

# Program and package xindex

—  
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## 1. Introduction

The Lua program `xindex` is a unicode aware program for creating an index file from an `.idx` source file. It is completely compatible to the current `makeindex` program, but can handle UTF-8, 16, 32, and 64. The  $\text{\LaTeX}$  package `xindex` is a package which provides a  $\text{\LaTeX}$  command which writes additional text into the index file. This text (comments and/or macros) will be accepted by the program `xindex`.

The general structure of a data element in the Lua table is:

```
data = { Entry = <text>, -- like the input line without command \indexentry
        pages = {
            { number = <roman/arabic number or text>,
              special = <macro> }, -- the part after | in the input
            [...]
            { number = <roman/arabic number or text>,
              special = <macro> }
        },
        sortChar = <unicode codepoint>, -- of the first character of Entry
        Macro     = <TeX macro> -- only useful with LaTeX package \lpack{xindex}
    }
```

After reading the input file the table `pages` has only one element for the number and the so-called special command. When the pages are compressed the table will collect all pages which refer to the same entry name.

### 1.1. Syntax

The syntax is `xindex [...]` `<file>` where `[...]` are optional arguments, either in short or long form which, of course, can be mixed:

```
xindex
    [-q,--quiet ]
    [-h,--help ]
    [-v ]                verbose
    [-c,--config ]       default is cfg
    [-e,--escapechar ]   default is "
    [-a, --nocasesensitive ] default is false
    [-n,--noheadings ]   default is false
    [-o,--output ]        default is <input>.ind
    [-l,--language ]      default is en
    [-p,--prefix]         default L
    [-u,--use_UCA ]       default is false
    <input file>
```

The language has to be chosen as an international abbreviation in lower- or uppercase letters, see [https://en.wikipedia.org/wiki/ISO\\_3166-2](https://en.wikipedia.org/wiki/ISO_3166-2)

## 1.2. How it works

xindex creates by default an output file <input>.ind which can be read by the  $\LaTeX$  document with the default command `\printindex`. One can use another output filename, which makes only sense if one doesn't use the `\printindex` command for typesetting the index. The default sorting is given by the configuration file, which defines replacements for accented characters, like  $\ddot{o} \rightarrow \circ$ .

## 1.3. The .idx file

There are four characters which must be escaped if used in the command `\index`: `!`, `@`, `"`, or `|`. These characters have a special meaning for the index. The default escape character is the double quote `"`:

```
\usepackage{makeidx}\makeindex

\section{Escaping characters}
\begin{itemize}
\item Exclamation mark ! \index{exclaim ("!)}
\item Vertical bar| \index{Vertical bar ("|)}
\item Doublequote \verb|"| \index{""}
\item Double doublequote \verb|""| \index{""""}
\item At character @ \index{At ("@)}
\end{itemize}
run \texttt{xindex <file.idx>}\index{<file.idx>}\index{123}
\newpage
\printindex
```

index-1

### 1 Escaping characters

- Exclamation mark `!`
- Vertical bar `|`
- Doublequote `"`
- Double doublequote `""`
- At character `@`

```
run xindex <file.idx>
```

### Index

#### Symbols

`"`, 1  
`""`, 1  
`<file.idx>`, 1

#### Numbers

123, 1

#### A

At (`@`), 1

#### E

exclaim (`!`), 1

#### V

Vertical bar (`|`), 1

For the german language the double quote is an active character and it makes live easier if one chooses another character. The escape character can be changed easily by the optional argument `-e "<char>"` or `--escapechar "<char>"`. The following example shows how it works for the escape character `>` (greater). Internally the escape sequences are now defined as:

2. Language

```
escape_chars = { -- by default " is the escape char
  {esc_char..'\'', '//escapedquote//',      '\''    },
  {esc_char..'@', '//escapedat//',          '@'      },
  {esc_char..'\'', '//escapedvert//',        '|'      },
  {esc_char..'!', '//scapedexcl//',          '!'      },
  {esc_char..'(', '//escapedparenleft//',    '('      },
  {esc_char..')', '//escapedparenright//',   ')'      }
}
```

which is, of course, not of interest for the user. With the beginning the escaped chars are converted into the internal strings and later back to the origin meaning.

```
\usepackage{makeidx}\makeindex
```

xindex-2

```
\section{Escaping characters with >}
\begin{itemize}
\item Exclamation mark ! \index{exclaim (>!)}
\item Vertical bar| \index{Vertical bar (>|)}
\item Doublequote \verb|"| \index{>}
\item Double doublequote \verb|" "| \index{>">}
\item At character @ \index{At (>@)}
\end{itemize}
Run \texttt{xindex} with \texttt{xindex -e ">"}\index{<file.idx>}\index{123}
\newpage
\printindex
```

