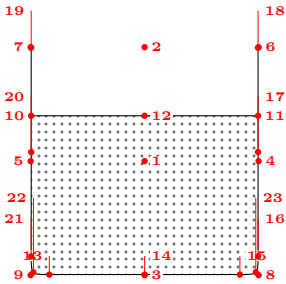


fluid tank

0 = start, 50 = midpoint, 100 = end

fluid tank (node)  
Keys: defaults  
fluid width 3cm  
fluid height 3cm  
fluid left level .7  
fluid right level .7  
Anchors: center, north, south, east, west, north east, north west, south east, south west, left-surface, right-surface, surface, text, base, base east, base west, mid, mid east, mid west  
Families: surface-0..100, bottom-0..100, right-0..100, left-0..100, bottom-left-0..100, bottom-right-0..100  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every fluid tank.  
surface runs left to right. bottom, right, left and the two rounded bottom corners follow the drawn outline counterclockwise.  
Use the manual for geometry rules and collision-safe aliases.

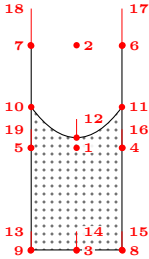


| Anchors |                 |    |                  |
|---------|-----------------|----|------------------|
| #       | Name            | #  | Name             |
| 1       | center          | 2  | north            |
| 3       | south           | 4  | east             |
| 5       | west            | 6  | north east       |
| 7       | north west      | 8  | south east       |
| 9       | south west      | 10 | left-surface     |
| 11      | right-surface   | 12 | surface          |
| 10      | surface-0       | 12 | surface-50       |
| 11      | surface-100     | 13 | bottom-0         |
| 14      | bottom-50       | 15 | bottom-100       |
| 16      | right-0         | 17 | right-50         |
| 18      | right-100       | 19 | left-0           |
| 20      | left-50         | 21 | left-100         |
| 21      | bottom-left-0   | 22 | bottom-left-50   |
| 13      | bottom-left-100 | 15 | bottom-right-0   |
| 23      | bottom-right-50 | 16 | bottom-right-100 |

meniscus

0 = start, 50 = midpoint, 100 = end

meniscus (node)  
Keys: defaults  
fluid width 1.2cm  
fluid height 2.7cm  
fluid level .7  
fluid bend .2  
Anchors: center, north, south, east, west, north east, north west, south east, south west, left-surface, right-surface, surface, text, base, base east, base west, mid, mid east, mid west  
Families: surface-0..100, bottom-0..100, right-0..100, left-0..100  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every meniscus.  
surface follows the cubic liquid boundary from left to right. bottom, right and left follow the vessel boundary counterclockwise.  
Use the manual for geometry rules and collision-safe aliases.

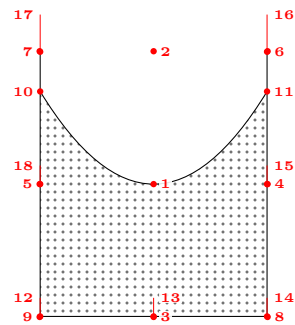


| Anchors |               |    |              |
|---------|---------------|----|--------------|
| #       | Name          | #  | Name         |
| 1       | center        | 2  | north        |
| 3       | south         | 4  | east         |
| 5       | west          | 6  | north east   |
| 7       | north west    | 8  | south east   |
| 9       | south west    | 10 | left-surface |
| 11      | right-surface | 12 | surface      |
| 10      | surface-0     | 12 | surface-50   |
| 11      | surface-100   | 13 | bottom-0     |
| 14      | bottom-50     | 15 | bottom-100   |
| 15      | right-0       | 16 | right-50     |
| 17      | right-100     | 18 | left-0       |
| 19      | left-50       | 13 | left-100     |

rotating fluid

0 = start, 50 = midpoint, 100 = end

```
rotating fluid (node)
Keys: defaults
fluid width      3cm
fluid height     3.5cm
fluid level      .5
fluid bend       .35
Anchors: center, north, south, east, west, north east, north west, south east, south
west, left-surface, right-surface, surface, text, base, base east, base west, mid, mid
east, mid west
Families: surface-0..100, bottom-0..100, right-0..100, left-0..100
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every rotating fluid.
surface follows the parabola from left to right. bottom, right and left follow the vessel
boundary counterclockwise.
Use the manual for geometry rules and collision-safe aliases.
```

