The multirow, bigstrut and bigdelim packages

Piet van Oostrum*  
Øystein Bache  
Jerry Leichter†

Released 2019/01/01, version v2.4

Contents

1 Introduction 2

2 Changes in version 2 2

3 Using multirow 3
   3.1 Package Options 4
   3.2 Examples 4
   3.3 Fine-Tuning 7
   3.4 Multirow and colored cells 8
   3.5 Fine-tuning the \bigstrut\ argument 9
   3.6 Use with longtable 10
   3.7 Use with supertabular 11
   3.8 Dealing with tall entries 12

4 Using bigstrut 16

5 Using bigdelim 16

6 Implementation 18
   6.1 The multirow package 18
   6.2 The bigstrut package 22
   6.3 The bigdelim package 22

A Appendix 23
   A.1 Case \textlangle nrows \textrangle > 0 23
   A.2 Case \textlangle nrows \textrangle < 0 25
   A.3 Overview 27

*catalogued “active author”
†Documentation originally put together by Robin Fairbairns
1 Introduction

These packages offer a series of extensions to the standard \LaTeX\ tabular environment. Their respective functions are:

**multirow** which provides a construction for table cells that span more than one row of the table;

**bigstrut** which creates struts which (slightly) stretch the table row in which they sit.

**bigdelim** which creates an appropriately-sized delimiter (for example, brace, parenthesis or bracket) to fit in a single multirow, to indicate a relationship between other rows; and

2 Changes in version 2

version 2.4

- Add a \texttt{\leavevmode} in \texttt{bigstrut} to force horizontal mode
- Make \texttt{⟨width⟩} and \texttt{⟨vmove⟩} in \texttt{\multirow calc} compatible

version 2.3

- Replaced \texttt{\textrm} with \texttt{\textnormal} in text beside big braces in bigdelim.sty.

version 2.2

- Support for fractional values of \texttt{⟨nrows⟩}.

version 2.0

- \texttt{\multirow} now has an first optional parameter \texttt{[⟨vpos⟩]}.
- The \texttt{⟨width⟩} parameter can be specified as \texttt{=} to use the defined width of the column in which the \texttt{\multirow} appears.
- Optional prefix letters (\texttt{t, b}) for the \texttt{⟨bigstruts⟩} parameter (see section 3.5).
- Package option \texttt{debug}.
- Package option \texttt{longtable} to work around a bug in \texttt{longtable}. See section 3.6.
- Package option \texttt{supertabular} to better support \texttt{supertabular}. See section 3.7.
- Better positioning in some cases.
- Lots of documentation.
- The distribution is now based on a \texttt{.dtx} file.
- Backwards compatible with v1.6.
Using \texttt{multirow}

\texttt{\multirow} sets a piece of text in a \texttt{tabular} or similar environment, spanning multiple rows. We will call the block of rows and columns that the text spans the \texttt{multirow} block. Usually this covers one column, but by combining it with \texttt{\multicolumn} more columns can be covered.

The basic syntax is:

\begin{verbatim}
\multirow{⟨vpos⟩}{⟨nrows⟩}{⟨bigstruts⟩}{⟨width⟩}{⟨vmove⟩}{⟨text⟩}
\end{verbatim}

where

⟨\texttt{vpos}⟩ defines the vertical positioning of the text in the \texttt{multirow} block. The default is [c] which means the text will be vertically centered. Other options are [t] for top alignment and [b] for bottom alignment.

⟨\texttt{nrows}⟩ is the number of rows to span. You should leave the other rows empty at this column, otherwise the stuff created by \texttt{\multirow} will over-write it. With a positive value of ⟨\texttt{nrows}⟩ the spanned columns are this row and (⟨\texttt{nrows}⟩-1) rows below it. With a negative value of ⟨\texttt{nrows}⟩ they are this row and (1-⟨\texttt{nrows}⟩) above it. Fractional values are permitted for ⟨\texttt{nrows}⟩; this allows for some fine-tuning.

⟨\texttt{bigstruts}⟩ is mainly used if you’ve used the \texttt{bigstrut} package. In that case it is the total number of uses of \texttt{\bigstrut} within the rows being spanned. Count 2 uses for each \texttt{\bigstrut}, 1 for each \texttt{\bigstrut[⟨x⟩]} where ⟨x⟩ is either t or b. The default is 0.

The ⟨\texttt{bigstruts}⟩ parameter can optionally be preceded by a prefix letter t, b or tb for finer control. See section 3.5 for details. The letter may be separated from the number by a space character.

⟨\texttt{width}⟩ is the width to which the text is to be set. Special values are * to indicate that the text parameter’s natural width is to be used, and = to indicate that the specified width of the column in which the \texttt{\multirow} entry is set should be used.

⟨\texttt{vmove}⟩ is a length used for fine-tuning: the text will be raised (or lowered, if ⟨\texttt{vmove}⟩ is negative) by that length above (below) wherever it would otherwise have gone.

⟨\texttt{text}⟩ is the actual text of the construct. If the width was set explicitly, the text will be set in a \texttt{\parbox} of that width; you can use \texttt{\\} to force linebreaks where you like.

If the width was given as * the text will be set in LR mode. If you want a multiline entry in this case you could use a \texttt{tabular} or array environment in the text parameter. See for example the \texttt{minitab} below.

The width can also be given as = when the \texttt{\multirow} entry is given in a column that has a defined width, for example in a \texttt{p{⟨width⟩}} column, an \texttt{X} column in \texttt{tabularx} or a L, C, R or J column in a \texttt{tabulary} environment. The text will be set in a \texttt{\parbox} of that width. If you give “=” in other situations, you will get strange results (usually a too wide column).
In *multirow* version 2.4 and later, the \texttt{⟨width⟩} and \texttt{⟨vmove⟩} arguments can be given as \texttt{calc} expressions if the \texttt{calc} package is loaded. It is the responsibility of the document writer to include the \texttt{calc} package; \texttt{multirow} does not do this.

N.B. \texttt{\textbackslash multirow} can be used in the \texttt{tabular} environment and most derivatives of it, for example \texttt{tabularx}, \texttt{tabulary}, \texttt{supertabular}, \texttt{ltablex}, \texttt{xtab}, \texttt{longtable}, \texttt{tabu}, \texttt{booktabs} and \texttt{ctable}. For some of these you have to pay special attention to certain cases, see below.

Just before \texttt{⟨text⟩} is expanded, the \texttt{\multirowsetup} macro is expanded to set up any special environment. Initially, \texttt{\multirowsetup} contains just \texttt{\raggedright}. It may be redefined with \texttt{\renewcommand}.

If you want to use both \texttt{\textbackslash multirow} and \texttt{\textbackslash multicolumn} on the same entry, you must put the \texttt{\textbackslash multirow} inside the \texttt{\textbackslash multicolumn}. The other way around will not work. For example:

\begin{verbatim}
\texttt{\textbackslash multicolumn\{2\}\{c\}\{\textbackslash multirow\{3\}\{*\}\{Multi\-multi\}}}
\end{verbatim}

### 3.1 Package Options

The following options are defined:

- \texttt{\textbackslash multirowdebugtrue}  
- \texttt{\textbackslash multirowdebugfalse}

**debug** This option causes information about multirow boxes to be written to the log file. This is done by the \TeX~\texttt{\showbox} command. Note: this will cause the \LaTeX~compilation to be considered failed, even if there is no real error. This option can also be activated anywhere in the document with the command \texttt{\textbackslash multirowdebugtrue} and deactivated with \texttt{\textbackslash multirowdebugfalse}.