1 Escaping characters with >

- Exclamation mark !
- Vertical bar|
- Doublequote "
- Double doublequote ""
- At character @

Run xindex with xindex -e ">"

Index

Symbols

", 1  
"", 1  
<file.idx(, 1

Numbers

123, 1

A

At (@), 1

E

exclaim (!), 1

V

Vertical bar (|), 1

2. Language

The language is only important for the first two headers in the output of the index data. They are by default *Symbols* followed by *Numbers*. In a new version of xindex it will be customizable. The predefined language is »en« and currently the following languages are possible:

```
indexheader = {
  cs = {"Symboly", "Čísla"},
  da = {"Symboler", "Tal"},
  de = {"Symbole", "Zahlen"},
  en = {"Symbols", "Numbers"},
  fr = {"Symboles", "Nombres"},
  it = {"Simboli", "Numeri"},
  jp = {"シンボル", "番号"},
}
```

The following example was run with `xindex -l it <file>.idx`:

```
\usepackage{makeidx}\makeindex

\section{Escaping characters with >}
\begin{itemize}
\item Exclamation mark ! \index{exclaim (>!)}
\item Vertical bar| \index{Vertical bar (>|)}
\item Doublequote \verb|"| \index{>}
\item Double doublequote \verb|" "| \index{>">}
\item At character @ \index{At (>@)}
\end{itemize}
Run \texttt{xindex} with \texttt{xindex -l it -e ">"}\index{123}
\newpage
\printindex
```

xindex-3

**1 Escaping characters with >**

- Exclamation mark !
- Vertical bar|
- Doublequote "
- Double doublequote ""
- At character @

Run xindex with xindex -l it -e ">"

Index
<b>Simboli</b>
”, 1
””, 1
<b>Numeri</b>
123, 1
<b>A</b>
At (@), 1
<b>E</b>
exclaim (!), 1
<b>V</b>
Vertical bar ( ), 1

### 3. **Sorting**

#### 3.1. **Default sorting by a character table**

The default sorting is unicode aware and uses a translation table for accented characters:

### 3. Sorting

```
alphabet_lower = { -- for sorting
  { ' ' }, -- only for internal tests
  { 'a', 'á', 'à', 'ä' },
  { 'b' },
  { 'c' },
  { 'd' },
  { 'e', 'é', 'è', 'ë' },
  { 'f' },
  { 'g' },
  { 'h' },
  { 'i', 'í', 'ì', 'ï' },
  { 'j' },
  { 'k' },
  { 'l' },
  { 'm' },
  { 'n', 'ñ' },
  { 'o', 'ó', 'ò', 'ö' },
  { 'p' },
  { 'q' },
  { 'r' },
  { 's' },
  { 't' },
  { 'u', 'ú', 'ù', 'ü' },
  { 'v' },
  { 'w' },
  { 'x' },
  { 'y' },
  { 'z' }
}
```

There is also a table for the uppercase letters. If it should be edited or extended then copy first the base configuration file `xindex-cfg.lua` and modify that new file. It can be used by `xindex` with the optional argument `-c newfile` if it is named as `xindex-newfile.lua`. For german there already exists a configuration file `xindex-DIN2.lua` which uses the so-called »Telefonbuchsortierung« which converts the umlauts like `ö→oe`:

```
alphabet_upper = { -- for sorting
  { ' ' },
  { 'A', 'Á', 'À', 'Ä' },
  { 'B' },
  { 'C' },
  { 'D' },
  { 'E', 'È', 'É', 'ë' },
  { 'F' },
  { 'G' },
  { 'H' },
  { 'I', 'Í', 'Ì', 'ï' },