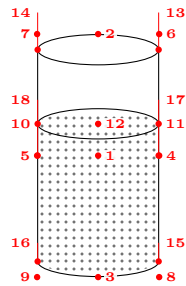


| Anchors |               |    |              |
|---------|---------------|----|--------------|
| #       | Name          | #  | Name         |
| 1       | center        | 2  | north        |
| 3       | south         | 4  | east         |
| 5       | west          | 6  | north east   |
| 7       | north west    | 8  | south east   |
| 9       | south west    | 10 | left-surface |
| 11      | right-surface | 1  | surface      |
| 10      | surface-0     | 1  | surface-50   |
| 11      | surface-100   | 12 | bottom-0     |
| 13      | bottom-50     | 14 | bottom-100   |
| 14      | right-0       | 15 | right-50     |
| 16      | right-100     | 17 | left-0       |
| 18      | left-50       | 12 | left-100     |

fluid cylinder

0 = start, 50 = midpoint, 100 = end

```
fluid cylinder (node)
Keys: defaults
fluid width      1.6cm
fluid height     3.2cm
fluid level      .65
Anchors: center, north, south, east, west, north east, north west, south east, south
west, left-surface, right-surface, surface, text, base, base east, base west, mid, mid
east, mid west
Families: surface-0..100, surface-rim-0..100, top-0..100, bottom-0..100, right-0..100,
left-0..100
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every fluid cylinder.
surface is the left-to-right diameter of the liquid ellipse; surface-rim, top and
bottom are full ellipse boundaries, starting at the rightmost point and running
counterclockwise. left and right cover the straight walls.
Use the manual for geometry rules and collision-safe aliases.
```

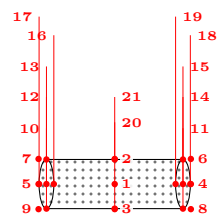


| Anchors |               |
|---------|---------------|
| #       | Name          |
| 1       | center        |
| 2       | north         |
| 3       | south         |
| 4       | east          |
| 5       | west          |
| 6       | north east    |
| 7       | north west    |
| 8       | south east    |
| 9       | south west    |
| 10      | left-surface  |
| 11      | right-surface |
| 12      | surface       |
| 13      | top-0         |
| 14      | top-50        |
| 15      | bottom-0      |
| 16      | bottom-50     |
| 17      | right-0       |
| 18      | right-50      |
| 19      | left-0        |
| 20      | left-50       |

pressure element

0 = start, 50 = midpoint, 100 = end

pressure element (node)  
Keys: defaults  
fluid width 2cm  
fluid height .65cm  
Anchors: center, north, south, east, west, north east, north west, south east, south west, inlet, outlet, text, base, base east, base west, mid, mid east, mid west  
Families: inlet-0..100, outlet-0..100, inlet-rim-0..100, outlet-rim-0..100, axis-0..100, top-0..100, bottom-0..100  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every pressure element.  
inlet and outlet run bottom to top across their projected faces. inlet-rim and outlet-rim run counterclockwise from the rightmost point. axis joins their centres left to right; top and bottom cover the straight outline.  
*Use the manual for geometry rules and collision-safe aliases.*

