

## Easy Table

Khanh Ha

### Introduction

*Easy Table* (**EZ**) is an application tabular package designed to run independently of computer platforms. Its goals are to meet the most rigid requirements from trade typesetters when it comes to tabular work. **EZ**'s refinements include: precision in row and column, vertical and horizontal placements; baseline and style control for horizontal rules; spanner headings; subspanner headings in four-level nestings; and a table splitting operation. **EZ** is a template-controlled program. It requires that table specifications be filled out once, and more important, it allows typing multi-line entries naturally anywhere in a table including in the spanner units. And table rows can be ended gracefully even with gutter rules but *without* the need to advance to the table's last column using `&s`.

Though a large program with about 200 commands, **EZ** is *easy* to learn, set up, and modify. Above all, it is comprehensive and highly precise.

If you master **EZ**, setting tables will be a joy, not a jolt. And when you reread Knuth's line, "*Printers charge extra when you ask them to typeset tables, . . .*" (*The T<sub>E</sub>Xbook*, p. 231), you might have a laugh or two.

### Table initialization with `\tabinit`

Because **EZ** relies on templates, it requires a proper table format specification before typesetting. Once a table format template is constructed, it is stored and can be reused later on. The `\tabinit` command is used to build a template for a table. This command specifies the following values:

1. Total columns
2. Table leading
3. Gutter width
4. Preambles

The template's general usage is:

```
\tabinit{<total columns>}{<tab leading>}
      {<gutter width>}{<preambles>}
```

Consider Table 1:

**TABLE 1** Top 10 Newsstand Sellers (000s)

Magazine	1982	1986	% Change
1. TV Guide	9,732	8,234	-13.2
2. Family Circle	7,234	6,243	-15.4
3. Woman's Day	9,732	6,334	-11.2
4. National Enquirer	5,732	8,897	-23.2
5. The Star	9,732	4,833	-12.3
6. Penthouse	8,436	4,039	-43.4
7. Cosmopolitan	7,795	5,237	-22.5
8. Good Housekeeping	5,345	8,657	-16.7
9. People Weekly	7,322	7,342	-14.3
10. Globe	8,872	8,764	-11.7
	<b>80,022</b>	68,580	-14.4

Source: Statements of Ownership. Based on 1986 ranking.

CODES:

```
\tabinit{4}{10pt}{12pt}{\og{.5pt}} % \og states outside gutter style
\C{1}{9pc}{1}{0pt}\C{2}{3pc}{c}{0pt}\C{3}{3pc}{c}{0pt}\C{4}{3pc}{c}{.5pt}}
```

```
\ninepoint
\ttitle{1}{Top 10 Newsstand Sellers (000s)}
\toprul
\hgstub{2em}
\tab{\bf Magazine&\bf 1982&\bf 1986&\bf \% Change\et}
\tab{\en 1.\en TV Guide&9,732&8,234&$$-13.2\et}
\tab{\en 2.\en Family Circle&7,234&6,243&$$-15.4\et}
\tab{\en 3.\en Woman's Day&9,732&6,334&$$-11.2\et}
\tab{\en 4.\en National Enquirer&5,732&8,897&$$-23.2\et}
```

```

\begin{table}
\begin{tabular}{l}
\end{tabular}
\hrule{3pt}{0} % hrule clears outside rules
\begin{tabular}{l}
\end{tabular}
\hrule{3pt}{0}
\begin{table}
\begin{tabular}{l}
\end{tabular}
\hrule{6pt}{1} % hrule joins outside rules

```

Calls to `\og` are of the form:

```
\og{<dimen>}
```

The left outside gutter can be either a plain or ruled gutter. Use `\og{0pt}` if plain; if ruled, fill in units of measure for the rule weights by using one of the five different rule styles below:

```

.5pt = half point
1pt = 1 point
2pt = 2 points
3pt = 3 points
99pt = double rules

```

Calls to `\C` are of the form:

```

\C{<col. "sequence">}{<col. "width">}
  {<col. "justification">}{<gutter style">}}

```

`<col. sequence>` is the ordinal number of the column, from left to right. `<col. justification>` can have one of three values to determine a column's paragraph shape: `j`=justified left/right, `l`=flush left/ragged right, `r`=flush right/ragged left, and `c`=ragged center. `<gutter style>` is determined with values as discussed for `\og`. If the style is `0pt`, the gutter is blank; otherwise it has a vrule centered in it.

### Setting table entries with `\tab`

**EZ** builds a table by stacking its entries. It sets one entry after another with a command called `\tab`, ends an entry with another command called `\et`, and separates the columns in each tab field by the conventional `&`. Thus:

```
\tab{<entry>& . . . &<entry>\et}
```

The only command worth discussing here is `\et`.

