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

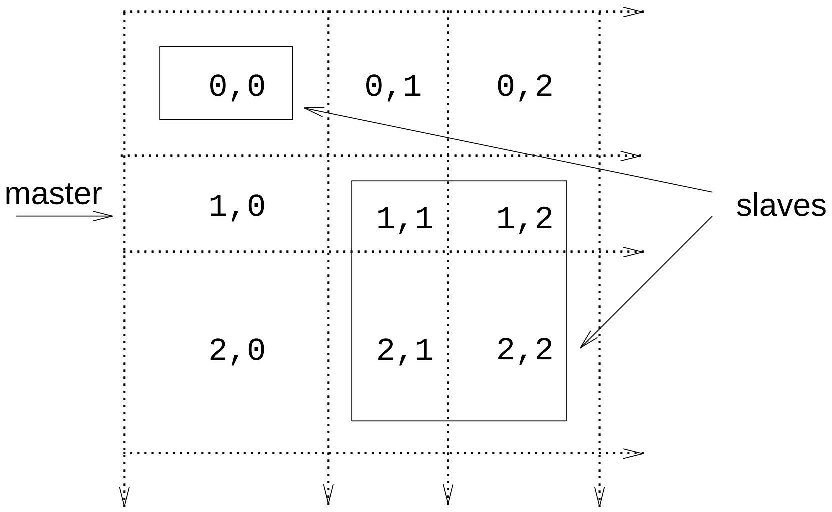
Based upon <u>two</u> observations:

- 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

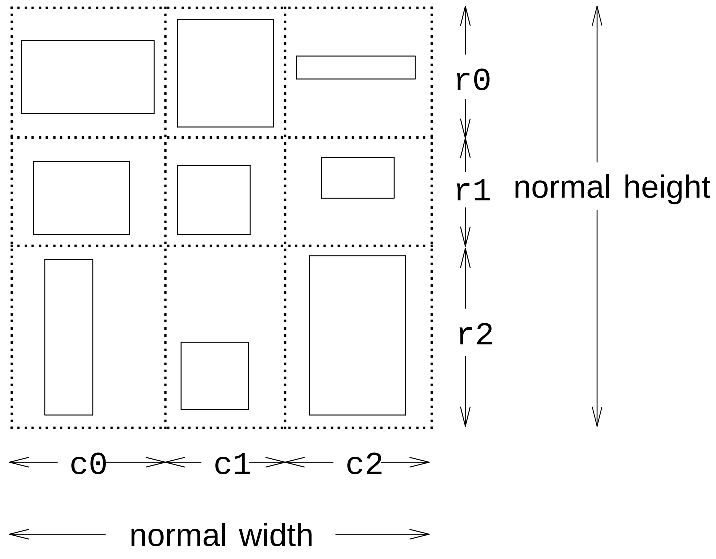
Table arranges windows (*slaves*) inside of another window (*master*).



- 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

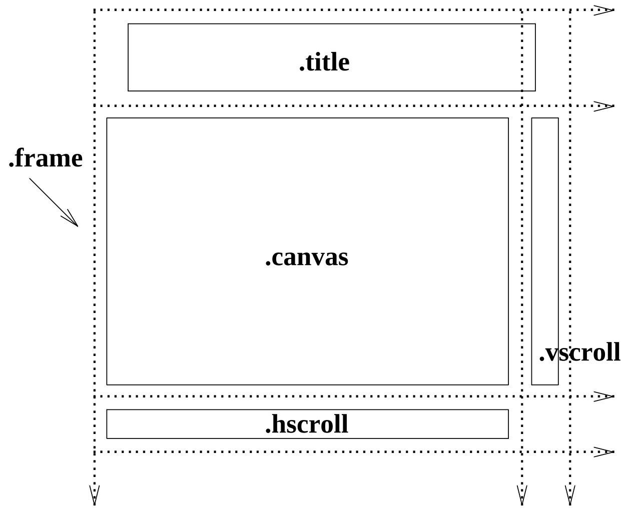
By default **table** tries to arrange all slaves in the minimum space required



