json`.

To list all but one or more certain types of annotation, add `-annot-no-type`:

```
cpdf -list-annotations-json in.pdf -annot-no-type /Link/Highlight > annots.json
```

Print all but link and highlight annotations from `in.pdf` in JSON format, redirecting output to `annots.json`.

Note that Popup annotations related to the chosen annotation type will not be included in these cases.

10.2 Setting annotations

We can also set annotations from a JSON file, either modified from the output of `-list-annotations-json` or produced manually:

```
cpdf -set-annotations annots.json in.pdf -o out.pdf
```

Add the annotations in `annots.json` on top of any already present in `in.pdf`, writing to `out.pdf`.

If replacing rather than adding annotations, use `-remove-annotations` first to clear the existing ones.

10.3 Copying Annotations

The `-copy-annotations` operation copies the annotations in the given page range from one file (the file specified immediately after the option) to another pre-existing PDF. The range is specified after this pre-existing PDF. The result is then written an output file, specified in the usual way.

```
cpdf -copy-annotations from.pdf to.pdf 1-10 -o result.pdf
```

Copy annotations from the first ten pages of `from.pdf` onto the PDF file `to.pdf`, writing the result to `results.pdf`.

It exists for historical reasons, and is no different from listing and setting the annotations using `-list-annotations-json` and `-set-annotations`.

10.4 Removing Annotations

The `-remove-annotations` operation removes all annotations from the given page range.

```
cpdf -remove-annotations in.pdf 1 -o out.pdf
```

Remove annotations from the first page of a file only.

10.5 Flattening Annotations

The `-flatten-annotations` operation removes all annotations from the given page range, flattening their appearances onto the page as ordinary graphics operations.

```
cpdf -flatten-annotations in.pdf -o out.pdf
```

Flatten annotations.

We can use `-annot-type` or `-annot-no-type` to select annotations to flatten, or to refrain from flattening. For example:

```
cpdf -flatten-annotations in.pdf -annot-no-type /Link/Highlight -o out.pdf
```

Flatten annotations, except link and highlight annotations.

Chapter 11

Document Information and Metadata

```
cpdf -info[-json] [-utf8] [-in | -cm | -mm] in.pdf

cpdf -page-info[-json] [-in | -cm | -mm] in.pdf [<range>]

cpdf -pages in.pdf

cpdf -sig-info [-json] in.pdf

cpdf -set-title <title of document>
     [-also-set-xmp] [-just-set-xmp] in.pdf -o out.pdf
```

(Also `-set-author` etc. See Section 11.2.)

```
cpdf -set-page-layout <layout> in.pdf -o out.pdf

cpdf -set-page-mode <mode> in.pdf -o out.pdf
cpdf -set-non-full-screen-page-mode <mode> in.pdf -o out.pdf

cpdf -hide-toolbar <true | false> in.pdf -o out.pdf
     -hide-menubar
     -hide-window-ui
     -fit-window
     -center-window
     -display-doc-title

cpdf -open-at-page <page number> in.pdf -o out.pdf
cpdf -open-at-page-fit <page number> in.pdf -o out.pdf
cpdf -open-at-page-custom <destination> in.pdf -o out.pdf

cpdf -set-language <language> in.pdf -o out.pdf

cpdf -set-metadata <metadata-file> in.pdf -o out.pdf
cpdf -remove-metadata in.pdf -o out.pdf
cpdf -remove-all-metadata in.pdf -o out.pdf
cpdf -print-metadata in.pdf
cpdf -extract-all-metadata in.pdf -o <directory>
```

```
cpdf -create-metadata in.pdf -o out.pdf
cpdf -set-metadata-date <date> in.pdf -o out.pdf

cpdf -add-page-labels in.pdf [<range>] -o out.pdf
     [-label-style <style>] [-label-prefix <string>]
     [-label-startval <integer>] [-labels-progress]
cpdf -add-page-labels-json in.json in.pdf -o out.pdf

cpdf -remove-page-labels in.pdf -o out.pdf
cpdf -print-page-labels[-json] in.pdf

cpdf -composition[-json] in.pdf
```

11.1 Reading Document Information

The `-info` operation prints entries from the document information dictionary, and from any XMP metadata to standard output.

```
$cpdf -info pdf_reference.pdf
Encryption: Not encrypted
Permissions:
Linearized: true
Object streams: true
ID: <0b1f990718e2a92c0c112fbf08b233fb> <b2f1dbee369e11d9b951000393c97fd8>
Version: 1.5
Pages: 1236
Title: PDF Reference, version 1.6
Author: Adobe Systems Incorporated
Subject: Adobe Portable Document Format (PDF)
Keywords:
Creator: FrameMaker 7.0
Producer: Acrobat Distiller 6.0.1 for Macintosh
Created: D:20041114084116Z
Modified: D:20041114163850-08'00'
Trapped: False
PageMode: UseOutlines
PageLayout:
OpenAction: [1/XYZ -32768 -32768 1]
HideToolbar:
HideMenubar:
HideWindowUI:
FitWindow:
CenterWindow:
DisplayDocTitle: True
NonFullScreenPageMode:
AcroForm: False
XFA: False
Marked: False
```

```
UserProperties: False
Suspects: False
MediaBox: 0.000000 0.000000 612.000000 792.000000
CropBox: 41.000000 63.000000 572.000000 729.000000
BleedBox:
TrimBox: various
ArtBox: various
Subformats:
Language: en-us
XMP dc:title: PDF Reference, version 1.6
XMP dc:creator: Adobe Systems Incorporated
XMP dc:description: Adobe Portable Document Format (PDF)
```

The details of the format for creation and modification dates can be found in Appendix A. If page boxes vary among pages, the entry will read `various`. Add `-in`, `-cm` or `-mm` to print boxes in inches, centimetres, or millimetres instead of points.

By default, Cpdf strips to ASCII, discarding character codes in excess of 127. In order to preserve the original unicode, add the `-utf8` option. To disable all post-processing of the string, add `-raw`. See Section 1.17 for more information.

The `-info-json` operation prints the information in JSON format instead. For example:

```
{
  "Encryption": "Not encrypted",
  "Permissions": [],
  "Linearized": true,
  "Object streams": true,
  "ID": [
    "0b1f990718e2a92c0c112fbf08b233fb", "b2f1dbee369e11d9b951000393c97fd8"
  ],
  "Version": [ 1, 5 ],
  "Pages": 1236,
  "Title": "PDF Reference, version 1.6",
  "Author": "Adobe Systems Incorporated",
  "Subject": "Adobe Portable Document Format (PDF)",
  "Keywords": null,
  "Creator": "FrameMaker 7.0",
  "Producer": "Acrobat Distiller 6.0.1 for Macintosh",
  "Created": "D:20041114084116Z",
  "Modified": "D:20041114163850-08'00'",
  "Trapped": false,
  "PageMode": "UseOutlines",
  "PageLayout": null,
  "OpenAction":
    [{ "I": 1 }, { "N": "/XYZ" }, { "I": -32768 },
     { "I": -32768 }, { "I": 1 }]
  "HideToolbar": null,
```

```
  "HideMenubar": null,
  "HideWindowUI": null,
  "FitWindow": null,
  "CenterWindow": null,
  "DisplayDocTitle": true,
  "NonFullPageScreenMode": null,
  "AcroForm": false,
  "XFA": false,
  "Marked": false,
  "UserProperties": false,
  "Suspects": false,
  "MediaBox": [ 0.0, 0.0, 612.0, 792.0 ],
  "CropBox": [ 41.0, 63.0, 572.0, 729.0 ],
  "BleedBox": null,
  "TrimBox": "various",
  "ArtBox": "various",
  "Subformats": [],
  "Language": "en-us"
  "XMP dc:title": "PDF Reference, version 1.6",
  "XMP dc:creator": "Adobe Systems Incorporated",
  "XMP dc:description": "Adobe Portable Document Format (PDF)"
}
```

The `-page-info` operation prints the page label, media box and other boxes, and number of annotations page-by-page to standard output, for all pages in the current range.

```
$cpdf -page-info 14psfonts.pdf
Page 1:
Label: i
MediaBox: 0.000000 0.000000 600.000000 450.000000
CropBox: 200.000000 200.000000 500.000000 500.000000
BleedBox:
TrimBox:
ArtBox:
Rotation: 0
Annotations: 0
```

Note that the format for boxes is minimum x, minimum y, maximum x, maximum y. Add `-in`, `-cm` or `mm` to print boxes in inches, centimetres, or millimetres instead of points. Using `-page-info-json` we can get the information in JSON format. For example:

```
[
  {
```

```
    "Page": 1,
    "Label": "i",
    "MediaBox": [ 0.0, 0.0, 600.0, 450.0 ],
    "CropBox": [ 200.0, 200.0, 500.0, 500.0 ],
    "BleedBox": null,
    "TrimBox": null,
    "ArtBox": null,
    "Rotation": 0,
    "Annotations": 0
  }
]
```

The `-pages` operation prints the number of pages in the file.

```
cpdf -pages Archos.pdf
8
```

The `-sig-info` operation prints information for each digital signature in the document:

```
/Sig, /Adobe.PPKLite, /adbe.x509.rsa_sha1, DIN Deutsches Institut
```

Add `-json` to use JSON instead:

```
[
  {
    "/Type": "/Sig",
    "/Filter": "/Adobe.PPKLite",
    "/SubFilter": "/adbe.x509.rsa_sha1",
    "/Name": "DIN Deutsches Institut"
  }
]
```

11.2 Setting Document Information

The *document information dictionary* in a PDF file specifies various pieces of information about a PDF. These can be consulted in a PDF viewer (for instance, Acrobat).

Here is a summary of the commands for setting entries in the document information dictionary:

Information	Example command-line fragment
Title	`cpdf -set-title "Discourses"`
Author	`cpdf -set-author "Joe Smith"`
Subject	`cpdf -set-subject "Behavior"`
Keywords	`cpdf -set-keywords "Ape Primate"`
Creator	`cpdf -set-creator "Original Program"`
Producer	`cpdf -set-producer "Distilling Program"`
Creation Date	`cpdf -set-create "D:19970915110347-08'00'"`
Modification Date	`cpdf -set-modify "D:19970915110347-08'00'"`
Mark as Trapped	`cpdf -set-trapped`
Mark as Untrapped	`cpdf -set-untrapped`

(The details of the format for creation and modification dates can be found in Appendix A. Using the date `"now"` uses the time and date at which the command is executed (unless the environment variable `CPDF_REPRODUCIBLE_DATES` is set to `true`). Note also that `-producer` and `-creator` may be used to set the producer and/or the creator when writing any file, separate from the operations described in this chapter.)

For example, to set the title, the full command line would be

```
cpdf -set-title "A Night in London" in.pdf -o out.pdf
```

The text string is considered to be in UTF8 format, unless the `-raw` option is added—in which case, it is unprocessed, save for the replacement of any octal escape sequence such as `\017`, which is replaced by a character of its value (here, 15).

To set also any field in the XMP metadata, add `-also-set-xmp`. The field must exist already. To set only the field (not the document information dictionary), add `-just-set-xmp` instead.

To delete existing non-XMP metadata in line with PDF 2.0, use `-remove-dict-entry "/Info"` as described in chapter 21.

11.3 XMP Metadata

PDF files can contain one or more pieces of arbitrary metadata, often in XMP format. This is typically stored in an uncompressed stream, so that other applications can read it without having to decode the whole PDF. To set the main metadata:

```
cpdf -set-metadata data.xml in.pdf -o out.pdf
```

To remove the main metadata:

```
cpdf -remove-metadata in.pdf -o out.pdf
```

To remove all metadata:

```
cpdf -remove-all-metadata in.pdf -o out.pdf
```

To print the main metadata to standard output:

```
cpdf -print-metadata in.pdf
```

To extract all metadata to file:

```
cpdf -extract-all-metadata in.pdf -o dir
```

This will create zero or one files `dir/main.xml` and zero or more files `dir/<objnum>.xml`.

To create main XMP metadata from scratch, using any information in the Document Information Dictionary (old-style metadata):

```
cpdf -create-metadata in.pdf -o out.pdf
```

To set the main XMP metadata date field, use:

```
cpdf -set-metadata-date <date> in.pdf -o out.pdf
```

The date format is defined in Appendix A.2. Using the date `"now"` uses the time and date at which the command is executed.

11.4 Upon Opening a Document

A mark can be put in a PDF to set the page viewing characteristics upon opening.

NB: If the file has a valid `/OpenAction` setting, which tells the PDF reader to open at a certain page or position on a page, this can override the page layout or display options described below. To prevent this, preprocess the file with the `-remove-dict-entry` functionality from Section 21.9:

```
cpdf -remove-dict-entry /OpenAction in.pdf -o out.pdf
```

You can see if the file has such an open action by referring to the output of `-info`.

NB: The initial view displayed by the dialog box File → Properties → Initial View in Adobe Reader / Acrobat may not reflect exactly the options here. The options here set the flags within the PDF - Adobe products may show different wording.

11.4.1 Page Layout

The `-set-page-layout` operation specifies the page layout to be used when a document is opened in, for instance, Acrobat. The possible (case-sensitive) values are:

`SinglePage`	Display one page at a time
`OneColumn`	Display the pages in one column
`TwoColumnLeft`	Display the pages in two columns, odd numbered pages on the left
`TwoColumnRight`	Display the pages in two columns, even numbered pages on the left
`TwoPageLeft`	(PDF 1.5 and above) Display the pages two at a time, odd numbered pages on the left
`TwoPageRight`	(PDF 1.5 and above) Display the pages two at a time, even numbered pages on the left

For instance:

```
cpdf -set-page-layout TwoColumnRight in.pdf -o out.pdf
```

11.4.2 Page Mode

The *page mode* in a PDF file defines how a viewer should display the document when first opened. The possible (case-sensitive) values are:

`UseNone`	Neither document outline nor thumbnail images visible
`UseOutlines`	Document outline (bookmarks) visible
`UseThumbs`	Thumbnail images visible
`FullScreen`	Full-screen mode (no menu bar, window controls, or anything but the document visible)
`UseOC`	(PDF 1.5 and above) Optional content group panel visible
`UseAttachments`	(PDF 1.5 and above) Attachments panel visible

For instance:

```
cpdf -set-page-mode FullScreen in.pdf -o out.pdf
```

If full screen mode is selected for document opening, we can also set a mode to be used when the user exits from full-screen mode:

```
cpdf -set-non-full-screen-page-mode UseAttachments in.pdf -o out.pdf
```

As would be expected, `FullScreen` is not allowed here.

11.4.3 Display Options

The appearance of the PDF viewer upon opening a document may be set with these options. Each is boolean - supply `true` or `false`:

`-hide-toolbar`	Hide the viewer's toolbar
`-hide-menubar`	Document outline (bookmarks) visible
`-hide-window-ui`	Hide the viewer's scroll bars
`-fit-window`	Resize the document's windows to fit size of first page
`-center-window`	Position the document window in the center of the screen
`-display-doc-title`	Display the document title instead of the file name in the title bar

For instance:

```
cpdf -hide-toolbar true in.pdf -o out.pdf
```

The page a PDF file opens at can be set using `-open-at-page`:

```
cpdf -open-at-page 15 in.pdf -o out.pdf
```

To have that page scaled to fit the window in the viewer, use `-open-at-page-fit` instead:

```
cpdf -open-at-page-fit end in.pdf -o out.pdf
```

(Here, we used `end` to open at the last page. Any page specification describing a single page is ok here.)

Alternatively, we may specify a full destination, of the kind described on page 36:

```
cpdf -open-at-page-custom "[3 /FitR 100 100 300 300]" in.pdf -o out.pdf
```

11.5 Document Language

The document language may be set by giving an IETF BCP 47 language tag:

```
cpdf -set-language "en-GB" in.pdf -o out.pdf
```

This is the top-level language tag. Existing tags on individual parts of the document are preserved.

11.6 Page Labels

It is possible to add *page labels* to a document. These are not the printed on the page, but may be displayed alongside thumbnails or in print dialogue boxes by PDF readers. We use `-add-page-labels` to do this, by default with decimal arabic numbers (1,2,3...). We can add `-label-style` to choose what type of labels to add from these kinds:

`DecimalArabic`	1, 2, 3, 4, 5...
`LowercaseRoman`	i, ii, iii, iv, v...
`UppercaseRoman`	I, II, III, IV, V...
`LowercaseLetters`	a, b, c, ..., z, aa, bb...
`UppercaseLetters`	A, B, C, ..., Z, AA, BB...
`NoLabelPrefixOnly`	No number, but a prefix will be used if defined.

We can use `-label-prefix` to add a textual prefix to each label. Consider a file with twenty pages and no current page labels (a PDF reader will assume 1,2,3... if there are none). We will add the following page labels:

i, ii, iii, iv, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, A-0, A-1, A-2, A-3, A-4, A-5

Here are the commands, in order:

```
cpdf -add-page-labels in.pdf 1-4 -label-style LowercaseRoman
     -o out.pdf

cpdf -add-page-labels out.pdf 5-14 -o out2.pdf

cpdf -add-page-labels out2.pdf 15-20 -label-prefix "A-"
     -label-startval 0 -o out3.pdf
```

By default the labels begin at page number 1 for each range. To override this, we can use `-label-startval` (we used 0 in the final command), where we want the numbers to begin at zero rather than one. The option `-labels-progress` can be added to make sure the start value progresses between sub-ranges when the page range specified is disjoint, e.g `1-9`, `30-40` or `odd`.

Alternatively, we can use `-add-page-labels-json` where a JSON page label file has been prepared as described below.

Page labels may be removed altogether by using `-remove-page-labels` command. To print the page labels from an existing file, use `-print-page-labels`. For example:

```
$ cpdf -print-page-labels in.pdf
labelstyle: LowercaseRoman
labelprefix: None
startpage: 1
startvalue: 1
```

```
labelstyle: DecimalArabic
labelprefix: A
startpage: 9
startvalue: 1
```

Or, in JSON format with `-print-page-labels-json`:

```
[
  {
    "labelstyle": "LowercaseRoman",
    "labelprefix": null,
    "startpage": 1,
    "startvalue": 1
  },
  {
    "labelstyle": "DecimalArabic",
    "labelprefix": "A",
    "startpage": 9,
    "startvalue": 1
  }
]
```

In both cases, the `labelprefix` string is in UTF8 format.

11.7 Composition of a PDF

The `-composition` and `-composition-json` operations show how much space in a PDF is used by each kind of data. Here is the output of `-composition` for this manual:

```
$ cpdf -composition cpdfmanual.pdf
Images: 0 bytes (0.00%)
Fonts: 144731 bytes (46.72%)
Content streams: 132767 bytes (42.85%)
Structure Info: 0 bytes (0.00%)
Attached Files: 0 bytes (0.00%)
XRef Table: 21082 bytes (6.80%)
Piece Info: 0 bytes (0.00%)
Unclassified: 11229 bytes (3.62%)
```

And here it is in JSON format:

```
$ cpdf -composition-json cpdfmanual.pdf
[
  ["Images", 0, 0.0],
  ["Fonts", 144731, 46.71620256351494],
  ["Content streams", 132767, 42.854468398271194],
  ["Structure Info", 0, 0.0],
  ["Attached Files", 0, 0.0],
  ["XRef Table", 21082, 6.8048378194306816],
  ["Piece Info", 0, 0.0],
  ["Unclassified", 11229, 3.6244912187831857]
]
```

Note that, due to small inaccuracies in the method, it is possible for the `Unclassified` numbers to be negative.

Chapter 12

File Attachments

```
cpdf -attach-file <filename> [-to-page <page number>]
     [-afd <string>] [-afr <relationship>] [-attach-file ...]
     in.pdf -o out.pdf
cpdf -attach-files-json in.json in.pdf -o out.pdf
cpdf -list-attached-files [-json] [-include-data] in.pdf
cpdf -remove-files in.pdf -o out.pdf
cpdf -dump-attachments in.pdf -o <directory>
```

PDF supports adding attachments (files of any kind, including other PDFs) to an existing file. The Cpdf tool supports adding and removing *document-level attachments* — that is, ones which are associated with the document as a whole rather than with an individual page, and also *page-level attachments*, associated with a particular page.

12.1 Adding Attachments

To add an attachment, use the `-attach-file` operation. For instance,

```
cpdf -attach-file sheet.xls in.pdf -o out.pdf
```

attaches the Excel spreadsheet `sheet.xls` to the input file. If the file already has attachments, the new file is added to their number. You can specify multiple files to be attached by using `-attach-file` multiple times. They will be attached in the given order.