### Ending a `\tab` entry with `\et`

The purpose of `\et` is to replace the primitive `\cr` while running **EZ**. `\et` ensures that all gutter rules in effect are output regardless of where the `\et` is

keyed. Needless to say, this helps reduce keystrokes in a multi-column table since stopping short to exit a row no longer requires `&s` to advance to the end of a row. (Even if a table has no gutter rules, `\cr` is still unusable. As long as you rely on the template `\tabinit` you must use `\et`; bad output will result if you use `\cr`.)

### The table hrules

Horizontal rules are vital attributes in tables. Their role is to accent the main components by creating demarcations with their style and weight. Before setting a regular hrule three facts need to be determined: the rule's weight, leading, and style. A complete `\hrul` command has two parameters:

```
\hrul{<leading>}{<style>}
```

`<leading>` is the distance to the hrule's baseline measured from the base of the line above it; `<style>` is the way in which the hrule is drawn in relation to possible outside gutter rules. The value of `<style>` is an integer: a "0" will clear the hrule from outside rules; a "1" will connect the hrule with outside rules.

### Vertical alignment

Tables must cope with three different vertical alignments: top, bottom, and center. Alignments may be changed at any time by stating one of the commands `\aligntop`, `\alignbot`, `\aligncen`.

### Horizontal alignment

Each column style in **EZ**, justified or ragged, is determined by the `\C` command in the `\tabinit` template. Once this style is set, it becomes easier later on to concentrate on the data being entered. However, a need for a change in paragraph style while in a column necessitates a means to control

the paragraph shapes. To change the predetermined paragraph style while in a column one uses: `\RR=ragged right`; `\RL=ragged left`; `\RC=ragged center`; `\XR=ragged cancelled (justified)` within the appropriate field of a `\tab`.

### Vruled table

Tables with gutter rules should allow two features:

- 1) All gutter rules in effect should be drawn even in cases where rows end short;
- 2) Select gutter rules can temporarily be blank for special purposes. Of

these two requirements the first can be solved with the use of the command `\et`.

**The `\et` operation.** As previously discussed, the command `\et` is used to end a `\tab` row in the same fashion as the `\cr`. Fortunately, the `\et` is much more useful than `\cr` in the face of vrules. In fact, when vrules are present they will be all drawn automatically no matter where you end your row if and only if you use `\et`.

To learn about the usage of `\et` we have two illustrations below. First with rows completely filled with data in Table 2:

TABLE 2 The use of `\et` in normal situation

Depth Station	10m	25m	75m	100m	125m	150m	200m
3	0.73	0.76	0.37	0.08	0.02	0.06	-0.58
4	0.46	0.45	0.55	0.09	0.13	0.56	-0.76
5	0.78	0.43	0.67	0.11	0.21	0.08	-0.45
6	0.89	0.21	0.53	0.42	0.12	0.07	-0.15

### CODES:

```

\ninepoint
\aligncen
\tabinit{8}{10pt}{12pt}{\og{.5pt}}
  \C{1}{5.5pc}{c}{.5pt}\C{2}{26pt}{c}{.5pt}\C{3}{26pt}{c}{.5pt}
  \C{4}{26pt}{c}{.5pt}\C{5}{26pt}{c}{.5pt}\C{6}{26pt}{c}{.5pt}
  \C{7}{26pt}{c}{.5pt}\C{8}{26pt}{c}{.5pt}}

\title{1}{The use of \et in normal situation}
\toprul
\tab{\RL\bf Depth\nl
  \RR\bf Station&
  \bf 10m&\bf 25m&\bf 75m&\bf 100m&\bf 125m&\bf 150m&\bf 200m\et}
\hrul{3pt}{1}
\tab{3&0.73&0.76&0.37&0.08&0.02&0.06&$$-0.58\et}
\tab{4&0.46&0.45&0.55&0.09&0.13&0.56&$$-0.76\et}
\tab{5&0.78&0.43&0.67&0.11&0.21&0.08&$$-0.45\et}
\tab{6&0.89&0.21&0.53&0.42&0.12&0.07&$$-0.15\et}
\hrul{3pt}{1}

```

Next with rows ending short in Table 3:

TABLE 3 The use of `\et` in special situation

Depth Station	10m	25m	75m	100m	125m	150m	200m
3	0.73	0.76	0.37	0.08	0.02	0.06	-0.58
4	0.46	0.45	0.55	0.09	0.13		
5	0.78	0.43	0.67	0.11	0.21	0.08	
6	0.89	0.21	0.53				

CODES:

```

\ninepoint
\aligncn
\restoretab{8} % bringing back the identical template
\ttitle{1}{The use of \et in special situation}
\toprul
\tab{\RL\bf Depth\nl
      \RR\bf Station&
      \bf 10m&\bf 25m&\bf 75m&\bf 100m&\bf 125m&\bf 150m&\bf 200m\et}
\hrul{3pt}{1}
\tab{3&0.73&0.76&0.37&0.08&0.02&0.06&$$-$0.58\et}
\tab{4&0.46&0.45&0.55&0.09&0.13\et}
\tab{5&0.78&0.43&0.67&0.11&0.21&0.08\et}
\tab{6&0.89&0.21&0.53\et}
\hrul{3pt}{1}

```

Thus far we have seen the usefulness of `\et`, especially in multicolumn ruled tables where one can exit a row gracefully, forgetting all the remaining tab alignments one would have needed to advance to reach the end of the current row. That leaves us with a second feature to explore: how to temporarily empty specific ruled gutters.

