A Table Geometry Manager for Tk

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Introduction

A geometry manager arranges windows (widgets) according to a particular layout style.

Conceived to simplify composition of graphic user interfaces.

- Manages size and placement of windows
- Automatically handles resizing of windows

Current implementations have several problems

- Overly complex
  — too hard to use
  — too many different managers
- Inflexible
  — difficult to align components
- Perpetuate bad graphical design
Table Geometry Manager

Arranges windows in a non-uniform rectilinear grid

Based upon two observations:

- Gridding is a common tool in graphical design.
  - Helps define relationships among graphical components (scale, balance, symmetry, etc.)

- Any orthogonal arrangement of rectangles can be described by a non-uniform grid.
  - Only need to consider horizontal and vertical relationships
**Description**

**Table** arranges windows (*slaves*) inside of another window (*master*).

- Master window partitioned into rows and columns
- Slave windows positioned at *row*,*column*
- Slaves may span multiple rows and columns (*row*,*column* is upper-left corner)
- But only one slave can start at any *row*,*column*
Layout

By default table tries to arrange all slaves in the minimum space required.

- Normal width/height of columns/rows based on requested sizes of slave windows
  - column width = max requested width
  - row height = max requested height
- Normal width/height of table is requested size of master window
  - table width = \( \Sigma \) column width
  - table height = \( \Sigma \) row height
- Extra space in master window (e.g. resizing) is divided among the rows and columns.
Example

- Canvas, label, two scrollbars

```tcl
table .frame 
   .title 0,0 -columnspan 2 
   .canvas 1,0 -fill both 
   .vscroll 1,1 -fill y 
   .hscroll 2,0 -fill x
```
Example: Canvas With Scrollbars

June 1993

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
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</tr>
<tr>
<td>13</td>
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<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Layout Options

Slave window configuration options

- Many **packer** options
  - fill
  - anchor
  - padx, pady
  - ipadx, ipady

- Can override requested size of slave window
  - reqwidth, reqheight

Row/column configuration options

- resize
  - controls stretch/shrink of row or column

- padx, pady
  - pads normal width/height of column/row

- width, height
  - specify normal width/height of column/row
  - create whitespace, enforce size requirements
Simplicity

- Table model is intuitive (tbl)
  - layout should be predictable from description
- Layout is independent of order specified
- Flattens hierarchy
  - reflects design view, not X hierarchy
  - one geometry manager

```bash
.table . 
.frame1 0,0 -columnspan 2 -fill both 
.frame2 0,2 -rowspan 2 -fill both 
.frame3 1,0 -rowspan 2 -fill both 
.frame4 2,1 -columnspan 2 -fill both
```
Alignment

- Creates strong attraction between elements
- Table naturally aligns both vertically and horizontally
- Balances and groups elements
Constraints

Override slave requested size or row/column size

- Not all widgets provide adequate resources to control their sizes
- Centralize layout description

Bound slave and row/column sizes too

- Four forms argument make take
  \{
  \  2i \} \quad \text{set size to value}
  \{ \ 1i \ 2i \} \quad \text{bound size between min/max}
  \{ \ .5i \ 2i \ 1i \} \quad \text{bound size and set nominal size}
  {} \quad \text{reset to default, no bounding}

Example: three buttons all one inch in width

```tcl
  table .frame \n    .apply 5,2 -reqwidth 1i \n    .cancel 5,3 -reqwidth 1i \n    .done 5,4 -reqwidth { .5i 3i 1i }
```
## Spreadsheet Example

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Nominal</th>
<th>Minimum</th>
<th>Bounds</th>
<th>Maximum</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
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<td></td>
<td>2</td>
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<tr>
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<td></td>
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</tr>
</tbody>
</table>
Bugs

- Slave window is taken by another geometry manager
- Master window is managed by another geometry manager
  - Can cause strange interaction with window manager