

# The `texsort` package

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## 1 Introduction

Purpose: sort/compress numerical lists.

## 2 Usage

`\sortlist`

Sort list:

```
\sortlist{1,5,20,6,23,2,1,4000,4}\to{mylist}\sep{,}
```

Result:

```
\mylist->1,1,2,4,5,6,20,23,4000
```

`\compresslist`

Compress list:

```
\compresslist{\mylist}\to{clist}\sep{,}{-}
```

Result:

```
\clist->1,1,2,4-6,20,23,4000
```

## 3 Implementation

```
1 \NeedsTeXFormat{LaTeX2e}
2 \ProvidesPackage{texsort}[2012/05/29]
3 \newcount\t@mp@r@a
4 \newcount\t@mp@r@b
5 \newcount\t@mp@r@c
```

`\initarray`  $\langle list \rangle$   $\langle array \rangle$

Converts  $\langle list \rangle$  to  $\langle array \rangle$ .

```
6 \def\initarray#1#2{%
7   \bgroup
8   \@tempcnta=\z@
```

```

9   \for\@@refb:=#2\do{%
10  \advance\@tempcnta by\@ne
11  \bgroup
12  \setbox\z@\hbox{%
13  \expandafter\global\expandafter\t@mp@r@a\expandafter\add@zero\@@refb\relax
14  }%
15  \ifdim\wd0>\z@\relax
16  \latex@warning{Not number \@@refb!}%
17  \fi
18  \expandafter\edef\csname @a@\endcsname{\expandafter\xdef\expandafter
19  \noexpand\csname#1@the\@tempcnta\endcsname{\the\t@mp@r@a}}\@a@
20  \egroup
21  }%
22  \expandafter\xdef\csname #1@length\endcsname{\the\@tempcnta}%
23  \egroup
24  }

```

`\outarray`  $\langle array \rangle$   $\langle sep \rangle$

Outputs  $\langle array \rangle$  elements separated by  $\langle sep \rangle$ .

```

25 \def\outarray#1\sep#2{%
26  \bgroup
27  \@tempcnta=\z@\relax
28  \@tempcntb=\getarraylength{#1}%
29  \loop
30  \ifnum\@tempcnta<\@tempcntb
31  \advance\@tempcnta by\@ne\relax
32  \ifnum\@tempcnta>\@ne\relax#2\fi
33  \csname#1@the\@tempcnta\endcsname
34  \repeat
35  \egroup
36  }

```

`\add@zero`  $\langle arg \rangle$

Adds 0 before  $\langle arg \rangle$ .

```

37 \def\add@zero#1{0#1}

```

`\getarrayitem`  $\langle array \rangle$   $\langle index \rangle$   $\langle command \rangle$

Gets  $\langle array \rangle$  element by  $\langle index \rangle$  to  $\langle command \rangle$ .

```

38 \def\getarrayitem#1#2\to#3{\expandafter\xdef\csname#3\endcsname{\csname#1@#2\endcsname}}

```

`\setarrayitem`  $\langle array \rangle$   $\langle index \rangle$   $\langle value \rangle$

Sets  $\langle array \rangle$  element by  $\langle index \rangle$  to  $\langle value \rangle$ .

```

39 \def\setarrayitem#1#2#3{%
40  \bgroup
41  \setbox0\hbox{%

```

```

42     \expandafter\global\expandafter\t@mp@r@a\expandafter\add@zero#3\relax
43     }%
44     \ifdim\wd0>\z@\relax
45     \@latex@warning{Not number #3!}%
46     \fi
47     \expandafter\xdef\csname#1@#2\endcsname{\the\t@mp@r@a}%
48     \egroup
49     }

\getarraylength <{array}>
    Gets <array> elements count.

50 \def\getarraylength#1{\@ifundefined{#1@length}{0}{\csname #1@length\endcsname}}

\setarraylength <{array}>{<value>}
    Sets <array> elements count to <value>.

51 \def\setarraylength#1#2{\expandafter\xdef\csname #1@length\endcsname{#2}}

\upheap <{array}>{<index>}
    Internal macro of sort algorithm.

52 \def\upheap#1#2{%
53     \bgroup
54     \getarrayitem{#1}{#2}\to{vara}%
55     \@namedef{#1@0}{\maxdimen}%
56     \@tempcntb=#2\relax
57     \loop
58     \@tempcnta=\@tempcntb
59     \divide\@tempcnta by2\getarrayitem{#1}{\the\@tempcnta}\to{varb}%
60     \ifnum\varb>\vara\relax
61     \else
62     \getarrayitem{#1}{\the\@tempcnta}\to{varb}%
63     \setarrayitem{#1}{\the\@tempcntb}{\varb}%
64     \divide\@tempcntb by2\relax
65     \repeat
66     \setarrayitem{#1}{\the\@tempcntb}{\vara}%
67     \egroup
68     }

\insertheapelem <{array}>{<value>}
    Internal macro of sort algorithm.

69 \def\insertheapelem#1#2{%
70     \bgroup
71     \@tempcnta=\getarraylength{#1}\relax
72     \advance\@tempcnta by1\relax
73     \setarraylength{#1}{\the\@tempcnta}\relax
74     \setarrayitem{#1}{\the\@tempcnta}{#2}%