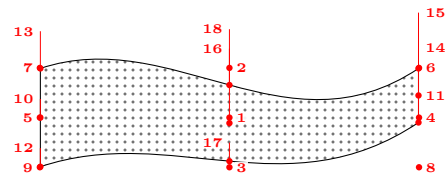


| Anchors |                |    |               |
|---------|----------------|----|---------------|
| #       | Name           | #  | Name          |
| 1       | center         | 2  | north         |
| 3       | south          | 4  | east          |
| 5       | west           | 6  | north east    |
| 7       | north west     | 8  | south east    |
| 9       | south west     | 10 | inlet         |
| 11      | outlet         | 12 | inlet-0       |
| 10      | inlet-50       | 13 | inlet-100     |
| 14      | outlet-0       | 11 | outlet-50     |
| 15      | outlet-100     | 16 | inlet-rim-0   |
| 17      | inlet-rim-50   | 16 | inlet-rim-100 |
| 18      | outlet-rim-0   | 19 | outlet-rim-50 |
| 18      | outlet-rim-100 | 10 | axis-0        |
| 1       | axis-50        | 11 | axis-100      |
| 15      | top-0          | 20 | top-50        |
| 13      | top-100        | 12 | bottom-0      |
| 21      | bottom-50      | 14 | bottom-100    |

flow tube

0 = start, 50 = midpoint, 100 = end

flow tube (node)  
Keys: defaults  
fluid width 5cm  
fluid height 1.3cm  
fluid bend .45  
Anchors: center, north, south, east, west, north east, north west, south east, south west, inlet, outlet, text, base, base east, base west, mid, mid east, mid west  
Families: inlet-0..100, outlet-0..100, axis-0..100, bottom-0..100, top-0..100  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every flow tube.  
inlet and outlet run bottom to top; axis follows their curved midline left to right.  
bottom runs left to right, top right to left on the actual cubic outline. Curve percentages use the cubic parameter.  
*Use the manual for geometry rules and collision-safe aliases.*

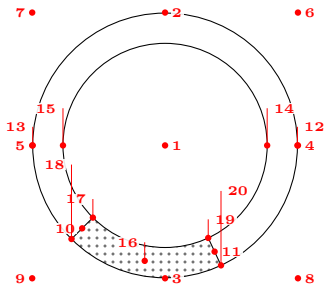


| Anchors |            |    |            |
|---------|------------|----|------------|
| #       | Name       | #  | Name       |
| 1       | center     | 2  | north      |
| 3       | south      | 4  | east       |
| 5       | west       | 6  | north east |
| 7       | north west | 8  | south east |
| 9       | south west | 10 | inlet      |
| 11      | outlet     | 12 | inlet-0    |
| 10      | inlet-50   | 13 | inlet-100  |
| 14      | outlet-0   | 11 | outlet-50  |
| 15      | outlet-100 | 10 | axis-0     |
| 16      | axis-50    | 11 | axis-100   |
| 12      | bottom-0   | 17 | bottom-50  |
| 14      | bottom-100 | 15 | top-0      |
| 18      | top-50     | 13 | top-100    |

liquid ring

0 = start, 50 = midpoint, 100 = end

liquid ring (node)  
Keys: defaults  
fluid width 3.5cm  
fluid tube width .4cm  
fluid angle 225  
fluid sweep 70  
Anchors: center, north, south, east, west, north east, north west, south east, south west, liquid-start, liquid-end, text, base, base east, base west, mid, mid east, mid west  
Families: outer-0..100, inner-0..100, liquid-0..100, start-0..100, end-0..100  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every liquid ring.  
outer and inner run counterclockwise from the rightmost point. liquid follows the filled sector centreline from liquid-start to liquid-end; start and end run radially from inner to outer boundary.  
*Use the manual for geometry rules and collision-safe aliases.*

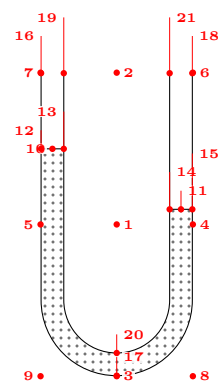


| Anchors |            |                 |
|---------|------------|-----------------|
| #       | Name       | # Name          |
| 1       | center     | 2 north         |
| 3       | south      | 4 east          |
| 5       | west       | 6 north east    |
| 7       | north west | 8 south east    |
| 9       | south west | 10 liquid-start |
| 11      | liquid-end | 12 outer-0      |
| 13      | outer-50   | 12 outer-100    |
| 14      | inner-0    | 15 inner-50     |
| 14      | inner-100  | 10 liquid-0     |
| 16      | liquid-50  | 11 liquid-100   |
| 17      | start-0    | 10 start-50     |
| 18      | start-100  | 19 end-0        |
| 11      | end-50     | 20 end-100      |