The `-to-page` option can be used to specify that the files will be attached to the given page, rather than at the document level. The `-to-page` option may be specified at most once.

The `-afd` and `-afr` options may be used to specify the textual description and/or relationship for the file.

Alternatively, attachments may be added with `-attach-files-json` from a JSON file in the format used by `-list-attached-files -json -include-data`, described below.

12.2 Listing Attachments

To list all document- and page-level attachments, use the `-list-attached-files` operation. The page number and filename of each attachment is given, page 0 representing a document-level attachment, then any description then any relationship:

```
$cpdf -list-attached-files 14psfonts.pdf
0 | utility.ml |  | Unspecified
0 | utility.mli |  |
4 | notes.xls | "My notes" | Unspecified
```

The same data may be listed in JSON format:

```
$cpdf -list-attached-files -json 14psfonts.pdf
[
  {
    "Page": 0,
    "Name": "utility.ml",
    "Description": null,
    "Relationship": null
  }
]
...
```

Adding `-include-data` to the command line when calling `-list-attached-files -json` will include an extra JSON field `data` containing the file data for each attachment.

12.3 Removing Attachments

To remove all document-level and page-level attachments from a file, use the `-remove-files` operation:

```
cpdf -remove-files in.pdf -o out.pdf
```

12.4 Extracting Attachments

The `-dump-attachments` operation, when given a PDF file and a directory path as the output, will write each attachment under its filename (as displayed by `-list-attached-files` to that directory. The directory must exist prior to the call.

```
cpdf -dump-attachments in.pdf -o /home/fred/attachments
```

Unless either the `-raw` or `-utf8` option is given, the filenames are stripped of dubious special characters before writing. It is converted from unicode to 7 bit ASCII, and the following characters are removed, in addition to any character with ASCII code less than 32:

```
/ ? < > \ : * | " ^ + =
```

As an alternative, and as described, adding `-include-data` to the command line when calling `-list-attached-files -json` will include an extra JSON field `data` containing the file data for each attachment.

Chapter 13

Images

```
cpdf -list-images[-json] [-inline] in.pdf [<range>]

cpdf -image-resolution[-json] <n> [-inline] in.pdf [<range>]

cpdf -list-images-used[-json] [-inline] in.pdf [<range>]

cpdf -extract-images in.pdf [<range>] [-im <path>] [-p2p <path>]
     [-dedup | -dedup-perpage] [-raw] [-inline] [-merge-masks] -o <path>

cpdf -extract-single-image <object number> [-im <path>] [-p2p <path>]
     [-raw] [-merge-masks] in.pdf -o <filename>

cpdf -process-images [-process-images-info] in.pdf [<range>]
     [-process-images-force]
     [-im <path>] [-jbig2enc <path>] [-jbig2dec <path>]
     [-lossless-resample[-dpi] <n> | -lossless-to-jpeg <n>]
     [-jpeg-to-jpeg <n>] [-jpeg-to-jpeg-scale <n>]
     [-lossless-to-jpeg2000 <n>] [-jpeg2000-to-jpeg2000 <n>]
     [-jpeg-to-jpeg-dpi <n>] [-1bpp-method <method>]
     [-jbig2-lossy-threshold <n>] [-pixel-threshold <n>]
     [-length-threshold <n>] [-percentage-threshold <n>]
     [-dpi-threshold <n>] [-resample-interpolate]
     -o out.pdf

cpdf -rasterize in.pdf [<range>] -o out.pdf
     [-rasterize[-gray|-1bpp|-jpeg|-jpeg-gray]
     [-rasterize-res <n>] [-rasterize-jpeg-quality <n>]
     [-rasterize-no-antialias | -rasterize-downsample]
     [-rasterize-annots] | [-rasterize-alpha]

cpdf -output-image in.pdf [<range>] -o <format>
     [-rasterize[-gray|-1bpp|-jpeg|-jpeg-gray]
     [-rasterize-res <n>] [-rasterize-jpeg-quality <n>]
     [-rasterize-no-antialias | -rasterize-downsample]
     [-rasterize-annots] [-rasterize-alpha]
     [-tobox <BoxName>]
```

13.1 Listing images

The `-list-images` operation lists all images in the file:

```
6, 1, /I0, 3300, 2550, 13432, 1, /DeviceGray, /FlateDecode, NoMask, none
9, 2 3, /I1, 3376, 2649, 37972, 1, /DeviceGray, /FlateDecode, NoMask, none
```

The fields are *object number, page numbers, image name, width, height, size in bytes, bits per pixel, colour space, filter (compression method), mask type, mask object number*. Image masks are also listed, and the mask object number may be used for cross-referencing. Mask types are `ExplicitMask`, `ColourKeyMask`, `SMask`, `SMaskInData` and `NoMask`.

With `-list-images-json`, the same information is available in JSON format:

```
[
  {
    "Object": 6,
    "Pages": [ 1 ],
    "Name": "/I0",
    "Width": 3300,
    "Height": 2550,
    "Bytes": 13432,
    "BitsPerComponent": 1,
    "Colourspace": "/DeviceGray",
    "Filter": "FlateDecode",
    "Mask": "NoMask",
    "MaskObjNum": null
  },
  {
    "Object": 9,
    "Pages": [ 2, 3 ],
    "Name": "/I0",
    "Width": 3376,
    "Height": 2649,
    "Bytes": 37972,
    "BitsPerComponent": 1,
    "Colourspace": "/DeviceGray",
    "Filter": "/FlateDecode"
    "Mask": "NoMask",
    "MaskObjNum": null
  }
]
```

By adding `-inline` to the command line, inline images will be listed too. For inline images, the object number will be zero and the image name will be `/InlineImage`.

13.2 Listing images at point of use

To list all images in the given range of pages which fall below a given resolution (in dots-per-inch), use the `-image-resolution` function:

```
cpdf -image-resolution 300 in.pdf [<range>]
```

Here is the result:

```
2, /Im5, 531, 684, 149.935297, 150.138267, 31
2, /Im6, 184, 164, 149.999988, 150.458710, 39
2, /Im7, 171, 156, 149.999996, 150.579145, 40
2, /Im9, 65, 91, 149.999986, 151.071856, 57
2, /Im10, 94, 60, 149.999990, 152.284285, 59
2, /Im15, 184, 139, 149.960011, 150.672060, 91
4, /Im29, 53, 48, 149.970749, 151.616446, 93
```

The format is *page number, image name, x pixels, y pixels, x resolution, y resolution, object number*. The resolutions refer to the image's effective resolution at point of use (taking account of scaling, rotation etc).

The information is also available in JSON format:

```
[
  {
    "Object": 240,
    "Page": 79,
    "XObject": "/Z_Im0",
    "W": 3326,
    "H": 2584,
    "Xdpi": 300.0,
    "Ydpi": 300.0
  },
  {
    "Object": 243,
    "Page": 80,
    "XObject": "/Z_Im0",
    "W": 3300,
    "H": 2550,
    "Xdpi": 300.0,
    "Ydpi": 300.0
  }
]
```

To list all images regardless of resolution, use -list-images-used or -list-images-used-json instead. Add -inline to list inline images too.

13.3 Extracting images

Cpdf can extract the raster images to a given location. JPEG and JPEG2000 and lossless JBIG2 images are extracted directly.

Lossy JBIG2 images are extracted likewise, but an extra __<n> is added, giving the number of the JBIG2Global stream for this image, which is extracted as <n>.jbig2global. You may reconstruct the individual images with, for example, jbig2dec.

Other images are written as PNGs, processed with either ImageMagick's "magick" command, or NetPBM's "pnmtopng" program, whichever is installed.

```
cpdf -extract-images in.pdf [<range>] [-im <path>] [-p2p <path]
     [-dedup | -dedup-perpage] -o <path>
```

The -im or -p2p option is used to give the path to the external tool, one of which must be installed (unless -raw is added, which outputs instead just JPEG or plain .pnm files).

The output specifier, e.g -o output/%%% gives the number format for numbering the images. Output files are named serially from 0, and include the page number too. For example, output files might be called output/000-p1.jpg, output/001-p1.png, output/002-p3.jpg etc. The specification %objnum may also be used to insert the object number of the image. Here is an example invocation:

```
cpdf -extract-images in.pdf -im magick -o output/%%%
```

The output directory must already exist. The -dedup option deduplicates images entirely; the -dedup-perpage option only per page. The -inline option also extracts inline images; they will have -inline appended to the stem of the file name.

Some images can have soft masks, which are a mechanism for adding transparency to images in a PDF. Such masks will be extracted with a -mask suffix. Adding -merge-masks to the command line will post-process by merging each soft mask and its image to produce an output PNG with an alpha channel, named by concatenating the two existing file names and adding the suffix -combined.

To extract a single image, we can use the object number printed when we use either -list-images[-json] or -list-images-used[-json]. For example:

```
cpdf -extract-single-image 14 in.pdf -im magick -o output
```

This will extract the image at object 14 to output.{png, pnm, jpeg, jpeg2000, jbig2}. Any soft mask will be extracted with name output-smask. Add -merge-masks to merge soft masks as already described. This single image extraction procedure does not work for lossy JBIG2 images with JBIG2Globals streams.

13.4 Removing an Image

To remove a particular image, find its name using `-list-images-used` then apply the `-draft` and `-draft-remove-only` operations from Section 21.1.

13.5 Processing Images

Cpdf can process images within a PDF, replacing the original with the processed version. It does this by saving out the image data, putting it through an external process, and then reading it back in and re-inserting it. This is typically used to reduce the size of image data, and thus the size of the PDF.

There are a number of option to deal with lossy (e.g JPEG) and lossless images, one or more of which is specified. For example, the `-jpeg-to-jpeg` option processes existing JPEG images to a given JPEG quality level:

```
cpdf -process-images -im magick -jpeg-to-jpeg 65 in.pdf -o out.pdf
```

ImageMagick is required. Use `-im` to supply it. If we specify `-process-images-info` too, we can see the work being done:

```
cpdf -process-images -process-images-info -jpeg-to-jpeg 65
     -im magick in.pdf -o out.pdf
```

Here is sample output:

```
(20/344) Object 265 (JPEG)... JPEG to JPEG 40798 -> 33463 (82%)
(38/344) Object 278 (JPEG)... JPEG to JPEG 4382 -> 3482 (79%)
(87/344) Object 266 (JPEG)... JPEG to JPEG 37227 -> 30199 (81%)
(243/344) Object 209 (JPEG)... no size reduction
(246/344) Object 270 (JPEG)... JPEG to JPEG 202568 -> 191175 (94%)
(281/344) Object 280 (JPEG)... JPEG to JPEG 12255 -> 9825 (80%)
(312/344) Object 279 (JPEG)... JPEG to JPEG 4117 -> 3157 (76%)
```

Similar output appears for the other methods, when they are specified. You can see the counter of work being done, and the result for each image chosen for processing. (The actual calls to external processes like imagemagick may be seen by setting the `CPDF_SHOW_EXT` environment variable to `true`).

The `-lossless-to-jpeg` option converts lossless images within PDFs to JPEG too, at the given quality level. It may be specified in addition to `-jpeg-to-jpeg`:

```
cpdf -process-images -jpeg-to-jpeg 65 -lossless-to-jpeg 80
     -im magick in.pdf -o out.pdf
```

Images are only processed if they meet certain thresholds. Changes to the default thresholds may be specified:

Option	Effect	Default value
`-pixel-threshold`	Images below this number of pixels not processed	25
`-length-threshold`	Images with less than this number of bytes of data not processed	100
`-percentage-threshold`	Results not below this percentage of original size discarded	99
`-dpi-threshold`	Only images above this threshold at all use points processed	(no dpi check)

The `-process-images-force` option will process the image even if the resulting image requires more storage than the original.

We may pick JPEG2000 compression instead of JPEG compression by choosing the option `-lossless-to-jpeg2000` instead of `-lossless-to-jpeg` or `-jpeg2000-to-jpeg2000` instead of `-jpeg-to-jpeg` or both.

Instead of compressing lossless images with lossy JPEG or JPEG2000 compression, we can resample losslessly:

```
cpdf -process-images -im magick -lossless-resample 80 in.pdf -o out.pdf
```

This will resample losslessly-compressed images to be 80 percent of the original width and height. By default, there will be no interpolation. To use interpolation, which may result in slightly larger data, add `-resample-interpolate`. To use a DPI target instead, use `-lossless-resample-dpi` instead:

```
cpdf -process-images -im magick -lossless-resample-dpi 300
     in.pdf -o out.pdf
```

We can also use resampling with `-jpeg-to-jpeg`, buy specifying `-jpeg-to-jpeg-scale`:

```
cpdf -process-images -im magick -jpeg-to-jpeg 70 -jpeg-to-jpeg-scale 50
     in.pdf -o out.pdf
```

We can alternatively use a DPI target:

```
cpdf -process-images -im magick -jpeg-to-jpeg 70 -jpeg-to-jpeg-dpi 150
     in.pdf -o out.pdf
```

The methods so far introduced do not operate on 1 bit per pixel data. Different compression mechanisms are typically in use, and we need a different approach. The `-1bpp-method` option specifies what to do with losslessly compressed 1 bit-per-pixel images.

Method	Effect
`JBIG2`	Lossless JBIG2
`JBIG2Lossy`	Lossy JBIG2, sharing JBIG2Globals data amongst all images.
`CCITTG4`	CCITT Group 4 fax, the best non-JBIG2 option.
`CCITTG3`	CCITT Group 3, obsolete.

The JBIG2 options always require the `jbig2enc` program, whose location may be specified with `-jbig2enc`. To convert from any JBIG2 compression type to any other JBIG2 or non-JBIG2 compression type in addition requires the `jbig2dec` program which may be specified with `-jbig2dec`.

For lossy JBIG2, the threshold for similarity of data may be set with `-jbig2-lossy-threshold`. For example:

```
cpdf -process-images -jbig2enc jbig2enc -1bpp-method JBIG2Lossy
     -jbig2-lossy-threshold 75 in.pdf -o out.pdf
```

The `-process-images-force` option is always on when processing 1bpp images, though for true forcing the length and pixel thresholds must also be removed.

13.6 Rasterization (PDF to image conversion)

Cpdf can send individual pages of a PDF out to `gs` to rasterize them - they are then read back in and replace the original page content:

```
cpdf -gs gs -rasterize in.pdf -o out.pdf
```

Other metadata (for example, bookmarks) is preserved. By default, the resolution is 144dpi, and the raster data is losslessly compressed. It is the Crop Box which is rasterized, or the Media Box if absent. The following options may be added:

Option	Effect
`-rasterize-gray`	Use grayscale instead of colour
`-rasterize-1bpp`	Use monochrome instead of colour
`-rasterize-jpeg`	Use JPEG instead of lossless compression
`-rasterize-jpeg-gray`	Use grayscale JPEG instead of lossless compression
`-rasterize-jpeg-quality`	Set JPEG image quality (0..100)
`-rasterize-res`	Set the resolution
`-rasterize-annots`	Rasterize annotations instead of retaining
`-rasterize-no-antialias`	Turn off antialiasing
`-rasterize-downsample`	Use better but slower antialiasing
`-rasterize-alpha`	Produce an alpha channel (lossless only)
`-gs-quiet`	Don't show `gs` output

In addition to rasterization of pages, we can export them in PNG or JPEG format, again by the use of `gs`:

```
cpdf -gs gs -output-image in.pdf 10-end -o image%%%.png
```

This will extract pages 10 onwards to the files `image010.png`, `image011.png` and so on. All the options above apply, and in addition we can choose which box is rasterized:

Option	Effect
`-tobox`	Choose rasterization box

For example:

```
cpdf -gs gs -output-image -tobox /BleedBox -rasterize-jpeg in.pdf
     -o image%%%.jpeg
```

Chapter 14

Fonts

```
cpdf -list-fonts[-json] in.pdf

cpdf -print-font-table <font name> -print-font-table-page <n> in.pdf

cpdf -copy-font fromfile.pdf -copy-font-page <int>
     -copy-font-name <name> in.pdf [<range>] -o out.pdf

cpdf -remove-fonts in.pdf -o out.pdf

cpdf -missing-fonts in.pdf

cpdf -embed-missing-fonts -gs <path to gs> in.pdf -o out.pdf

cpdf -extract-font <page number>,<pdf font name> in.pdf -o out.font
```

14.1 Listing Fonts

The `-list-fonts` operation prints the fonts in the document, one-per-line to standard output. For example:

```
1 /F245 /Type0 /Cleargothic-Bold /Identity-H
1 /F247 /Type0 /ClearGothicSerialLight /Identity-H
1 /F248 /Type1 /Times-Roman /WinAnsiEncoding
1 /F250 /Type0 /Cleargothic-RegularItalic /Identity-H
2 /F13 /Type0 /Cleargothic-Bold /Identity-H
2 /F16 /Type0 /Arial-ItalicMT /Identity-H
2 /F21 /Type0 /ArialMT /Identity-H
2 /X02 /F58 /Type1 /Times-Roman /WinAnsiEncoding
2 /F59 /Type0 /ClearGothicSerialLight /Identity-H
2 /F61 /Type0 /Cleargothic-BoldItalic /Identity-H
2 /F68 /Type0 /Cleargothic-RegularItalic /Identity-H
3 /F47 /Type0 /Cleargothic-Bold /Identity-H
3 /F49 /Type0 /ClearGothicSerialLight /Identity-H
```

```
3 /F50 /Type1 /Times-Roman /WinAnsiEncoding
3 /F52 /Type0 /Cleargothic-BoldItalic /Identity-H
3 /F54 /Type0 /TimesNewRomanPS-BoldItalicMT /Identity-H
3 /F57 /Type0 /Cleargothic-RegularItalic /Identity-H
4 /F449 /Type0 /Cleargothic-Bold /Identity-H
4 /F451 /Type0 /ClearGothicSerialLight /Identity-H
4 /F452 /Type1 /Times-Roman /WinAnsiEncoding
```

The first column gives the page number, the second the internal unique font name (or, if the font is used in a Form XObject, the path e.g `/X1/F0`), the third the type of font (Type1, TrueType etc), the fourth the PDF font name, the fifth the PDF font encoding.

The information is also available in JSON format with `-list-fonts-json`:

```
[
  {
    "page": 1,
    "name": "/F47",
    "subtype": "/Type1",
    "basefont": "/XYPLPB+NimbusSanL-Bold",
    "encoding": "Custom"
  },
  {
    "page": 1,
    "name": "/F50",
    "subtype": "/Type0",
    "basefont": "/MCBERL+URWPalladioL-Roma",
    "encoding": "/Identity-H"
  }
]
```

14.2 Listing characters in a font

We can use Cpdf to find out which characters are available in a given font, and to print the map between character codes, unicode codepoints, and Adobe glyph names. This is presently a best-effort service, and does not cover all font/encoding types.

We find the name of the font by using `-list-fonts`:

```
$ ./cpdf -list-fonts cpdfmanual.pdf 1
1 /F46 /Type1 /XYPLPB+NimbusSanL-Bold
1 /F49 /Type1 /MCBERL+URWPalladioL-Roma
```

We may then print the table, giving either the font's name (e.g `/F46`) or basename (e.g `/XYPLPB+NimbusSanL-Bold`):

```
$ ./cpdf -print-font-table /XYPLPB+NimbusSanL-Bold
         -print-font-table-page 1 cpdfmanual.pdf
67 = U+0043 (C - LATIN CAPITAL LETTER C) = /C
68 = U+0044 (D - LATIN CAPITAL LETTER D) = /D
70 = U+0046 (F - LATIN CAPITAL LETTER F) = /F
71 = U+0047 (G - LATIN CAPITAL LETTER G) = /G
76 = U+004C (L - LATIN CAPITAL LETTER L) = /L
80 = U+0050 (P - LATIN CAPITAL LETTER P) = /P
84 = U+0054 (T - LATIN CAPITAL LETTER T) = /T
97 = U+0061 (a - LATIN SMALL LETTER A) = /a
99 = U+0063 (c - LATIN SMALL LETTER C) = /c
100 = U+0064 (d - LATIN SMALL LETTER D) = /d
101 = U+0065 (e - LATIN SMALL LETTER E) = /e
104 = U+0068 (h - LATIN SMALL LETTER H) = /h
105 = U+0069 (i - LATIN SMALL LETTER I) = /i
108 = U+006C (l - LATIN SMALL LETTER L) = /l
109 = U+006D (m - LATIN SMALL LETTER M) = /m
110 = U+006E (n - LATIN SMALL LETTER N) = /n
111 = U+006F (o - LATIN SMALL LETTER O) = /o
112 = U+0070 (p - LATIN SMALL LETTER P) = /p
114 = U+0072 (r - LATIN SMALL LETTER R) = /r
115 = U+0073 (s - LATIN SMALL LETTER S) = /s
116 = U+0074 (t - LATIN SMALL LETTER T) = /t
```

The first column is the character code, the second the Unicode codepoint, the character itself and its Unicode name, and the third the Adobe glyph name.