```

```

{ 'J' },
{ 'K' },
{ 'L' },
{ 'M' },
{ 'N', 'Ñ' },
{ 'O', 'Ó', 'Ò', 'Ö' },
{ 'P' },
{ 'Q' },
{ 'R' },
{ 'S' },
{ 'T' },
{ 'U', 'Ú', 'Ù', 'Ü' },
{ 'V' },
{ 'W' },
{ 'X' },
{ 'Y' },
{ 'Z' }
}

```

```

\usepackage{makeidx}\makeindex
\newcommand\Index[1]{\index{#1}#1}

```

Sorted with `\verb|-l DE|`

```

\Index{Österreich} \Index{Öresund}
\Index{Ostern} \Index{Ober}
\Index{Oberin} \Index{Österreich}
\Index{Öresund} \Index{Ostern}
\Index{Ober} \Index{Oberin}
\Index{Obstler} \Index{Öl}
\Index{ölen} \Index{Ödem}
\Index{Oligarch} \Index{Oder}
\Index{oder} \index{Fluss!Oder}
\index{Oder|seealso{Fluss}}
\Index{Göbel} \Index{Goethe}
\Index{Göthe} \Index{Götz}
\Index{Goldmann}

```

```
\printindex
```

## Index

<b>F</b>	
Fluss	Oberin, 1
- Oder, 1	Obstler, 1
	Ödem, 1
<b>G</b>	oder, 1
Göbel, 1	Oder, 1, <i>siehe auch</i> Fluss
Goethe, 1	Öl, 1
Goldmann, 1	ölen, 1
Göthe, 1	Oligarch, 1
Götz, 1	Öresund, 1
<b>O</b>	Ostern, 1
Ober, 1	Österreich, 1

xindex-4

The same sorted with the german DIN variant 2 with `--config DIN2`, which is part of the  $\TeX$  distribution. In this case a letter  $\ddot{O}$  is converted to  $Oe$  before sorting the word beginning with the letter  $\ddot{O}$ :

xindex-5

```
\usepackage{makeidx}\makeindex
\newcommand\Index[1]{\index{#1}#1}

Sorted with
\verb|--config DIN2 -l DE|

\Index{Österreich} \Index{Öresund}
\Index{Ostern} \Index{Ober}
\Index{Oberin} \Index{Österreich}
\Index{Öresund} \Index{Ostern}
\Index{Ober} \Index{Oberin}
\Index{Obstler} \Index{Öl}
\Index{ölen} \Index{Ödem}
\Index{Oligarch} \Index{Oder}
\Index{oder} \index{Fluss!Oder}
\index{Oder|seealso{Fluss}}
\Index{Göbel} \Index{Goethe}
\Index{Göthe} \Index{Götz}
\Index{Goldmann}

\printindex
```

Index

<b>F</b>	Öl, 1
Fluss	ölen, 1
- Oder, 1	Öresund, 1
<b>G</b>	Österreich, 1
Göbel, 1	Ober, 1
Goethe, 1	Oberin, 1
Göthe, 1	Obstler, 1
Götz, 1	Oder, 1
Goldmann, 1	oder, 1
<b>O</b>	Oder, <i>siehe auch</i> Fluss
Ödem, 1	Oligarch, 1
	Ostern, 1

The following runs with xindex -l jp <file>:

xindex-6

```
\usepackage{fontspec}
\setmainfont{SourceHanSans}
\usepackage[japanese]{babel}
\addto\captionsjapanese{%
\def\indexname{指数}}
\usepackage[hvindex}% for \Index
\usepackage{makeidx}\makeindex

\Index{車} \Index{車道}
日本\index{日本|fbox}
\Index{病院} \Index{コンピュータ}
\Index{プリンタ} \Index{印刷}
\Index{スイミングプール} \Index{天王}
\Index{広島} \Index{ドイツ}
\Index{日本} \Index{ワープロ}
\Index{foo} und \Index{bar}
\Index{//} \Index{4711}
\newpage\printindex
```

指数

<b>シンボル</b>	<b>ワ</b>
//, 1	ワープロ, 1
<b>番号</b>	<b>印</b>
4711, 1	印刷, 1
<b>B</b>	<b>天</b>
bar, 1	天王, 1
<b>F</b>	<b>広</b>
foo, 1	広島, 1
<b>コ</b>	<b>日</b>
コンピュータ, 1	日本, 1, <span style="border: 1px solid black; padding: 0 2px;">1</span>
<b>ス</b>	<b>病</b>
スイミングプール, 1	病院, 1
<b>ド</b>	<b>車</b>
ドイツ, 1	車, 1
<b>プ</b>	車道, 1
プリンタ, 1	