When such a command is placed just before a \texttt{\multirow}, it applies only to that specific \texttt{\multirow} entry.

**longtable** The \texttt{\textbackslash longtable} option redefines the \texttt{\textbackslash cline} macro to work around a bug in the \texttt{longtable} package. See section 3.6.

### 3.2 Examples

An example with both \texttt{\textbackslash multirow} and \texttt{\textbackslash bigstrut}:

\begin{verbatim}
\newcommand\minitab\[2\]\[l\]{\begin{tabular}{#1}#2\end{tabular}}
\begin{tabular}{|c|c|}
\hline
\multirow{4}\{1in\}\{\text{Common g text} \& Column g2a\}
 & Column g2b \ \\
 & Column g2c \ \\
 & Column g2d \ \\
\hline
\multirow{3}\{6\}\{\text{Common g text} \& Column g2a\textbackslash bigstrut\}\{\textbackslash cline\{2\-2\}\}
 & Column g2b \bigstrut\{\textbackslash cline\{2\-2\}\}
 & Column g2c \bigstrut\{\textbackslash cline\{2\-2\}\}
\hline
\multirow{4}\{8\}\{\text{Common g text, but a bit longer.} \& Column g2a\textbackslash bigstrut\}\{\textbackslash cline\{2\-2\}\}
 & Column g2b \bigstrut\{\textbackslash cline\{2\-2\}\}
 & Column g2c \bigstrut\{\textbackslash cline\{2\-2\}\}
 & Column g2d \bigstrut\{\textbackslash cline\{2\-2\}\}
\end{tabular}
\end{verbatim}
\begin{tabular}{|c|c|c|c|}
\hline
\text{Common g text} & Column g2a \& Column g2b \& Column g2c \& Column g2d \\
\hline
\end{tabular}

which will appear as:

<table>
<thead>
<tr>
<th>Common g text</th>
<th>Normal case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Column g2a</td>
</tr>
<tr>
<td></td>
<td>Column g2b</td>
</tr>
<tr>
<td></td>
<td>Column g2c</td>
</tr>
<tr>
<td></td>
<td>Column g2d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common g text</th>
<th>With \texttt{\bigstrut} and * as \texttt{\langle width\rangle}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Column g2a</td>
</tr>
<tr>
<td></td>
<td>Column g2b</td>
</tr>
<tr>
<td></td>
<td>Column g2c</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common g text, but a bit longer.</th>
<th>With \texttt{\bigstrut} and normal \texttt{\langle width\rangle}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Column g2a</td>
</tr>
<tr>
<td></td>
<td>Column g2b</td>
</tr>
<tr>
<td></td>
<td>Column g2c</td>
</tr>
<tr>
<td></td>
<td>Column g2d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common g text</th>
<th>Multiline text in \texttt{\multirow}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Column g2a</td>
</tr>
<tr>
<td></td>
<td>Column g2b</td>
</tr>
<tr>
<td></td>
<td>Column g2c</td>
</tr>
<tr>
<td></td>
<td>Column g2d</td>
</tr>
</tbody>
</table>

An example with the “=” \texttt{\langle width\rangle} specifier in a \texttt{tabulary} (Note: The braces around the = may be omitted):

\begin{tabular}{|L|L|L|}
\hline
All human beings are born free and equal in dignity and rights. & Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.) & No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms. & No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. \\
\hline
\end{tabular}
<table>
<thead>
<tr>
<th>All human beings are born free and equal in dignity and rights.</th>
<th>Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.</th>
<th>Everyone has the right to life, liberty and security of person.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.</td>
<td>No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment.</td>
<td></td>
</tr>
</tbody>
</table>

A few observations about this example:

1. The middle column is the \texttt{\multirow}. You would expect it to be vertically centered, but it isn’t. This is because \texttt{\multirow} doesn’t know the height of the box. The only estimate \texttt{\multirow} can make about the height is the number of rows $\times$ the normal height of a row. It tries to center the text in that space, but that space is too low in this example. Therefore the text is at the top of the box. If you want it to be centered, you have to supply a \texttt{\vmove} argument to shift it down.

2. We have used an \texttt{\extrarowheight} of 2pt, to make a bit room between the \texttt{\hline} and the following text. However, this is not applied to the \texttt{\multirow}, because this is thought to be centered. In this case you can give the \texttt{\vpos} argument as [t], in which case \texttt{\multirow} will do the proper positioning.

Now with a negative \texttt{\nrows}.

\begin{verbatim}
\setlength{\extrarowheight}{2pt}
\begin{tabulary}{11cm}{|L|L|L|}
\hline
All human beings are born free and equal in dignity and rights. & Everyone has the right to life, liberty and security of person. \ & &
\hline
Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. & No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. \ & &
\hline
\end{tabulary}
\end{verbatim}

\textsuperscript{1}This is only available with the array package, which tabulary includes automatically.
| All human beings are born free and equal in dignity and rights. | Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. | Everyone has the right to life, liberty and security of person. |
| No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms. | | No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. |

In this case the text would be centered somewhere in the bottom row, which would make it stick out of the bottom. Therefore we applied a \textit{vmove} of 12mm. The \textit{vmove} usually requires some experimentation.

### 3.3 Fine-Tuning

If any of the spanned rows are unusually large, or if you’re using the \texttt{bigstrut} package and \texttt{\bigstruts} are used asymmetrically about the centerline of the spanned rows, the vertical centering may not come out right. Use the \textit{vmove} parameter in this case. Sometimes it may be more helpful to just use a larger value for \textit{nrows}, including fractional values. See an example in section 3.8.

It’s just about impossible to deal correctly with descenders. The text will be set up centered, but it may then have a baseline that doesn’t match the baseline of the stuff beside it, in particular if the stuff beside it has descenders and \textit{text} does not. This may result in a small misalignment. About all that can be done is to do a final touchup on \textit{text}, using the \textit{vmove} optional parameter. (Hint: If you use a measure like .1ex, there’s a reasonable chance that the \textit{vmove} will still be correct if you change the point size.)

\texttt{\textbackslash{multirow}} is mainly designed for use with \texttt{tabular}, as opposed to \texttt{array}, environments. It might not work well in an array environment if there are big formulas in some rows; in that case you can use the \textit{vmove} parameter to refine the result.

In some cases you might want to align the multirow entry with the top of the other row cells, for example if you have a large capital in it. When you use \textit{vpos} = [t], the baselines will be aligned, which is the wrong thing in this case. You can then do the positioning with the \textit{vmove} parameter and let \texttt{\LaTeX} calculate the amount. For example:

\begin{verbatim}
\usepackage{calc}
\newlength{\shiftdown}
\setlength{\shiftdown}{\heightof{\Huge\bfseries B}-\heightof{f}}
\begin{tabular}{cll}
\toprule
\multirow[5]{*}{[-\shiftdown]{\Huge\bfseries B}} & foo & Lorem ipsum dolor sit \\
& bar & Maecenas sed purus \\
& baz & Nullam luctus id tellus \\
\bottomrule
\end{tabular}
\end{verbatim}
In `\multirow` version 2.4 and later you can also directly use the expression `-\heightof{\Huge\bfseries B}-\heightof{f}` instead of `-\shiftdown` for the \langle\emove\rangle argument.

