`tbl.typ`: a `tbl`-like preprocessor for Typst and `tablex`

Version TK

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Contents

Introduction

Typst [1] is "a new markup-based typesetting system that is powerful and easy to learn." While Typst provides a built-in `table()` function, it does not currently support more advanced features such as row spans and column spans, fine-grain control of borders, or complex cell alignments. Pg Biel's `tablex` project [2] provides many of these features. However, it remains the case that writing a table using either `table()` or `tablex()` can require rather verbose syntax.

The `tbl.typ` project is an effort to allow the expression of rich tables in Typst using a more terse syntax. This syntax comes from a UNIX heritage: the `tbl` preprocessor which designed for use with the traditional TROFF typesetting system [3] [4] [5]. Important differences between the syntax of traditional `tbl` and `tbl.typ` are noted later in this document.

After importing the library using `#import "tbl.typ"`, the basic format of a table when using `tbl.typ` is the following:

````
```tbl
Format specifications .
Data
```
````

The two main components of this syntax are:

- *Format specifications*. This describes the layout of the table in terms of the number and style of columns for each row.

  The last line of the format specifications must end in a period (`.`). This is the separator between the two sections.

- *Data*. This is the content that will fill each cell of the table. Generally every line of input in this section corresponds to a row in the table, though there are exceptions noted later. Cells are separated by the `tab` option which defaults to a TAB character.

Region options

In addition to the overall table syntax itself, you may specify *region options* that control the parsing and styling of the table as a whole using a "show-everything" rule prior to the tables you would like to control. For example:

```
#show: tbl.template.with(
  allbox: true,
  tab: "|",
)
```

The following options are recognized:

auto-lines, allbox	Like box, but also draw a line between every cell if true. This is the same option from tablex. *Default:* false
box, frame	If true, draw a line around the entire table. *Default:* false
breakable, nokeep	If true, the table can span multiple pages if necessary. *Default:* false
center, centre	Aliases for a tbl-align value of center.
decimalpoint	The string used to separate the integral part of a number from the fractional part. Used in N-classified columns. *Default:* "."
doublebox, doubleframe	Like box, but also draw a second line around the entire table if true. *Default:* false
font	The font for the table. Can be overridden later by the TK column modifier. *Default:* "Times"
header-rows	The number of rows at the beginning of the table to consider part of the "header" for the purposes of repeat-header. This option is also controlled by .TH rows in the table data. *Default:* 1

macros	A dictionary of (name, function) pairs that can be used with column modifier **TK**. *Default:* `(:)`
repeat-header	If `breakable` is `true` and this option is `true`, then the table header controlled by `header-rows` will be re-displayed on each subsequent page. This option is also controlled by `.TH` rows in the table data. *Default:* `false`
stroke, `linesize`	How to draw all lines in the table. *Default:* `1pt`
tab	The string delimiter that separates different cells within a given row of the table data. *Default:* `"\t"` (a TAB character)
tbl-align	How to align the table as a whole. *Default:* `left`

Format specifications

The format specifications section controls the layout and style of cells within rows and columns of the table.

Each comma or new line of format specification begins a new *row definition*. Within each row definition, encountering a *column classifier* character denotes a new column in the table. The classifier may be followed by any number of *column modifiers*, some of which may have required arguments enclosed in parentheses.

The following column classifiers are recognized. They may be given as either capital or lowercase.

`L`	Left align.
`R`	Right align.
`C`	Center align.
`N`	Numerically align.
`S`	This cell is column-spanned by the previous cell to the left in the current row. *The corresponding table data entries should be empty.*
`^` (caret)	This cell is row-spanned by the corresponding cell in the previous row above. *The corresponding table data entries should be empty.*
`_` (underscore), `-` (hyphen)	This cell contains a vertically-centered horizontal rule. *The corresponding table data entries should be empty.*
`=` (equals sign)	Same as `_`, but draw a double horizontal rule instead. *The corresponding table data entries should be empty.*
`|` (vertical bar)	This classifier does not actually begin a new column, but rather indicates the location of a vertical line. If placed at the beginning of a row definition, the line is drawn to the left of the first cell in that row. Otherwise, it is drawn to the right of the current cell in that row.