### 3.2. Sorting by using UCA (Unicode Collation Algorithm)

With the optional argument `-u` or alternatively `--use_UCA` the sorting will be done by Michal Hoftich's Lua package `LUA-UCA`, which should be part of any  $\TeX$  installation.

```
\usepackage{multicol}
\usepackage{makeidx}\makeindex
\def\Index#1{#1\index{#1}}
```

```
Sorted with \verb|-u -l cs|
\Index{ahoj} \Index{crha}, \Index{čaj}, \Index{chachar},
\Index{rak}, \Index{řeka}, \Index{srp}, \Index{šutr},
\Index{hudba}, \Index{linux}, \Index{zebra},
\Index{žába}, \Index{7 ůdub}
\begin{multicols}{2} \printindex \end{multicols}
```

Sorted with `-u -l cs` ahoj crha, čaj, chachar, rak, řeka, srp, šutr, hudba, linux, zebra, žába, 7 dubů

Index	L
	linux, 1
<b>A</b>	<b>R</b>
ahoj, 1	rak, 1
<b>C</b>	<b>Ř</b>
crha, 1	řeka, 1
<b>Č</b>	<b>S</b>
čaj, 1	srp, 1
	šutr, 1
<b>H</b>	<b>Z</b>
hudba, 1	žába, 1
	zebra, 1
<b>C</b>	<b>Čísla</b>
chachar, 1	7 dubů, 1

xindex-7

The sorting order can be easily modified. Read the documentation of the package `LUA-UCA` on how to do it and what languages are supported so far. Any additional code setting for UCA should be done in the file `xindex-cfg-uca.lua`, which will automatically be read by `xindex`.

## 4. Compressing pagenumbers

By default page sequences of an entry are compressed to

**8f** page 8 and 9

**8ff** page 8, 9, and 10

**8-12** page 8, 9, ..., 12

The so-called folio abbreviation is language dependent and defined in the file `xindex-cfg-common.cfg`:

```
folium = {
  cs = {"f", "ff"},
  da = {"f", "ff"},
  de = {"f", "ff"},
  en = {"f", "ff"},
  fr = {"\,sq", "\,sqq"},
}
```

## 6. Page argument

```
it = {"f", "ff"},
jp = {"シンボル", "番号"},
no = {"\\,f.", "\\,ff."},
}
```

xindex-8

```
\usepackage{makeidx}\makeindex
```

```
Sorted with \verb|-l fr|
```

```
foobar\index{foobar|()}
foo\index{foo}\index{bar}\index{baz}\newpage
foo\index{foo}\index{bar}\index{baz}\newpage
foo\index{bar}\index{baz}\newpage
foo\index{baz}\newpage
foo\index{foo}foobar\index{foobar|)}
\newpage
\printindex
```

## Index

### B

bar, 1 sqq  
baz, 1–4

### F

foo, 1 sq, 5  
foobar, 1–5

## 5. hyperref

Using the package hyperref is no problem:

xindex-9

```
\usepackage{makeidx}\makeindex
\usepackage{hvinde}% for \Index
\usepackage{colorlinks}{hyperref}
```

```
Sorted with \verb|-l DE|
```

```
\Index{Österreich} \Index{Öresund}
\Index{Ostern} \Index{Ober} \Index{Oberin}
\Index{Österreich} \index{Öresund|textbf}
\Index{Ostern} \Index{Ober} \Index{Oberin}
\Index{Obstler} \Index{Öl} \Index{ölen}
\Index{Ödem} \Index{Oligarch} \Index{Oder}
\Index{oder} \index{Fluss!Oder|textit}
\Index{Oder|seealso{Fluss}} \Index{Göbel}
\Index{Goethe} \Index{Göthe} \Index{Götz}
\newpage\Index{Goldmann} \Index{Goethe}
\newpage \printindex
```