### 3.4 Multirow and colored cells

If you use `\multirow` with the `colortbl` package you have to take precautions if you want to color the column that has the `\multirow` in it. The `colortbl` package works by coloring each cell separately. So if you use `\multirow` with a positive \langle\nrows\rangle value, `colortbl` will first color the top cell, then `\multirow` will typeset \langle\nrows\rangle cells starting with this cell, and later `colortbl` will color the other cells, effectively hiding the text in that area. This can be solved by putting the `\multirow` in the last row with a negative \langle\nrows\rangle value. See, for example:

```
\begin{tabular}{l>{\columncolor{yellow}}l}
  aaaa & \\
  cccc & \\
  dddd & \multirow{-3}*{bbbb}\\
\end{tabular}
```

which will produce:

```
   aaaa
  cccc   bbbb
   dddd
```

When you use colored multirow cells together with the `hhline` package you may find some white stripes in your colored multirow cell. For example:

```
\begin{tabular}{|>{\columncolor{red}}c|c|}
  \hline
  \bfseries ColumnOne & \bfseries ColumnTwo\\
  \hline
  First data & 932\\ \hline
  & 239\ \hline
  & 137\ \hline
  \multirow{-3}{*}{More data} & 319\ \hline
  Last data & 132\ \hline
\end{tabular}
```

8
This can be solved by putting colored horizontal rules with the same color in the colored multirow cell.

\begin{tabular}{|>{\columncolor{red}}c|c|}
\hline
\textbf{ColumnOne} & \textbf{ColumnTwo} \\
\hline
First data & 932 \\
& 239 \\
& 137 \\
\hline
More data & 319 \\
\hline
Last data & 132 \\
\end{tabular}

### 3.5 Fine-tuning the ⟨bigstruts⟩ argument

\texttt{\multirow} can calculate the height of the required multirow box from \texttt{⟨nrows⟩} and \texttt{⟨bigstruts⟩}, supposed that all the rows don’t have “unusual heights. However, there are cases when this is not enough to properly position the box, especially when there is a \texttt{\bigstrut} on top of the first row and/or one on the bottom of the last row. In that case \texttt{\multirow} should be given additional information. This is done by prefixing the \texttt{⟨bigstruts⟩} argument with a letter (or two) indicating which of these two are present.

See the following examples:

(in these examples we have \texttt{\setlength{\bigstrutjot}{10pt}} to make the effect clearly visible)

```latex
\begin{tabular}{|c|c|}
\hline
\texttt{Multirow} & T \bigstrut\[t\] \\
\cline{2-2}
& X \\
\cline{2-2}
& B \\
\hline
\end{tabular}
```

In the top box in the above example the text “Multirow” should be centered, but
it is a bit below the center, because of the $\texttt{\bigstrut[t]}$ in the top row. We can correct this by giving the $\langle \texttt{bigstruts} \rangle$ parameter as “t 1”, indicating a bigstrut in the top. This is done in the bottom box, where $\texttt{\multirow[3][t 1]{*}{Multirow}}$ is used.

A second example:

\begin{tabular}{|c|c|}
\hline
& T \\
\cline{2-2}
& X \\
\cline{2-2}
\multirow{-3}[1]{*}{Multirow} & B $\texttt{\bigstrut[b]}$ \\
\hline
\end{tabular}

In the top box the $\texttt{\multirow[t]}$ should be positioned on the same height as the T, but it is too high, because there is a $\texttt{\bigstrut}$ in the bottom. We can correct that by specifying the $\langle \texttt{bigstruts} \rangle$ argument as “b 1”, i.e. using $\texttt{\multirow[t]{-3}[b 1]{*}{Multirow}}$.

The possibilities for the prefix are:

- **t**: There is a bigstrut in the top, i.e. a $\texttt{\bigstrut}$ or $\texttt{\bigstrut[t]}$ in the top row.
- **b**: There is a bigstrut in the bottom, i.e. a $\texttt{\bigstrut}$ or $\texttt{\bigstrut[b]}$ in the bottom row.
- **tb**: They are both present. Note: this cannot be given as bt.

The space between the letter(s) and the number is optional. Please note that the prefix does not depend on whether the $\texttt{\multirow}$ is in the top or the bottom row.

### 3.6 Use with longtable

It is possible to use $\texttt{\multirow}$ in a $\texttt{longtable}$ environment (as well as in its descendent $\texttt{longtabu}$). However, care must be taken that the longtable doesn’t break the multirow entry when it is near the bottom of the page. For example:
\begin{longtable}{|l|l|l|}
\ldots & \ldots & \ldots \\
Sept. 21 & 09:00 & event 1 \\
Sept. 22 & 10:00 & event 2 \\
Sept. 23 & \multirow{3}*{10:00} & event 3 \\
& 12:00 & event 4 \\
& 15:00 & event 5 \\
Sept. 24 & 09:00 & event 6 \\
\ldots & \ldots & \ldots \\
\end{longtable}

In this case if the “Sept. 23” entry comes close to the bottom of the page, you
want to prevent the pagebreak to occur in the middle of this entry. You can do
this by ending the intermediate rows with ``` and instead of ```.

\multirow{3}*{Sept. 23} & 10:00 & event 3 \\
& 12:00 & event 4 \\
& 15:00 & event 5 \\
\hline
Sept. 24 & 09:00 & event 6 \\
\hline
\ldots & \ldots & \ldots \\
\end{longtable}

There is, however, a bug in `longtable`, that causes the ``` not to work if it is
followed by a ``` like in the following example:

\multirow{3}*{Sept. 23} & 10:00 & event 3 \\
& \cline{2-3} & 12:00 & event 4 \\
& \cline{2-3} & 15:00 & event 5 \\
\hline
\ldots & \ldots & \ldots \\
\end{longtable}