**Gutter rules temporarily blank with `\bgut`.** In order to void any gutter rules within a table body one must state a *range*, i.e., the starting column and

the ending column; this range includes the gutter rules to be blank:

```
\bgut [start col]-(end col)]
```

where the hyphen (-) stands for possible columns in between, and the pair of brackets form the command's delimiters. This command can be stated either before or after the `\tab` starts; its effect will be limited to only the row it is issued for. Table 4 shows its usage:

TABLE 4 Blank Gutters

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

CODES:

```

\tabinit{6}{10pt}{12pt}{\og{.5pt}
  \C{1}{1pc}{c}{.5pt}\C{2}{1pc}{c}{.5pt}\C{3}{1pc}{c}{.5pt}
  \C{4}{1pc}{c}{.5pt}\C{5}{1pc}{c}{.5pt}\C{6}{1pc}{c}{.5pt}}

\ninepoint
\toprul
\ttitle{1}{Blank Gutters}
\toprul
\tab{\en 1&\en 2&\en 3&\en 4&\en 5&\en 6\et}
\hrul{3pt}{1}
\bgut[1-3] % stated outside \tab
\tab{\en 7&\en 8&\en 9&10&11&12\et}
\hrul{3pt}{1}
\tab{13&14&15&16&17&18\et}

```

```

\hrul{3pt}{1}
\tab{\bgut[4-6] 19&20&21&22&23&24\et} % stated inside \tab
\hrul{3pt}{1}
\tab{25&26&27&28&29&30\et}
\hrul{3pt}{1}

```

## Spanners

Spanners are tough customers. The first type of spanner is a column spanner, and the second a row spanner. Column spanners are entries that straddle a number of columns; they must be able to wrap around automatically in multi-line paragraph fashion with no contrived manual line-breaking operation; they must also be able to justify within their own territory in terms of raggedness or left and right justification; they ought to relate in vertical alignment to their possible counterparts on the same level in the row; their spanner rules must be flexible enough to remain within their own width or extend to join the neighboring gutter rules in addition to their rules' vertical adjustability for a particular leading; and they must be able to nest other spanners.

The second type of spanner is the row spanner. This kind is a column which spans vertically a number of rows and serves as their common heading.

**Body spanners with `\bspan`.** In a table body one might come across an entry that spans a number of columns. This type of column spanner must be specified by a *range*, i.e., the starting column and the ending column of the spanned columns. **EZ**'s command for the body column spanner is `\bspan`, which is delimited by a pair of brackets:

```
\bspan[(start col)-(end col)]
```

`\bspan` must be stated *inside* the `\tab` command. Once the span is active, data can be poured into this space and **EZ** will handle the line-breaking algorithm in addition to the paragraph shape that has been specified. This shape is controlled by the style in the column that starts the body spanner, which has been specified in the `\tabinit` template. One can always override this style with one of the following commands: `\JUST`, `\RR`, `\RL`, `\RC`. Table 5 demonstrates the use of `\bspan`:

TABLE 5 Body Spanner

SUN	MON	TUES	WED	THUR	FRI	SAT
<i>Beat midsummer heat the cool and easy way with delightful, delicious dairy-fresh ice cream. Dip into the natural goodness of America's favorite treat. Build yourself the sundae of your dreams with your favorite fruits, nuts and syrups, or with the classic whipped cream and a cherry.</i>						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
<sup>23</sup> / <sub>30</sub>	<sup>24</sup> / <sub>31</sub>	25	26	27	28	29

CODES:

```

\ninepoint
\tabinit{7}{10pt}{12pt}{\og{.5pt}
\C{1}{3pc}{1}{.5pt}\C{2}{3pc}{1}{.5pt}\C{3}{3pc}{1}{.5pt}
\C{4}{3pc}{1}{.5pt}\C{5}{3pc}{1}{.5pt}\C{6}{3pc}{1}{.5pt}
\C{7}{3pc}{1}{.5pt}}