## Index

### F

Fluss

- Oder, 1

### G

Göbel, 1

Goethe, 1f

Goldmann, 2

Göthe, 1

Götz, 1

### O

Ober, 1

Oberin, 1

Obstler, 1

Ödem, 1

Oder, 1

oder, 1

Oder, *see also* Fluss

Öl, 1

ölen, 1

Oligarch, 1

Öresund, 1, 1

Ostern, 1

Österreich, 1

## 6. Page argument

Every page can be combined with an additional macro, like `\index{foo|fbox}`, the page number will be set into a framebox. If we have on the same page the two commands:

```
foo\index{foo} and foo\index{foo|bar}
```

then we have two *different* index entries which will not be compressed to one entry. In the following example we have four different entries for *foo* which is the reason that we do not get

an output like foo, 1--4. Only the first two entries are of the same type, so we get 1f in the output.

```
\usepackage{makeidx}\makeindex
```

```
Ein foo\index{foo} \newpage und \index{foo}
ein foo\index{foo|textit} \newpage
und foo\index{foo|textbf} \newpage
und foo\index{foo|fbox}
```

```
\newpage
\printindex
```

## Index

**F**  
foo, 1f, 2, **3**, 4

xindex-10

## 7. The config file

The main config file is xindex-cfg.lua is used by default and loading it by the optional parameter `-c` makes no sense. A new config file must have the prefix `xindex-` and the file extension `.lua`, for example: `xindex-HAdW-eK0.lua` which can be used with `--config HAdW-eK0`. The file must be saved in the documents directory or in one which is known to `kpsewhich`, for example<sup>1</sup> `$TEXMFLOCAL/tex/lualatex/xindex/` Don not forgot to update the filename database.

A new config file must declare at least the variables which are part of the default config file: the translation tables and

```
itemPageDelimiter = ","      -- Hello, 14
compressPages      = true
  -- something like 12--15, instead of 12,13,14,15. the |( ... |) syntax is still valid
fCompress          = true    -- 3f -> page 3, 4 and 3ff -> page 3, 4, 5
minCompress        = 3       -- 14--17 or
rangeSymbol        = "--"
numericPage        = true    -- for non numerical pagenumbers, like "VI-17"
sublabels          = {"", "-\\-", "--\\-", "---\\-"}
  -- for the sub(sub(sub-items, first one is empty
pageNoPrefixDel     = ""     -- a delimiter for page numbers like "VI-17" -- not used !!!
indexOpening       = ""     -- commands/text after \begin{theindex}
```

The new config file can define own functions for compressing the pagelist for a given entry and for the formatting of the output. They must be called `specialCompressPageList` and `specialGetPageList`.

For example:

```
function specialCompressPageList(pages)
  if (pages[1]["number"] == "") then pages[1]["number"] = " " end
  if (#pages <= 1) then
```

<sup>1</sup>The directory `xindex` must be created before saving the file.

## 7. The config file

```

    pages[1]["number"] = pages[1]["number"]:gsub('-',':~')-- replace "-" with ":~"
    return pages
end -- only one pageno
local sortPages = {}
local roman
local volume
local page
local i
for i=1,#pages do
    roman = string.gsub(pages[i]["number"],'%U*','') -- only uppercase to catch VII/1-123f and VII/3-123ff (folium pages)
    if romanToNumber(roman) then
        roman = string.format("%05d",tonumber(romanToNumber(roman))) -- only roman part VII
    else
        roman = ""
    end
    volume = string.gsub(pages[i]["number"],'%a*','') -- only the number /2 123 or /2-123
    if volume then volume = volume:gsub('%d*','') end -- delete - char to get /2
    page = string.gsub(pages[i]["number"],'.*-', '')
    page = string.format("%5s",page)
    sortPages[#sortPages+1] = {
        origin = pages[i],
        sort = roman..volume.." "..page } -- no minus between Roman/Volume and first page
    end
end
table.sort(sortPages, function(a,b) return a["sort"] < b["sort"] end )

[...]

    return pages
end
end

```

is a special function which can handle page numbers like VII-17, VIII/2/1-186. Internally exists a function `compressPageList` which is used if no `specialCompressPageList` is defined.

```
\usepackage{makeidx}
```

```
\mbox{}\printindex
```