`multirow` has a package option `longtable` that redefines `\cline` so that the
``` will also work when followed by ``` The code comes from David Carlisle.

### 3.7 Use with `supertabular`

With the package `supertabular` (or the augmented version `xtab`) there is the same
requirement to keep the rows of a multirow together when a pagebreak occurs. Un-
fortunately, `supertabular` does not have a way to specify that a pagebreak should
be suppressed. i.e. ``` does not suppress a pagebreak. Therefore `multirow` pro-
vides a package option `supertabular` that redefines ``` inside a `supertabular`
to suppress the pagebreak. You should use this to end the intermediate rows in
a multirow block. However, this does not cause `supertabular` to consider break-
ing the page before the `\multirow`, contrary to `longtable`. Thus the table may
become too long.

\multitable{\STneed}{\|}{\|}
\STneed & \STneed & \STneed \\
\ldots & \ldots & \ldots \\
\end{longtable}

Therefore when the `supertabular` option is given, `multirow` also provides a
command `\STneed` to be used in a `supertabular` that specifies how much space
we need on the page. Then if there is not enough space, a pagebreak will occur at
that place. For example:
3.8 Dealing with tall entries

Sometimes there are rows that are taller than what is expected. This section gives some hints how to deal with these situations. There are two cases:

1. When there is an exceptionally tall row outside of the \texttt{multirow} block the positioning of the \texttt{multirow} might be wrong. This is because \texttt{multirow} does not have information about the heights of the rows. This can happen for example when a large formula is entered in a cell, or a multi-line paragraph in a \texttt{\{\}} column. An example:

\begin{tabular}{| l | l | p{4cm} |}
\hline
\texttt{\multirow{3}*{Week 38}} & Monday & Rain most of the day \& Tuesday & Sunny with some clouds \& Wednesday & A clear day with a lot of sunshine. However, the strong wind will bring down the temperature. \hline
\end{tabular}
The \texttt{\multirow} is positioned on the second row, because it specifies that it should cover 3 rows. However, the second row is not the vertical center in this case because the third row is much taller.

To remedy this, the \texttt{(emove)} parameter could be used. However, in this case it would be easier to pretend that \texttt{\multirow} spans 6 rows (the total number of lines in the last column). So use \texttt{\multirow{6}}... and we get:

\begin{tabular}{| p{2mm} l | p{5cm} |}
\hline
\multicolumn{2}{|l|}{\textbf{Medicine \\ & dose}} & \textbf{Possible Side effects} \\
\hline
\multicolumn{2}{|l|}{Spirino} & Confusion, hallucinations, rapid breathing, seizure (convulsions); upset stomach, heartburn; severe nausea, vomiting, or stomach pain or mild headache. \\
& initial: 200 mg/day & \\
& maintenance: 100-400 mg/day & \\
\hline
\multicolumn{2}{|l|}{Conzac} & Anxiety; nervousness; insomnia; anorexia; mild bradycardia; SA node slowing; weight loss; solar photosensitivity; hyponatremia; sexual dysfunction (both genders); may alter glycemic control in diabetic patients. \\
& initial: 10 mg/day & \\
& maintenance: 10-40 mg/day & \\
\hline
\end{tabular}

2. The second case is when the \texttt{\multirow} entry is taller than the surrounding normal rows. In that case the multirow text will stick out of its block. We must now enlarge the other rows, and that is something \texttt{\multirow} cannot do.

An example: (Don’t take this as a medical advice. The names are fake anyway.)

\begin{verbatim}
\begin{tabular}{| l |}
\hline
\multicolumn{1}{|l|}{\begin{tabular}{| p{2mm} l | p{5cm} |}
\hline
\multicolumn{2}{|l|}{\textbf{Medicine \\ & dose}} & \textbf{Possible Side effects} \\
\hline
\multicolumn{2}{|l|}{Spirino} & Confusion, hallucinations, rapid breathing, seizure (convulsions); upset stomach, heartburn; severe nausea, vomiting, or stomach pain or mild headache. \\
& initial: 200 mg/day & \\
& maintenance: 100-400 mg/day & \\
\hline
\multicolumn{2}{|l|}{Conzac} & Anxiety; nervousness; insomnia; anorexia; mild bradycardia; SA node slowing; weight loss; solar photosensitivity; hyponatremia; sexual dysfunction (both genders); may alter glycemic control in diabetic patients. \\
& initial: 10 mg/day & \\
& maintenance: 10-40 mg/day & \\
\hline
\end{tabular}}
\end{tabular}
\end{verbatim}
<table>
<thead>
<tr>
<th>Medicine &amp; dose</th>
<th>Possible Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirino</td>
<td>Confusion, hallucinations, rapid breathing, seizure (convulsions); upset stomach, heartburn; severe nausea, vomiting, or stomach pain or mild headache.</td>
</tr>
<tr>
<td>initial: 200 mg/day</td>
<td>maintenance: 100-400 mg/day</td>
</tr>
<tr>
<td>Conzac</td>
<td>Anxiety; nervousness; insomnia; anorexia; mild bradycardia; SA node slowing; weight loss; solar photosensitivity; hyponatremia; sexual dysfunction (both genders); may alter glycemic control in diabetic patients.</td>
</tr>
<tr>
<td>initial: 10 mg/day</td>
<td>maintenance: 10-40 mg/day</td>
</tr>
</tbody>
</table>

Both \texttt{\multirow} entries are too high; the first sticks out into the second entry, and the second one sticks out of the table.

There are two ways we can correct this: The simplest would be to add extra empty rows to cover the overlapping space. For the first entry that would be 2 extra rows; for the second 4. So we add twice \texttt{& \&} \texttt{\&} before the third \texttt{\hline}, and four of these before the last \texttt{\hline}. This gives us just the correct table:

<table>
<thead>
<tr>
<th>Medicine &amp; dose</th>
<th>Possible Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirino</td>
<td>Confusion, hallucinations, rapid breathing, seizure (convulsions); upset stomach, heartburn; severe nausea, vomiting, or stomach pain or mild headache.</td>
</tr>
<tr>
<td>initial: 200 mg/day</td>
<td>maintenance: 100-400 mg/day</td>
</tr>
<tr>
<td>Conzac</td>
<td>Anxiety; nervousness; insomnia; anorexia; mild bradycardia; SA node slowing; weight loss; solar photosensitivity; hyponatremia; sexual dysfunction (both genders); may alter glycemic control in diabetic patients.</td>
</tr>
<tr>
<td>initial: 10 mg/day</td>
<td>maintenance: 10-40 mg/day</td>
</tr>
</tbody>
</table>

The second way is to stretch the normal rows vertically, such that they fit with the multirow entry. In this table, where the font size is 10pt, each row has a total height of 12pt. For the first entry we need 24pt extra (2 rows). Because this space must be divided over 3 rows that is 8pt per row, making the total height of the row 20pt. The normal row has a height of 8.4pt and a depth of 3.6pt (total 12pt). We can add 4pt on the top and 4pt on the bottom, or any other combination that adds up to 8pt. In this case I have chosen to make the height 12pt and the depth 8pt. We do this with a \texttt{\rule} with 0 width. \texttt{\newcommand{\mystrut}{\rule[-8pt]{0pt}{20pt}}} and put \texttt{\mystrut} in each of the first 3 rows. By defining your own struts you have complete control over the layout. You can choose to give some rows more space than others, or to put all the space is the last row, for example.

For the second entry we need 48pt extra (4 rows). We will use \texttt{\bigstrut} in each row, that is 16pt per row, and as a \texttt{\bigstrut} is 2\texttt{\bigstrutjot}s, we set \texttt{\bigstrutjot} to 8pt. The \texttt{booktabs} package adds some extra vertical space around the rules, therefore when using the normal \texttt{tabular} environment, it
is probably better to make the struts a little bit bigger, or a bit smaller with booktabs. After some experimentation it appeared that a \bigstrutjot of 7pt was enough. Of course we added the \bigstruts argument of \[tb6\] to the second multirow. Please note that this is not possible with our own struts, unless we cheat.

Now with booktabs the code becomes:

```latex
\newcommand{\mystrut}{\rule[-8pt]{0pt}{20pt}}
\setlength{\bigstrutjot}{7pt}
\begin{tabular}{ p{2mm} l p{5cm} } 
  \toprule
  \multicolumn{2}{l}{\textbf{Medicine \& dose}} & \textbf{Possible Side effects} \\
  \cmidrule(r){1-2} \cmidrule(l){3-3}
  \multicolumn{2}{l}{Spirino} \mystrut & \multirow{3}={Confusion, hallucinations, rapid breathing, seizure (convulsions); upset stomach, heartburn; severe nausea, vomiting, or stomach pain or mild headache.} \\
  \cmidrule(r){1-2}
  & initial: 200 mg/day \mystrut & \\
  \cmidrule(r){1-2}
  & maintenance: 100-400 mg/day \mystrut & \\
  \midrule
  \multicolumn{2}{l}{Conzac} \bigstrut & \multirow{3}{2cm}{Anxiety; nervousness; insomnia; anorexia; mild bradycardia; SA node slowing; weight loss; solar photosensitivity; hyponatremia; sexual dysfunction (both genders); may alter glycemic control in diabetic patients.} \\
  \cmidrule(r){1-2}
  & initial: 10 mg/day \bigstrut & \\
  \cmidrule(r){1-2}
  & maintenance: 10-40 mg/day \bigstrut & \\
  \bottomrule
\end{tabular}
```

<table>
<thead>
<tr>
<th>Medicine &amp; dose</th>
<th>Possible Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirino</td>
<td>Confusion, hallucinations, rapid breathing, seizure (convulsions); upset stomach, heartburn; severe nausea, vomiting, or stomach pain or mild headache.</td>
</tr>
<tr>
<td>initial: 200 mg/day</td>
<td></td>
</tr>
<tr>
<td>maintenance: 100-400 mg/day</td>
<td></td>
</tr>
<tr>
<td>Conzac</td>
<td>Anxiety; nervousness; insomnia; anorexia; mild bradycardia; SA node slowing; weight loss; solar photosensitivity; hyponatremia; sexual dysfunction (both genders); may alter glycemic control in diabetic patients.</td>
</tr>
<tr>
<td>initial: 10 mg/day</td>
<td></td>
</tr>
<tr>
<td>maintenance: 10-40 mg/day</td>
<td></td>
</tr>
</tbody>
</table>

4 Using \texttt{bigstrut}

\texttt{\bigstrut} produces a strut (a rule with width 0) which is \texttt{\bigstrutjot} (2pt by default) higher, lower, or both than the standard array/tabular strut. Use it in table entries that are adjacent to \texttt{\hline} to leave an extra bit of space—according to the TeXbook (page 246), “This is a little touch that improves the appearance of boxed tables; look for it as a mark of quality.”

Although you could use \texttt{\bigstrut} in an array, there isn’t normally much point since arrays are ‘opened up’ by \texttt{\jot} anyway.

\texttt{\bigstrut[t]} adds height; \texttt{\bigstrut[b]} adds depth. Just \texttt{\bigstrut} adds both. So: Use \texttt{\bigstrut[t]} in the row just after an \texttt{\hline}; \texttt{\bigstrut[b]} in the row just before; and \texttt{\bigstrut} if there are \texttt{\hline}s both before and after.

Spaces after the \texttt{\bigstrut} are ignored, even if it has an optional argument. Spaces before the \texttt{\bigstrut} are generally ignored (by a single \texttt{\unskip}).

Note: The \texttt{multicolumn} package makes use of \texttt{\bigstrutjot}. If both packages are used, they can be used in either order, as each checks to see if the other has already defined \texttt{\bigstrutjot}. However, the default values they set are different: if only \texttt{multicolumn} is used, \texttt{\bigstrutjot} will be set to 3pt. If \texttt{bigstrut} is used, with or without \texttt{multicolumn}, \texttt{\bigstrutjot} will be 2pt.

5 Using \texttt{bigdelim}

The package is for working in a \texttt{tabular} or \texttt{array} environment, in which the \texttt{multicolumn} package is also used.

\texttt{\bigdelim} Syntax of use is

\begin{verbatim}
\bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdelim \bigdeli
The first parameter is a delimiter to be used, e.g., \{ \} \[ \) ( — in fact, anything that can be used with \left or \right, as appropriate. Here is an example:

\begin{equation}
\begin{array}{ccccccc}
\ldelim({4}{4mm} & x & x & x & x & \rdelim){4}{4mm} \ \ \\
& x & x & x & x & & i \ \\
& x & x & x & x & & j \ \\
& x & x & x & x & \ \\
& & u & v & \ \\
\end{array}
\end{equation}

\begin{pmatrix}
 x & x & x & x \\
 x & x & x & x \\
 x & x & x & x \\
 u & v
\end{pmatrix}

(1)

When \ldelim is used, the optional \text is set centred to the left of \ldelim. If \rdelim is used it is set to the right of \rdelim. The \langle width \rangle parameter is the space that is reserved for the delimiter and its text; as with the multirow package, the \langle width \rangle may be given as *.

\begin{tabular}{p{2em}l}
\ldelim\{{3}{*}[type] & dvi \\
& ps \\
& pdf
\end{tabular}

\begin{tabular}{l@{}l@{}l}
\ldelim\{{3}{*}[type] & dvi \\
& ps \\
& pdf
\end{tabular}

In the first example we cheated: by using a column width that is too small, we swallowed up some of the intercolumn space, at the cost of an “Overfull \hbox” message. In the second example we did it the proper way by inserting @{} to replace the default intercolumn space with a narrow space.

Also the commands may be used in the last row of the extension with a negative \langle n \rangle argument. This is useful in combination with colortbl (see the discussion in section 3 on multirow). If there are unusually tall rows you may have to enlarge \langle n \rangle (you can use fractional values). If you have horizontal lines that interact with the braces you are advised to use the hhline package to make the lines.

In case you want to have a paragraph type text as optional parameter you could put it in a \parbox. Alternatively you could add an extra column with the text in a \multirow, like in

\begin{tabular}{l@{}l@{}l@{}l}
17
These are the output types, that are commonly used for TeX.

Note that we used \@{} to eliminate the intercolumn space to get the text tight to the brace.

6 Implementation

6.1 The multirow package

This is a boolean to [de]activate debugging (showing the generated box contents).
It is activated by the debug package option. The \newif initializes it to false.

\ifmultirowdebug
\multirowdebugtrue
\multirowdebugfalse
\fi

\cline
The package option longtable redefines the \cline macro to work around a bug in longtable. See section 3.6.2.

\DeclareOption{longtable}{% 
\AtBeginDocument{% 
\def\@cline#1-#2\@nil{% 
\omit 
\@multicnt#1
\advance\@multispan\m@ne
\ifnum\@multicnt=\@ne\@firstofone{&\omit}\fi
\@multicnt#2
\advance\@multicnt-#1
\advance\@multispan\@ne
\leaders\hrule\@height\arrayrulewidth\hfill
\cr
\noalign{\nobreak\vskip-\arrayrulewidth}}
\}

The package option supertabular redefines \* inside a supertabular. The redefinition is delayed until the \begin{document}.

\ST@tabularcr This macro is the definition of \ inside a supertabular. We check for a *, and if it is present we call our own version, otherwise the supertabular version.

\def\ST@tabularcr{% 
{\ifnum0='\fi
\@ifstar{\MRST@xtabularcr}{\ST@xtabularcr}}

\textsuperscript{2}Thanks to David Carlisle. See http://tex.stackexchange.com/questions/52100/longtable-multirow-problem-with-cline-and-nopagebreak#answer-52101