14.3 Copying Fonts

In order to use a font other than the standard 14 with `-add-text`, it must be added to the file. The font source PDF is given, together with the font's resource name on a given page, and that font is copied to all the pages in the input file's range, and then written to the output file.

The font is named in the output file with its basefont name, so it can be easily used with `-add-text`.

For example, if the file `fromfile.pdf` has a font `/GHLIGA+c128` with the name `/F10` on page 1 (this information can be found with `-list-fonts`), the following would copy the font to the file `in.pdf` on all pages, writing the output to `out.pdf`:

```
cpdf -copy-font fromfile.pdf -copy-font-name /F10
     -copy-font-page 1 in.pdf -o out.pdf
```

Text in this font can then be added by giving `-font /GHLIGA+c128`. Be aware that due to the vagaries of PDF font handling concerning which characters are present in the source font, not all characters may be available, or Cpdf may not be able to work out the conversion from UTF8 to the font's own encoding. You may add `-raw` to the command line to avoid any conversion, but the encoding (mapping from input codes to glyphs) may be non-obvious and require knowledge of the PDF format to divine.

14.4 Removing Fonts

To remove embedded fonts from a document, use `-remove-fonts`. PDF readers will substitute local fonts for the missing fonts. The use of this function is only recommended when file size is the sole consideration.

```
cpdf -remove-fonts in.pdf -o out.pdf
```

14.5 Missing Fonts

The `-missing-fonts` operation lists any unembedded fonts in the document, one per line.

```
cpdf -missing-fonts in.pdf
```

The format is

```
Page number, Name, Subtype, Basefont, Encoding
```

The operation `-embed-missing-fonts` will process the file with `gs` (which must be installed) to embed missing fonts (where found):

```
cpdf -embed-missing-fonts -gs gs in.pdf -o out.pdf
```

Note: putting a PDF file through `gs` in this manner may not be lossless: some metadata may not be preserved.

14.6 Extracting Fonts

We may extract a font file by giving the page number and the PDF font resource name, as printed by `-list-fonts` or `-list-fonts-json`. For example, for the TrueType font `/F50` on page 5:

```
cpdf -extract-font 5,/F50 in.pdf -o out.ttf
```

Chapter 15

PDF and JSON

```
cpdf in.pdf -output-json -o out.json
     [-output-json-parse-content-streams]
     [-output-json-no-stream-data]
     [-output-json-decompress-streams]
     [-output-json-clean-strings]
     [-utf8]
cpdf -j in.json -o out.pdf
```

In addition to reading and writing PDF files in the original Adobe format, Cpdf can read and write them in its own CPDFJSON format, for somewhat easier extraction of information, modification of PDF files, and so on.

15.1 Converting PDF to JSON

We convert a PDF file to JSON format like this:

```
cpdf -output-json in.pdf -o out.json
```

The resultant JSON file is an array of arrays containing an object number followed by an object, one for each object in the file and two special ones:

- Object -1: Cpdf's own data with the PDF version number, CPDF JSON format number, and flags used when writing (which may be required when reading):
  - `/CPDFJSONformatversion` (CPDFJSON integer (see below), currently 3)
  - `/CPDFJSONcontentparsed` (boolean, true if content streams have been parsed)
  - `/CPDFJSONstreamdataincluded` (boolean, true if stream data included. Cannot round-trip if false).

  - `/CPDFJSONmajorpdfversion` (CPDFJSON integer)
  - `/CPDFJSONminorpdfversion` (CPDFJSON integer)

- Object 0: The PDF's trailer dictionary
- Objects 1..n: The PDF's objects.

Objects are formatted thus:

- PDF arrays, dictionaries, booleans, and strings are the same as in JSON.
- Integers are written as {`"I": 0`}
- Floats are written as {`"F": 0.0`}
- Names are written as {`"N": "/Pages"`}
- Indirect references are integers
- Streams are {`"S": [dict, data]`}
- Strings are converted to JSON string format in a way which, when reversed, results in the original string. For best results when editing files, use the `-utf8` option. The string representation is again reversible, but easier to edit. Unicode strings are written as {`"U": "the text"`}.

Here is an example of the output for a small PDF:

```
[
  [
    -1,
    { "/CPDFJSONformatversion": { "I": 2 },
      "/CPDFJSONcontentparsed": false,
      "/CPDFJSONstreamdataincluded": true,
      "/CPDFJSONmajorpdfversion": { "I": 1 },
      "/CPDFJSONminorpdfversion": { "I": 1 } }
  ],
  [
    0,
    { "/Size": { "I": 4 }, "/Root": 4,
      "/ID" : [ <elided>, <elided>] } ],
  [
    1, { "/Type": { "N": "/Pages" }, "/Kids": [ 3 ], "/Count": { "I": 1 } }
  ],
  [
    2,
    {"S": [{ "/Length": { "I": 49 } },
     "1 0 0 1 50 770 cm BT/F0 36 Tf(Hello, World!)Tj ET"] }
  ],
  [
    3, { "/Type": { "N": "/Page" }, "/Parent": 1,
    "/Resources": {
```

```
      "/Font": {
        "/F0": {
          "/Type": { "N": "/Font" },
          "/Subtype": { "N": "/Type1" },
          "/BaseFont": { "N": "/Times-Italic" }
        }
      }
    },
    "/MediaBox":
      [{ "I": 0 }, { "I": 0 },
       { "F": 595.2755905510001 }, { "F": 841.88976378 }],
    "/Rotate": { "I": 0 },
    "/Contents": [ 2 ] } ],
[
  4, { "/Type": { "N": "/Catalog" }, "/Pages": 1 } ]
]
```

The option `-output-json-parse-content-streams` will also convert content streams to JSON, so our example content stream will be expanded:

```
2, {
"S": [
  {}, [
  [
  { "F": 1.0 }, { "F": 0.0 }, { "F": 0.0 }, { "F": 1.0 }, { "F": 50.0 }, {
  "F": 770.0 }, "cm" ], [ "BT" ], [ "/F0", { "F": 36.0 }, "Tf" ], [
  "Hello, World!", "Tj" ], [ "ET" ] ]
] } ]
```

The option `-output-json-no-stream-data` simply elides the stream data instead, leading to much smaller JSON files. But these may not be round-tripped back into PDF, of course.

The option `-output-json-decompress-streams` keeps the streams intact, and decompresses them.

The option `-output-json-clean-strings` converts any UTF16BE strings with no high bytes to PDFDocEncoding prior to output, so that editing them is easier. *Note: this is deprecated as of version 2.6 in favour of* `-utf8`.

15.2 Converting JSON to PDF

We can load a JSON PDF file with the `-j` option in place of a PDF file anywhere in a normal Cpdf command. A range may be applied, just like any other file.

```
cpdf -j in.json -o out.pdf
```

It is not required that `/Length` entries in CPDFJSON stream dictionaries be correctly updated when the JSON file is edited: Cpdf will fix them when loading.

Chapter 16

Optional Content Groups

```
cpdf -ocg-list in.pdf
cpdf -ocg-list-json in.pdf
cpdf -ocg-replace in.json in.pdf -o out.pdf
cpdf -ocg-rename -ocg-rename-from <a> -ocg-rename-to <b> in.pdf -o out.pdf
cpdf -ocg-remove in.pdf -o out.pdf
cpdf -ocg-coalesce-on-name in.pdf -o out.pdf
cpdf -ocg-order-all in.pdf -o out.pdf
```

In a PDF file, optional content groups are used to group graphical elements together, so they may appear or not, depending on the preference of the user. They are similar in some ways to layers in graphics illustration programs.

```
cpdf -ocg-list in.pdf
```

List the optional content groups in the PDF, one per line, to standard output. UTF8. To list in JSON format instead, use `-ocg-list-json`. This JSON data may be edited, and the result round-tripped back into the same file with `-ocg-replace`:

```
cpdf -ocg-replace in.json in.pdf -o out.pdf
```

To rename an optional content group:

```
cpdf -ocg-rename -ocg-rename-from <a> -ocg-rename-to <b> in.pdf -o out.pdf
```

To remove the optional content group structure entirely, making all content visible:

```
cpdf -ocg-remove in.pdf -o out.pdf
```

To coalesce optional content groups:

```
cpdf -ocg-coalesce-on-name in.pdf -o out.pdf
```

For example, if we merge or stamp two files both with an OCG called ”Layer 1”, we will have two different optional content groups. Running `-ocg-coalesce-on-name` will merge the two into a single optional content group.

To ensure that every optional content group appears in the order list:

```
cpdf -ocg-order-all in.pdf -o out.pdf
```

Chapter 17

Creating New PDFs

```
cpdf -create-pdf [-create-pdf-pages <n>]
     [-create-pdf-papersize <paper size>] -o out.pdf

cpdf -typeset <text file> [-create-pdf-papersize <size>]
     [-font <font>] [-font-size <size>] [-color <color>] [-margin <n>]
     [-opacity <n>] [-line-spacing <n>] [-outline] [-linewidth <n>]
     [-subformat <subformat>] [-title <string>] -o out.pdf

cpdf [-subformat <subformat>] [-title <string>] -jpeg <filename>
     -o out.pdf

cpdf [-subformat <subformat>] [-title <string>] -png <filename>
     -o out.pdf

cpdf [-subformat <subformat>] [-title <string>] -jpeg2000 <filename>
     -o out.pdf

cpdf [-subformat <subformat>] [-title <string>]
     [-jbig2-global <filename>] -jbig2 <filename>
     [-jbig2-global | -jbig2-global-clear]
     [-jbig2 <filename>] ...
      -o out.pdf
```

17.1 A new blank PDF

We can build a new PDF file, given a number of pages and a paper size. The default is one page, A4 portrait.

```
cpdf -create-pdf -create-pdf-pages 20
     -create-pdf-papersize usletterportrait -o out.pdf
```

The standard paper sizes are listed in Section 3.1, or you may specify the width and height directly, as described in the same chapter. To build new PDF/UA files, see `-create-pdf-ua-1` and `-create-pdf-ua-2` in chapter 19.

The -create-pdf operation may appear after AND too, naturally:

```
cpdf one.pdf AND -create-pdf AND two.pdf -o out.pdf
```

17.2 Convert a text file to PDF

A basic text to PDF convertor is included in Cpdf. It takes a UTF8 text file (ASCII is a subset of UTF8) and typesets it ragged-right, splitting on whitespace. Both Windows and Unix line endings are allowed.

```
cpdf -typeset file.txt -create-pdf-papersize a3portrait
     -font Courier -font-size 10 -o out.pdf
```

The standard paper sizes are listed in Section 3.1, or you may specify the width and height directly, as described in the same chapter. The margin may be set with -margin. The default is 7.5% of the page width.

To produce a PDF in PDF/UA-1 or PDF/UA-2 format add, say, -subformat PDF/UA-2 -title "Thesis" to the command line.

The font may be specified as described in Section 8.2.5. The default font is Times-Roman and the default size is 12. See Chapter 8 for -color, -opacity, -line-spacing, -outline, and -linewidth.

17.3 Make a PDF from a PNG, JPEG or JPEG2000 image

Simple facilities for making PDFs from PNG and JPEG images are included in Cpdf. The resulting file can be written out, or used for further operations.

For PNG files, the file must have no interlacing, and must not be palletised:

```
cpdf -png image.png -o out.pdf
cpdf image.png AND -add-text "My Image" -o out.pdf
```

Notice that the -png can be omitted if your file has a standard file extension. Almost any JPEG file may be used with -jpeg or again, with a -jpg or -jpeg extension:

```
cpdf -jpeg image.jpg -o out.pdf
```

JPEG2000 images may be used similarly, with -jpeg2000 or alone with a jp2, jpx or jpf extension:

```
cpdf -jpeg2000 image.jp2 -o out.pdf
```

The output file will have one point of width or height for each pixel in the input.

To produce a PDF in PDF/UA-1 or PDF/UA-2 format add, say, `-subformat "PDF/UA-2" -title "Opus"` to the command line. NB this must appear before the image file on the command line.

17.4 Make a PDF from one or more JBIG2 images

Cpdf can build multi-pages files from one or more PDF-appropriate JBIG2 fragments, prepared by the `jbig2enc` program. In lossless mode, there is one JBIG2 fragment for each page:

```
cpdf -jbig2 1.jbig2 -jbig2 2.jbig2 -jbig2 3.jbig2 -o out.pdf
```

This produces a PDF of three pages. In lossy mode, a JBIG2Globals stream can be added, which contains shared data for several pages:

```
cpdf -jbig2-global 0.jbig2globals
     -jbig2 1.jbig2 -jbig2 2.jbig2 -jbig2 3.jbig2 -o out.pdf
```

The `-jbig2-global` option may be used to change the JBIG2Globals stream in use. The `-jbig2-global-clear` option may be used to cease use of a globals stream and return to lossless mode.

To produce a PDF in PDF/UA-1 or PDF/UA-2 format add, say, `-subformat PDF/UA-2 -title "Opus"` to the command line.

Chapter 18

Drawing on PDFs

```
cpdf in.pdf [<range>] [-draw-struct-tree] [-underneath]
     -draw <draw operations> -o out.pdf

cpdf -text-width <text> [-font <font>] [-fontsize <fontsize>]
```

BUILDING AND SHOWING PATHS
`-rect` Draw rectangle
`-to` Move to
`-line` Add line to path
`-bez` Add Bezier curve to path
`-bez23` Add Bezier curve to path
`-bez13` Add Bezier curve to path
`-circle` Add circle to path
`-stroke` Stroke path
`-fill` Fill path
`-filleo` Fill path, even odd
`-strokefill` Stroke and fill path
`-strokefilleo` Stroke and fill path, even odd
`-close` Close path

CLIPPING WITH PATHS
`-clip` Clip
`-clipeo` Clip, even odd

PATH PARAMETERS
`-strokecol` Set stroke colour
`-fillcol` Set fill colour
`-thick` Set stroke thickness
`-cap` Set cap
`-join` Set join
`-miter` Set miter limit

`-dash` Set dash pattern

THE GRAPHICS STACK AND MATRICES
`-push` Push graphics stack
`-pop` Pop graphics stack
`-matrix` Append to graphics matrix
`-mtrans` Translate the graphics matrix
`-mrot` Rotate the graphics matrix
`-mscale` Scale the graphics matrix
`-mshearx` Shear the graphics matrix in X
`-msheary` Shear the graphics matrix in Y

RE-USE WITH XOBJECTS
`-xobj-bbox` Specify the bounding box for xobjects
`-xobj` Begin saving a sequence of graphics operators
`-end-xobj` End saving a sequence of graphics operators
`-use` Use a saved sequence of graphics operators

IMAGES
`-draw-jpeg` Load a JPEG from file and name it
`-draw-png` Load a PNG from file and name it
`-draw-jpeg2000` Load a JPEG2000 from file and name it
`-image` Draw an image which has already been loaded

TRANSPARENCY
`-fill-opacity` Set opacity
`-stroke-opacity` Set stroke opacity

TEXT
`-bt` Begin text
`-et` End text
`-text` Draw text
`-stext` Draw text with %specials
`-para` Typeset a paragraph
`-paras` Typeset multiple paragraphs
`-leading` Set leading
`-charspace` Set character spacing
`-wordspace` Set word space
`-textscale` Set text scale
`-rendermode` Set text rendering mode
`-rise` Set text rise
`-nl` New line

THE NEXT PAGE
`-newpage` Move to a fresh page

STRUCTURE INFORMATION
`-draw-struct-tree` Add structure information
`-tag` Begin marked content
`-end-tag` End marked content
`-stag` Begin structure tree branch
`-end-stag` End structure tree branch
`-auto-tags` Automatically tag paragraphs and images
`-no-auto-tags` Refrain from automatically tagging paragraphs and images
`-artifact` Begin manual artifact
`-end-artifact` End manual artifact
`-no-auto-artifacts` Prevent automatic addition of artifacts during postprocessing
`-namespace` Set the namespace for future branches of the tree
`-eltinfo` Set element information
`-end-eltinfo` Erase element information
`-rolemap` Set role map

18.1 Basics

We can draw on an existing PDF (or a new one created with `-create-pdf` from the previous chapter) using the `-draw` operation. This provides commands for drawing vector graphics, simple text and adding images. For example:

```
cpdf -create-pdf AND -draw -bt -text Hello -et -o out.pdf
cpdf in.pdf -draw -bt -text Hello -et -o out.pdf
```

The first example builds a new A4 portrait PDF with one page, and writes Hello in the default 12pt Times Roman font at the bottom left. The second does the same, but for every page of an existing PDF.

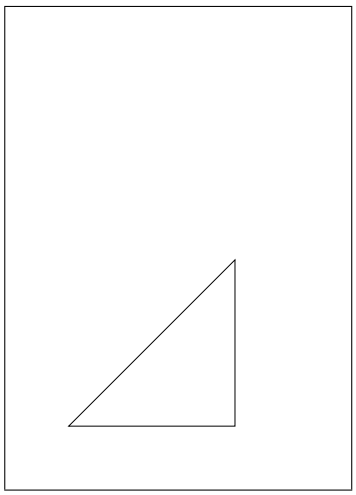
18.2 Building and showing paths

`-rect "x y w h"` Draw rectangle
`-to "x y"` Move to
`-line "x y"` Add line to path
`-bez "x1 y1 x2 y2 x3 y3"` Add Bezier curve to path
`-bez23 "x2 y2 x3 y3"` Add Bezier curve to path
`-bez13 "x1 y1 x3 y3"` Add Bezier curve to path
`-circle "x y r"` Add circle to path
`-stroke` Stroke path
`-fill` Fill path
`-filleo` Fill path, even odd
`-strokefill` Stroke and fill path
`-strokefilleo` Stroke and fill path, even odd
`-close` Close path

To draw line art, we build paths and then stroke or fill them. For example:

```
cpdf -create-pdf AND -draw -to "100 100" -line "400 400" -stroke
     -line "400 100" -line "100 100" -stroke
     -o out.pdf
```

We use `-to` to start the path at a given coordinate, `-line` to extend the path with each line, and then `-stroke` to stroke the path. Coordinates in a PDF file have the origin $(0, 0)$ at the bottom-left of the page. All units are in points (1/72 inch). This creates the following PDF:



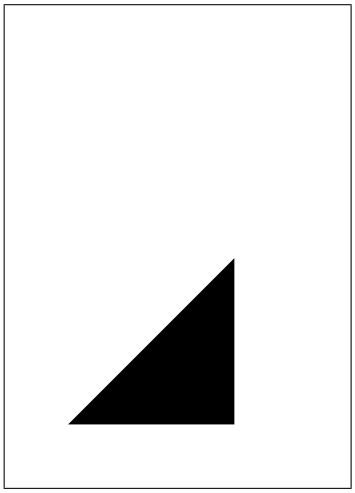
Alternatively, we may use `-close` to draw the final line back to the starting point:

```
cpdf -create-pdf AND -draw -to "100 100" -line "400 400"
     -line "400 100" -close -stroke
     -o out.pdf
```

We can have multiple such subpaths in a path, by closing and carrying on. We can fill our path with `-fill`:

```
cpdf -create-pdf AND -draw -to "100 100" -line "400 400"
     -line "400 100" -close -fill
     -o out.pdf
```

Now we have a filled triangle:



The operations `-filleo`, `-strokefill` and `-strokefilleo` provide alternative combinations of stroke, fill, and winding rule.