```

```

\toprul
\ttitle{1}{Body Spanner}
\toprul
\bgut[1-7] % no gutter rules in the column headings
\tab{\bf SUN&\bf MON&\bf TUES&\bf WED&\bf THUR&\bf FRI&\bf SAT\et}
\hrul{6pt}{1}
\tab{\bspan[1-6]\it % ragged right is in effect from template for 2nd col.
Beat midsummer heat the cool and easy way with delightful, delicious
dairy-fresh ice cream. Dip into the natural goodness of America's
favorite treat. Build yourself the sundae of your dreams with your
favorite fruits, nuts and syrups, or with the classic whipped cream
and a cherry.&&&&&& % skip 6 spanned columns
1\et}
\hrul{6pt}{1}
\tab{2&3&4&5&6&7&8\et}
\hrul{6pt}{1}
\tab{9&10&11&12&13&14&15\et}
\hrul{6pt}{1}
\tab{16&17&18&19&20&21&22\et}
\hrul{6pt}{1}
\tab{\frac{23}{30}&\frac{24}{31}&25&26&27&28&29\et}
\hrul{6pt}{1}

```

Because a body spanner always straddles a number of columns, it must collect an *equal* number of tab alignments from these spanned columns in order to move past them to the next column. Thus the spanner in this example needs six &s for six skipped columns. The paragraph shape of this spanner is controlled by the command “1” in the `\tabinit` template for the second column which starts the spanner. Again overriding the text shape of the spanner is simple, as already discussed.

**Head spanners with `\spaninit`.** The main difference between a body spanner and a head spanner is that the first acts like a header crossing a number of designated columns (it has no entries beneath it) while the second works as a header but also has entries under it and often has an hrule separating the header from its spanned entries. Therefore a head spanner must be treated as one complete unit that combines the header, the rule, and the spanned entries. To **EZ** each unit requires a column for itself; thus, for example, a 3-column spanner will occupy *one* single column and within this column the three spanned entries. **EZ**'s method of setting a row with column spanners is to set each spanner

unit in a column completely, then move onward to the next possible column. It does *not* set across line for line as a typewriter would. Users need not guess entry depths nor make awkward attempts to break entries manually before setting the spanners. For clarity, **EZ** calls the head spanner *spanner head* and its spanned entries *spanner cells*; the separating rule between these two components is termed a *spanner rule*.

When a table has spanner heads, **EZ** uses this principle: the main body's template must be designed first before that of the spanner heads. Thus two templates will be present: 1) `\tabinit` for the main body, and 2) `\spaninit` for the column headings with spanner units.

**Spanner units in ruled tables.** The design for spanner units is the same in both table styles, ruled or plain. Spanner units which are ruled on all sides normally would incorporate sub-spanner units because these rules serve as demarcation. In plain tables the spanner units are single-level.

Now consider Table 6 for the introduction of spanner units:

TABLE 6 Vruled Spanner: Single Level

Size	Amps	Reserve capacity	Battery case size, inches			Catalog Number	Wt. lbs.
			L	W	H		
24°	500	115	10	6	8	28K 4315N	41
34°	502	116	20	7	8	28K 4314N	42
44°	504	117	30	8	8	28K 4313N	43
54°	506	118	40	9	8	28K 4312N	44
64°	508	119	50	2	8	28K 4311N	45
74°	510	120	60	3	8	28K 4319N	46

CODES:

```

\ninepoint
\aligncen
\tabinit{8}{10pt}{6pt}{\og{0pt} % 8 cols for main body
\C{1}{1.5pc}{1}{.5pt}\C{2}{2pc}{c}{.5pt}\C{3}{3pc}{c}{2pt}\C{4}{1pc}{c}{.5pt}
\C{5}{1pc}{c}{.5pt}\C{6}{1pc}{c}{2pt}\C{7}{4.5pc}{c}{.5pt}\C{8}{1.5pc}{c}{0pt}}

\spaninit{6}{10pt}{6pt}{\og{0pt} % 6 cols for headings
\C{1}{1.5pc}{1}{.5pt}\C{2}{2pc}{c}{.5pt}\C{3}{3pc}{c}{2pt}
\C{4}{4pc}{c}{2pt}\C{5}{4.5pc}{c}{.5pt}\C{6}{1.5pc}{c}{0pt}}

\def\dg{^{\circ}} % degree symbol

\toprul
\ttitle{1}{Vruled Spanner: Single Level}
\toprul
\tab{Size&Amps&Reserve capacity&
  \main{Battery case size, inches}{1} % Style 1: connecting gutter rules
  \startmain
  \maine{1pc}{L} | \maine{1pc}{W} | \maine{1pc}{H}
  \endmain
  &
  Catalog Number& Wt. lbs.\et}
\hrul{3pt}{0}

\tab{24\dg&500&115&10&6&8&28K 4315N&41\et}
\tab{34\dg&502&116&20&7&8&28K 4314N&42\et}
\tab{44\dg&504&117&30&8&8&28K 4313N&43\et}
\tab{54\dg&506&118&40&9&8&28K 4312N&44\et}
\tab{64\dg&508&119&50&2&8&28K 4311N&45\et}
\tab{74\dg&510&120&60&3&8&28K 4319N&46\et}
\hrul{3pt}{0}

```

This table shows two templates, one for the main body, another for the column headings with spanner units. As already mentioned, the main body's template must be given first; for this table it prepares 8 columns. Next the template for the headings is designed for 6 columns because of

the 3-column spanner unit—this unit occupies one column. We turn now to the method of computing the total width of the spanner head.