u tube

0 = start, 50 = midpoint, 100 = end

```
u tube (node)
Keys: defaults
fluid width      2cm
fluid height     4cm
fluid tube width  .3cm
fluid left level .75
fluid right level .55
Anchors: center, north, south, east, west, north east, north west, south east, south west, left-surface, right-surface, surface, text, base, base east, base west, mid, mid east, mid west
Families: surface-0..100, left-surface-0..100, right-surface-0..100, outer-0..100, inner-0..100
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.
Defaults hook: every u tube.
left-surface and right-surface independently run left to right across the liquid in each arm. surface selects the left arm, never the empty gap. outer and inner follow the U outline by distance from the left lip down through the bend to the right lip.
Use the manual for geometry rules and collision-safe aliases.
```

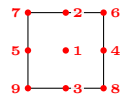


| Anchors              |                     |
|----------------------|---------------------|
| # Name               | # Name              |
| 1 center             | 2 north             |
| 3 south              | 4 east              |
| 5 west               | 6 north east        |
| 7 north west         | 8 south east        |
| 9 south west         | 10 left-surface     |
| 11 right-surface     | 10 surface          |
| 12 surface-0         | 10 surface-50       |
| 13 surface-100       | 12 left-surface-0   |
| 10 left-surface-50   | 13 left-surface-100 |
| 14 right-surface-0   | 11 right-surface-50 |
| 15 right-surface-100 | 16 outer-0          |
| 17 outer-50          | 18 outer-100        |
| 19 inner-0           | 20 inner-50         |
| 21 inner-100         |                     |

block

0 = start, 50 = midpoint, 100 = end

block (node)  
 Keys: defaults  
 minimum width 1cm  
 minimum height 1cm  
 Size aliases: block width = minimum width; block height = minimum height.  
 Anchors: center, north, south, east, west, north east, north west, south east, south west, base, base east, base west, mid, mid east, mid west, text  
 Families: bottom-0..100, right-0..100, top-0..100, left-0..100; Bare numeric anchors remain angles in degrees, as in ordinary TikZ.  
 Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
 Defaults hook: every block.  
 bottom, right, top, left follow the boundary counterclockwise. Use 0 for an edge start, 50 for its midpoint, 100 for its end.  
*Use the manual for geometry rules and collision-safe aliases.*

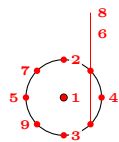


| Anchors |            |
|---------|------------|
| #       | Name       |
| 1       | center     |
| 3       | south      |
| 5       | west       |
| 7       | north west |
| 9       | south west |
| 3       | bottom-50  |
| 8       | right-0    |
| 6       | right-100  |
| 2       | top-50     |
| 7       | left-0     |
| 9       | left-100   |

pulley

0 = start, 50 = midpoint, 100 = end

```
pulley (node)
Keys: defaults
minimum size          1cm
pulley axle radius     1.5pt
pulley axle color      black
Size aliases: pulley diameter = minimum size.
Anchors: center, north, south, east, west, north east, north west, south east, south
west, base, base east, base west, mid, mid east, mid west, text
Families: rim-0..100; Bare numeric anchors remain angles in degrees, as in ordinary TikZ.
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every pulley.
rim starts at the rightmost point and runs counterclockwise around the circle. 25 is
north, 50 west, 75 south, and 100 returns to the start.
Use the manual for geometry rules and collision-safe aliases.
```