Data

Differences from traditional `tbl`

Examples

Example 1: adapted from [4]

```tbl
lz  s | rt
lt| cb| ^
^ | rz  s.
left||r
l|center|
|right
```

left		r
l	**center**	
		right

Example 2: adapted from [5, p. 41]

```tbl
c c c
l l ne .
Fact|Location|Statistic
Largest state|Alaska|591,004 sq. mi.
Smallest state|Rhode Island|1,212 sq. mi.
Longest river|Mississippi-Missouri|3,710 mi.
Highest mountain|Mount McKinley, AK|20,320 ft.
Lowest point|Death Valley, CA|-- 282 ft.
```

Fact	Location	Statistic
Largest state	Alaska	591,004 sq. mi.
Smallest state	Rhode Island	1,212 sq. mi.
Longest river	Mississippi-Missouri	3,710 mi.
Highest mountain	Mount McKinley, AK	20,320 ft.
Lowest point	Death Valley, CA	– 282 ft.

Example 3: adapted from [4]

```tbl
r| l
r  n.
software|version
_
AFL|2.39b
Mutt|1.8.0
Ruby|1.8.7.374
TeX Live|2015
```

software	version
AFL	2.39b
Mutt	1.8.0
Ruby	1.8.7.374
TeX Live	2015

Example 4: adapted from [5, p. 43]

```
```tbl
cf(Courier New) s s s
c | cs s
c | cs s
c |c|c|c
c |c|c|c
l |n |ne |ne.
Composition of Foods

_
Food|Percent by Weight
\^|_
\^|Protein|Fat|Carbo-
\^|\^|\^|hydrate

_
Apples|.4|.5|13.0
Halibut|18.4|5.2|...
Lima beans|7.5|.8|22.0
Milk|3.3|4.0|5.0
Mushrooms|3.5|.4|6.0
Rye bread|9.0|.6|52.7
```
```

Composition of Foods

Food	Percent by Weight		
	Protein	Fat	Carbo-hydrate
Apples	.4	.5	13.0
Halibut	18.4	5.2	…
Lima beans	7.5	.8	22.0
Milk	3.3	4.0	5.0
Mushrooms	3.5	.4	6.0
Rye bread	9.0	.6	52.7

Example 5: adapted from [5, p. 42]

```
```tbl
c s s
c | c | c
l | l | ne .
Major New York Bridges

_
Bridge|Designer|Length

_
Brooklyn|J . A . Roebling|1595
Manhattan|G . Lindenthal|1470
Williamsburg|L . L . Buck|1600

_
Queensborough|Palmer &|1182
|Hornbostel

_
||1380
Triborough|O . H . Ammann|_
||383

_
Bronx Whitestone|O . H . Ammann|2300
Throgs Neck|O . H . Ammann|1800

_
George Washington|O . H . Ammann|3500
```
```

Major New York Bridges

Bridge	Designer	Length
Brooklyn	J . A . Roebling	1595
Manhattan	G . Lindenthal	1470
Williamsburg	L . L . Buck	1600
Queensborough	Palmer & Hornbostel	1182
Triborough	O . H . Ammann	1380
		383
Bronx Whitestone	O . H . Ammann	2300
Throgs Neck	O . H . Ammann	1800
George Washington	O . H . Ammann	3500

Example 6: adapted from [4]

```
```tbl
rb c  lb
r  ci l.
r|center|l
ri|ce|le
right|c|left
```
```

r	center	**l**
ri	*ce*	le
right	*c*	left

Example 7: adapted from [3]

```tbl
Cf(BI) Cf(BI) Cf(B), C C Cu.
n|n*#sym.times;*n|difference
1|1
2|4|3
3|9|5
4|16|7
5|25|9
6|36|11
```

n	$n \times n$	**difference**
1	1	
2	4	3
3	9	5
4	16	7
5	25	9
6	36	11

Example 8: adapted from [5, p. 42]

```tbl
c c
np(-2) | n | .
|Stack
|_
1|46
|_
2|23
|_
3|15
|_
4|6.5
|_
5|2.1
|_
```

	Stack
1	46
2	23
3	15
4	6.5
5	2.1

Example 9: adapted from [5, p. 37]

```tbl
n.
13
4.2
26.4.12
26.4. 12
26.4 .12
abc
abc\&
43\&3.22
749.12
```