**Setting the spanner heads with \main.** The command for spanner head is \main. Its form is:

```
\main{<Spanner Head Text>}{<Spanner Rule Style>}
```

where the spanner head text in the first argument can be multi-line data whose line-breaking algorithm is determined by the paragraph style commands, i.e., justified or ragged. The spanner rule style in the second argument controls the length of the rule: if "1", it will join the adjacent gutter rules; if "0", it will remain within the true width (the width of the spanner head).

**Setting the spanner cells with \maine.** Spanner cells are grouped together under the main spanner head. The adjective *main* is used to distinguish the first-level spanner head from the second-, third-, and fourth-level spanner heads. This complication arises when the column headings incorporate sub spanner units inside the main one. **EZ** allows four levels of spanners, descending from main to sub to subsub to subsubsub spanners. Regardless of the possible existence of the sub spanners, all entities under the main spanner head must start with \startmain and end with \endmain:

```
\main{<spanner head>}{<rule style>}
\startmain
\maine{<dimen>}{<cell text>} |
```

```
. . . \maine{<dimen>}{<cell text>}
\endmain
```

where \maine is a command for each spanner cell that looks for two arguments: 1) width of spanner cell, 2) text of spanner cell. The | will draw a gutter rule whose default weight is .5pt.

**Setting the spanner rules.** A spanner rule can have one of three styles specified by: "0" to stay within the true width of the spanner head; "1" to extend the rule to join adjacent, but not outside, gutter rules; "2" to extend rule to intersect all adjacent, including outside, gutter rules. Besides this option, the rule leading default (3pts) can be changed any time by stating

```
\sprskip{<dimen>}
```

where <dimen> is the leading amount for the spanner rule. The \sprskip command affects the leading change for the spanner rule only in the current column; thus changing leading for multiple spanner rules in different columns requires the \sprskip command to be restated each time in a new column. Making two changes to the rule leading and style of the previous example, we have:

Size	Amps	Reserve capacity	Battery case size, inches			Catalog Number	Wt. lbs.
			L	W	H		

**CODES:**

```
\ninepoint
\restorespan{6} % most recent spanner template
\toprul
\tab{Size&Amps&Reserve capacity&
\sprskip{6pt} % rule leading is now 6pt (good for one column only)
\main{Battery case size, inches}{0} % Style 0: not touching gutter rules
\startmain
\maine{1pc}{L} | \maine{1pc}{W} | \maine{1pc}{H}
\endmain
&
Catalog Number&Wt. lbs.\et}
\hrul{3pt}{0}
```

**Multiple spanners.** When a row has more than one spanner unit it must resolve an issue of alignment for the spanner heads and spanner cells. All

the spanner heads on a row will be related in their vertical alignment, and so are the spanner cells. Our first look at multiple spanners focuses on Table 7:



TABLE 7 Multiple Spanners

Months and year	Number of stoppages		Workers involved		Days idle	
	Beginning in month or year	In effect during month	Beginning in month or year (in thousands)	In effect during month (in thousands)	Number (in thousands)	Percent of estimated working time
1947.....	270	.....	1,629	.....	25,720	—
1948.....	245	.....	1,435	.....	26,127	.22
1949.....	262	.....	2,537	.....	43,420	.38
1950.....	424	.....	1,698	.....	30,390	.26

CODES:

```

\aligncen
\ninepoint
\tabinit{7}{10pt}{6pt}{\og{.5pt} % 7 columns for body
\C{1}{8pc}{1}{2pt}\C{2}{3.5pc}{c}{.5pt}\C{3}{3.5pc}{c}{2pt}\C{4}{3.5pc}{c}{.5pt}
\C{5}{3.5pc}{c}{2pt}\C{6}{3.5pc}{c}{.5pt}\C{7}{3.5pc}{c}{.5pt}}

\spaninit{4}{10pt}{6pt}{\og{.5pt} % 4 columns for headings
\C{1}{8pc}{1}{2pt}\C{2}{7.5pc}{c}{2pt}
\C{3}{7.5pc}{c}{2pt}\C{4}{7.5pc}{c}{.5pt}}

\toprul
\ttitle{1}{Multiple Spanners}
\toprul

\tab{Months and year&
  \main{Number of stoppages}{1}
  \startmain
  \main{3.5pc}{Beginning in month or year} |
  \main{3.5pc}{In effect during month}
  \endmain
  &
  \main{Workers involved}{1}
  \startmain
  \main{3.5pc}{Beginning in month or year (in thousands)} |
  \main{3.5pc}{In effect during month (in thousands)}
  \endmain
  &
  \main{Days idle}{2} % Style 2: intersecting outside rule
  \startmain
  \main{3.5pc}{Number (in thousands)} |
  \main{3.5pc}{Percent of estimated working time}
  \endmain
\et}
\hrul{6pt}{1}

\tab{1947\dotlead&270&\dotlead&1,629&\dotlead&25,720&\md\et}
\tab{1948\dotlead&245&\dotlead&1,435&\dotlead&26,127&.22\et}
\tab{1949\dotlead&262&\dotlead&2,537&\dotlead&43,420&.38\et}
\tab{1950\dotlead&424&\dotlead&1,698&\dotlead&30,390&.26\et}