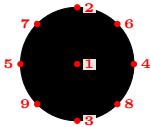


| Anchors |            |   |            |
|---------|------------|---|------------|
| #       | Name       | # | Name       |
| 1       | center     | 2 | north      |
| 3       | south      | 4 | east       |
| 5       | west       | 6 | north east |
| 7       | north west | 8 | south east |
| 9       | south west | 4 | rim-0      |
| 2       | rim-25     | 5 | rim-50     |
| 3       | rim-75     | 4 | rim-100    |

particle

0 = start, 50 = midpoint, 100 = end

```
particle (node)
Keys: defaults
minimum size      3mm
Anchors: center, north, south, east, west, north east, north west, south east, south
west, base, base east, base west, mid, mid east, mid west, text
Families: rim-0..100; Bare numeric anchors remain angles in degrees, as in ordinary TikZ.
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every particle.
rim starts at the rightmost point and runs counterclockwise around the circle. 25 is
north, 50 west, 75 south, and 100 returns to the start.
Use the manual for geometry rules and collision-safe aliases.
```

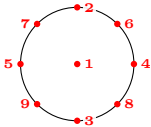


| Anchors      |              |
|--------------|--------------|
| # Name       | # Name       |
| 1 center     | 2 north      |
| 3 south      | 4 east       |
| 5 west       | 6 north east |
| 7 north west | 8 south east |
| 9 south west | 4 rim-0      |
| 2 rim-25     | 5 rim-50     |
| 3 rim-75     | 4 rim-100    |

disk

0 = start, 50 = midpoint, 100 = end

disk (node)  
Keys: defaults  
minimum size 15mm  
Anchors: center, north, south, east, west, north east, north west, south east, south west, base east, base west, mid, mid east, mid west, text  
Families: rim-0..100; Bare numeric anchors remain angles in degrees, as in ordinary TikZ.  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every disk.  
rim starts at the rightmost point and runs counterclockwise around the circle. 25 is north, 50 west, 75 south, and 100 returns to the start.  
*Use the manual for geometry rules and collision-safe aliases.*

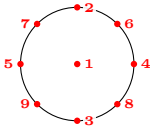


| Anchors      |              |
|--------------|--------------|
| # Name       | # Name       |
| 1 center     | 2 north      |
| 3 south      | 4 east       |
| 5 west       | 6 north east |
| 7 north west | 8 south east |
| 9 south west | 4 rim-0      |
| 2 rim-25     | 5 rim-50     |
| 3 rim-75     | 4 rim-100    |

ring

0 = start, 50 = midpoint, 100 = end

ring (node)  
Keys: defaults  
minimum size 15mm  
Anchors: center, north, south, east, west, north east, north west, south east, south west, base east, base west, mid, mid east, mid west, text  
Families: rim-0..100; Bare numeric anchors remain angles in degrees, as in ordinary TikZ.  
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width, minimum height, inner sep, outer sep.  
Defaults hook: every ring.  
rim starts at the rightmost point and runs counterclockwise around the circle. 25 is north, 50 west, 75 south, and 100 returns to the start.  
*Use the manual for geometry rules and collision-safe aliases.*

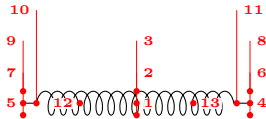


| Anchors      |              |
|--------------|--------------|
| # Name       | # Name       |
| 1 center     | 2 north      |
| 3 south      | 4 east       |
| 5 west       | 6 north east |
| 7 north west | 8 south east |
| 9 south west | 4 rim-0      |
| 2 rim-25     | 5 rim-50     |
| 3 rim-75     | 4 rim-100    |

spring

0 = start, 50 = midpoint, 100 = end

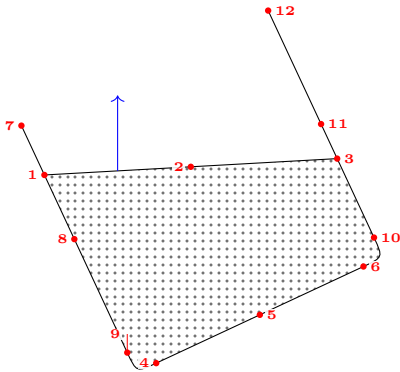
```
spring (node and path)
Keys: defaults
minimum width      3cm (node)
minimum height     0pt (node)
pre length         5pt
post length        5pt
amplitude          4.5pt
segment length     4.5pt
aspect             0.5
Size aliases: spring length = minimum width.
Anchors: center, start, end, coil-start, coil-end, north, south, east, west, north east,
south west, north west, south east, text
Families: axis-0..100
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every spring.
Use draw[spring] (A)--(B) for a two-point connection, or node[spring] (S) for a
positioned coil. Node length defaults to 3cm; spring length and minimum width set its
length. start/end are exact axis attachments, coil-start/coil-end delimit the leads, and
axis-0..100 samples the straight axis, not the coil wire. show anchors/show keys apply to
nodes; physicshelpspring describes both forms. Lead lengths may be zero; their sum must
be smaller than the node length. amplitude and segment length must be positive.
Use the manual for geometry rules and collision-safe aliases.
```