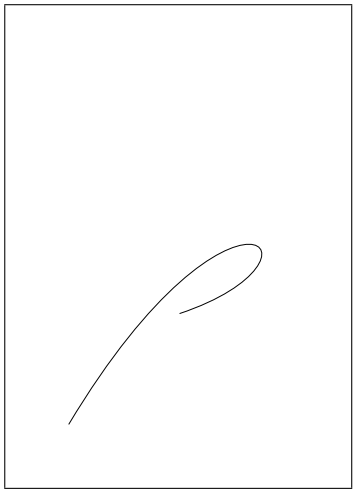
We can save time when drawing rectangles by using the `-rect` operation, which takes the lower left coordinate, width and height. There is no need to explicitly close the rectangle.

```
cpdf -create-pdf AND -draw -rect "200 300 200 300" -stroke
     -o out.pdf
```

We can build bezier curves using `-bez`, `-bez23` and `-bez13`. The first adds a bezier path using six coordinates - for the control points first, and then for the end point (the start point is the current coordinate):

```
cpdf -create-pdf AND -draw -to "100 100" -bez "400 600 600 400 300 300"
     -stroke -o out.pdf
```

Here is the result:



The operation `-bez23` is a shorthand used when the first control point is equal to the current point. The operation `-bez13` is a shorthand used when the second control point is equal to the final point.

To avoid calculating the Bezier curves for a circle manually, Cpdf can generate them automatically when given the center and radius:

```
cpdf -create-pdf AND -draw -circle "200 200 100"
     -stroke -o out.pdf
```

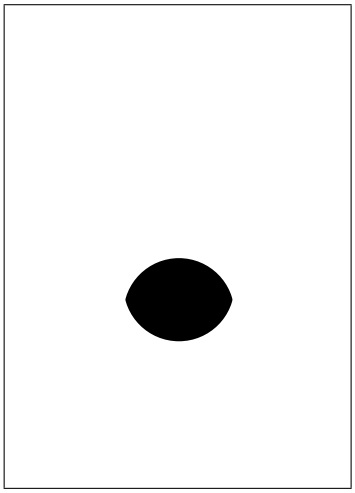
18.3 Clipping with paths

`-clip` Clip
`-clipeo` Clip, even odd

We can use a path to form a clipping region for subsequent content using `-clip` or `-clipeo`. For example:

```
cpdf -create-pdf AND -draw -circle "300 300 100" -clip
     -circle "300 350 100" -fill -o out.pdf
```

Here is the result:



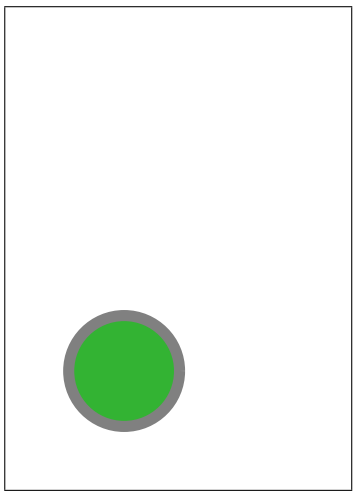
18.4 Path parameters

`-strokecol "g" | "r g b" | "c m y k" | <namedcolour>` Set stroke colour
`-fillcol "g" | "r g b" | "c m y k" | <namedcolour>` Set fill colour
`-thick <n>` Set stroke thickness
`-cap butt | round | square` Set cap
`-join miter | round | bevel` Set join
`-miter <n>` Set miter limit
`-dash <pattern>` Set dash pattern

We can set stroke and fill colours for our paths, either as greyscale (one component), RGB (three components) or CMYK (four components), or by naming a colour as described in Chapter 8:

```
cpdf -create-pdf AND -draw -circle "200 200 100" -thick 20
     -strokecol 0.5 -fillcol "0.2 0.7 0.2" -strokefill -o out.pdf
```

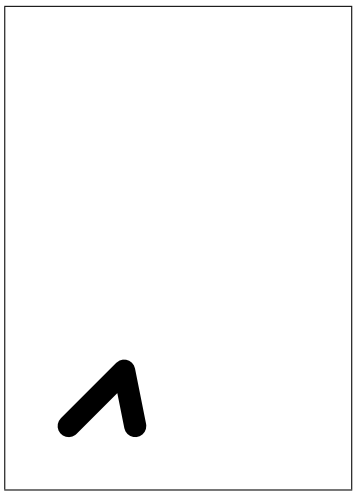
Here is the result:



We can set line caps and joins with `-cap`, `-join`:

```
cpdf -create-pdf AND -draw -to "100 100"
     -join round -cap round -thick 40
     -line "200 200" -line "220 100" -stroke
     -o out.pdf
```

Then we see:

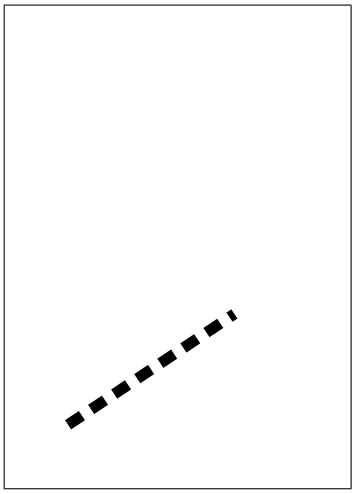


The miter limit (see PDF reference for details) may be set with `-miter`.

Lines may have dash patterns. A dash pattern consists of one or more numbers. All save the last form the list of dash lengths and gap lengths. The last is the phase, which defines how far along the pattern we start. For example, using a dash pattern of ”30 20 0” i.e black 30, white 20, phase 0:

```
cpdf -create-pdf AND -draw -to "100 100"
     -dash "30 20 0" -thick 20 -line "400 300" -stroke
     -o out.pdf
```

Here is the result:



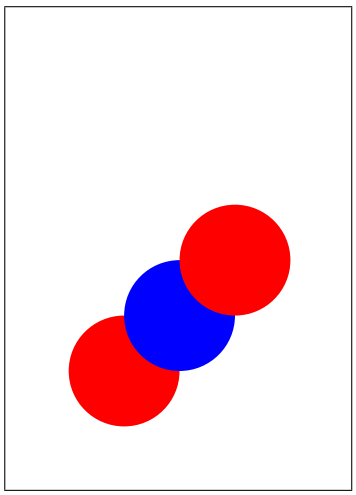
18.5 The graphics stack and matrices

`-push` Push graphics stack
`-pop` Pop graphics stack
`-matrix "a b c d e f"` Append to graphics matrix
`-mtrans "tx ty"` Translate the graphics matrix
`-mrot "x y a"` Rotate the graphics matrix counterclockwise around `(x, y)` by angle `a` in radians
`-mscale "x y sx sy"` Scale the graphics matrix around `(x, y)`
`-mshearx "x y a"` Shear the graphics matrix in X around `(x, y)` by angle `a`
`-msheary "x y a"` Shear the graphics matrix in Y around `(x, y)` by angle `a`

PDF maintains a stack of graphics state, which we can manipulate with `-push` which stores the current state, then modify the state for our own purposes, and then use `-pop` to restore the previous state. Such invocations may be nested. Here is a simple example:

```
cpdf -create-pdf AND -draw -circle "200 200 100" -fillcol red -fill
     -push -fillcol blue -circle "300 300 100" -fill
     -pop -circle "400 400 100" -fill  -o out.pdf
```

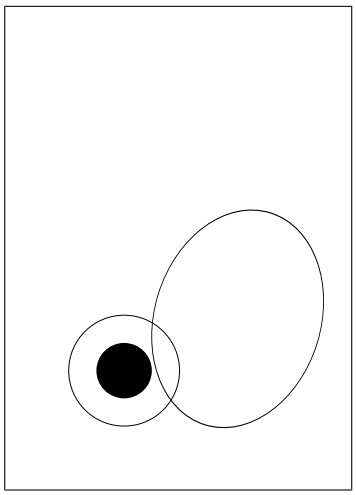
When we use `-pop` the colour returns to the saved one:



One very common use for a `-push`/`-pop` pair is to isolate the effects of an operation which modifies the current transformation matrix. These operations are used to translate, rotate, scale and so on. For example:

```
cpdf -create-pdf AND -draw -circle "200 200 100" -stroke -push
     -mrot "0 0 -0.3" -mscale "0 0 1.5 2" -circle "200 200 100" -stroke
     -pop -circle "200 200 50" -fill -o out.pdf
```

This is the result. See how the graphics transformation is undone when `-push` is invoked:



This is important because, in the absence of `-push` and `-pop` there would be no way to reverse the effect of a graphics matrix modification except to manually calculate its inverse and apply it.

NB: When writing text (see below) the `-font` option is not subject to `-push` and `-pop`. Text is set the the font most recently chosen on the command line.

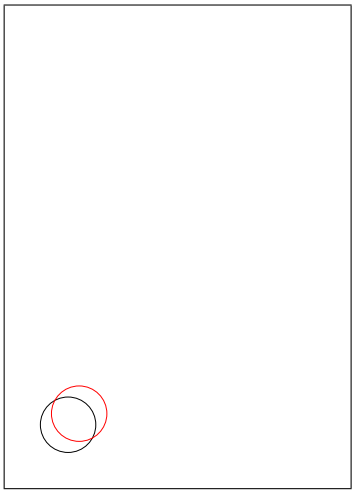
18.6 Re-use with XObjects

`-xobj-bbox "x y w h"` Specify the bounding box for xobjects
`-xobj <name>` Begin saving a sequence of graphics operators
`-end-xobj` End saving a sequence of graphics operators
`-use <name>` Use a saved sequence of graphics operators

In our examples, we have sometimes had to write the same operations multiple times. To avoid this, PDF has a mechanism called an XObject. This allows us to save a set of operations for re-use in different contexts, or on different pages. For example, here we store an XObject which just strokes a circle. We then `-use` it once, and alter the colour and transformation matrix and `-use` it again.

```
cpdf -create-pdf AND -draw -xobj-bbox "0 0 200 200" -xobj A
     -circle "100 100 50" -stroke -end-xobj
     -use A -strokecol red -mtrans "20 20" -use A -o out.pdf
```

Note that we must specify a bounding box for the XObject with `-xobj-bbox`. Here is the result:



XObjects may be nested.

18.7 Images

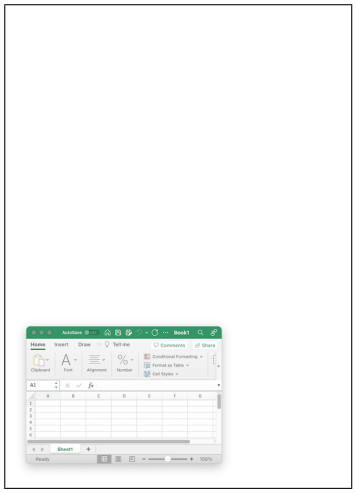
`-draw-jpeg <name>=<filename>` Load a JPEG from file and name it
`-draw-png <name>=<filename>` Load a PNG from file and name it

`-draw-jpeg2000 <name>=<filename>` Load a JPEG2000 from file and name it
`-image <name>` Draw an image which has already been loaded

We can include a 24bit non-transparent and non-interlaced PNG, or any JPEG or JPEG2000 by using `-draw-jpeg[2000]` or `-draw-png` to load it and assign it a name. We can then use `-image` to use it at any point:

```
cpdf -create-pdf AND -draw -draw-png A=sheet.png
     -mscale "0 0 400 294" -image A -o out.pdf
```

Here is the result:



You can see we had to scale by the width and height of the image to draw it at the size we expect.

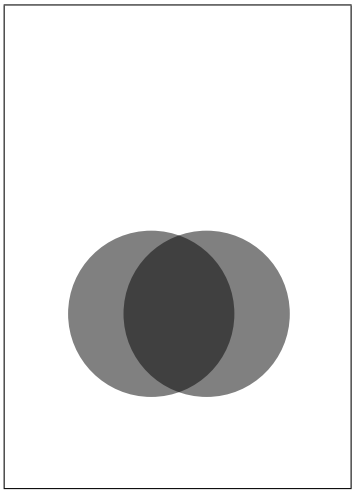
18.8 Transparency

`-fill-opacity <n>` Set opacity
`-stroke-opacity <n>` Set stroke opacity

We can set fill and stroke transparencies, between 0 (fully transparent) and 1 (fully opaque):

```
cpdf -create-pdf AND -draw -fill-opacity 0.5
     -circle "250 300 150" -fill -circle "350 300 150" -fill
     -o out.pdf
```

Here is the result:



Notice that we used `-fill` twice, to ensure each circle was in a different path. If they had been part of the same path, the effect would be different.

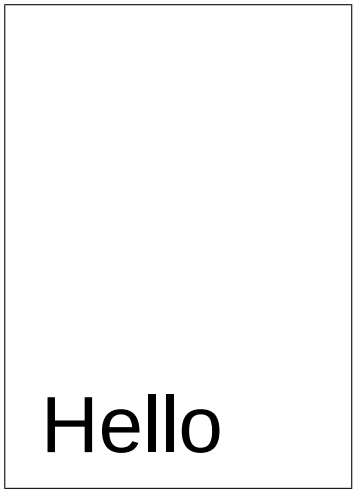
18.9 Text

`-bt` Begin text
`-et` End text
`-text <text>` Draw text
`-stext <text>` Draw text with %specials
`-font <fontname>` Set font
`-font-size <n>` Set font size
`-leading <n>` Set leading
`-charspace <n>` Set character spacing
`-wordspace <n>` Set word space
`-textscale <n>` Set text scale
`-rendermode <n>` Set text rendering mode
`-rise <n>` Set text rise
`-nl` New line

We can draw text in a *text section*, which must start with `-bt` and end with `-et`. For example:

```
cpdf -create-pdf AND -draw -mtrans "50 50" -font Helvetica -font-size 144
     -bt -text "Hello" -et -o out.pdf
```

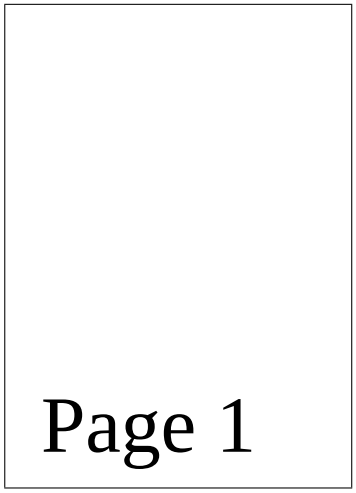
Here is the result:



If we use `-stext` instead of `-text` the usual special values from Chapter 8 (with the exception of URL links) may be used:

```
cpdf -create-pdf AND -draw -mtrans "50 50" -font-size 144
     -bt -stext "Page %Page" -et -o out.pdf
```

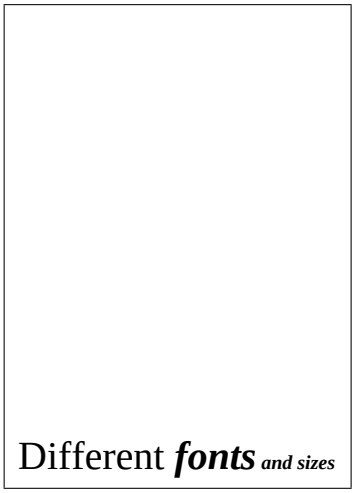
Now we see:



We can use `-text` multiple times, interspersing operators which change the text state, such as font and font size:

```
cpdf -create-pdf AND -draw -mtrans "10 20" -font-size 72
     -bt -text "Different " -font Times-BoldItalic -text "fonts"
     -font-size 36 -text " and sizes" -et -o out.pdf
```

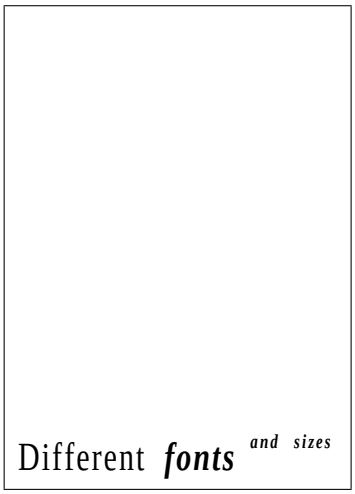
Here is the result:



We can alter the character space, word space, horizontal scaling (100 = no scaling, less than 100 shrink, more than 100 stretch), and text rise:

```
cpdf -create-pdf AND -draw -mtrans "10 20" -font-size 72
     -bt -textscale 75 -charspace 5 -wordspace 20 -text "Different "
     -font Times-BoldItalic -text "fonts" -font-size 36 -rise 40
     -text " and sizes" -et -o out.pdf
```

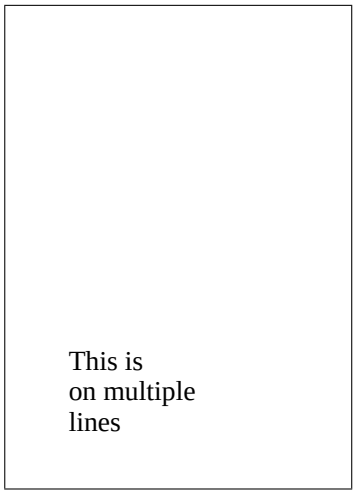
Now we see:



Text may appear on multiple lines. We set up the line spacing with `-leading` then make new lines with `-nl`:

```
cpdf -create-pdf AND -draw -mtrans "100 200" -font-size 50
     -leading 55 -bt -text "This is" -nl -text "on multiple"
     -nl -text "lines" -et -o out.pdf
```

Now we have:



When composing text, we may need to find the width of a piece of text to see where to break it, or for right alignment. We can use `-text-width` for this:

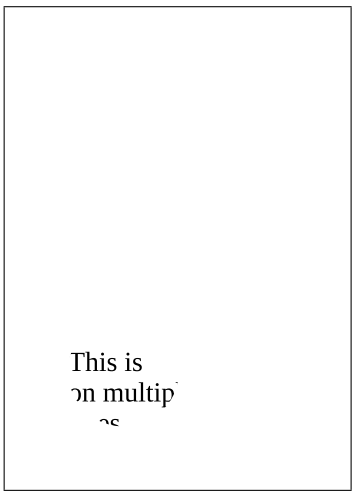
```
cpdf -font Times-Roman -font-size 20 -text-width "Hello"
```

The result is in points.

We can change the text rendering mode to show outline text or, in this example, to use text as a clipping region:

```
cpdf -create-pdf AND -draw -rendermode 7 -mtrans "100 200" -font-size 50
     -leading 55 -bt -text "This is" -nl -text "on multiple"
     -nl -text "lines" -et -circle "100 0 100" -fill -o out.pdf
```

Here is the result:



Here are the text rendering modes:

0 Fill text (default)
1 Stroke text
2 Fill, then stroke text
3 Neither fill nor stroke (invisible)
4 Fill text and add to path for clipping
5 Stroke text and add to path for clipping
6 Fill, then stroke text and add to path for clipping
7 Add text to path for clipping

NB: When writing text the `-font` option is not subject to `-push` and `-pop`. Text is set the the font most recently chosen on the command line.

NB: To use a TrueType font with `-draw`, the `-load-ttf` must appear after the `-draw`.

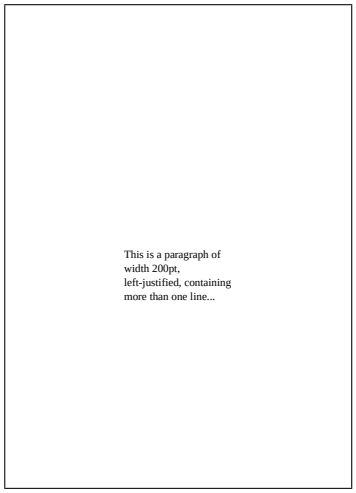
NB: To use `-embed-std14`, put it before `-draw`.

18.10 Paragraphs

We can add a paragraph of text of a given width and justification (Left, Right, or Center) using the `-para` operation:

```
cpdf -create-pdf AND -draw -mtrans "200 400" -font-size 20 -leading 25
     -bt -para "L200pt=This is a paragraph of width 100pt, left-justif
     ied, containing more than one line..." -et
     -o out.pdf
```

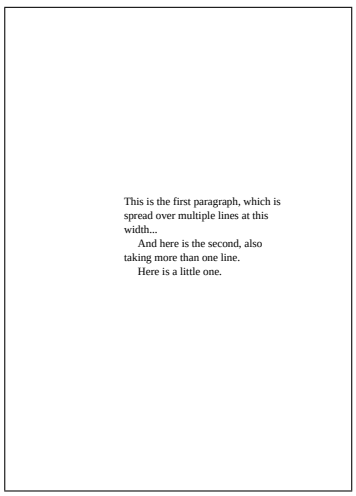
Notice the paragraph specification `L200pt=` for left justified, 200pt-wide at the beginning of the string. Notice also we must give a value for `-leading`. Here is the result:



Multiple paragraphs with optional indenting may be laid out with `-paras`:

```
cpdf -create-pdf AND -draw -mtrans "200 500" -bt -font-size 20 -leading 25
     -indent 20 -paras "L300=This is the first paragraph, which is spread
     over multiple lines at this width...\nAnd here is the second, also ta
     king more than one line.\nHere is a little one." -et AND -decompress
     -o out.pdf
```

We specify the newlines with `\n`, and the indentation with `-indent`. Here is the result.