```

```
\hrul{6pt}{1}
```

Notice the correct vertical alignment of each component in all the spanner units: The spanner heads and also the spanner cells fulfill their assignments once they are able to relate vertically to each

other. To get a better look at this vertical relation, examine Table 8:

TABLE 8 Multiple Spanners

Warp. No.	Fabric Description	Thickness (in.)	Weight (oz/yd <sup>2</sup> )	Tensile Strength (lb/in.)		Tear Strength (lb)		Peel Strength (lb)		Flexural Rigidity* (lb/in. <sup>2</sup> /in.)	
				Warp	Fill	Warp	Fill	Warp	Fill	Warp	Fill

CODES:

```
\aligncen
\sixpoint
\tabinit{12}{8pt}{6pt}{\og{.5pt}}
\C{1}{1.5pc}{c}{2pt}\C{2}{7pc}{c}{2pt}\C{3}{3pc}{c}{2pt}\C{4}{3pc}{c}{2pt}
\C{5}{1.5pc}{c}{.5pt}\C{6}{1.5pc}{c}{2pt}\C{7}{1.5pc}{c}{.5pt}\C{8}{1.5pc}{c}{2pt}
\C{9}{1.5pc}{c}{.5pt}\C{10}{1.5pc}{c}{2pt}\C{11}{1.5pc}{c}{.5pt}\C{12}{1.5pc}{c}{.5pt}}

\spaninit{8}{8pt}{6pt}{\og{.5pt}}
\C{1}{1.5pc}{c}{2pt}\C{2}{7pc}{c}{2pt}\C{3}{3pc}{c}{2pt}\C{4}{3pc}{c}{2pt}
\C{5}{3.5pc}{c}{2pt}\C{6}{3.5pc}{c}{2pt}\C{7}{3.5pc}{c}{2pt}\C{8}{3.5pc}{c}{.5pt}}

\toprul
\ttitle{1}{Multiple Spanners}
\toprul

\tab{Warp. No.& Fabric Description& Thickness (in.)& Weight (oz/yd$^2$)&
  \main{Tensile Strength (lb/in.)}{1}
  \startmain
  \main{1.5pc}{Warp} |
  \main{1.5pc}{Fill}
  \endmain
  &
  \main{Tear Strength (lb)}{1}
  \startmain
  \main{1.5pc}{Warp} |
  \main{1.5pc}{Fill}
  \endmain
  &
  \main{Peel Strength (lb)}{1}
  \startmain
  \main{1.5pc}{Warp} |
  \main{1.5pc}{Fill}
  \endmain
  &
  \main{Flexural Rigidity* (lb/in.$^2$/in.)}{2} % Style 2: intersecting outside rule
  \startmain
  \main{1.5pc}{Warp} |
  \main{1.5pc}{Fill}
  \endmain
\et}
```

`\hrul{6pt}{1}`

**Nested spanners.** Nested spanners occur when a spanner unit encloses another spanner unit which, in turn, comprises another one and so on. **EZ** supports four levels of nested spanners descending from the main to sub to subsub to subsubsub spanners. The commands for nested spanners are: `\sub`, `\ssub`, and `\sssusub`, all below the main level of `\main` and restricted within the limit marked by `\startmain` and `\endmain`. All the subspanner units have the following usage:

```
\sub{{subspanner heading}}{{rule style}}
  {{subcell entries}}
\ssub{{ssubspanner heading}}{{rule style}}
  {{ssubcell entries}}
\sssusub{{sssusubspanner heading}}{{rule style}}
  {{sssusubcell entries}}
```

where the first two arguments are like those in `\main`. Only the third argument merits attention because

this extra argument makes `\sub` (and its counterparts) different from `\main`. A complete look at a subspanner unit:

```
\sub{{subspanner heading}}{{rule style}}{
  % 3rd argument begins
  \sube{{cell width}}{{entry text}} |
  .
  .
  \sube{{cell width}}{{entry text}}
} % end of 3rd argument and subspanner
```

where `\sube` is much like `\maine` and `|` is the dividing rule between subspanner cells. The focus here is on the third argument for each subspanner unit: it must have matching braces to avoid "Runaway argument" errors. Spaces after the argument's open brace and also spaces before its close brace are ignored. To see how nested spanners work, examine Table 9:

**TABLE 9** Nested Spanners

County	Industry	Employment change				Location quotient
		Actual	Effect of shift-share by			
			State-wide	Industry mix	Country share	
Santa Cruz (Arizona):	Apparel..	7	28	48	32	5.9