```

```

75     \upheap{#1}{\the\@tempcnta}%
76   \egroup
77   }

78 \newcount\@tempcntd

\downheap {<array>}{<index>}

      Internal macro of sort algorithm.

79 \def\downheap#1#2{%
80   \bgroup
81     \getarrayitem{#1}{#2}\to{vara}%
82     \@tempcntb=\getarraylength{#1}%
83     \t@mp@r@c=\@tempcntb\relax
84     \divide\@tempcntb by2\relax
85     \t@mp@r@b=\@tempcntb\relax
86     \@tempcntb=#2\relax
87     \ifnum\@tempcntb>\t@mp@r@b\relax
88     \else
89       \loop
90         \@tempcnta=\@tempcntb \advance\@tempcnta by\@tempcntb\relax
91         \@tempcntd=\@tempcnta \advance\@tempcntd by1\relax
92         \ifnum\@tempcnta<\t@mp@r@c\relax
93           \getarrayitem{#1}{\the\@tempcnta}\to{temp@a}%
94           \getarrayitem{#1}{\the\@tempcntd}\to{temp@b}%
95           \ifnumtemp@a<temp@b\relax
96             \@tempcnta=\@tempcntd
97           \fi
98         \fi
99         \getarrayitem{#1}{\the\@tempcnta}\to{temp@a}%
100        \ifnum\vara>temp@a\relax
101          \t@mp@r@b=-1\relax
102        \else
103          \getarrayitem{#1}{\the\@tempcnta}\to{temp@a}%
104          \setarrayitem{#1}{\the\@tempcntb}{\temp@a}%
105          \@tempcntb=\@tempcnta
106        \fi
107        \ifnum\@tempcntb>\t@mp@r@b\relax
108        \else
109        \repeat
110      \fi
111      \setarrayitem{#1}{\the\@tempcntb}{\vara}%
112    \egroup
113  }

```

```

\removetop {<array>}\to{<command>}

```

Internal macro of sort algorithm.

```

115 \def\removetop#1\to#2{%
116   \bgroup
117   \getarrayitem{#1}{1}\to{temp@c}%
118   \expandafter\xdef\csname #2\endcsname{\temp@c}%
119   \@tempcnta=\getarraylength{#1}%
120   \getarrayitem{#1}{\the\@tempcnta}\to{temp@a}%
121   \setarrayitem{#1}{1}{\temp@a}%
122   \setarrayitem{#1}{\the\@tempcnta}{}%
123   \advance\@tempcnta by-1\relax
124   \setarraylength{#1}{\the\@tempcnta}%
125   \downheap{#1}{1}%
126   \egroup
127 }

```

`\g@addto@macrobeg`  $\langle macro \rangle$   $\langle definition \rangle$

Adds some more  $\langle definition \rangle$  to  $\langle macro \rangle$  beginning.

```

128 \long\def\g@addto@macrobeg#1#2{%
129   \begingroup
130   \def\@a{#2}%
131   \toks@{\expandafter\expandafter\expandafter{\expandafter\@a@#1}%
132   \xdef#1{\the\toks@}%
133   \endgroup
134 }

```

`\sortlistarray`  $\langle array \rangle$   $\langle sorted array \rangle$

Sorts  $\langle array \rangle$  and puts result to  $\langle sorted array \rangle$ .

```

135 \def\sortlistarray#1\to#2{%
136   \bgroup
137   \@for\@@refb:=#1\do{%
138     \inserttheapelem{@tempa@}{\@@refb}%
139     }%
140   \@tempcntb=\getarraylength{@tempa@}%
141   \setarraylength{#2}{\the\@tempcntb}%
142   \@for\@@refb:=#1\do{%
143     \removetop{@tempa@}\to{aka}%
144     \setarrayitem{#2}{\the\@tempcntb}{\aka}%
145     \advance\@tempcntb by-1\relax
146     }%
147   \egroup
148 }

```

`\sortlist`  $\langle list \rangle$   $\langle macro \rangle$   $\langle sep \rangle$