These are copies of the corresponding macros from `supertabular`, but instead of `\ST@cr` they call `\MRST@cr`.

\def\MRST@xtabularcr{\@ifnextchar[{}\MRST@argtabularcr}\
\def\MRST@argtabularcr[#1]{\ifnum0='{\fi}\cr\MRST@cr}
\def\MRST@xargarraycr#1{\@tempdima #1\advance\@tempdima \dp\@arstrutbox\vrule\@height\z@\@depth\@tempdima\@width\z@\cr\noalign{\global\ST@toadd=#1}\MRST@cr}
\def\MRST@yargarraycr#1{\cr\noalign{\vskip\global\MRST@toadd=#1}\MRST@cr}
\def\MRST@cr{\noalign{\ifnum\ST@pboxht<\ST@lineht\global\advance\ST@pageleft-\ST@lineht\global\ST@prevht\ST@lineht\else\global\advance\ST@pageleft-\ST@pboxht\global\advance\ST@pageleft-0.1\ST@pboxht\global\ST@toadd-\ST@stretchht\global\ST@pboxht\z@\fi\global\advance\ST@pageleft-\ST@toadd\global\ST@toadd\z@}}
\def\STneed#1{\ifdim\ST@pageleft<#1\ST@newpage\ST@next\fi}

`\ST@cr` is a truncated copy of `\ST@cr`. It does all the bookkeeping about the space the `longtable` occupies, but it doesn’t do the pagebreaking part.

This macro can be used in a `supertabular` to indicate how much space a multirow entry needs. See section 3.7.

`\multirow@colwidth` is a length that is used to implement the “=” variant of \langle\textit{width}\rangle.

`\multirow@colwidth` is a length that is used to implement the “=” variant of \langle\textit{width}\rangle.
\multirow@cntb \multirow@dima Define two counters and a length for internal use in \multirow.
\newcount\multirow@cntb
\newlength\multirow@dima

\multirow@setcolwidth This macro calculates \multirow@colwidth for an entry that has the \textit{width} given as “\textasciitilde\textasciitilde”. We check if we are inside a \texttt{tabulary} environment, by checking if \TY@final is defined. If not, then \multirow@colwidth = \hsize. The \texttt{tabulary} environment will make two passes. On the first pass, we set \multirow@colwidth to the size that the text would have in LR mode (with newlines replaced by spaces), so that \texttt{tabulary} will gives us enough space. On the second pass (characterized by \TY@box = \TY@bbox) we use the value that \texttt{tabulary} has given us in \hsize. This algorithm is not perfect, but good enough in most cases.
\def\multirow@setcolwidth#1{\ifx\TY@final\multirow@undefined \multirow@colwidth=\hsize \else \ifx\TY@box\TY@box@v \multirow@colwidth=\hsize \else \setbox0\hbox{\let\\space\let\newline\space #1} \multirow@colwidth=\wd0 \fi \fi }

\multirowsetup \multirowsetup is executed at the beginning of each \multirow.
\newcommand\multirowsetup{\raggedright}

\multirow@vbox This creates the \texttt{vbox}. Parameters:
\texttt{#1}=\langle vpos \rangle, \texttt{#2}=initialization code (for example to set the width of the \parbox), \texttt{#3}=box contents. Depending on the \langle vpos \rangle parameter, it will be top-aligned, vertically centered, or bottom-aligned. This is done by inserting \texttt{vfill} in the proper places. Note: the \relax is to protect against an empty \langle vpos \rangle argument.
\long\def\multirow@vbox#1#2#3{\setbox0\vtop to \multirow@dima{#2 \if #1t\relax\else\vfill\fi \multirowsetup #3 \if #1b\relax\else\vfill\fi}}

\multirow Make an entry that will span multiple rows of a table. First collect all the arguments and replace missing optional arguments by their default values.
\% \multirow \{vpos\} \{nrows\} \{bigstruts\} \{width\} \{vmove\} \{text\}
\newcommand\multirow[2][c]{\@multirow[#1]{#2}}
\def\@multirow[#1]{#2}{\@ifnextchar[{{\@@multirow[#1]{#2}}}{\@@multirow[#1]{#2}[0pt]}}
\def\@@multirow[#1]{#2}[#3]{#4}{\@ifnextchar[{{\@xmultirow[#1]{#2}[#3]{#4}}}{\@xmultirow[#1]{#2}[#3]{#4}[0pt]}}
\ifmultirow@prefixt \multirow@prefixttrue \fi\multirow@prefixfalse
\ifmultirow@prefixb \multirow@prefixbtrue \fi\multirow@prefixfalse

\ifmultirow@prefixxtrue \ifmultirow@prefixfalse \multirow@prefixxfalse \fi\multirow@prefixfalse
\ifmultirow@prefixxfalse \ifmultirow@prefixb \multirow@prefixbtrue \fi\multirow@prefixfalse
\ifmultirow@prefixbtrue \ifmultirow@prefixfalse \multirow@prefixbfalse \fi\multirow@prefixfalse
\ifmultirow@prefixbfalse \ifmultirow@prefixx \multirow@prefixxtrue \fi\multirow@prefixfalse

\if\ifmultirow@prefixx\fi\ifmultirow@prefixb\fi\ifmultirow@prefix\fi\multirow@prefixfalse
\if\ifmultirow@prefixfalse\fi\ifmultirow@prefixtrue\fi\ifmultirow@prefix\fi\multirow@prefixfalse
\if\ifmultirow@prefixfalse\fi\ifmultirow@prefixfalse\fi\ifmultirow@prefixtrue\fi\multirow@prefixfalse
\if\ifmultirow@prefixfalse\fi\ifmultirow@prefixfalse\fi\ifmultirow@prefixfalse\fi\ifmultirow@prefixtrue\fi\multirow@prefixfalse
\if\ifmultirow@prefixfalse\fi\ifmultirow@prefixfalse\fi\ifmultirow@prefixfalse\fi\ifmultirow@prefixfalse\fi\ifmultirow@prefixtrue\fi\multirow@prefixfalse
This is the real workhorse. It starts with splitting the \textit{bigstruts} argument, and then calculating the height of the multirow box. Because \textit{(nrows)} (\#2) can be fractional, we cannot use \texttt{ifnum} to test for positive or negative. Therefore we use \texttt{ifdim} by putting a unit (pt) after the number.

\begin{verbatim}
\def\@xmultirow[#1]{#2[#3][#4][#5][#6]}{\expandafter\multirow@piii#3\relax\end% 
\setlength\multirow@dima{#2\ht\@arstrutbox} 
\addtolength\multirow@dima{#2\dp\@arstrutbox} 
\ifdim#2pt<\z@ \setlength\multirow@dima{-\multirow@dima} \fi 
\addtolength\multirow@dima{\multirow@cntb1\bigstrutjot} \fi
\end{verbatim}

The text is set in a \texttt{vbox} by calling \texttt{multirow@vbox}. If the \texttt{(width)} argument is * set just the text in the \texttt{vbox}.

\begin{verbatim}
\if*#4\multirow@vbox{#1}{}{\hbox{\strut#6\strut}}% 
\else \if=#4\multirow@setcolwidth{#6}{\multirow@vbox{#1}{\setlength\hsize{\multirow@colwidth}\@parboxrestore}{\strut#6\strut\par}}% 
\else \multirow@vbox{#1}{\setlength\hsize{#4}\@parboxrestore}{\strut#6\strut\par}% \fi \fi
\end{verbatim}

Now position the \texttt{vbox} properly. More details are given in the appendix. The overview of the calculation of the shift amount can be found in section A.3.

If \textit{(nrows)} > 0:

If \textit{(vpos)} = [t], then the box is already positioned correctly (the baseline is on the baseline of the row). However, later the top of the box will be taken as the reference point (instead of the baseline), therefore we take the height of the box (h) as the shift amount. See fig. 1.

If \textit{(vpos)} = [c] we shift it up h1 (see fig. 2), where h1 = \texttt{\ht\@arstrutbox} + (\texttt{\bigstrutjot \ifmultirow@prefixt}.

If \textit{(vpos)} = [b] we shift it up h1 + h2 (see fig. 3), where h2 = \texttt{\dp\@arstrutbox} + (\texttt{\bigstrutjot \ifmultirow@prefixb}.

We calculate the required shift in \texttt{\multirow@dima}.

\begin{verbatim}
\ifdim#2pt<\z@ \relax\setlength\multirow@dima{\ht0}\else \setlength\multirow@dima{\ht\@arstrutbox}\fi 
\if#1\relax \addtolength\multirow@dima{\bigstrutjot}\fi