CODES:

```
\ninepoint
\aligncn
\tabinit{7}{10pt}{6pt}{\og{.5pt} % 7 cols for body
  \C{1}{4pc}{1}{.5pt}\C{2}{4pc}{1}{2pt}\C{3}{3pc}{c}{.5pt}\C{4}{3pc}{c}{.5pt}
  \C{5}{3pc}{c}{.5pt}\C{6}{3pc}{c}{2pt}\C{7}{3pc}{c}{.5pt}}

\spaninit{4}{10pt}{6pt}{\og{.5pt} % 4 cols for headings
  \C{1}{4pc}{1}{.5pt}\C{2}{4pc}{1}{2pt}\C{3}{13.5pc}{c}{2pt}\C{4}{3pc}{c}{.5pt}}

\toprul
\ttitle{1}{Nested Spanners}
\toprul

\TAB{County& Industry&
  \main{Employment change}{1}
  \startmain
  \maine{3pc}{Actual} |
  \sub{Effect of shift-share by}{1}{ % subspanner cells go in here
```

```

\sube{3pc}{Statewide} |
\sube{3pc}{Industry mix} |
\sube{3pc}{Country share} % space ignored
} % end of subspanner

\endmain % end of main spanner
&
Location quotient\et}
\hrul{6pt}{1}

\ab{Santa Cruz (Arizona):& Apparel\dotlead& 7& 28& 48& 32& 5.9\et}
\hrul{6pt}{1}

```

**More nested spanners**

When spanners start to nest in multilevel fashion, the user is responsible for keeping track of each one, its start and its end. In practice it helps to type empty brace pairs first to lock up the design in

question, then start pouring in text data. It also helps to use a text editor which has a brace-checking utility to spot unbalanced braces. Table 10 features spanners with three levels deep:

**TABLE 10** Nested Spanners

Year	Noninsti- tutional population	Labor force									Not in labor force	
		Number	Percent of population	Employed						Unemployed		
				Total	Percent of population	Resident Armed Forces	Civilian			Number		Percent of labor force
							Total	Agriculture	Nonagri- cultural industries			

**CODES:**

```

\fivepoint
\aligncen

\tabinit{13}{7pt}{.5pt}{\og{0pt}}
\C{1}{1.5pc}{1}{2pt}\C{2}{3pc}{c}{2pt}\C{3}{3pc}{c}{.5pt}\C{4}{3pc}{c}{.5pt}
\C{5}{1.5pc}{c}{.5pt}\C{6}{3pc}{c}{.5pt}\C{7}{3pc}{c}{.5pt}\C{8}{1.5pc}{c}{.5pt}
\C{9}{3pc}{c}{.5pt}\C{10}{3pc}{c}{.5pt}\C{11}{3pc}{c}{.5pt}
\C{12}{3pc}{c}{2pt}\C{13}{3pc}{c}{0pt}}

\spaninit{4}{7pt}{.5pt}{\og{0pt}}
\C{1}{1.5pc}{1}{2pt}\C{2}{3pc}{c}{2pt}\C{3}{28.5pc}{c}{2pt}\C{4}{3pc}{c}{0pt}}

\toprul
\ttitle{1}{Nested Spanners}
\toprul

\ab{%
Year&
Noninstitutional population&
\main{Labor force}{1}
\startmain
\maine{3pc}{Number} |
\maine{3pc}{Percent of population} |
\sub{Employed}{1}{% subspanner begins (space ignored)
\sube{1.5pc}{Total} |

```

```

\sube{3pc}{Percent of population} |
\sube{3pc}{Resident Armed Forces} |
  \ssub{Civilian}{1}{% subsubspanner begins
    \ssube{1.5pc}{Total} |
    \ssube{3pc}{Agriculture} |
    \ssube{3pc}{Nonagricultural industries}
  } % end of subsub unit
} | % end of sub unit (| comes after sub ends)
\sub{Unemployed}{1}{% subspanner begins
  \sube{3pc}{Number} |
  \sube{3pc}{Percent of labor force} % space ignored
} % end of sub unit
\endmain % end of whole main unit
&Not in labor force\et}
\vskip-2pt
\hrul{3pt}{1}

```

**Spanners forever.** We close this section about column spanners with an example whose details in drawing nested spanners should be studied carefully

by readers to gain an idea about **EZ's** principles in spanner design:

TABLE 11 Heavy-Duty Spanners

Company and Market	Price				Volume		Earnings and Dividends			P/E Ratio				
	Last Week's Close	Pct. Change		5 Year		Last Week's		Earnings per Share		Indicated Dividend Yield	5 Year Average	Current		
		Last Week	4 Wks.	Year to Date	High	Low	Shares Traded	Shares Outstanding	Last 12 Months Amt.				5 Yr. Annual Growth Rate Change	
BaltGas	\$ 14.88	% .0	% 2.6	% .8	\$ 23.88	\$ 14.25	(000) 110	% .51	\$ NA	% NA	% NA	% 12.2	— NA	— NA