## Personenverzeichnis

<b>A</b>		<b>K</b>	
Aachen, Johannes von	VII/1 : 215	Karl	
Aarones	VII/2/1 : 1003, 1012	- II., Kaiser	VII/1 : 147
Abrahamson	VII/2/1 : 864, 991, 1048, 1067, 1156	- III., Kaiser	VII/1 : 149
Adamson	VII/2/1 : 1223, IX/1 : 1228	- IV., Kaiser	VI/1 : 12, VII/1 : 34, 147
Adrian		- V., Kaiser	VI/1 : 84, 284, 654, VI/2 : 708, 1014, 1043, 1131, 1210, VII/1 : 34
- Hauster	VII/1 : 514, XI/1 : 515	- VI., Kaiser	VII/1 : 296
Alting		- IX., Kaiser	VII/1 : 296
- Mensa	VII/1 : 426, 434, 453, 455, 466f.	- X., Kaiser	VII/1 : 149
<b>B</b>		- der Große, Kaiser	VI/2 : 987, 989, 1028
Braunschweig-Wolfenbüttel		<b>O</b>	
- Karl Viktor von, Herzog	VI/1 : 83	Osnabrück	
Bremen		- Heinz von, Bischof	see Sachsen-Lauenburg
- Heinz von, Erzbischof	see Sachsen-Lauenburg	<b>S</b>	
<b>J</b>		Schleswig-Holstein	
Julian		- Rudolf von, Herzog	VII/2/1 : 758–761, 765
- Apostata, römischer Kaiser	VII/2/1 : 904	<b>Z</b>	
Justinian I., byzantinischer Kaiser	VII/1 : 326, 734, VII/2/1 : 1011	Zwingl, Haldrich	IX : 479, 692

The config file `xindex-dtk.lua` defines a special page output:

```
function specialGetPageList(v,hyperpage) -- Entry table, boolean
  local Pages = {}
[...]
```

```
  if (Pages[1]["special"] == nil) or (Pages[1]["number"] == nil) then return "" end
  if #Pages == 1 then
    return "\\relax"..Pages[1]["number"].."\\@nil"
  else
    pageNo = "\\relax"..Pages[1]["number"]
    for i=2,#Pages do
      if Pages[i]["number"] then
        pageNo = pageNo..", "..Pages[i]["number"].."\\@nil"
        Pages[i] = {}
      end
    end
  end
[...]
```

```
end
```

The following example runs `xindex -c dtk -l de -n <input>`

8. Including  $\LaTeX$  commands into the .idx file

xindex-l2

<code>\usepackage{makeidx}</code>	??		
	<b>Autorenliste</b>		
<code>\mbox{}\ref{president}</code>	<b>Elke Bährendtsen</b>	[14]	<b>Eike Schulter</b> [40]
<code>\printindex</code>	elke@xyz.de		Haussteig 15 36396 Stuttgart eike.schulter@kabel.de
	<b>Horst Fannt</b>	[48]	
	Friedrichallee 74		<b>Markus Severs</b> [4]
	13233 Neu-Isenburg		siehe Seite ??
	horst.fannt@gmxnet.de		
	<b>Jonasson Jared Jazek</b>	[20]	<b>Herbert Voß</b> [3, 5]
	mail@jones.net		Wasgensteig 12 10127 Potsdam herbert@xyz.de
	<b>Martin Koon</b>	[24, 31]	<b>Michael Ziegenda</b> [9]
	Freiherr-Links-Weg 16		Lokostr. 19 20713 Kallin ziegenda@mail.com
	15525 Neckar		
	koo@xyz.org		

There are three predefined sublabels for `\subitems`. The program itself can handle more, there is no limit for `xindex`.

xindex-l3

```
\makeatletter
\g@addto@macro{\theindex}{%
  \def\subsubsubitem{\@idxitem\hspace*{35\p@}}
  \def\subsubsubsubitem{\@idxitem\hspace*{40\p@}}
}
\makeatother
\usepackage{makeidx}\makeindex

foo\index{foo} bar\index{foo!bar}
baz\index{foo!bar!baz} foobar%
\index{foo!bar!baz!foobar} Kuba
\index{foo!bar!baz!foobar!Kuba}
\newpage \printindex
```

Index

**F**  
foo, 1  
    - bar, 1  
        - baz, 1  
            — foobar, 1  
            — Kuba, 1

8. Including  $\LaTeX$  commands into the .idx file

The command `\addtocontents` doesn't work for the index file. With the  $\LaTeX$  package `xindex` (same name as the Lua program `xindex`) defines a macro `\writeidx` which writes its argument into the .idx file. This can be usefull to insert a `pagebreak`/`columnbreak` before a new letter in the output of the index file:

```
\documentclass{article}
\usepackage{makeidx}
\makeindex
\usepackage{xindex}
\begin{document}
```

```
\index{foo}foo and
\writeidx{\clearpage}
\index{bar}bar

\printindex
\end{document}
```