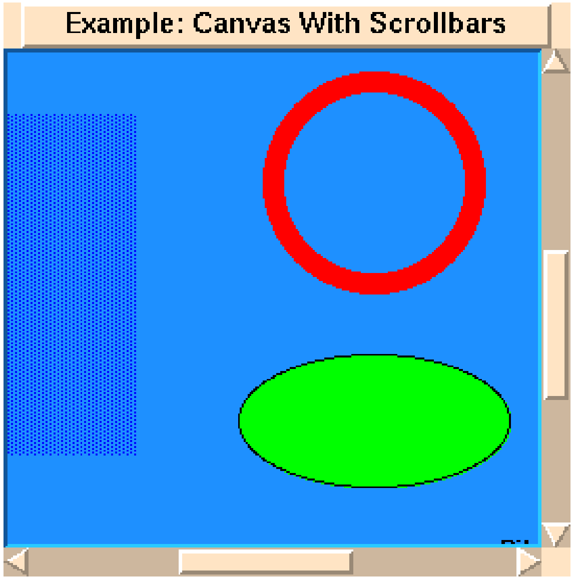
- Normal width/height of columns/rows based on requested sizes of slave windows
  - column width = max requested width
  - row height = max requested height
- Normal width/height of table is requested size of master window
  - table width = Σ column width
  - table height = Σ row height
- Extra space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