Note that there is no automatic typesetting over multiple pages with `-paras`.

18.11 The next page

`-newpage` Move to a fresh page

If the drawing range is a single page, and the next page already exists, the drawing operation `-newpage` operation moves to the next page. Otherwise, it creates a fresh page of the same dimensions as the last page of the document, and sets the drawing range to just that page. For example:

```
cpdf -create-pdf AND -draw -bt -text "Page 1" -et
     -newpage -bt -text "Page 2" -et
     -o out.pdf
```

This will create a two page PDF with ”Page 1” written on page one and ”Page 2” written on page two.

18.12 Structure information

A PDF may contain, in addition to its graphical content, a tree of information concerning the logical organization of the document into chapters, sections, paragraphs, figures and so on. When used with a standard set of pre-defined data types, this is known as Tagged PDF. Some PDF subformats, such as PDF/UA, mandate – amongst other things – the full tagging of the file.

When drawing on a fresh file, Cpdf can add such structure information. Partly this can happen automatically, partly it is for the user to add the tags. When drawing on an existing file, the new drawing is marked as an artifact.

To enable the generation of structure information, we add `-draw-struct-tree` to our command. NB It must precede `-draw` on the command line.

```
cpdf -create-pdf AND
     -draw-struct-tree -draw -bt -text "Hello, World" -et -o out.pdf
```

Structure information in a PDF is in the form of a tree. We can now show the structure tree, and see that our paragraph on page one has been automatically tagged by Cpdf:

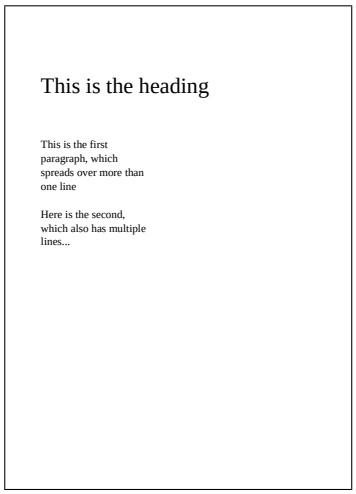
```
$cpdf -print-struct-tree out.pdf
StructTreeRoot
└── P (1)
```

To prevent such automatic tagging, relying only on manual tags, use `-no-auto-tags`. The effect may be reversed at any point with `-auto-tags`. Unless told otherwise, Cpdf auto-tags text added using `-text`, `-stext` and `-paras` with tag P, and images with tag Figure.

There are two types of tag we can add manually. One kind is used to tag individual pieces of content. We do this with a `-tag`/`-end-tag` pair. Note that nesting is not permitted here. For example, let us tag a heading:

```
cpdf -create-pdf AND -draw-struct-tree -draw -mtrans "50 700"
     -font-size 40 -no-auto-tags -tag H1 -bt -text "This is the heading"
     -et -end-tag -auto-tags -mtrans "0 -100" -font-size 20 -leading 25
     -bt -paras "L200pt=This is the first paragraph, which spreads over
more than one line\nHere is the second, which also has multiple lines..."
     -et -o out.pdf
```

We turned off auto-tagging with `-no-auto-tag`, then used `-tag H1` and `-end-tag` to tag the heading. Then we turned auto-tagging back on with `-auto-tag`. Here is the result, visually:



And here is the structure tree:

```
StructTreeRoot
├── H1 (1)
├── P (1)
└── P (1)
```

Content tagging is flat - every part of the content of a page is part of only one `-tag`. The logical structure of a document, however, is a tree structure – sections contain paragraphs, and so on. To build the logical structure tree, we add structure tags using `-stag` / `-end-stag` pairs which, of course, may be nested. For example, let's put our H1, and P sections in a Section structure tag:

```
cpdf -create-pdf AND -draw-struct-tree -draw -mtrans "50 700"
     -font-size 40 -no-auto-tags -stag Section -tag H1 -bt
     -text "This is the heading" -et -end-tag -auto-tags -mtrans "0 -100"
     -font-size 20 -leading 25 -bt -paras "L200pt=This is the first parag
raph, which spreads over more than one line\nHere is the second, which al
so has multiple lines..." -et -end-stag -o out.pdf
```

Here is the structure tree:

```
StructTreeRoot
└──Section (1)
     ├── H1 (1)
     ├── P (1)
     └── P (1)
```

Some PDF standards require that everything not marked as content (e.g paragraph, figure) etc. is marked as a an artifact. For example, a background image which is the same on every page, or a page border. This tells PDF processors that it is not logical content.

By default, Cpdf with `-draw-struct-tree` will mark anything not automatically or manually tagged as content as an artifact. Should you wish to disable this, you may use `-no-auto-artifacts`. Whether or not you use `-no-auto-artifacts`, you may use `-artifact` / `end-artifact` pairs to mark artifacts manually. For example:

```
cpdf -create-pdf AND -draw-struct-tree -draw -no-auto-artifacts
     -artifact -mtrans "50 700" -end-artifact -bt -text "Hello" -et
     -o out.pdf
```

Here we manually tagged the `-mtrans` as being an artifact. The text section was automatically tagged as a paragraph, and so all content has been tagged or marked as an artifact.

Some tags require a namespace other than the default. You can set the namespace with `-namespace`, which affects all future tags until reset. Two namespace abbreviations are available: `PDF` for the default `http://iso.org/pdf/ssn` namespace and `PDF2` for the PDF 2.0 namespace `http://iso.org/pdf2/ssn`.

Extra information may be added to structure tree nodes with `-eltinfo` / `-end-eltinfo`. For example, to set the alternative description for an image, we might write (in JSON format, or prefixing with `PDF` in PDF format) `-eltinfo "Alt=PDF(A large horse)" -image A -end-eltinfo`. Multiple items may be set at once, for example Alt, ActualText, Lang etc.

A role map, which maps non-standard structure types to standard ones, may be set with `-rolemap`. For example `-rolemap "/S1/H1/S2/H2"` would map the S1 structure type to the standard type H1 and so on.

To build a fresh PDF/UA or PDF/UA-2 file for use with `-draw` use `-create-pdf-ua-1` or `-create-pdf-ua-2` from chapter 19.

Chapter 19

Accessible PDFs with PDF/UA

```
cpdf -print-struct-tree in.pdf
cpdf -extract-struct-tree in.pdf -o out.json
cpdf -replace-struct-tree in.json in.pdf -o out.pdf
cpdf -remove-struct-tree in.pdf -o out.pdf
cpdf -mark-as-artifact in.pdf -o out.pdf
cpdf -verify "PDF/UA-1(matterhorn)" [-json] in.pdf
cpdf -verify "PDF/UA-1(matterhorn)" -verify-single <test> [-json] in.pdf
cpdf -mark-as ["PDF/UA-1" | "PDF/UA-2"] in.pdf -o out.pdf
cpdf -remove-mark ["PDF/UA-1" | "PDF/UA-2"] in.pdf -o out.pdf
cpdf -create-pdf-ua-<1|2> <title> [-create-pdf-pages <n>]
      [-create-pdf-papersize <paper size>] -o out.pdf
```

PDF/UA (Universal Accessibility) is a PDF subformat whose rules consist of a set of machine-checkable and human-checkable-only requirements to make PDF documents accessible for all users - for example, those using screen readers. Cpdf has some basic facilities for manipulating the extra PDF constructs which are used in (amongst others) PDF/UA, and a basic verifier for many of the machine-checkable requirements.

19.1 Structure trees

In a PDF document, the optional Structure Tree is a parallel construct which describes the logical structure of a document (as opposed to the information for rendering the document on the screen or printing it out, which every PDF of course contains.)

We can print an abbreviated form of the structure tree to standard output:

```
cpdf -print-struct-tree in.pdf
```

This might yield:

```
StructTreeRoot
└── Document
    ├── Sect
    │   ├── P (1)
    │   │   ├── Span (1)
    │   └── Figure (1)
    ├── Sect
    │   ├── H1 (2)
    │   └── TOC
    │       ├── TOCI
    │       │   └── P
    │       │       └── Link (2)
    .       .
    .       .
    .       .
```

The numbers in parentheses are the page numbers for structure elements, where present. We can extract the full structure tree to JSON for inspection or manupulation:

```
cpdf -extract-struct-tree in.pdf -o out.json
```

Here is a typical fragment:

```
[
  [ 0, { "/CPDFJSONformatversion": 1, "/CPDFJSONpageobjnumbers": [ 52 ] } ],
  [
    102,
    {
      "/Type": { "N": "/StructElem" },
      "/S": { "N": "/TD" },
      "/P": 98,
      "/Pg": 52,
      "/K": { "I": 38 },
      "/T": { "U": "row #7, col #3" },
      "/A": {
        "/O": { "N": "/Layout" },
        "/Height": { "F": 18.28 },
        "/Width": { "F": 73.07689999999999 }
      }
    }
```

```
  ],
  [
    15,
    {
      "/Type": { "N": "/StructElem" },
      "/S": { "N": "/TD" },
      "/P": 59,
      "/Pg": 52,
      "/K": { "I": 20 },
      "/T": { "U": "row #3, col #5" },
      "/A": {
        "/O": { "N": "/Layout" },
        "/Height": { "F": 18.28 },
        "/Width": { "F": 73.07689999999999 }
      }
    }
  ],
...
```

This JSON file contains the structure tree objects from the file, using the format described in chapter 15. There is a special entry in object `0` which gives the key to the page object numbers. In this example, there is one page with object number `52`.

This JSON file can be edited, for example to change text strings, and reapplied to the same file from which it was extracted:

```
cpdf -replace-struct-tree out.json in.pdf -o out.pdf
```

If extra objects are required, they should be introduced with negative object numbers: Cpdf will renumber them on import so as not to clash with any existing numbers.

To remove a structure tree from a PDF, we can use `-remove-struct-tree`:

```
cpdf -remove-struct-tree in.pdf -o out.pdf
```

This removes the structure tree and all references to it, including from inside page content. In addition we can, afterward, use `-mark-as-artifact`:

```
cpdf -mark-as-artifact in.pdf -o out.pdf
```

This marks all content in the file as being an artifact.

19.2 Verifying conformance to PDF/UA

Cpdf contains a new, experimental verifier for PDF/UA via most of the machine-checkable subset of the Matterhorn Protocol, a list of checks based on the PDF/UA-1 specification. For example, we can run:

```
cpdf -verify "PDF/UA-1(matterhorn)" in.pdf
```

We see:

```
06-001 UA1:7.1-8 Document does not contain an XMP metadata stream
07-001 UA1:7.1-9 ViewerPreferences dictionary of the Catalog dictionary does
not contain a DisplayDocTitle entry
11-006 UA1:7.2-3 Natural language for document metadata cannot be determined.
("No top-level /Lang")
28-004 UA1:7.18.1-4 An annotation, other than of subtype Widget, does not
have a Contents entry and does not have an alternative description (in the
form of an Alt entry in the enclosing structure element).
28-008 UA1:7.18.3-1 A page containing an annotation does not contain a Tabs
entry
28-011 UA1:7.18.5-1 A link annotation is not nested within a <Link> tag.
28-012 UA1:7.18.5-2 A link annotation does not include an alternate
description in its Contents entry.
```

The first column here is the Matterhorn Protocol checkpoint, the second the reference in the PDF/UA-1 standard docunment, the third the textual description from the Matterhorn Protocol, and an optional fourth (in parentheses) any extra information available.

The same information is available in JSON format by adding `-json` to the command line:

```
[
  {
    "name": "06-001",
    "section": "UA1:7.1-8",
    "error": "Document does not contain an XMP metadata stream",
    "extra": null
  },
  {
    "name": "07-001",
    "section": "UA1:7.1-9",
    "error": "ViewerPreferences dictionary of the Catalog dictionary does not
contain a DisplayDocTitle entry",
    "extra": null
  },
  {
    "name": "11-006",
    "section": "UA1:7.2-3",
    "error": "Natural language for document metadata cannot be determined.",
    "extra": "No top-level /Lang"
  },
  {
    "name": "28-004",
    "section": "UA1:7.18.1-4",
    "error": "An annotation, other than of subtype Widget, does not have a
Contents entry and does not have an alternative description (in the form of
an Alt entry in the enclosing structure element).",
```

```
    "extra": null
  },
  {
    "name": "28-008",
    "section": "UA1:7.18.3-1",
    "error": "A page containing an annotation does not contain a Tabs entry",
    "extra": null
  },
  {
    "name": "28-011",
    "section": "UA1:7.18.5-1",
    "error": "A link annotation is not nested within a <Link> tag.",
    "extra": null
  },
  {
    "name": "28-012",
    "section": "UA1:7.18.5-2",
    "error": "A link annotation does not include an alternate description in
its Contents entry.",
    "extra": null
  }
```

If verifying many files for a single fault, we may choose which test to run by adding `-verify-single <testname>` to the command line. For example:

```
cpdf -verify "PDF/UA-1(matterhorn)" -verify-single "28-012" in.pdf
```

Presently, Matterhorn tests 31-001–016,018,030 are unimplemented. Matterhorn tests 31-027,10-001,11-001–005 are partially implemented. All others are implemented.

19.3 PDF/UA compliance markers

Once we are sure a file complies to PDF/UA, in terms of both machine and human checks, we can mark it as such:

```
cpdf -mark-as "PDF/UA-1" in.pdf -o out.pdf
```

Or, for the more recent PDF/UA-2 standard:

```
cpdf -mark-as "PDF/UA-2" in.pdf -o out.pdf
```

To remove such a marker we can use, for example:

```
cpdf -remove-mark "PDF/UA-1" in.pdf -o out.pdf
```

19.4 Merging and splitting PDF/UA files

The `-process-struct-trees` option should always be used in conjunction with any splitting or merging command to preserve PDF/UA compliance. Sometimes `-subformat` may be required too. Details are given in chapter 2.

19.5 Creating new PDF/UA files

To create a new PDF/UA-1 file, with A4 portrait paper, one page, and the title `"My Book"`, we may write:

```
cpdf -create-pdf-ua-1 "My Book" -o out.pdf
```

A title is needed for every PDF/UA document (even a blank one) for it to meet the standard. For `PDF/UA-2`, use `-create-pdf-ua-2` instead. To make it valid, you must also draw a top-level PDF/UA-2 Document tag as described below i.e:

```
cpdf -create-pdf-ua-2 "My Book" AND -draw -draw-struct-tree
     -namespace PDF2 -stag Document -end-stag -o out.pdf
```

19.6 Drawing PDF/UA files

Cpdf can add PDF/UA structure data when drawing on new PDF/UA files. For example the following produces a valid PDF/UA-1 file with structure information:

```
cpdf -create-pdf-ua-1 "Hello" AND
     -embed-std14 /path/to/fonts -draw-struct-tree
     -draw -bt -text "Hello, World" -et -o out.pdf
```

Note we had to specify embedded fonts to make this a valid PDF/UA-1 file. To make a valid PDF/UA-2 file we must also add a top-level Document structure tag with the appropriate namespace. Here is the PDF/UA-2 version of our file:

```
cpdf -create-pdf-ua-2 "Hello" AND
     -embed-std14 /path/to/fonts -draw-struct-tree
     -draw -namespace PDF2 -stag Document -namespace PDF
     -bt -text "Hello, World" -et -end-stag -o out.pdf
```

See chapter 18 for more details about adding structure information when drawing.

19.7 Remediation of PDF/UA verification errors

Remediation of a file which claims to match PDF/UA but which does not (either failing human or mechanical tests) is a complex topic. In this section, we list possible remediations for a file which fails mechanical verification with Cpdf or another verification tool. Sometimes these will be clear and simple – for example where some piece of document metadata is missing – and sometimes they will be almost impossible. Of course, often the truth lies between those two extremes.

When all else fails, it may be possible to modify the basic structures of the PDF manually. This may be done by extracting the PDF to JSON using `-output-json` from chapter 15, modifying the file manually in a text editor or automatically with a JSON processing tool such as `jq` and converting back to a PDF with `-j`. If the remediation requires altering page content streams, the option `-output-json-parse-content-streams` may be used.

19.7.1 Remediation List

The following table lists each mechanically-verifiable test from the Matterhorn protocol. For each, we give the number, description from the Matterhorn protocol, and the reference into the PDF/UA standard. Then we describe, if possible, how to use Cpdf to remediate the failure. Sometimes this is a definitive command, sometimes a last-ditch attempt to re-process the file (to embed missing fonts or correct font structures, for example) and sometimes simply a direction to try the manual remediation procedure described above.

NUMBER	DESCRIPTION	REFERENCE
01-003	**Content marked as Artifact is present inside tagged content.**	**UA1:7.1-1**
01-004	**Tagged content is present inside content marked as Artifact.**	**UA1:7.1-1**
01-005	**Content is neither marked as Artifact nor tagged as real content.**	**UA1:7-1-2**
	File does not meet Tagged PDF standard - only manual remediation possible (see description above this table).	
01-007	**Suspects entry has a value of true.**	**UA1:7-1-11**
	If you are sure the file conforms to tagged PDF conventions, use `cpdf -replace-obj /Root/MarkInfo/Suspects=false in.pdf -o out.pdf`.	
02-001	**One or more non-standard tag's mapping does not terminate with a standard type.**	**UA1:7.1-3**
02-003	**A circular mapping exists.**	**UA1:7.1-3**
02-004	**One or more standard types are remapped.**	**UA1:7.1-4**
	File does not meet PDF/UA tagging standard - only manual remediation possible (see description above this table).	
06-001	**Document does not contain an XMP metadata stream**	**UA1:7.1-8**

NUMBER	DESCRIPTION	REFERENCE

Create XMP metadata from any existing old-style metadata in the file with `cpdf -create-metadata in.pdf -o out.pdf`. This may lead to further verification errors due to empty metadata entries.

06-002	**The XMP metadata stream in the Catalog dictionary does not include the PDF/UA identifier.**	**UA1:5**

Mark the file as PDF/UA using `cpdf -mark-as ["PDF/UA-1" | "PDF/UA-2"] in.pdf -o out.pdf`.

06-003	**XMP metadata stream does not contain dc:title**	**UA1:7.1-8**

Add a title using `cpdf -set-title "My title" -also-set-xmp in.pdf -o out.pdf`.

07-001	**ViewerPreferences dictionary of the Catalog dictionary does not contain a DisplayDocTitle entry**	**UA1:7.1-9**

Add the entry with `cpdf -display-doc-title true in.pdf -o out.pdf`.

07-002	**ViewerPreferences dictionary of the Catalog dictionary contains a DisplayDocTitle entry with a value of false**	**UA1:7.1-9**

Replace the entry with `cpdf -display-doc-title true in.pdf -o out.pdf`.

09-004	**A table-related structure element is used in a way that does not conform to the syntax defined in ISO 32000-1, Table 337.**	**UA1-7.2-1**
09-005	**A list-related structure element is used in a way that does not conform to Table 336 in ISO 32000-1.**	**UA1-7.2-1**
09-006	**A TOC-related structure element is used in a way that does not conform to Table 333 in ISO 32000-1.**	**UA1-7.2-1**
09-007	**A Ruby-related structure element is used in a way that does not conform to Table 338 in ISO 32000-1.**	**UA1-7.2-1**
09-008	**A Warichu-related structure element is used in a way that does not conform to Table 338 in ISO 32000-1.**	**UA1-7.2-1**

File does not meet PDF/UA tagging standard - only manual remediation possible (see description above this table).

10-001	**Character code cannot be mapped to Unicode.**	**UA1:7.2-2**

It is possible that reprocessing the file with `gs` using `cpdf in.pdf -gs gs -gs-malformed-force -o out.pdf [-gs-quiet]` will correct the fonts.