Such commands are then taken into account by the program `xindex`. With the often used program `makeindex` such commands are ignored. In the following example we put an horizontal line after the first entry:

```
\usepackage{xindex}
\makeindex
```

```
\index{foo}foo and
\writeidx{\item\protect\hrulefill}
\index{bar}bar
\index{gex}gex
\printindex
```

## Index

**B**  
bar, 1

**F**  
foo, 1

---

**G**  
gex, 1

xindex-14

## 9. Headings

By default the output uses the english headings: *Symbols*, *Numbers*, and *A ...*. There are three predefined languages `en`, `de`, and `fr`. The definition is in the file `xindex-cfg-common.lua` (see also section 2 on page 4). It can easily be extended for other languages. Sometimes the headers are not needed, for example in a name list. With the optional argument `-n` or `--noheadings` the created `.ind` file has only the vertical space between different first letters:

```
\usepackage{makeidx}\makeindex
```

```
Ein foo\index{foo}\index{bar|{}
\newpage und \index{foo}
ein foo\index{foo|textit} \newpage
und foo\index{foo|textbf} \newpage
und foo\index{foo|fbox}
\index{bar|)}
\newpage
\verb|xindex -n <file>|
\printindex
```

`xindex -n <file>`

## Index

bar, 1–4

foo, 1f, 2, 3, 4

xindex-15

The headings are printed by default as `\textbf`. This can be changed in the config file by setting the variable `idxnewletter`, for example: `idxnewletter = "\\textit"`. If you need some more code

## 10. Case sensitive index entries

here then define an own macro for it, which can be seen in the following example. It has an own config file `xindex-header.lua` which has the line

```
idxnewletter = "\\idxnewletter"
```

In the documents preamble there is the definition:

```
\newcommand\idxnewletter[1]{\textbf{\textit{#1}}}
```

xindex-l6

```
œšžŒŠŸŽ
\usepackage{makeidx}\makeindex
\newcommand\idxnewletter[1]{\textbf{\textit{#1}}}

œšžŒŠŸŽ
\section{Escaping characters}
\begin{itemize}
\item Exclamation mark ! \index{exclaim ("!)}
\item Vertical bar| \index{Vertical bar ("|)}
\item Doublequote \verb|"| \index{""}
\item Double doublequote \verb|" "| \index{" ""}
\item At character @ \index{At ("@)}
\end{itemize}
run \verb|xindex -c header <file.idx>|
\index{<file.idx>@\texttt{<file.idx>}}
\index{123}
\newpage
\printindex
```

## Index

### *Symbols*

", 1  
"", 1  
<file.idx>, 1

### *Numbers*

123, 1

### *A*

At (@), 1

### *E*

exclaim (!), 1

### *V*

Vertical bar (|), 1

## 10. Case sensitive index entries

By default `foo` and `Foo` are two different entries and will handled differently by `xindex`: `Foo` will be as an own entry *before* `foo`. Let's see a more complex example. In the index the entry `xindex-DIN2.lua` is the first one of the `xindex-???` series because uppercase letters are sorted before lowercase letters.

xindex-l7

```
\usepackage{makeidx}
\usepackage{hyperref}

foo\newpage
\printindex
```

## Index

### **X**

`xindex` package, 2, 15  
`xindex` program, 4, 13f  
`xindex-DIN2.lua` file, 6  
`xindex-HAdW-eKO.lua` file, 10  
`xindex-cfg-common.cfg` file, 9  
`xindex-cfg-common.lua` file, 14  
`xindex-cfg.lua` file, 6, 10  
`xindex-dtk.lua` file, 12  
`xindex-newfile.lua` file, 6

The same example sorted with the `-a` or `--nocasesensitive` has another output: now `xindex-cfg-common.lua` is the first one of the `xindex-???` series.

```
\usepackage{makeidx}
\usepackage{hyperref}
```

```
foo\newpage
\printindex
```