CODES:

```

\aligncn
\fivepoint
\tabinit{15}{6pt}{6pt}{\og{0pt}}
  \C{1}{3pc}{1}{.5pt}\C{2}{1.5pc}{r}{.5pt}\C{3}{1.5pc}{r}{.5pt}
  \C{4}{1.5pc}{r}{.5pt}\C{5}{1.5pc}{r}{.5pt}\C{6}{1.5pc}{r}{.5pt}
  \C{7}{1.5pc}{r}{.5pt}\C{8}{1.5pc}{r}{.5pt}\C{9}{2pc}{r}{.5pt}
  \C{10}{1.5pc}{r}{.5pt}\C{11}{2pc}{r}{.5pt}\C{12}{2pc}{r}{.5pt}
  \C{13}{1.5pc}{r}{.5pt}\C{14}{2pc}{r}{.5pt}\C{15}{2pc}{r}{0pt}}

\spaninit{5}{6pt}{6pt}{\og{0pt}}
  \C{1}{3pc}{1}{.5pt}\C{2}{1.5pc}{c}{.5pt}
  \C{3}{4pc}{c}{.5pt}\C{4}{8.5pc}{c}{.5pt}\C{5}{4.5pc}{c}{0pt}}

\toprul
\ttitle{1}{Heavy-Duty Spanners}
\toprul

\ab{Company and Market&
  \main{Price}{1}
  \startmain
  \maine{1.5pc}{Last Week's Close} | % 1st maine
  \sub{Pct. Change}{1}{% % 2nd maine a subunit
    \ssub{Last}{1}{% 1st sube is a ssub unit
      \ssube{1.5pc}{Week} |
      \ssube{1.5pc}{4 Wks.}
    }
  }

```

```

        } | % gutrule MUST be given AFTER end of ssub
    \sube{1.5pc}{Year to Date}
        } | % end sub
\sub{5 Year}{1}{%      3rd maine a subunit
    \sube{1.5pc}{High} |
    \sube{1.5pc}{Low}
    }
\endmain
&
\main{\bf Volume}{1}
\startmain
\sub{Last Week's}{1}{%
    \sube{1.5pc}{Shares Traded} |
    \sube{2pc}{Shares Out\standing}
    } % end sub
\endmain
&
\main{\bf Earnings and Dividends}{1}
\startmain
\sub{Earnings per Share}{1}{%
    \ssub{Last 12 Months}{1}{%
        \ssube{1.5pc}{Amt.} |
        \ssube{2pc}{Change}
        } | % end ssub
    \sube{2pc}{5 Yr. Annual Growth Rate}
    } | % end sub
\maine{1.5pc}{Indi\cated Divi\cend Yield}
\endmain
&
\main{P/E Ratio}{1}
\startmain
\maine{2pc}{5 Year Average} |
\maine{2pc}{Current}
\endmain
\et}
\vskip-1pt
\hrul{3pt}{0}

\tab{%
    &\$\%&\%&\%&\%&\%&\$(000)&\%&\%&\%&\%&\%&\md&\md\et}
\tab{%
    BaltGas& 14.88& .0& 2.6& .8& 23.88& 14.25& 110& .51&
    NA& NA& NA& 12.2& NA& NA\et}
\hrul{6pt}{0}

```

**Row spanners.** In contrast to column spanners which cross columns, row spanners cross rows. The cell supposedly acting as a row spanner will vertically straddle a number of rows; in **EZ** such a spanner is achieved with `\xrow`. Its usage is:

`\xrow{entry text}`

and it is treated like a normal column. Table 12 provides an example:

TABLE 12 Row Spanners

BATTERIES NOT INCLUDED. FULL 1-YEAR MONEY BACK GUARANTEE	Subtotal	\$
	NY residents add sales tax	\$
	Add \$2 shipping no matter how many you order	\$
	TOTAL	\$

CODES:

```

\ninepoint
\begin{table}[t]
\begin{tr}
|  |  |  |
| --- | --- | --- |
| BATTERIES NOT INCLUDED. FULL 1-YEAR MONEY BACK GUARANTEE | Subtotal | $ |
| NY residents add sales tax | $ |
| Add $2 shipping no matter how many you order | $ |
|  | TOTAL | $ |

```

Note that the row spanner acts like a normal column because, after setting it, one must tab across to the next column. While working with a row spanner, `\prul` will be needed to draw partial hrules which avoid the cell the row spanner occupies. Once beyond the row spanner, the normal `\hrul` for full-width hrules can be used.

**Conclusion.** This article is excerpted from the 118-page operation manual of *Easy Table*. Its purpose is to illustrate a few major features of this software. For more information about the purchase of *Easy Table* software, please contact me at 301-598-0557, or write to:

◊ Khanh Ha  
14912 Village Gate Drive  
Silver Spring, MD 20906