Sorts  $\langle list \rangle$  and puts elements separated by  $\langle sep \rangle$  to  $\langle macro \rangle$ .

```

149 \def\sortlist#1\to#2\sep#3{%
150   \bgroup
151   \@for\@@refb:=#1\do{%
152     \inserttheapelem{@tempa@}{\@@refb}%

```

```

153     }%
154     \@tempcntb=\getarraylength{\@tempa}%
155     \expandafter\def\csname#2\endcsname{}%
156     \expandafter\def\expandafter\@a\expandafter{\csname#2\endcsname}%
157     \@for\@refb:=#1\do{%
158         \removetop{\@tempa}\to{aka}%
159         \advance\@tempcntb by-1\relax
160         \expandafter\expandafter\expandafter
161         \g@addto@macro\expandafter\@a\expandafter{\aka}%
162         \ifnum\@tempcntb>0\relax
163             \expandafter\expandafter\expandafter
164             \g@addto@macro\expandafter\@a\expandafter{#3}%
165         \fi
166     }%
167 \egroup
168 }

```

`\compresslist`  $\langle list \rangle$   $\to$   $\langle macro \rangle$   $\setsep$   $\langle single \rangle$   $\langle multi \rangle$

Compress  $\langle list \rangle$  and puts result to  $\langle macro \rangle$ ; single elements separated by  $\langle single \rangle$ , multi by  $\langle multi \rangle$ .

```

169 \def\compresslist#1\to#2\sep#3#4{%
170     \bgroup
171     \expandafter\def\csname#2\endcsname{}%
172     \expandafter\def\expandafter\@a\expandafter{\csname#2\endcsname}%
173     \t@mp@r@a=-1\relax
174     \@tempcnta=-2\relax
175     \expandafter\@for\expandafter\@refb\expandafter:\expandafter=#1\do{%
176         \ifnum\t@mp@r@a=-1\relax
177             \t@mp@r@a=\@refb\relax
178             \t@mp@r@b=\@refb\relax
179             \t@mp@r@c=\@refb\relax
180             \expandafter\expandafter\expandafter
181             \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@a}%
182         \else
183             \t@mp@r@c=\@refb\relax
184             \ifnum\t@mp@r@c=\t@mp@r@a\relax
185                 \expandafter\expandafter\expandafter
186                 \g@addto@macro\expandafter\@a\expandafter{#3}%
187                 \expandafter\expandafter\expandafter
188                 \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@c}%
189                 \t@mp@r@b=\t@mp@r@c\relax
190             \else
191                 \@tempcnta=\t@mp@r@b\relax
192                 \advance\@tempcnta by1\relax
193                 \ifnum\@tempcnta=\t@mp@r@c\relax
194                     \t@mp@r@b=\t@mp@r@c\relax
195                 \else
196                     \@tempcnta=\t@mp@r@a\relax
197                 \advance\@tempcnta by-\t@mp@r@b\relax

```

```

198     \ifnum\@tempcnta<-1\relax
199         \expandafter\expandafter\expandafter
200             \g@addto@macro\expandafter\@a\expandafter{#4}%
201     \expandafter\expandafter\expandafter
202         \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@b}%
203     \expandafter\expandafter\expandafter
204         \g@addto@macro\expandafter\@a\expandafter{#3}%
205     \expandafter\expandafter\expandafter
206         \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@c}%
207     \else
208         \ifnum\t@mp@r@a<\t@mp@r@b
209             \expandafter\expandafter\expandafter
210                 \g@addto@macro\expandafter\@a\expandafter{#3}%
211             \expandafter\expandafter\expandafter
212                 \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@b}%
213         \fi
214     \expandafter\expandafter\expandafter
215         \g@addto@macro\expandafter\@a\expandafter{#3}%
216     \expandafter\expandafter\expandafter
217         \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@c}%
218     \fi
219     \t@mp@r@a=\t@mp@r@c\relax
220     \t@mp@r@b=\t@mp@r@c\relax
221 \fi
222 \fi
223 \fi
224 }%
225 \ifnum\t@mp@r@a<\t@mp@r@c\relax
226     \advance\t@mp@r@a by-\t@mp@r@c\relax
227     \ifnum\t@mp@r@a<-1\relax
228         \expandafter\expandafter\expandafter
229             \g@addto@macro\expandafter\@a\expandafter{#4}%
230     \else
231         \expandafter\expandafter\expandafter
232             \g@addto@macro\expandafter\@a\expandafter{#3}%
233     \fi
234     \expandafter\expandafter\expandafter
235         \g@addto@macro\expandafter\@a\expandafter{\the\t@mp@r@c}%
236 \fi
237 \egroup
238 }
239 %\endinput

```