| Anchors |            |    |            |
|---------|------------|----|------------|
| #       | Name       | #  | Name       |
| 1       | center     | 2  | north      |
| 3       | south      | 4  | east       |
| 5       | west       | 6  | north east |
| 7       | north west | 8  | south east |
| 9       | south west | 5  | start      |
| 4       | end        | 10 | coil-start |
| 11      | coil-end   | 5  | axis-0     |
| 12      | axis-25    | 1  | axis-50    |
| 13      | axis-75    | 4  | axis-100   |

Transformed free surface

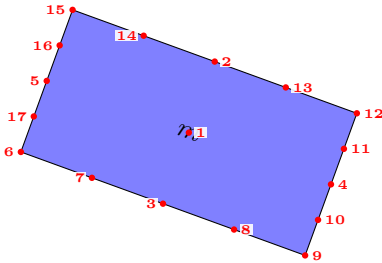
```
fluid tank (node)
Keys: defaults
fluid width      3cm
fluid height     3cm
fluid left level .7
fluid right level .7
Anchors: center, north, south, east, west, north east, north west, south east, south
west, left-surface, right-surface, surface, text, base, base east, base west, mid, mid
east, mid west
Families: surface-0..100, bottom-0..100, right-0..100, left-0..100, bottom-left-0..100,
bottom-right-0..100
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every fluid tank.
surface runs left to right. bottom, right, left and the two rounded bottom corners follow
the drawn outline counterclockwise.
Use the manual for geometry rules and collision-safe aliases.
```



| Anchors |               |    |             |
|---------|---------------|----|-------------|
| #       | Name          | #  | Name        |
| 1       | left-surface  | 2  | surface     |
| 3       | right-surface | 1  | surface-0   |
| 2       | surface-50    | 3  | surface-100 |
| 4       | bottom-0      | 5  | bottom-50   |
| 6       | bottom-100    | 7  | left-0      |
| 8       | left-50       | 9  | left-100    |
| 10      | right-0       | 11 | right-50    |
| 12      | right-100     |    |             |

Filled block: markers above the fill

```
block (node)
Keys: defaults
minimum width      1cm
minimum height     1cm
Size aliases: block width = minimum width; block height = minimum height.
Anchors: center, north, south, east, west, north east, north west, south east, south
west, base, base east, base west, mid, mid east, mid west, text
Families: bottom-0..100, right-0..100, top-0..100, left-0..100; Bare numeric anchors
remain angles in degrees, as in ordinary TikZ.
Also: draw, fill, line width, color, opacity, rotate, scale, anchor, minimum width,
minimum height, inner sep, outer sep.
Defaults hook: every block.
bottom, right, top, left follow the boundary counterclockwise. Use 0 for an edge start, 50
for its midpoint, 100 for its end.
Use the manual for geometry rules and collision-safe aliases.
```



| Anchors |            |
|---------|------------|
| #       | Name       |
| 1       | center     |
| 2       | north      |
| 3       | south      |
| 4       | east       |
| 5       | west       |
| 6       | bottom-0   |
| 7       | bottom-25  |
| 8       | bottom-75  |
| 9       | bottom-100 |
| 10      | right-0    |
| 11      | right-25   |
| 12      | right-50   |
| 13      | right-100  |
| 14      | top-0      |
| 15      | top-25     |
| 16      | top-75     |
| 17      | top-100    |
| 18      | left-0     |
| 19      | left-25    |
| 20      | left-50    |
| 21      | left-75    |
| 22      | left-100   |