## Index

### X

xindex package, 2, 15  
 xindex program, 4, 13f  
 xindex-cfg-common.cfg file, 9  
 xindex-cfg-common.lua file, 14  
 xindex-cfg.lua file, 6, 10  
 xindex-DIN2.lua file, 6  
 xindex-dtk.lua file, 12  
 xindex-HAdW-eKO.lua file, 10  
 xindex-newfile.lua file, 6

xindex-18

## 11. Automatic index creation

With package `xindex` one can define several different index files, e.g. an index of names. With the optional argument `imakeidx` the package itself loads `imakeidx` and adds the program `xindex` as the default program to `imakeidx`.

xindex-19

```
\usepackage[imakeidx]{xindex}
\makeindex[name=persons,title=Index of names,
  columns=1,options=--noheadings]
\def\ThanhVN{Hàn Thê\protect\llap{%
  \raise 0.5ex\hbox{\'}{}}}
```

```
foo\index[persons]{Niepraschk,~ Rolf}
foo\index[persons]{Lamport,~ Leslie}
foo\index[persons]{Knuth,~ Donald}
foo\index[persons]{Knuth,~ Donald}
\newpage
foo\index[persons]{Lamport,~ Leslie}
foo\index[persons]{Thành,~ \ThanhVN}
foo\index[persons]{Kew,~ Jonathan}
foo\index[persons]{Kohm,~ Markus}
foo\index[persons]{Preining,~ Norbert}
\newpage
foo\index[persons]{Schenk,~ Christian}
foo\index[persons]{Feuerstack,~ Thomas}
foo\index[persons]{Tobin,~ Geoffrey}
foo\index[persons]{Wilson,~ Peter}
\newpage
foo\index[persons]{Kohm,~ Markus}
foo\index[persons]{Theiling,~ Henrik}
foo\index[persons]{Pégourié-Gonnard,~ Manuel}
foo\index[persons]{Roux,~ Élie}
\newpage
foo\index[persons]{Mittelbach,~ Frank}
foo\index[persons]{Fairbairns,~ Robin}
foo\index[persons]{Lemberg,~ Werner}
foo\index[persons]{Volovich,~ Vladimir}

\printindex[persons]
```

## Index of names

Fairbairns, Robin,  
Feuerstack, Thomas,

Kew, Jonathan,  
Knuth, Donald,  
Kohm, Markus,

Lamport, Leslie,  
Lemberg, Werner,

Mittelbach, Frank,

Niepraschk, Rolf,

Pégourié-Gonnard, Manuel,  
Preining, Norbert,

Roux, Élie,

Schenk, Christian,

Thành, Hàn Thê,  
Theiling, Henrik,  
Tobin, Geoffrey,

Volovich, Vladimir,

Wilson, Peter,

You have to run  $\text{\LaTeX}$  with the `--shell-escape` option to run `xindex` from within the  $\text{\LaTeX}$  document.

## 12. Demerits

- For more than 5000 entries in the `.idx` file the internal Lua function for sorting may take some time.
- The `.idx` file is not checked for  $\text{\LaTeX}$  errors in the argument of `\indexentry`.

## A. Examples

```
\usepackage[imakeidx]{xindex}
\makeindex
% Brian Dunn
```

```
First level.\index{first level}

First level second level.\index{first level!second level}

Duplicate.\index{first level!second level}

Alpha.\index{alpha}

Alpha beta.\index{alpha!beta}

Alpha beta gamma.\index{alpha!beta!gamma}

Duplicate alpha beta.\index{alpha!beta}

Duplicate alpha beta gamma.\index{alpha!beta!gamma}

\newpage
\printindex
```

```
\usepackage[imakeidx]{xindex}
\makeindex
% Martin Sievers
```

```
Test \index{A!Test} oder auch \index{B!Test}
\newpage
\printindex
```

### Index

A  
alpha, 1  
    - beta, 1  
    - gamma, 1

F  
first level, 1  
    - second level, 1

xindex-20

### Index

A  
A  
    - Test, 1

B  
B  
    - Test, 1

xindex-21

# Index

## Symbols

@, 3

(, 3

!, 3

## A

accented characters, 3

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xindex-cfg-uca.lua file, 9

xindex-cfg.lua file, 6, 11

xindex-DIN2.lua file, 6

xindex-dtk.lua file, 13

xindex-HAdW-eK0.lua file, 11

xindex-header.lua file, 16

xindex-newfile.lua file, 6