11-001	**Natural language for text in page content cannot be determined.**	**UA1:7.2-3**
11-002	**Natural language for text in Alt, ActualText and E attributes cannot be determined.**	**UA1:7.2-3**
11-003	**Natural language in the Outline entries cannot be determined.**	UA1:7.2-3

NUMBER	DESCRIPTION	REFERENCE
11-004	**Natural language in the Contents entry for annotations cannot be determined.**	**UA1:7.2-3**
11-005	**Natural language in the TU entry for form fields cannot be determined.**	**UA1:7.2-3**
11-006	**Natural language for document metadata cannot be determined.**	**UA1:7.2-3**

Assuming the document is all in a single language, set the top-level language with, for example, `cpdf -set-language "en-US" in.pdf -o out.pdf`. If the document contains multiple languages, only manual remediation is possible.

13-004	**<Figure> tag alternative or replacement text missing.**	**UA1:7.3-3**
14-002	**Does use numbered headings, but the first heading tag is not <H1>.**	**UA1:7.4.2-1**
14-003	**Numbered heading levels in descending sequence are skipped (Example: <H3> follows directly after <H1>).**	**UA1:7.4-1**
14-006	**A node contains more than one <H> tag.**	**UA1:7.4.4-1**
14-007	**Document uses both <H> and <H#> tags.**	**UA1:7.4.4-3**
15-003	**In a table not organized with Headers attributes and IDs, a <TH> cell does not contain a Scope attribute.**	**UA1:7.5-2**
17-002	**<Formula> tag is missing an Alt attribute.**	**UA1:7.7-1**

File does not meet PDF/UA standard - only manual remediation possible (see description above this table). Alternatively, edit the tree manually using `-extract-struct-tree` and `-replace-struct-tree` from this chapter.

17-003	**Unicode mapping requirements are not met.**	**UA1:7.7-2**

It is possible that reprocessing the file with `gs` using `cpdf in.pdf -gs gs -gs-malformed-force -o out.pdf [-gs-quiet]` will correct the fonts.

19-003	**ID entry of the <Note> tag is not present.**	**UA1:7.9-2**
19-004	**ID entry of the <Note> tag is non-unique.**	**UA1:7.9-2**
20-001	**Name entry is missing or has an empty string as its value in an Optional Content Configuration Dictionary in the Configs entry in the OCProperties entry in the Catalog dictionary.**	**UA1:7.10-1**
20-002	**Name entry is missing or has an empty string as its value in an Optional Content Configuration Dictionary that is the value of the D entry in the OCProperties entry in the Catalog dictionary.**	**UA1:7.10-1**

File does not meet PDF/UA standard - only manual remediation possible (see description above this table). Alternatively, edit the tree manually using `-extract-struct-tree` and `-replace-struct-tree` from this chapter.

NUMBER	DESCRIPTION	REFERENCE
20-003	**An AS entry appears in an Optional Content Configuration Dictionary.**	**UA1:7.10-2**

File does not meet PDF/UA standard - only manual remediation possible (see description above this table).

21-001	**The file specification dictionary for an embedded file does not contain F and UF entries.**	**UA1:7.11-1**

File does not meet PDF/UA standard - only manual remediation possible (see description above this table). Alternatively, edit the tree manually using `-extract-struct-tree` and `-replace-struct-tree` from this chapter.

25-001	**File contains the dynamicRender element with value "required".**	**UA1:7.15-1**

Not remediable, unless actually a wrong marker. This is an interactive PDF form which likely only works with Adobe Acrobat. If the marker is actually wrong, it may be edited manually inside the XML stream using the instructions above.

26-001	**The file is encrypted but does not contain a P entry in its encryption dictionary.**	**UA1:7.16-1**
26-002	**The file is encrypted and does contain a P entry but the 10th bit position of the P entry is false.**	**UA1:7.16-1**

Re-encrypt the file with Cpdf as described in Chapter 4.

28-002	**An annotation, other than of subtype Widget, Link and PrinterMark, is not a direct child of an <Annot> structure element.**	**UA1:7.18.1-2**
28-004	**An annotation, other than of subtype Widget, does not have a Contents entry and does not have an alternative description (in the form of an Alt entry in the enclosing structure element).**	**UA1:7.18.1-4**
28-005	**A form field does not have a TU entry and does not have an alternative description (in the form of an Alt entry in the enclosing structure element).**	**UA1:7.18.1-4**

File does not meet PDF/UA standard - only manual remediation possible (see description above this table). Alternatively, edit the tree manually using `-extract-struct-tree` and `-replace-struct-tree` from this chapter.

28-006	**An annotation with subtype undefined in ISO 32000 does not meet 7.18.1.**	**UA1:7.18.2-1**
28-007	**An annotation of subtype TrapNet exists.**	**UA1:7.18.2-2**
28-008	**A page containing an annotation does not contain a Tabs entry**	**UA1:7.18.3-1**
28-009	**A page containing an annotation has a Tabs entry with a value other than S.**	**UA1:7.18.3-1**

NUMBER	DESCRIPTION	REFERENCE

If annotations are not required, they may be removed with `cpdf -remove-annotations in.pdf -o out.pdf`. Alternatively, use `-list-annotations-json` and `-set-annotations` as described in Chapter 10 to remove one or more specific annotations.

28-010	**A widget annotation is not nested within a <Form> tag.**	**UA1:7.18.4-1**
28-011	**A link annotation is not nested within a <Link> tag.**	**UA1:7.18.5-1**

If annotations are not required, they may be removed with `cpdf -remove-annotations in.pdf -o out.pdf`. Alternatively, use `-list-annotations-json` and `-set-annotations` as described in Chapter 10 to remove one or more specific annotations. Alternatively, edit the tree manually using `-extract-struct-tree` and `-replace-struct-tree` from this chapter.

28-012	**A link annotation does not include an alternate description in its Contents entry.**	**UA1:7.18.5-2**
28-014	**CT entry is missing from the media clip data dictionary.**	
28-015	**Alt entry is missing from the media clip data dictionary.**	**UA1:7.18.6.2-1**
28-016	**File attachment annotations do not conform to 7.11.**	**UA1:7.18.7-1**

If annotations are not required, they may be removed with `cpdf -remove-annotations in.pdf -o out.pdf`. Alternatively, use `-list-annotations-json` and `-set-annotations` as described in Chapter 10 to remove one or more specific annotations.

28-017	**A PrinterMark annotation is included in the logical structure.**	**UA1:7.18.8-1**

If annotations are not required, they may be removed with `cpdf -remove-annotations in.pdf -o out.pdf`. Alternatively, use `-list-annotations-json` and `-set-annotations` as described in Chapter 10 to remove one or more specific annotations. Alternatively, edit the tree manually using `-extract-struct-tree` and `-replace-struct-tree` from this chapter.

28-018	**The appearance stream of a PrinterMark annotation is not marked as Artifact.**	**UA1:7.18.8-2**

If annotations are not required, they may be removed with `cpdf -remove-annotations in.pdf -o out.pdf`. Alternatively, use `-list-annotations-json` and `-set-annotations` as described in Chapter 10 to remove one or more specific annotations.

30-001	**A reference XObject is present.**	**UA1:7.2**

A reference XObject references a page in another file. May be cut out manually using the manual remediation instructions above.

30-002	**Form XObject contains MCIDs and is referenced more than once.**	**UA1:7.21.3.1-1**

Number	Description	Reference
	Unlikely to be remediable: the only option is to manually remove them, but this would then result in a tag tree pointing to non-existent MCIDs, which would be another kind of invalidity. Any PDF producer creating Tagged PDF with MCIDs like this is simply broken.	
31-001	**A Type 0 font dictionary with encoding other than Identity-H and Identity-V has values for Registry in both CIDSystemInfo dictionaries that are not identical.**	**UA1:7.21.3-1**
31-002	**A Type 0 font dictionary with encoding other than Identity-H and Identity-V has values for Ordering in both CIDSystemInfo dictionaries that are not identical.**	**UA1:7.21.3.1-1**
31-003	**A Type 0 font dictionary with encoding other than Identity-H and Identity-V has a value for Supplement in the CIDSystem-Info dictionary of the CID font that is less than the value for Supplement in the CIDSystemInfo dictionary of the CMap.**	**UA1:7.21.3.1-1**
31-004	**A Type 2 CID font contains neither a stream nor the name Identity as the value of the CIDToGIDMap entry.**	**UA1:7.21.3.2-1**
31-005	**A Type 2 CID font does not contain a CIDToGIDMap entry.**	**UA1:7.21.3.2-1**
31-006	**A CMap is neither listed as described in ISO 32000- 1:2008, 9.7.5.2, Table 118 nor is it embedded.**	**UA1:7.21.3.3-1**
31-007	**The WMode entry in a CMap dictionary is not identical to the WMode value in the CMap stream.**	**UA1:7.21.3.3-1**
31-008	**A CMap references another CMap which is not listed in ISO 32000-1:2008, 9.7.5.2, Table 118.**	**UA1:7.21.3.3-2**
31-009	**For a font used by text intended to be rendered the font program is not embedded.**	**UA1:7.21.4.1-1**
31-011	**For a font used by text the font program is embedded but it does not contain glyphs for all of the glyphs referenced by the text used for rendering.**	**UA1:7.21.4.1-3**
31-012	**The FontDescriptor dictionary of an embedded Type 1 font contains a CharSet string, but at least one of the glyphs present in the font program is not listed in the CharSet string.**	**UA1:7.21.4.2-1**
31-013	**The FontDescriptor dictionary of an embedded Type 1 font contains a CharSet string, but at least one of the glyphs listed in the CharSet string is not present in the font program.**	**UA1:7.21.4.2-2**
31-014	**The FontDescriptor dictionary of an embedded CID font contains a CIDSet string, but at least one of the glyphs present in the font program is not listed in the CIDSet string.**	**UA1:7.21.4.2-3**

NUMBER	DESCRIPTION	REFERENCE
31-015	**The FontDescriptor dictionary of an embedded CID font contains a CIDSet string, but at least one of the glyphs listed in the CIDSet string is not present in the font program.**	**UA1:7.21.4.2-4**
31-016	**For one or more glyphs, the glyph width information in the font dictionary and in the embedded font program differ by more than 1/1000 unit.**	**UA1:7.21.5-1**
31-017	**A non-symbolic TrueType font is used for rendering, but none of the cmap entries in the embedded font program is a non-symbolic cmap.**	**UA1:7.21.6-1**
31-018	**A non-symbolic TrueType font is used for rendering, but for at least one glyph to be rendered the glyph cannot be looked up by any of the non-symbolic cmap entries in the embedded font program.**	**UA1:7.21.6-2**
31-019	**The font dictionary for a non-symbolic TrueType font does not contain an Encoding entry.**	**UA1:7.21.6-3**
31-020	**The font dictionary for a non-symbolic TrueType font contains an Encoding dictionary which does not contain a BaseEncoding entry.**	**UA1:7.21.6-4**
31-021	**The value for either the Encoding entry or the BaseEncoding entry in the Encoding dictionary in a non-symbolic TrueType font dictionary is neither MacRomanEncoding nor WinAnsiEncoding.**	**UA1:7.21.6-5**
31-022	**The Differences array in the Encoding entry in a non-symbolic TrueType font dictionary contains one or more glyph names which are not listed in the Adobe Glyph List.**	**UA1:7.21.6-6**
31-023	**The Differences array is present in the Encoding entry in a non-symbolic TrueType font dictionary but the embedded font program does not contain a (3,1) Microsoft Unicode cmap.**	**UA1:7.21.6-7**
31-024	**The Encoding entry is present in the font dictionary for a symbolic TrueType font.**	**UA1:7.21.6-8**
31-025	**The embedded font program for a symbolic TrueType font contains no cmap.**	**UA1:7.21.6-9**
31-026	**The embedded font program for a symbolic TrueType font contains more than one cmap, but none of the cmap entries is a (3,0) Microsoft Symbol cmap.**	**UA1:7.21.6-10**

NUMBER	DESCRIPTION	REFERENCE
31-027	**A font dictionary does not contain the ToUnicode entry and none of the following is true: the font uses MacRomanEncoding, MacExpertEncoding or WinAnsiEncoding; the font is a Type 1 or Type 3 font and the glyph names of the glyphs referenced are all contained in the Adobe Glyph List or the set of named characters in the Symbol font, as defined in ISO 32000-1:2008, Annex D; the font is a Type 0 font, and its descendant CIDFont uses Adobe-GB1, Adobe-CNS1, Adobe-Japan1 or Adobe-Korea1 character collections; the font is a non-symbolic TrueType font.**	**UA1:7.21.7-1**
31-028	**One or more Unicode values specified in the ToUnicode CMap are zero (0).**	**UA1:7.21.7-2**
31-029	**One or more Unicode values specified in the ToUnicode CMap are equal to either U+FEFF or U+FFFE.**	**UA1:7.21.7-3**
31-030	**One or more characters used in text showing operators reference the .notdef glyph.**	**UA1:7.21.8-1**

It is possible that reprocessing the file with `gs` using `cpdf in.pdf -gs gs -gs-malformed-force -o out.pdf [-gs-quiet]` will correct the fonts.

Chapter 20

Redaction

```
cpdf -redact
     [-redact-structure remove,all] [-redact-bookmarks remove,page]
     [-redact-links remove,page] in.pdf [<range>] -o out.pdf

cpdf -redact-shape <rectangle> [application options]
     in.pdf [<range>] -o out.pdf
cpdf -redact-apply [application options] in.pdf -o out.pdf
cpdf -redact-apply-type <type> [application options] in.pdf -o out.pdf
cpdf -annotate <rectangle> [annotation options] in.pdf -o out.pdf
cpdf -remove-search-index in.pdf -o out.pdf
cpdf -remove-marked-content in.pdf [<range>] -o out.pdf
cpdf -remove-acroform in.pdf -o out.pdf
cpdf -remove-struct-tree in.pdf -o out.pdf
cpdf -ocg-remove in.pdf -o out.pdf
```

Redaction application options:

`-color <color>` *(see Chapter 8 for color specifications)*
`-opacity <n>` *(see Chapter 8)*
`-linewidth <n>` *(see Chapter 8)*
`-underneath` *(see Chapter 8)*
`-outline` *(see Chapter 8)*
`-jbig2dec <path>` *when chopping images only*
`-jbig2enc <path>` *when chopping images only*
`-magick <path>` *when chopping images only*
`-redact-no-show`
`-redact-text [remove|leave],[touches|encloses]`
`-redact-images [remove|chop|leave],[touches|encloses|covers<n>]`
`-redact-inline-images [remove|leave],[touches|encloses| covers<n>]`
`-redact-vectors [remove|leave],[touches|encloses|covers<n>]`
`-redact-annotations [remove|leave],[touches|encloses|covers<n>]`
`-redact-bookmarks [remove|leave],[page|touches]`

```
-redact-links [remove|leave],[page|touches]
-redact-structure [remove|leave],[all|innermost|containing]
-redact-apply-appearance
-redact-invert
```

Redaction annotation creation options:

`-redact-color <color>` *(see Chapter 8 for color specifications)*
`-redact-outline-color <color>` *(see Chapter 8)*
`-redact-text-color <color>` *(see Chapter 8)*
`-redact-opacity` *Opacity for redaction fill and outline (see below for text opacity)*

```
-redact-overlay <text>
-redact-repeat
-redact-auto-size
-font <font>
-fontsize <n>
-opacity <n>
-linespace <n>
-outline <n>
-linewidth <n>
```

Redaction removes content from a PDF, erasing it entirely rather than merely covering it up.

20.1 Redacting whole pages

To redact one or more whole pages we give the page range we use `-redact`. Such pages will be emptied of content, and any annotations and page resources removed. The page dimensions remain the same.

```
cpdf -redact in.pdf 1,2,19-end -o out.pdf
```

Redact pages 1,2 and 19-end of `in.pdf`, writing to `out.pdf`

If `-redact-structure remove,all` is added to the command, the document's structure tree will be shorn of any parts which are marked as relating to the now-redacted pages. We can add `-redact-bookmarks remove,page` to remove bookmarks linking to the page range, and `-redact-links remove,page` to remove any hyperlink in the whole PDF pointing to any redacted page.

20.2 Redacting content selectively

The `-redact-shape` operation allows a shape (presently just a rectangle) to be redacted in the given page range. For example:

```
cpdf -redact-shape "100 100 200 300" in.pdf 2 -o out.pdf
```

Redact rectangle on page 2 of `in.pdf`, writing to `out.pdf`

The rectangle is given as "minx miny width height" as usual. What content is removed, and how it is detected and processed is defined by a number of options:

Option	Values	Default value
`-redact-text`	`[remove|leave], [touches|encloses|covers<n>]`	`remove,touches`
`-redact-images`	`[remove|chop|leave], [touches|encloses|covers<n>]`	`leave`
`-redact-inline-images`	`[remove|leave], [touches|encloses|covers<n>]`	`leave`
`-redact-vectors`	`[remove|leave], [touches|encloses|covers<n>]`	`leave`
`-redact-annotations`	`[remove|leave], [touches|encloses|covers<n>]`	`leave`

The specification is made of two parts – the first required, the second optional. For the first, the `remove` specifier will remove matching content, `leave` will leave the content unredacted, and `chop` – for images only – will cut out the part of the image to be redacted. For the second, the `touches` specifier will consider any content intersecting with the redaction rectangle, whereas `encloses` will consider only such content as is fully enclosed within the redaction rectangle. The `covers` specifier insists the redaction rectangle cover at least the given percentage of the content (e.g `covers80` for 80%). The default is `touches`. NB: Intersecting and enclosed and covers here refer to operations on the rectangular bounding boxes of glyphs, images, paths etc. The exact shapes are not used.

The appearance of the redaction is governed by the options `-color` (default black, format described in Chapter 8), `-outline` (default filled), `-linewidth`, `-underneath`, `-opacity`, and in the alternative `-redact-no-show` (omit the redaction appearance entirely).

The options `-jbig2enc`, `-jbig2dec`, and `magick` may be required when `-redact-image` is in `chop` mode. The `magick` program is always required; `-jbig2dec` and `-jbig2enc` only where the file contains JBIG2 images.

20.3 Applying redaction annotations

Annotations denoting future redactions can be added to a PDF in Adobe Acrobat or other interactive PDF software. Cpdf can apply these annotations to perform the redaction. To apply existing annotation redactions:

```
cpdf -redact-apply in.pdf 2 out.pdf
```

Apply redaction annotations on page two of `in.pdf`, writing to `out.pdf`

The redaction application appearance options described above may be used here too. Or, if we supply `-redact-show-appearance` the redaction annotation's own appearance will be used instead.

If the interactive software you are using to demarcate the annotations does not know about redaction annotations, you can use a different kind of annotation and Cpdf will use that annotation's bounding box as the redaction rectangle:

```
cpdf -redact-apply-type /Square in.pdf 2 out.pdf
```

Apply Square (rectangle) annotations as if they were redaction annotations in `in.pdf`, writing to `out.pdf`

As above, the redaction itself is controlled through the options as `-redact-text`, `-redact-images` and so on.

20.4 Creating redaction annotations

To add new redaction annotations, we may write

```
cpdf -annotate "100 100 200 300" in.pdf 1 out.pdf
```

Add a redaction annotation to page 1 of `in.pdf`, writing to `out.pdf`

Recall that this does not redact content, merely marks it for future redaction.

By default, the redaction shows as a black filled rectangle with a dark red outline. We can change this with `-redact-color` and `-redact-outline-color` and `-redact-opacity`.

We can add text to, for example, show which rule required the redaction, with `-redact-overlay`:

```
cpdf -annotate "100 100 200 300" -redact-overlay "(b) (1) (A)"
     in.pdf 1 out.pdf
```

Add a description redaction annotation to page 1 of `in.pdf`, writing to `out.pdf`

The text colour may be changed with `-redact-text-color`. Another use of overlay text is to add repeated text to show where text has been redacted. We can do this by adding `-redact-repeat`. The text will be repeated, interspersed with spaces. To auto-size the text to the width of the redaction annotation, we can add `-redact-auto-size`. Where both `-redact-repeat` and `-redact-auto-size` are present, the given text is interspersed with newlines instead, each repetition scaled to fit one line.

The following options from Chapter 8 may be used to style the text: `-font`, `-fontsize`, `-opacity`, `-linespace`, `-outline`, `-linewidth`.

20.5 Removing other metadata

Even when we have removed the required page content, it may leak in other places. For example, bookmarks or links which point to the redacted content or in PDF/UA logical structure. Cpdf provides options to be added to all redaction commands (such as `-redact-shape`) to redact such data:

Option	Values	Default value
`-redact-bookmarks`	`[remove|leave], [page|touches]`	`leave`
`-redact-links`	`[remove|leave], [page|touches]`	`leave`
`-redact-structure`	`[remove|leave], [all|innermost|containing]`	`leave`

For example, to remove bookmarks which link to the redacted areas, use `-redact-bookmarks remove,touches`. To remove links from other pages which point to anywhere on the page where content has been redacted, use `-redact-links remove,page`.