\if#1\relax \addtolength\multirow@dima{\dp\@arstrutbox}\fi 
\ifmultirow@prefixb \addtolength\multirow@dima{\bigstrutjot}\fi
\fi
\end{verbatim}
If \( n_{rows} \) < 0:
If \( v_{pos} = [t] \), shift the box up \( H - h_1 - h_2 + h \). See fig. 4.
If \( v_{pos} = [c] \), shift the box up \( H - h_2 \). See fig. 5.
If \( v_{pos} = [b] \), shift the box up \( H \). See fig. 6.

\( H \) is the current value of \textbackslash multirow@dima.  

Finally, we add the \( v_{move} \) argument (\#5), and go into horizontal mode. Then we shift the box up by putting a \textbackslash vskip above it, and add it to the output. Because of the \textbackslash vskip the resulting box will have a height 0. We set the depth of the \textbackslash vbox to 0, so that it will not influence the depth of the current row.

If \texttt{multirowdebug} is true, we show the box.

6.2 The \texttt{bigstrut} package

\texttt{bigstrutjot}  Define \texttt{bigstrutjot} if not already defined.

6.3 The \texttt{bigdelim} package

\texttt{delim}  This macro typesets a left delimiter. It calls \texttt{multirow} with the proper arguments. The size of the delimiter is determined by putting a \textbackslash vbox with the proper height
and zero width next to it. The height is the one that `\multirow` already has calculated in `\multirow@dima`.

\begin{verbatim}
132 \newcommand\ldelim[3]{{\@ifnextchar[{{\@ldelim{#1}{#2}{#3}}}{{\@ldelim{#1}{#2}{#3}[null]}}}
133 \def\@ldelim#1#2#3[#{4}]% 
134 {\multirow{#2}{#3}{% 
135 \ensuremath 
136 {\left.\vcenter{\hsize=0pt\vrule height \multirow@dima width 0pt}% 
137 \textnormal{#4}\right#1}}}
\end{verbatim}

This macro typesets a right delimiter. It calls `\multirow` with the proper arguments, similar to `\ldelim`.

\begin{verbatim}
138 \newcommand\rdelim[3]{{\@ifnextchar[{{\@rdelim{#1}{#2}{#3}}}{{\@rdelim{#1}{#2}{#3}[null]}}}
139 \def\@rdelim#1#2#3[#{4}]% 
140 {\multirow{#2}{#3}{% 
141 \ensuremath 
142 {\left#1\vcenter{\hsize=0pt\vrule height \multirow@dima width 0pt}% 
143 \textnormal{#4}\right.}}}
\end{verbatim}

`\rdelim` This macro typesets a right delimiter. It calls `\multirow` with the proper arguments, similar to `\ldelim`.

\section{Appendix}

In this section we explain the `\vbox` positioning in `\multirow`. The positioning depends on the \langle `nrows`\rangle, \langle `vpos`\rangle, \langle `bigstruts`\rangle and \langle `vmove`\rangle arguments. The box is constructed with `\vtop`. The algorithm of `\vtop` is described in The \TeX{}book, p. 81.

Each case is described by a figure. In the figure the lefthand column indicates the context of the tabular in which the multirow appears, i.e. \langle `nrows`\rangle rows. The righthand column is the multirow box that is to be inserted. The baseline is the natural position where the material will be positioned in the first place. Later it will be shifted up to the desired location.

H is the calculated height of the box: \langle `nrows`\rangle × the natural height of a row + \langle `bigstruts`\rangle × `\bigstrutjot`. `\bigstrutjot` is the height of a tabular row + `\bigstrut`.

- `\topstrut` = `\bigstrutjot` if there is a `\bigstrut` on the top of the first row (as indicated by the t prefix in the \langle `bigstruts`\rangle argument), otherwise 0.
- `\botstrut` = `\bigstrutjot` if there is a `\bigstrut` on bottom of the last row (as indicated by the b prefix in the \langle `bigstruts`\rangle argument), otherwise 0.
- `h1` = height of a tabular row + `\topstrut`
- `h2` = depth of a tabular row + `\botstrut`

Note: the following descriptions describe the vertical shift of the box without taking the \langle `vmove`\rangle into account. In all cases \langle `vmove`\rangle has to be added if it is given.

\subsection{Case \langle `nrows`\rangle > 0}

\langle `vpos`\rangle = [t]

In this case the `\vbox` contains the text followed by a `\vfill`. Such a `\vbox` has a height that is the height of the top line of the text (h), H = height + depth of the box. This means that the box is already positioned correctly. However, later we will put the box inside another `\vbox`, with a `\vskip` on to of it, and this will make the top of the box its reference point. Therefore we will have to shift it up.
again over a distance $h$ (which probably will be different from the height of the tabular row). So the total shift becomes $h$. See fig. 1.

Alternatively, we could have omitted the \texttt{\vskip} in this case, thereby leaving the baseline undisturbed, but this would make the code unsymmetrical. Moreover, this would not work when a non-zero \texttt{\vmove} is present. Therefore we choose to set the shift amount to $h$ here.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure1.png}
\caption{Case $\langle n\text{rows} \rangle > 0$, $\langle \text{vpos} \rangle = [t]$}
\end{figure}

$\langle \text{vpos} \rangle = [c]$

In this case the \texttt{\vbox} contains a \texttt{\vfill}, the text, and another \texttt{\vfill}. Such a \texttt{\vbox} has a height 0, i.e. the top of the box is on the baseline. Because both boxes have the same size ($H$), they can be aligned by shifting the \texttt{\vbox} up over $h_1$. See fig. 2.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure2.png}
\caption{Case $\langle n\text{rows} \rangle > 0$, $\langle \text{vpos} \rangle = [c]$}
\end{figure}
\langle vpos \rangle = [b]

Now the \vbox contains a \vfill, followed by the text. Because it ends with the text, it gets an additional depth equal to the depth of the last line of the text. Such a \vbox has a height 0, i.e. the top of the box is on the baseline, but its depth is H + that depth. In other words the baseline of the last text line is H below the top.

Because \langle vpos \rangle = [b] we want the baseline of the last text line to shift to the baseline of the last tabular row. The amount of the shift is h1 + h2. See fig. 3.

Figure 3: Case \langle nrows \rangle > 0, \langle vpos \rangle = [b]

A.2 Case \langle nrows \rangle < 0

\langle nrows \rangle < 0 when the multirow is positioned in the last row of the multirow block.

\langle vpos \rangle = [t]

In this case the \vbox contains the text followed by a \vfill. Such a \vbox has a height that is the height of the top line of the text. The baseline is aligned with the baseline of the last row. Because \langle vpos \rangle = [t], we want it to be aligned with the baseline of the first row. Therefore it has to be shifted up H − h1 − h2. But because later the height of the box will be set to 0, we must also add the current height h. Therefore the total shift becomes H − h1 − h2 + h. See fig. 4.

\langle vpos \rangle = [c]

In this case the \vbox contains a \vfill, the text, and another \vfill. Such a \vbox has a height 0, i.e. the top of the box is on the baseline. Because both boxes have the same size (H), they can be aligned by shifting the \vbox up over H − h2. See fig. 5.