13
4.2
26.4.12
26.4. 12
26.4 .12
abc
abc
433.22
749.12

Example 10: adapted from [5, p. 41]

```tbl
c s s
c c c
n n ne .
AT&T Common Stock
Year|Price|Dividend
1984|15-20|\$1.20
5|19-25|1.20
6|21-28|1.20
7|20-36|1.20
8|24-30|1.20
9|29-37|.30\*
```

AT&T Common Stock		
Year	Price	Dividend
1984	15-20	$1.20
5	19-25	1.20
6	21-28	1.20
7	20-36	1.20
8	24-30	1.20
9	29-37	.30*

Example 11

```tbl
cb cb
c  c.
Grade|Points
A|510
B|450
C|390
D|330
```

Grade	Points
A	510
B	450
C	390
D	330

Example 12: adapted from [5, p. 44]

```tbl
cf(I) s s
c cw(1in) cw(1in)
ltp(9) ltp(9) ltp(9).
New York Area Rocks
Era|Formation|Age (years)
Precambrian|Reading Prong|>1 billion
Paleozoic|Manhattan Prong|400 million
Mesozoic|T{
#set text(hyphenate: true, overhang: true)
Newark Basin, incl.
Stockton, Lockatong, and Brunswick
formations; also Watchungs
and Palisades.
T}|200 million
Cenozoic|Coastal Plain|T{
#set text(hyphenate: true, overhang: true)
#set par(justify: true)
On Long Island 30,000 years;
Cretaceous sediments redeposited
by recent glaciation.
T}
```

New York Area Rocks		
Era	Formation	Age (years)
Precambrian	Reading Prong	>1 billion
Paleozoic	Manhattan Prong	400 million
Mesozoic	Newark Basin, incl. Stockton, Lockatong, and Brunswick formations; also Watchungs and Palisades.	200 million
Cenozoic	Coastal Plain	On Long Island 30,000 years; Cretaceous sediments redeposited by recent glaciation.

Example 13: adapted from [4]

```tbl
le le7| lw(10).
The fourth line|_|line 1
of this column|=|line 2
determines|\_|line 3
the column width.|T{
This text is too wide to fit into a column of width 17.
T}|line 4
T{
No break here.
T}||line 5
```

The fourth line		line 1
of this column		line 2
determines		line 3
the column width.	This text is too wide to fit into a column of width 17.	line 4
No break here.		line 5

Example 14: adapted from [5, p. 45]

```tbl
cb s s s s
cp(-2) s s s s
c | c | c | c | c
c | c | c | c | c
r2 | n2 | n2 | n2e | nbe.
Readability of Text
Line Width and Leading for 10-Point Type

_
Line : Set : 1-Point : 2-Point : 4-Point
Width : Solid : Leading : Leading : Leading
_
9 Pica : 93 : --6.0 : --5.3 : --7.1
14 Pica : 450 : --0.6 : --0.3 : --1.7
19 Pica : 5 : --5.1 : 0.0 : --2.0
31 Pica : 3 : --3.8 : --2.4 : --3.6
43 Pica : 5.1 : --90000.000 : --5.9 : --8.8
```

Readability of Text

Line Width and Leading for 10-Point Type

Line Width	Set Solid	1-Point Leading	2-Point Leading	4-Point Leading
9 Pica	93	–6.0	–5.3	**–7.1**
14 Pica	450	–0.6	–0.3	**–1.7**
19 Pica	5	–5.1	0.0	**–2.0**
31 Pica	3	–3.8	–2.4	**–3.6**
43 Pica	5.1	–90000.000	–5.9	**–8.8**

References

[1] https://typst.app/

[2] Pg Biel, "Typst-tablex." https://github.com/PgBiel/typst-tablex

[3] https://man7.org/linux/man-pages/man1/tbl.1.html

[4] https://man.openbsd.org/tbl.7

[5] L. L. Cherry, and M. E. Lesk, "Tbl – a program to format tables," in *Unix Res. System*, A. G. Hume, and M. D. McIlroy, Eds., vol. 2, 10th ed., Murray Hill, New Jersey 07974: Holt Rinehart & Winston, pp. 35–51. [Online]. Available: https://9p.io/10thEdMan/tbl.pdf