To erase structure content (which may include the same text as text on the page content itself) we use `-redact-structure`. The `remove,all` specification erases all structure item text on the page. The `remove,containing` removes all structure item text enclosing the redacted content. The `remove,innermost` removes just the innermost enclosing structure. The structure is left intact, so PDF/UA compliance is preserved, but any text which has been redacted will be removed also from the structure.

Three other options can help to remove metadata from a file where it might contain information we do not wish to release. To remove the search index:

```
cpdf -remove-search-index in.pdf -o out.pdf
```

Remove the proprietary Adobe search index from a document

To remove marked content, proprietary or otherwise from all content streams in the document (NB: will void PDF/UA status).

```
cpdf -remove-marked-content in.pdf -o out.pdf
```

Remove all marked content from PDF streams.

To remove the structure tree wholesale (NB: will void PDF/UA status):

```
cpdf -remove-struct-tree in.pdf -o out.pdf
```

Remove all marked content from PDF streams.

To remove any AcroForm from the document:

```
cpdf -remove-acroform in.pdf -o out.pdf
```

Remove AcroForm.

And one more from elsewhere in this manual:

```
cpdf -ocg-remove in.pdf -o out.pdf
```

Remove the optional content structure from a document. See Chapter 16 for details.

20.6 Evidence of redaction

There are several ways to check that redaction has proceeded as we would have wished:

Inversion Adding `-redact-invert` and writing to another PDF will keep all objects redaction would lose, and lose all objects redaction would keep. Each object (image, vector, glyph) ends up only the redacted or inverted output (note that images are never chopped with `-redact-invert` the specifier `chop` is considered the same as `remove` in this context).

Page content JSON Page content can be extracted with `-page-content` as described in Section 21.15 for the redacted and unredacted file, and a comparison made.

Full JSON To check metadata as well, we can use `-output-json` from Chapter 15 and compare the output on redacted and unredacted files.

Text extraction Whilst Cpdf does not yet have text extraction facilities, you can use another text extraction program to extract the text from the original file and the redacted file and check the differences.

Image extraction Cpdf's image listing and extraction facilities (see Chapter 13) may be used to check that images have been redacted when in `chop` mode, and that no hidden images or image masks have survived.

Structure tree extraction Cpdf's `-extract-struct-tree` (see Chapter 19) may be used to verify the erasure of text in structure tree nodes referring to redacted content.

Chapter 21

Miscellaneous

```
cpdf -draft [-boxes] [-draft-remove-only <n>] in.pdf [<range>] -o out.pdf

cpdf -remove-all-text in.pdf [<range>] -o out.pdf

cpdf -blacktext in.pdf [<range>] -o out.pdf
cpdf -blacklines in.pdf [<range>] -o out.pdf
cpdf -blackfills in.pdf [<range>] -o out.pdf
cpdf -reveal-text in.pdf [<range>] -o out.pdf

cpdf -thinlines <min thickness> in.pdf [<range>] -o out.pdf

cpdf -clean in.pdf -o out.pdf

cpdf -set-version <version number> in.pdf -o out.pdf

cpdf -copy-id-from source.pdf in.pdf -o out.pdf

cpdf -remove-id in.pdf -o out.pdf

cpdf -list-spot-colors in.pdf

cpdf -print-dict-entry <key> [-json]  in.pdf

cpdf -remove-dict-entry <key> [-dict-entry-search <term>]
      in.pdf -o out.pdf

cpdf -replace-dict-entry <key> -replace-dict-entry-value <value>
     [-dict-entry-search <term>] in.pdf -o out.pdf

cpdf -remove-clipping [<range>] in.pdf -o out.pdf

cpdf -obj[-json] <object specification> in.pdf

cpdf -replace-obj <object specification>=<object> in.pdf -o out.pdf
cpdf -remove-obj <object number> in.pdf -o out.pdf

cpdf -extract-stream[-decompress] <object specification>
     in.pdf [-o out.dat | -stdout]

cpdf -replace-stream <object specification>
     -replace-stream-with <filename>
     in.pdf -o out.pdf
```

```
cpdf -contains-javascript in.pdf
cpdf -remove-javascript in.pdf -o out.pdf

cpdf -show-bboxes [-light] in.pdf [<range>] -o out.pdf
cpdf -show-bboxes-shape <boxspec> [-light] in.pdf [<range>] -o out.pdf

cpdf -page-content [-pc-no-images] [-pc-no-graphics] [-pc-no-text]
      in.pdf [<range>] -o out.json
```

21.1 Draft Documents

The `-draft` operation removes bitmap (photographic) images from a file, so that it can be printed with less ink. Optionally, the `-boxes` option can be added, filling the spaces left blank with a crossed box denoting where the image was. This is not guaranteed to be fully visible in all cases (the bitmap may be have been partially covered by vector objects or clipped in the original). For example:

```
cpdf -draft -boxes in.pdf -o out.pdf
```

To remove a single image only, specify `-draft-remove-only`, giving the name of the image obtained by a call to `-list-images-used` as described in Section 13.2 and giving the appropriate page or page range. For example:

```
cpdf -draft -boxes -draft-remove-only "/Im1" in.pdf 7 -o out.pdf
```

Note that this is only appropriate if the image is not used by pages outside the range. Check this by cross-referencing object numbers in the output of `-list-images[-used]`. To remove text instead of images, use the `-remove-all-text` operation:

```
cpdf -remove-all-text in.pdf -o out.pdf
```

21.2 Blackening Text, Lines and Fills

Sometimes PDF output from an application (for instance, a web browser) has text in colors which would not print well on a grayscale printer. The `-blacktext` operation blackens all text on the given pages so it will be readable when printed.

This will not work on text which has been converted to outlines, nor on text which is part of a form.

```
cpdf -blacktext in.pdf -o out.pdf
```

The `-blacklines` operation blackens all lines on the given pages.

```
cpdf -blacklines in.pdf -o out.pdf
```

The `-blackfills` operation blackens all fills on the given pages.

```
cpdf -blackfills in.pdf -o out.pdf
```

Contrary to their names, all these operations can use another color, if specified with `-color`.

The operation `-reveal-text` will change the text rendering mode of all text to 0 (stroke and fill). This should reveal hidden text. Note that hidden text added by an OCR program may have no associated font glyph data, and so will not re-appear:

```
cpdf -reveal-text in.pdf -o out.pdf
```

Using `-reveal-text` prior to `-blacktext` will reveal all possible text.

21.3 Hairline Removal

Quite often, applications will use very thin lines, or even the value of 0, which in PDF means "The thinnest possible line on the output device". This might be fine for on-screen work, but when printed on a high resolution device, such as by a commercial printer, they may be too faint, or disappear altogether. The `-thinlines` operation prevents this by changing all lines thinner than `<minimal thickness>` to the given thickness. For example:

```
cpdf -thinlines 0.2mm in.pdf [<range>] -o out.pdf
```

Thicken all lines less than 0.2mm to that value.

A negative value will instead thin lines to the absolute of the value given. By processing twice, with a positive then negative figure, it is therefore possible to clamp thicknesses to a range or single value.

21.4 Garbage Collection

Sometimes incremental updates to a file by an application, or bad applications can leave data in a PDF file which is no longer used. This function removes that unneeded data.

```
cpdf -clean in.pdf -o out.pdf
```

NB: This operation is deprecated. This work is now done by default upon writing any file.

21.5 Change PDF Version Number

To change the pdf version number, use the `-set-version` operation, giving the part of the version number after the decimal point. For example:

```
cpdf -set-version 4 in.pdf -o out.pdf
```

Change file to PDF 1.4.

This does not alter any of the actual data in the file — just the supposed version number. For PDF versions starting with 2 add ten to the number. For example, for PDF version 2.0, use `-set-version 10`.

21.6 Copy ID

The `-copy-id-from` operation copies the ID from the given file to the input, writing to the output.

```
cpdf -copy-id-from source.pdf in.pdf -o out.pdf
```

Copy the id from `source.pdf` to the contents of `in.pdf`, writing to `out.pdf`.

If there is no ID in the source file, the existing ID is retained. You cannot use `-recrypt` with `-copy-id-from`.

21.7 Remove ID

The `-remove-id` operation removes the ID from a document.

```
cpdf -remove-id in.pdf -o out.pdf
```

Remove the ID from `in.pdf`, writing to `out.pdf`.

You cannot use `-recrypt` with `-remove-id`.

21.8 List Spot Colours

This operation lists the name of any "separation" color space in the given PDF file.

```
cpdf -list-spot-colors in.pdf
```

List the spot colors, one per line in `in.pdf`, writing to `stdout`.

21.9 PDF Dictionary Entries

This is for editing data within the PDF's internal representation. Use with caution. To print a dictionary entry:

```
cpdf -print-dict-entry /URI in.pdf
```

Print all URLs in annotation hyperlinks in `in.pdf`, one per line.

To report data in JSON format, add `-json`. To remove a dictionary entry:

```
cpdf -remove-dict-entry /One in.pdf -o out.pdf
```

Remove the entry for `/One` in every dictionary `in.pdf`, writing to `out.pdf`.

```
cpdf -remove-dict-entry /One -dict-entry-search "\{I : 1\}"
     in.pdf -o out.pdf
```

Replace the entry for `/One` in every dictionary `in.pdf` if the key's value is the given CPDFJSON value, writing to `out.pdf`. Alternatively, prefix `PDF` to give the value in PDF format.

To replace a dictionary entry, give the replacement value in JSON or format:

```
cpdf -replace-dict-entry /One -replace-dict-entry-value "PDF2"
     in.pdf -o out.pdf
```

Remove the entry for `/One` in every dictionary `in.pdf`, writing to `out.pdf`.

```
cpdf -replace-dict-entry /One -dict-entry-search "\{I : 1\}"
     -replace-dict-entry-value "\{I : 2\}" in.pdf -o out.pdf
```

Remove the entry for `/One` in every dictionary `in.pdf` if the key's value is the given value, writing to `out.pdf`.

21.10 Removing Clipping

The `-remove-clipping` operation removes any clipping paths on given pages from the file.

```
cpdf -remove-clipping in.pdf -o out.pdf
```

Remove clipping paths in `in.pdf`, writing to `out.pdf`.

21.11 Exploring PDFs

The `-obj` operation prints an object to standard output, given the object number. Number 0 is the trailer dictionary, so we begin there:

```
$ cpdf -obj 0 in.pdf
<</Root 1256 0 R/Length 588/ID[('\029\\t>\249\157\182F_\153V\175z[\234\196)
('\029\\t>\249\157\182F_\153V\175z[\234\196)]/Info 1351 0 R/Size 1406>>

$ cpdf -obj 1256 in.pdf
<</OpenAction 1238 0 R/PageLabels<</Nums[0<</S/r>>16<</S/D>>]>>/PageMode
/UseOutlines/Names 924 0 R/Outlines 838 0 R/Pages 851 0 R/Type/Catalog>>

$ cpdf -obj 1238 out.pdf
<</D[1225 0 R/Fit]/S/GoTo>>
```

Alternatively, we may follow a chain of dictionary entries from the trailer dictionary:

```
$ ./cpdf -obj /Root/Pages/Count cpdfmanual.pdf
133
```

Or, from a given object number:

```
$ ./cpdf -obj 1256/PageLabels/Nums cpdfmanual.pdf
[0<</S/r>>16<</S/D>>]
```

We may also begin at a numbered page instead of at the trailer dictionary:

```
./cpdf -obj P20/Resources/Font/F58/BaseFont cpdfmanual.pdf
/MCBERL+URWPalladioL-Roma
```

To output data in JSON format instead of PDF format, use `-obj-json` instead:

```
./cpdf -obj-json 140/Prev/Prev/Prev cpdfmanual.pdf
{ "/Title": 129, "/A": 126, "/Parent": 112, "/Prev": 124, "/Next": 132 }
```

We can follow array entries as well as dictionary entries by giving the index number into the array - here object 0 (the trailer dictionary), dictionary entry `/ID`, index number 0:

```
./cpdf -obj 0/ID/[0] hello.pdf
(\232\20625\030\179/\176q:O\202\135\176u\137)
```

A stream may be extracted with `-extract-stream` or `-extract-stream-decompress`, which decompresses it first where possible:

```
$ cpdf -obj 0 hello.pdf
<</Size 4/Root 4 0 R/ID[(\232\20625\030\179/\176q:O\202\135\176u\137)
(\232\20625\030\179/\176q:O\202\135\176u\137)]>>

$ cpdf -obj 4 hello.pdf
<</Type/Catalog/Pages 1 0 R>>

$ cpdf -obj 1 hello.pdf
<</Type/Pages/Kids[3 0 R]/Count 1>>

$ cpdf -obj 3 hello.pdf
<</Type/Page/Parent 1 0 R/Resources<</Font<</F0<</Type/Font/Subtype/Type1
```

```
/BaseFont/Times-Italic>>>>>>/MediaBox[0 0 595.275590551 841.88976378]
/Rotate 0/Contents[2 0 R]>>

$ cpdf -extract-stream-decompress 2 hello.pdf -stdout
1 0 0 1 50 770 cm BT/F0 36 Tf(Hello, World!)Tj ET
```

By these mechanisms, ad-hoc exploration of PDF files is possible.

We may also edit dictionary entries with `-replace-obj` by giving an object specification, and the new value in JSON or PDF format (prefix with "PDF" to denote PDF format):

```
cpdf -replace-obj /Root/MarkInfo/Marked=true in.pdf -o out.pdf
```

Replace or add dictionary entry in `in.pdf`, writing to `out.pdf`.

```
cpdf -replace-obj '/Root/Info/Title=PDF(New title)' in.pdf -o out.pdf
```

Replace or add dictionary entry in `in.pdf`, writing to `out.pdf`.

Any part of the object specification not already present will be fabricated using direct nested dictionaries. For example, if `/MarkInfo` does not exist in the root dictionary, this command adds `/MarkInfo <</Marked true>>` to the root dictionary.

An object may be remove with `-remove-obj`:

```
cpdf -remove-obj 6 in.pdf -o out.pdf
```

Remove object 6 from `in.pdf`, writing to `out.pdf`.

Stream contents may be replaced with `-replace-stream`:

```
cpdf -replace-stream 4 -replace-stream-with in.dat in.pdf -o out.pdf
```

Replace stream object 4's contents with the contents of `in.dat`.

The stream dictionary is unaffected, save for any correction to its length entry.

21.12 JavaScript and PDF

We can see if a PDF contains any JavaScript scripts or `javascript:` URIs:

```
cpdf -contains-javascript in.pdf -o out.pdf
```

Prints `true` if the PDF contains JavaScript, `false` otherwise.

We can remove any such from the PDF:

```
cpdf -remove-javascript in.pdf -o out.pdf
```

Remove JavaScript from `in.pdf`, writing to `out.pdf`.

21.13 Debugging tools

Some extra options are available to aid debugging of Cpdf and PDF output:

```
cpdf -debug in.pdf ...
```

Show debug information.

```
cpdf -debug-crypt in.pdf ...
```

Show extra debug information to do with encryption.

```
cpdf -debug-malformed in.pdf ...
```

Treat file as if malformed.

```
cpdf -debug-stderr-to-stdout in.pdf ...
```

Intermingle `stderr` and `stdout` output on `stdout`.

```
cpdf -debug-readable-ops in.pdf ...
```

Use newlines instead of spaces in page stream content.

```
cpdf -stay-on-error in.pdf ...
```

Do not call `exit()` after an error.

And one operation:

```
cpdf -remove-stream-content in.pdf -o out.pdf
```

Remove stream content when writing. This will create a document which is malformed, but easier to navigate in a text editor.

21.14 Showing object bounding boxes

We can show the content which makes up each page by showing the bounding box of each path, glyph, image, inline image, shading, and clipping region:

```
cpdf -show-bboxes in.pdf -o out.pdf
```

Here are the colours:

Object	Colour
Path	Blue
Glyph	Black
Image	Green
Inline image	Red
Shading	Cyan
Clip	Black, dashed.

The option `-light` may be specified to use lighter versions of these colours if the PDF in question is dark.

To show only such boxes as lie within a given rectangle (for example, those which may be redacted by a redaction annotation covering that region), use `-show-bboxes-shape` instead:

```
cpdf -show-bboxes-shape "50 50 200 300" in.pdf -o out.pdf
```

21.15 Extracting page content

The `-page-content` operation outputs JSON describing the graphic objects, text, and images on the given pages of the given PDF:

```
cpdf -page-content in.pdf -o out.json
```

Since such output can be very large, the options `-pc-no-text`, `-pc-no-graphics` and `-pc-no-images` may be used to suppress unwanted elements.

In the future, this JSON format will contain enough information to modify and round-trip page content.

Appendix A

Dates

A.1 PDF Date Format

Dates in PDF are specified according to the following format:

```
D:YYYYMMDDHHmmSSOHH'mm'
```

where:

- `YYYY` is the year;
- `MM` is the month;
- `DD` is the day (01-31);
- `HH` is the hour (00-23);
- `mm` is the minute (00-59);
- `SS` is the second (00-59);
- `O` is the relationship of local time to Universal Time (UT), denoted by '+', '-' or 'Z';
- `HH` is the absolute value of the offset from UT in hours (00-23);
- `mm` is the absolute value of the offset from UT in minutes (00-59).