Figure 4: Case $\langle nrows \rangle < 0, \langle vpos \rangle = [t]$ 

Figure 5: Case $\langle nrows \rangle < 0, \langle vpos \rangle = [c]$
The \vbox contains a \vfill, followed by the text. Because it ends with the text, it gets an additional depth equal to the depth of the last line of the text. Such a \vbox has a height 0, i.e. the top of the box is on the baseline, but its depth is $H$ + that depth. In other words the baseline of the last text line is $H$ below the top.

Because $\langle vpos \rangle = [b]$ we want the baseline of the last text line to shift to the baseline of the last tabular row. The amount of the shift is $H$. See fig. 6.

![Diagram](image)

Figure 6: Case $\langle nrows \rangle < 0$, $\langle vpos \rangle = [b]$

## A.3 Overview

<table>
<thead>
<tr>
<th>$\langle vpos \rangle$</th>
<th>$\langle nrows \rangle &gt; 0$</th>
<th>$\langle nrows \rangle &lt; 0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>[t]</td>
<td>$h$</td>
<td>$H - h_1 - h_2 + h$</td>
</tr>
<tr>
<td>[c]</td>
<td>$h_1$</td>
<td>$H - h_2$</td>
</tr>
<tr>
<td>[b]</td>
<td>$h_1 + h_2$</td>
<td>$H$</td>
</tr>
<tr>
<td>$x$</td>
<td></td>
<td>$H - h_1 - h_2 + x$</td>
</tr>
</tbody>
</table>

## Change History

### bigdelim v0.0

General: bigbrace.sty by Øystein Bache 22

### bigdelim v1.0

General: Initial version

Bigdelim.sty 22
bigdelim v2.3
\delim: Replace \textrm by \textnormal .................. 23
\rdelim: Replace \textrm by \textnormal .................. 23
bigstrut v1.0
General: Initial version ............ 22
bigstrut v2.4
General: Add \leavevmode at the
beginning to force horizontal
mode ............................. 22
multirow v1.0
General: distributed anonymously,
based on a Usenet posting .... 18
multirow v1.1
General: allow it to work without
bigstrut.sty (Piet van
Oostrum) ......................... 18
multirow v1.2
General: modified by Jerry
Leichter for the same goal, but
using a different approach
which will work properly with
bigstrut.sty ...................... 18
multirow v1.2a
General: modified by Piet van
Oostrum to use \vskip instead
of \raise in positioning,
avoiding making rows too high
when the adjustment is large . 18
multirow v1.3
General: modified by Piet van
Oostrum to work properly in a
p column (\leavevmode added) 18
multirow v1.4
General: modified by Piet van
Oostrum to check for the
special case that the width is
given as an *. In this case the
natural width of the text
argument will be used and the
argument is processed in
LR-mode .......................... 18
multirow v1.5
General: modified by Piet van
Oostrum: Added a % after
\hbox{#5}\vfill.
Added \struts around #5 for
better vertical positioning.
Additional coding for negative
value of \langle nrows \rangle .......... 18
multirow v1.6
General: modified by Piet van
Oostrum: Replace a space by
\relax after
\advance\multirow@dima#4 .. 18
v1.7
General: Give all the files the same
version number .................. 1
v1.8 \multirow: Add the optional first
parameter \langle vpos \rangle ........... 20
v1.9
General: Give \multirow its own
temp registers, so that we can
safely pass the box height to
bigdelim. ...................... 19
Implement the “=” option for
\multirow’s \langle width \rangle
parameter .......................... 19
v1.9a \multirow: Add the optional prefix
to the \langle bigstruts \rangle parameter . 20
Redo the \vbox calculation and
positioning ........................ 21
General: Implement the \debug
option ............................ 18
v1.9b
General: Implement the \longtable
option ............................... 18
Implement the \supertabular
option and the \STneed
command .......................... 18
v2.0 General: Release v2.0 ............. 1
v2.1 \multirow: Set depth of final
\vbox to 0, to prevent a tall
multirow line to push the
following rows downwards. ...... 22
General: Rename \langle fixup \rangle to
\langle vmove \rangle in the documentation
as in The LaTeX Companion. .. 3
v2.2 \multirow: Support fractional
values for \langle nrows \rangle ........ 21
General: Eliminate
\multirow@cnta ........................ 19
v2.3
General: Small bugfix ............. 1
v2.4 \multirow: Support calc
compatible expressions for
\langle width \rangle and \langle vmove \rangle ........ 21
General: Add in bigstrut.sty ....... 1
Make \langle width \rangle and \langle vmove \rangle in
\multirow calc compatible ....... 1
28
# Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

<table>
<thead>
<tr>
<th>B</th>
<th>\bigstrut ... 16, 126</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>\bigstrutjot 16, 124, 125</td>
</tr>
<tr>
<td></td>
<td>booktabs .... 15</td>
</tr>
<tr>
<td>C</td>
<td>\cline ... 3</td>
</tr>
<tr>
<td></td>
<td>colorbl ... 8, 17</td>
</tr>
<tr>
<td>E</td>
<td>\extrarowheight ... 5, 6</td>
</tr>
<tr>
<td></td>
<td>hhline ... 8, 17</td>
</tr>
<tr>
<td>I</td>
<td>\ifmultirow@prefixb ... 77</td>
</tr>
<tr>
<td></td>
<td>\ifmultirow@prefixt ... 77</td>
</tr>
<tr>
<td></td>
<td>\ifmultirowdebug ... 1</td>
</tr>
<tr>
<td>L</td>
<td>\ldelim ... 16, 132</td>
</tr>
<tr>
<td></td>
<td>longtable ... 10</td>
</tr>
<tr>
<td></td>
<td>\multirow ... 10</td>
</tr>
<tr>
<td></td>
<td>\multirow@setcolwidth ... 60</td>
</tr>
<tr>
<td></td>
<td>\multirow@vbox ... 69</td>
</tr>
<tr>
<td></td>
<td>\multirowdebugfalse ... 1, 4</td>
</tr>
<tr>
<td></td>
<td>\multirowdebugtrue ... 1, 4</td>
</tr>
<tr>
<td></td>
<td>\multirowsetup ... 4, 68</td>
</tr>
<tr>
<td></td>
<td>\mystrut ... 14</td>
</tr>
<tr>
<td>M</td>
<td>\MRST@argtabularc ... 22</td>
</tr>
<tr>
<td></td>
<td>\MRST@cr ... 39</td>
</tr>
<tr>
<td></td>
<td>\MRST@xargtabularc ... 22</td>
</tr>
<tr>
<td></td>
<td>\MRST@xtabularc ... 22</td>
</tr>
<tr>
<td></td>
<td>\MRST@yargtabularc ... 22</td>
</tr>
<tr>
<td></td>
<td>\multicolumn ... 4</td>
</tr>
<tr>
<td></td>
<td>\multirow ... 3, 72</td>
</tr>
<tr>
<td></td>
<td>\multirow@cntb ... 58</td>
</tr>
<tr>
<td></td>
<td>\multirow@colwidth ... 57</td>
</tr>
<tr>
<td></td>
<td>\multirow@dima ... 58</td>
</tr>
<tr>
<td></td>
<td>\multirow@piii ... 77</td>
</tr>
<tr>
<td></td>
<td>\multirow@prefixbfalse ... 77</td>
</tr>
<tr>
<td></td>
<td>\multirow@prefixtrue ... 77</td>
</tr>
<tr>
<td></td>
<td>\multirow@prefixfalse ... 77</td>
</tr>
<tr>
<td></td>
<td>\multirow@setcolwidth ... 60</td>
</tr>
<tr>
<td></td>
<td>\multirow@vbox ... 69</td>
</tr>
<tr>
<td></td>
<td>\multirowdebugfalse ... 1, 4</td>
</tr>
<tr>
<td></td>
<td>\multirowdebugtrue ... 1, 4</td>
</tr>
<tr>
<td></td>
<td>\multirowsetup ... 4, 68</td>
</tr>
<tr>
<td></td>
<td>\mystrut ... 14</td>
</tr>
<tr>
<td>S</td>
<td>\ST@tabularcr ... 19</td>
</tr>
<tr>
<td></td>
<td>\STneed ... 11, 54</td>
</tr>
<tr>
<td></td>
<td>supertabular ... 11</td>
</tr>
<tr>
<td>V</td>
<td>\vbox ... 23</td>
</tr>
<tr>
<td>X</td>
<td>\xtab ... 11</td>
</tr>
</tbody>
</table>