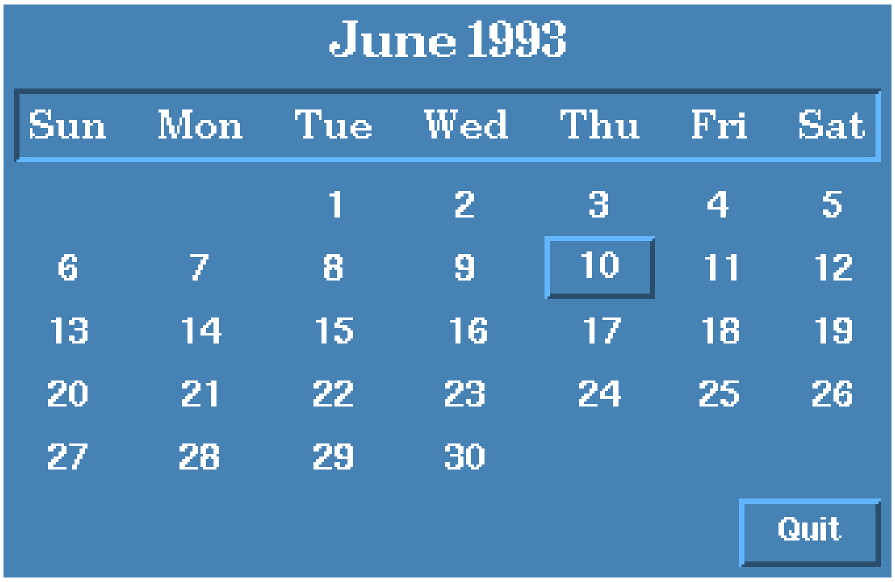
Example

- Canvas, label, two scrollbars




```
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
Sun
Mon
Tue
Wed
Thu
Fri
Sat
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
Quit

Layout Options

Slave window configuration options

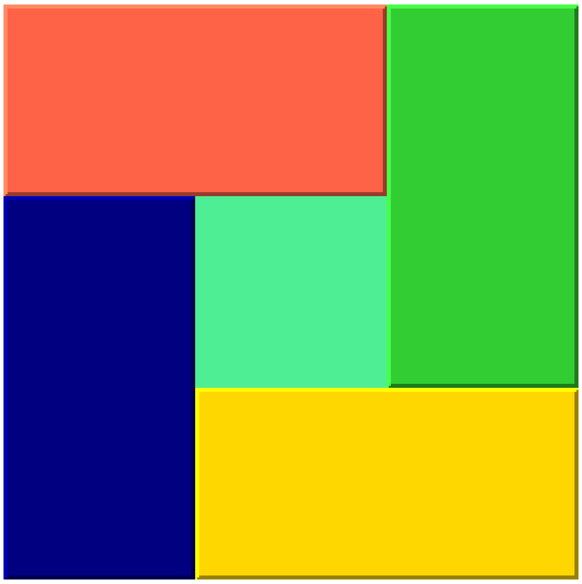
- Many **packer** options
  - `fill`
  - `anchor`
  - `padx`, `pady`
  - `ipadx`, `ipady`
- Can override requested size of slave window
  - `reqwidth`, `reqheight`

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

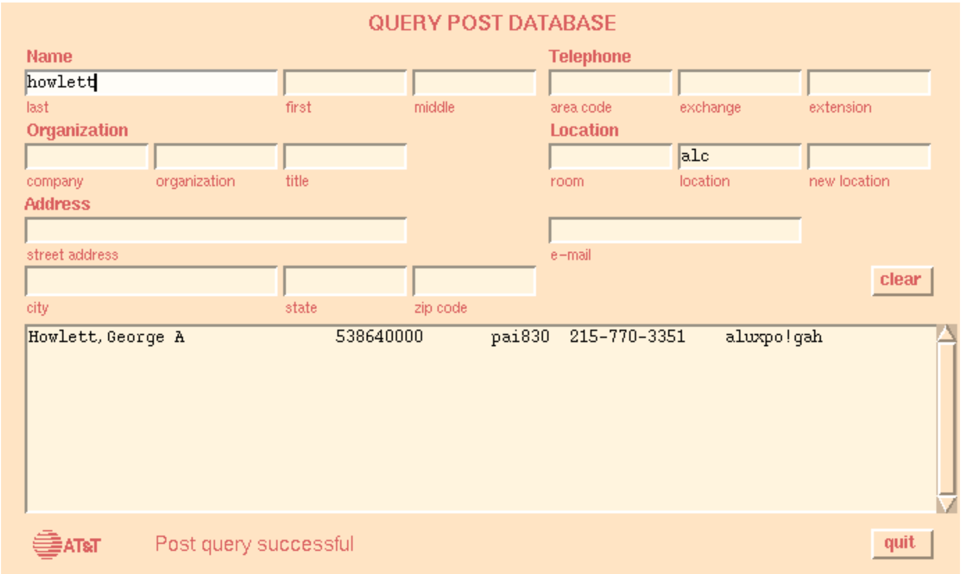
- Table model is intuitive (*tbl*)
  - layout should be predictable from description
- Layout is independent of order specified
- Flattens hierarchy
  - reflects design view, not X hierarchy
  - one geometry manager



```
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 <u>both</u> 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 }`	set size to value
`{ 1i 2i }`	bound size between min/max
`{ .5i 2i 1i }`	bound size and set nominal size
`{}`	reset to default, no bounding

Example: three buttons all one inch in width

```
table .frame \
      .apply   5,2 -reqwidth 1i \
      .cancel 5,3 -reqwidth 1i \
      .done    5,4 -reqwidth { .5i 3i 1i }
```

Spreadsheet Example

Parameters	Nominal	Minimum	Bounds	Maximum	Current
VS	1.4398	1		2	1.4398
VKO	0.0621	0.05		1	0.0621
KN	1.071	1		10	1.071
RO	99.143	10		10000	4205.8
RX	264.334	10		10000	264.334
R1	1	0		1	0.19
C1	1	0		1	0.33
XRF	1	0		1	0.76
RS	1.1	0.1		10	1.1
RD	1.1	0.1		10	1.1
RHO	0.65	0.01		10	0.65
COGS	0.326805	0		1	0.326805
COGD	0.326805	0		1	0.326805
CODS	0.18833	0		1	0.18833
CGSO	1.5	0		10	1.5
CGDO	1.5	0		10	1.5
CDSO	0.4555	0		10	0.4555
ALPH	0.2	0.01		1	0.2
F	3	1		10	3
A3	0	0		10	0
E3	2.3	1		5	2.3
DEL3	0	0		1	0
A4	-2.22965	-10		0	-2.22965

Bugs

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