A contiguous prefix of the parts above can be used instead, for lower accuracy dates. For example:

`D:2014` (2014)
`D:20140103` (3rd January 2014)

`D:201401031854-08'00'` (3rd January 2014, 6:54PM, US Pacific Standard Time)

A.2 XMP Metadata Date Format

These are the possible data formats for `-set-metadata-date`:

```
YYYY
YYYY-MM
YYYY-MM-DD
YYYY-MM-DDThh:mmTZD
YYYY-MM-DDThh:mm:ssTZD
```

where:

`YYYY`	year
`MM`	month (01 = Jan)
`DD`	day of month (01 to 31)
`hh`	hour (00 to 23)
`mm`	minute (00 to 59)
`ss`	second (00 to 59)
`TZD`	time zone designator (`Z` or `+hh:mm` or `-hh::mm`)

Appendix B

Change logs

B.1 Cpdf Change Log

```
2.9.3 (October 2026)

New features

* Remove search index with -remove-search-index
* Add -annot-type to -list-annotations-json to filter
* Remove all optional content with -ocg-remove
* Remove marked content with -remove-marked-content
* Optionally apply appearance of a redaction annotation
* Remove AcroForm with -remove-acroform
* Remove bookmarks and links to redacted content
* Flatten annotations with -flatten-annotations

Extended features:

* Erase or filter text sections post-redaction
* Add /NM, /M and /QuadPoints to redaction annotations
* More finely controlled redaction with 'covers' specification
* Create and style overlay text for redaction annotations
* Text styling (e.g colours) works for -typeset, -toc etc.

* = Supported by a grant from NLnet

2.9.2 (September 2026)

New features:

* Redact documents with -redact-shape
* Apply redaction annotations with -redact-apply
* Apply other annotations as redactions with -redact-apply-type
* Create redaction annotations with -add-annotation

Fixes:

o Reprocessing an RGB JPEG could resulting in a grayscale JPEG, leading to a
malformed PDF.
```

```
* = Supported by a grant from NLnet

2.9.1 (May 2026)

New features:

o Print number of revisions in a PDF with -revisions
o Choose which revision to load with -revision
o Update a PDF by appending with -update
o Show digital signature information with -sig-info
o Add attached files from JSON data
o Add page labels from JSON data
o List OCGs in JSON form with -ocg-list-json
o Edit & round-trip OCGs with -ocg-replace
o Remove stream content for debug
* Show bounding boxes of page content with -show-bboxes
o Suppress adjacent identical errors
* Export basic page content as JSON

Extended features:

o Operations -relative-to-[bleed|art|trim]box as well as crop
o Document all debug functions in -summary
o Rotate text for -add-text using -text-[90|180|270].
o Optionally add a border to URLs in -add-text
o %URL now works with diagonal text
o Identify custom encodings in -list-fonts

Fixes:

o -midline and -topline now work properly for custom fonts
o -summary goes to stdout
o Correct parent links for non-dests in -set-annotations

* = Supported by a grant from NLnet

2.9 (March 2026)

New features:

o Cpdf now has a man page, which abbreviates cpdfmanual.pdf
o More sensible -help (current -help moved to -summary)
o Detect and remove JavaScript
o Show progress on long files
o Create PDF portfolios
o Remove procsets, article threads, page pieces
o Remove web capture, output intents, alternate images
o Reprocess JPEG2000s within files
o Convert lossless images to JPEG2000
o Remove all metadata streams
o Extract all metadata streams to file
o Allow the empty range
o Allow a range specifying some pages which do not exist
o Extract a single image with -extract-single-image

Extended features:

o CCITT and CCITTG4 encoders in -process-images
```

```
o Force image processing even when image larger
o -thinlines can ensure maximum as well as minimum thickness
o New -just-content for easier content stream debugging
o -squeeze processes xobjects inside xobjects
o Speed increases for -squeeze on huge files
o Select only such pages as are annotated
o Allow -create-pdf and friends to appear in middle of AND
o -draw can use JPEG2000s
o New -list-attached-files -json optionally including file data
o List and add descriptions and relationships for attachments
o Process lossless CMYK images
o Use 8bpp Alpha PNGs with -rasterize, -output-image, -png and when drawing
o -list-images and friends show mask status, and list masks
o -list-images and friends now list inline images
o -list-images now distinguishes types of CCITT encoding
o -list-images now distinguishes lossy and lossless JBIG2
o Extract inline images
o Extract soft masks
o Optionally combine soft marks with image when extracting images
o Decompress can decompress JBIG2 encoded streams with jbig2dec

Fixes:

* Sanitizes inputs to prevent command injection attacks
o Fix PMAXX et al. w.r.t -add-rectangle
o Allow Float/Int to appear anywhere in CPDFJSON / bookmark JSON
o Allow -info in the case where objstm reading requires password
o Allow -stdin in -info and in -merge (once)
o Cpdfimages was accidentally creating palettised PNGs
o Page label prefixes now in UTF8
o Regression where bookmarks were being corrupted
o Removes the dependency on wmic for reading the date.
o -pad-after, -pad-before were failing if range not sorted

* = Supported by a grant from NLnet

2.8.1 (April 2025)

New features:

* -remove-struct-tree removes whole structure tree
* -mark-as-artifact marks a whole file as an artifact

Extended features:

o -obj JSON output
* -obj/-obj-json can follow a chain from an object number
* -obj/-obj-json can explore through arrays and name/number trees
* -print-dict-entry, -remove-dict-entry and -replace-dict-entry
  can follow a chain from each found dictionary entry
* Much more of the PDF/UA Matterhorn verification suite implemented
* PDF/UA verifier now returns extra information with most failures
* Font lister now returns the font itself
o Allow %objnum in output name for -extract-images
* -show-boxes, -trim-marks, -table-of-contents, -add-text
  -add-rectangle, -impose, -twoup, -twoup-stack now preserve
  PDF/UA and PDF/UA-2 compatibility
* Preserve PDF/UA and PDF/UA-2 when drawing on existing PDF
```

```
* Preserve PDF/UA and PDF/UA-2 with -stamp-on and -combine-pages
o Allow -scale-stamp-to-fit for -combine-pages
* Allow -underneath for -combine-pages
* Preserve roundtripping of names destinations / actions
* -preserve-actions allows PDF/UA-2 style roundtripping of
  outlines

Fixes:

o Harden auto-compression against malformed streams
o Add backup JPEG dimensions method in Cpdfimage
o Correct object stream behaviour when splitting
o Fix margin calculation for -table-of-contents

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2.8 (December 2024)

New features:

o New -center-to-fit centres pages on a given paper size
o New -jpeg-to-jpeg-scale and -jpeg-to-jpeg-dpi
o Rasterize PDFs by calling out to GhostScript
o Extract pages as PNG/JPEG by calling out to GhostScript
o Replace stream content with -replace-stream

Extended features:

o Expand page characteristics to cover Art, Trim, Bleed
o Add Piece Info to -composition[-json]
o Add @b<n>@ for trimming bookmark text to given length
o Allow bold, italic, colours for JSON bookmarks
o Show OpenAction in -info
o Show more form information in -info
o Allow JSON / PDF syntax in dict processing and object exploration
o Show %Bookmark text when stamping text
o Change units for -info[-json] and -page-info[-json]
o Optionally add dot leaders to tables of content
o Add -collate-n to extend -collate to multiple pages at once

Fixes:

o Clean up @B implementation for -split-on-bookmarks
o -merge-add-bookmarks now has proper titles for images
o Font operations now include fonts within xobjects
o Image extraction now includes images within xobjects within xobjects
* HTML manual now ranks equally with PDF manual

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2.7.2 (October 2024)

New features:

* New -args-json for better control files
* New -replace-obj to edit dictionary entries via chain
* Create PDF/UA files from scratch with -create-pdf-ua-[1|2]
* Create structure information for files with -draw
```

```
* Draw can now make paragraphs with -para, -paras
* Add structure information to -typeset
* -typeset can make PDF/UA documents
* -jpeg, -png and friends can make PDF/UA documents
* Merge PDF/UA-1 and PDF/UA-2 files, preserving standards compliance
o -stretch scales without preserving aspect ratio
o -redact removes whole pages

Extended features:

o Rectangles may be specified as x y x' y' rather than x y w h

Fixes:

o Removed setting of Producer field in AGPL version
* Removed long-deprecated -control
* More compact -print-struct-tree
o -image-resolution-json was listing all images

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2.7.1 (July 2024)

New features:

o Build PDF files from JPEG2000 (.jp2, .jpf/.jpx) files
* Mark a file as PDF/UA compliant, or remove such marking
* Partial verification to PDF/UA via the Matterhorn protocol
* Extract, edit and reapply document structure tree
* Print structure tree summary
* Split structure tree when splitting PDF to save size
* Combine structure trees when merging or stamping PDFs
* Set the natural language of a file

Extended features:

o Allow -obj to look up nested PDF information
* Merge structure trees better when merging files
* Report top-level natural language on -info
* Report mark information dictionary contents on -info

Backward-incompatible change:

* -process-struct-tree replaces -no-process-struct-tree
newly introduced in previous version

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2.7 (February 2024)

New features:

o Split files to max size with -split-max
o Spray splits a file to multiple outputs by alternating pages
o List document and page info in JSON format
o List page labels in JSON format
```

```
o List fonts in JSON format
o Identify PDF/A, PDF/X, PDF/E, PDF/VT, PDF/UA in -info
o Identify AcroForm in -info
o Extract font files from a document
o List images on a page with -list-images[-json]
o Chop pages up into sections with -chop
o Build PDF files from JBIG2 streams, including globals
o Reprocess images within PDFs to further compress them
o Extract streams to disk
o Explore PDFs by printing objects
o Shift page boxes with -shift-boxes

Extended features:

o -list-images-used[-json] extends -image-resolution
o Use -raw with -extract-images to get PNMs
o -extract-images can extract JBIG2 images and their globals
o More PNGs - greyscale 1, 2, 4, 8, 16bpp and RGB 16bpp
o Report number of annotations in -page-info
o Specify image based only on file extension
o -squeeze updates old compression methods
o Show page size summary in -info
o Add -no-process-struct-trees to prevent merging of structure trees

Fixes:

o Added opam file in-source
o Fixed -set-annotations with page links
o Allow Exif JPEGs as well as JFIF ones in -jpeg and -draw-jpeg
o Only compress a stream if it actually makes it smaller


2.6.1 (September 2023)

o Fixed regression in UTF8 text with -add-text


2.6 (July 2023)

New features:

o Create new PDF documents or draw on existing ones with -draw
o Embed TrueType fonts with -load-ttf
o Embed the 14 standard fonts if requested
o Add links to parts of text with -add-text as %URL[|]
o Convert JPEGs and PNGs to PDFs with -jpeg and -png
o Export, import, and thereby round-trip annotations via JSON
o Show composition of PDF with -composition[-json]
o Use page labels like <iii> and <A-2> in page specifications

Extended features:

o Allow -utf8 with -split-bookmarks -o @B.pdf to produce UTF8 filenames
o -merge-add-bookmarks now works with unicode filenames
o Better transformation of some annotation types
o -list-annotations[-json] now respects page range
o Merge now merges structure trees (tagged PDF)
o Merge now rewrites clashing name tree entries
```

```
o Preserve /GoTo actions in bookmarks when merging
o UTF8 option for JSON output
o -info now shows object stream, /ID data, page mode and layout
o More options for viewer preference control
o More default colours, by using the CSS colour list

Fixes:

o Updated Yojson to remove dependency on Stream, ready for OCaml 5
o -typeset was opening files in text mode, instead of binary
o Fixed behaviour of -squeeze-no-pagedata / -squeeze-no-recompress
o Significant improvements to malformed file reading
o Allow DUP page specifications to use larger numbers
o Reworked functions transforming pages to better preserve patterns


2.5.1 (January 2022)

o Fix a regression where standard fonts could not be chosen


2.5 (January 2022)

New features:

o Can read as well as write PDFs in JSON format with -j
o New operation -typeset typesets a text file as a PDF
o New operation -table-of-contents makes table of contents from bookmarks
o New operations -impose and -impose-xy for document imposition
o New operation -print-font-table gives (charcode, unicode, glyph name) triples
o New -print-dict-entry operation prints values for a given key
o New -replace-dict-entry function to search & replace e.g URLs
o Prepend e.g 2DUP to a page range to make 1,2,3 --> 1,1,2,2,3,3 etc.
o Prepend NOT to a page range to invert it
o Output annotations in JSON form with -list-annotations-json
o Output bookmarks in JSON format with -list-bookmarks-json
o Load bookmarks in JSON format with -add-bookmarks-json
o New option -collate to collate pages when merging
o Text added in existing fonts is now encoding-aware (plus new raw mode)

Extended features:

o Extend -remove-dict-entry to allow search
o Annotation /QuadPoints processed in addition to /Rect when transforming pages
o When adding text or graphics, may choose CYMK or Grey instead of RGB
o The -list-fonts operation now obeys the range
o Can now search for a font by real name with -font
o Basic merging of AcroForms when merging documents
o Add -idir-only-pdfs to restrict -idir to just files ending in .pdf
o Option -debug-force now properly documented as -decrypt-force

Internal changes:

o Switch to Yojson for faster/better JSON input/output
o Environment variable CPDF_REPRODUCIBLE_DATES for testing
o Environment variable CPDF_DEBUG for -debug
o Effectively make stderr unbuffered
o Split cpdf.ml into separate modules
```

```
2.4 (June 2021)

o New operation -extract-images
o New operation -output-json et al. to export PDF files in JSON format
o New operations to manipulate Optional Content Groups
o New operation -stamp-as-xobject to add one PDF as an xobject in another
o Optional Content Groups now preserved when merging / stamping pages
o Listing, coalescing and modfiying Optional Content Groups.
o New -labels-progress option to improve page labels interface
o Appearance streams transformed when transforming annotations
o Bookmark destination positions transformed when transforming pages
o No longer depends on Bigarray or Unix modules


2.3 (patchlevel 1, December 2019)

o Fixed bug which prevented -info working on encrypted files
o Allow -shift with -add-text for additional adjustment
o Prepend and postpend directly to page content streams


2.3 (October 2019)

o Directly set and remove Trim, Art, and Bleed boxes
o Dump attachments to file
o Extended bookmark format, preserving all bookmark information
o New -pad-with, -pad-mutiple-before options
o Set or create XMP metadata
o Remove graphics clipping
o Extended support for reading malformed files
o Embed missing fonts by calling out to gs
o Set bookmarks open to a given level
o Create PDF files from scatch
o Remove single images by name
o Add trim marks


2.2 (patchlevel 1)

o Fix for inability to read null objects in streams
o Workaround for Adobe "Error 21" on re-saving encrypted files
o More efficient bookmark operations on files with many pages
o New operation -hard-box to clip contents to a given box


2.2 (March 2017)

o Perform arithmetic on dimensions when specifying size or position
o Add simple rectangles to PDF to blank things out
o Stamping operations now preserve annotations
o Decryption fully on-demand for speed.
o -keep-l keeps existing linearization status
o -remove-dict-entry to remove the contents of a dictionary entry
o -topline in addition to -midline
o -producer and -creator may be used to alter producer and creator
in conjunction with any other operation
```

```
o -topline and -midline now apply to stamps
o -list-spot-colours
o -bates-at-range and -bates-pad-to
o -print-page-labels
o -squeeze replaces smpdf
o Preserve more sharing of data when doing merges and page alterations


2.1 (December 2014)

o Encryption now much, much faster
o Faster parsing of delayed object streams on large files
o -decompress now leaves object streams decompressed
o Select pages by landscape-ness or portrait-ness in a page range
o New -open-at-page and -open-at-page-fit option to set the open action
o New -recrypt option to re-encrypt output
o Reads XMP metadata and outputs it on -info
o New -center position for text
o -stamp can now use positions, just like stamping text
o Better handling of permissions for files with user passwords
o Linearization excised
o Can encrypt or recrypt output of -split and -split-bookmarks now
o -args replaces -control with better behaviour
o Can scale a stamp to fit before stamping with -scale-stamp-to-fit
```

B.2 CamlPDF Change Log

(CamlPDF is the library Cpdf is based upon)

```
2.9.3 (October 2026)

o Expose Pdfannot.string_of_subtype

2.9.2 (September 2026)

o New CAMLPDF_SHOW_EXT environment variable to show external commands

2.9.1 (May 2026)

o Support reading of file at given revision
o Support writing with incremental update
o Read (extended) and (new) write OCGs
o Flatness graphics parameter now (correctly) real
o Expand definition of Standard Font for malformed files
o Read widths for vertical mode fonts properly
o Allow supression of identical adjacent logs in Pdfe

2.9 (March 2026)

o Add cycle detection in find_pages_quick for malformed files
o CCITT Group 3 encoder (native) and Group 4 encoder (via imagemagick)
o New Pdf.remove_chain
o Check object requires renumbering before doing so (speed)
o Allow extraction of encryption when lack of password prevents reading
o Repair name/number trees with duplicate keys (better)
o Fix bad name detection and improve error message
```

```
o Fix regression where bookmark strings were mangled
o Fix (partially) efficiency of page renumbering on very large files
o Disambiguate annotation object numbers where a page is copied
o Allow optional use of jbig2dec to decode JBIG2 streams
o Failure to decrypt an object due to malformity no longer fatal

2.8.1 (April 2025)

o Pdf.lookup_chain can look within arrays
o Pdf.replace_chain can replace within arrays
o Repair name/number trees with duplicate keys
o Pdfpage.pagenumber_of_target works on GoTo actions
o Allow optional shallow reading of destinations
o Ensure that shallow destinations are transformed
o Empty name now a warning not an error (written as /)

2.8 (December 2024)

o Read and write bookmark colour and flags
o Fixed a bug in Pdfst.renumber_parent_trees
o Only call renumber_parent_trees when processing struct trees

2.7.2 (October 2024)

o Process destination name tree in Pdfpage.pdf_of_pages
o Options to change the whitespace between operators
o Allow writing of comments in streams
o Allow addition of top-level Document in struct tree when merging
o New lookup_chain / replace_chain functions in Pdf
o Revert 2.7 "Remember and reapply inline image decode parameters"

2.7.1 (July 2024)

o Fix sign extension in js_of_ocaml
o Pdfannot expanded to more annotation types
o Extract code to Pdftree module (API subject to change)
o Structure tree optionally trimmed on Pdf.pdf_of_pages
o Structure tree optionally trimmed & merged in Pdfmerge

2.7 (February 2024)

o Add opam file in-source
o Cope with more malformed bookmarks
o Remember and reapply inline image decode parameters
o Pdfimage extracts and stores JBIG2Globals
o Option to compress a stream only if it is made smaller
o Encode predictor for PNG Sub (bpc = 8, 3 components)
o Fix for LZWDecode streams which overfill the table
o New endpage_fast
o Remove some very old unused Pdfimage code
o Reconstruct tree in Pdfpage.pdf_of_pages for better bookmarks
o Cope with predictor dictionary not being end of inline image dictionary

2.6 (July 2023)

Merging improvements:
o Keep major PDF version number
o Merge /StructTreeRoot entries (Structure hierarchy / Tagged PDF)
```

```
o Disambiguate destination name trees when merging
o Preserve named destinations in bookmarks when merging
o Remove /OpenAction on merge
o Preserve first metadata seen on merge

Other:
o Cope with files with no /MediaBox at all
o Write IDs as Hexadecimal strings
o Replace Stream/Genlex and other deprecations for OCaml 5
o Allows malformed numbers --1, --2.5 etc.
o Support for alternative stubs for js_of_ocaml
o Push mk_id down to pdf_to_output so it works when writing to
  non-file destinations
o Fix Pdf.getnum and Pdf.parse_rectangle to cope with indirects
o Ignore data check errors in flate decoding
o Now reads many more files from Stressful PDF Corpus
o Revert 'build byte code top level camlpdf.top by default'
o Pdfpage.add_prefix now detects and fixes non-ISO PDFs
o Loosen EI check on inline image lexing
o Compress inline images upon writing if uncompressed
o Retired old unused modules to old/
o Cope with /Crypt identity filters
o Ability to redirect error output
o Harden ASCII85Decode against whitespace

2.5 (January 2022)

o Build byte code top level camlpdf.top by default
o Replace deprecated C interface functions for OCaml 5.0
o Document most undocumented functions
o Pdfpage.change_pages now preserves object streams
o Width calculation in Pdfstandard14 now more efficient
o Charcode and text extractors have font not fontdict counterparts
o Pdftext.charcode_extractor_of_font copes with more encodings
o Add Pdftext.simplify_utf16be
o Merge now merges AcroForms
o Fix Pdfio.setinit and friends to deal with 0-length data
o Harden Pdfmarks against erroneous empty /Title in doc outline
o AFM and glyphlists loaded from compressed sources
o Environment variable CAMLPDF_REPRODUCIBLE_IDS for testing
o Effectively make stderr unbuffered for all output
o A dictionary entry with null for its value now does not exist
o A missing mediabox now not fatal - we use the most-recently-seen

2.4 (June 2021)

o Prefixed all C stubs to avoid clashes with zlib / cryptokit
o Fix for zero-sized Pdfio.input_outputs
o Bad interaction between deferred decryption and object streams fixed
o Optional content groups merged when merging
o Pdfpage.change_pages can now alter bookmark destinations for transformed pages
o Preserves zero bytes in malformed names
o Merged files get fresh /ID
o Pdfpagelabels.write now removes labels when given an empty list

2.3 (patchlevel 2, 2020)

o Bad interaction between deferred decryption and object streams worked around
```

2.3 (patchlevel 1, December 2019)

o Updated Makefile to build on bytecode-only architectures
(thanks Ralf Treinen)

2.3 (October 2019)

o Malformed file reading for files with content before the header now works
o Switches to disable malformed file reading or always read as if malformed
o Fix to preserve integers > 2^30 or < -2^30 on 32 bit systems
o Allow [/DCT] as well as /DCT in inline image filter specifications
o Improvements to text width calculation (thanks Alain Frisch)

2.2 (patchlevel 1, September 2017)

o Code for adding annotations (thanks @waclena)
o Indirect encryption dictionaries
o Workaround for Adobe "Error 21" on re-saving encrypted files
o Fix reading of null objects in streams

2.2 (2017)

o Keeps was_linearized flag with every loaded PDF

2.1 (November 2014)

o Excised linearization. We recommend qpdflib / qpdf for this task now.
o Encryption now performed by fast C routines, replacing the OCaml ones
o Faster parsing of delayed object streams on large files
o New implementation of Pdf.page_reference_numbers. More robust
o Faster parsing by using better primitive operations for I/O
o Tighter spacing of output in Pdfwrite leading to smaller files
o Fixed pdf_of_pages not to produce duplicate page objects when multiple parts
of the output pdf come from the same input pdf
o Pdfpagelabels bug fixes, especially to alphabetic labels
o Read StemV etc. values from the AFM header directly
o Object streams may be written uncompressed for manual inspection
o Recrypting overhauled. Now a first class citizen.

1.7 (30th August 2013)

o Support for writing with object streams
o AES256ISO encryption support
o More compact writing of files
o Support for reading many malformed files
o Now under a standard LGPL license
o Has no dependencies
o First import into git for use with GitHub for open development
o Support for ocamlfind