

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@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@a}}\@a@
20      \egroup
21      }%
22      \expandafter\xdef\csname #1@length\endcsname{\the\@tempcnta}%
23  \egroup
24  }

\outarray {<array>}{<sep>}
      Outputs <array> elements separated by <sep>.

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 {<arg>}
      Adds 0 before <arg>.

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

\getarrayitem {<array>}{<index>}\to{<command>}
      Gets <array> element by <index> to \<command>.

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

\setarrayitem {<array>}{<index>}{<value>}
      Sets <array> element by <index> to <value>.

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 }

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

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

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

51 \def\setarraylengtht#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=\getarraylengtht{#1}\relax
72     \advance\@tempcnta by1\relax
73     \setarraylengtht{#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       \ifnum\temp@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   \toks0\expandafter\expandafter\expandafter{\expandafter\@a@#1}%
132   \xdef#1{\the\toks0}%
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` $\{\langle list \rangle\}\to\{\langle macro \rangle\}\sep\{\langle sep \rangle\}$

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 $\{ \langle macro \rangle \}$ sep $\{ \langle single \rangle \}$ $\{ \langle multi \rangle \}$

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

```