XYGraph

# Measurement, Arrange and Render

Cannot use DesiredSize in OnRender, because DesiredSize includes Margin.

Use DesiredSize.Width, not just Width

# Trace with Grid.Measure problem

484.00; 507.18; Stretch; mainGrid

58.41; 58.41; Left; yLegendScroller

448.77; 448.77; Stretch; xLegendScroller

448.77; 448.77; Stretch; plotArea

35.23; 58.41; Stretch; totalZoomDockGrid

Trc 10:11:35.482 XYGraph.Measure(484,262)

Trc 10:11:35.482 XYGraphGrid.Measure(484,262)

Trc 10:11:35.482 YLegendScroller.Measure(+unendlich,+unendlich)

Trc 10:11:35.482 YLegendScroller.Measure(0,0) end

Trc 10:11:35.482 XLegendScroller.Measure(448.77,+unendlich)

Trc 10:11:35.482 XLegendScroller.FullWidth=448.77

Trc 10:11:35.482 XLegend.Measure(448.77,+unendlich)

Trc 10:11:35.482 XLegend.Measure(448.77,15.9609375) end

Trc 10:11:35.482 XLegendScroller.Measure(448.77,32.9609375) end

Trc 10:11:35.482 YLegendScroller.Measure(+unendlich,229.0390625)

Trc 10:11:35.482 YLegendScroller.FullHeight=229.0390625

Trc 10:11:35.482 YLegend.Measure(+unendlich,229.0390625)

Trc 10:11:35.482 YLegend.Measure(41.4140625,229.0390625) end

Trc 10:11:35.482 YLegendScroller.Measure(58.4140625,229.0390625) end

Trc 10:11:35.482 PlotArea.Measure(448.77,229.0390625)

Trc 10:11:35.482 PlotArea.Measure(448.77,229.0390625) end

Trc 10:11:35.482 XYGraphGrid.Measure(507.1840625,262) end

Trc 10:11:35.482 XYGraph.Measure(484,262) end

Trc 10:11:35.482 XYGraph.Arrange(484,262)

Trc 10:11:35.482 XYGraphGrid.Arrange(507.1840625,262)

Trc 10:11:35.482 YLegendScroller.Arrange(58.4140625,229.0390625)

Trc 10:11:35.482 YLegend.Arrange(41.4140625,229.0390625)

Trc 10:11:35.482 YLegend.Arrange(41.4140625,229.0390625) end

Trc 10:11:35.482 YLegend.Render(41.4140625,229.0390625)

Trc 10:11:35.482 YLegend.Render end

Trc 10:11:35.482 YLegendScroller.Arrange(58.4140625,229.0390625) end

Trc 10:11:35.482 YLegendScroller.Render(58.4140625,229.0390625)

Trc 10:11:35.482 YLegendScroller.Render end

Trc 10:11:35.482 XLegendScroller.Arrange(448.77,32.9609375)

Trc 10:11:35.482 XLegend.Arrange(448.77,15.9609375)

Trc 10:11:35.482 XLegend.Arrange(448.77,15.9609375) end

Trc 10:11:35.482 XLegend.Render(448.77,15.9609375)

Trc 10:11:35.482 XLegend.Render end

Trc 10:11:35.482 XLegendScroller.Arrange(448.77,32.9609375) end

Trc 10:11:35.482 XLegendScroller.Render(448.77,32.9609375)

Trc 10:11:35.482 XLegendScroller.Render end

Trc 10:11:35.482 PlotArea.Arrange(448.77,229.0390625)

Trc 10:11:35.482 PlotArea.Arrange(448.77,229.0390625) end

Trc 10:11:35.482 PlotArea.Render(448.77,229.0390625)

Trc 10:11:35.482 PlotArea.Render end

Trc 10:11:35.482 XYGraphGrid.Arrange(507.1840625,262) end

Trc 10:11:35.482 XYGraphGrid.Render(507.1840625,262)

Trc 10:11:35.482 XYGraphGrid.Render end

Trc 10:11:35.482 XYGraph.Arrange(484,262) end

Trc 10:11:35.482 XYGraph.Render(484,262)

Trc 10:11:35.482 XYGraph.Render end

Trc 10:11:35.482 XLegendScroller.Measure(448.77,+unendlich)

Trc 10:11:35.482 XLegend.Measure(448.77,+unendlich)

Trc 10:11:35.482 XLegend.Measure(448.77,15.9609375) end

Trc 10:11:35.482 XLegendScroller.Measure(448.77,32.9609375) end

Trc 10:11:35.482 YLegendScroller.Measure(+unendlich,229.0390625)

Trc 10:11:35.482 YLegendScroller.PageRange=10

Trc 10:11:35.482 YLegend.Measure(+unendlich,229.0390625)

Trc 10:11:35.482 YLegend.Measure(41.4140625,229.0390625) end

Trc 10:11:35.482 YLegendScroller.Measure(58.4140625,229.0390625) end

Trc 10:11:35.482 YLegendScroller.Arrange(58.4140625,229.0390625)

Trc 10:11:35.482 YLegend.Arrange(41.4140625,229.0390625)

Trc 10:11:35.482 YLegend.Arrange(41.4140625,229.0390625) end

Trc 10:11:35.482 YLegend.Render(41.4140625,229.0390625)

Trc 10:11:35.482 YLegend.Render end

Trc 10:11:35.482 YLegendScroller.Arrange(58.4140625,229.0390625) end

Trc 10:11:35.482 YLegendScroller.Render(58.4140625,229.0390625)

Trc 10:11:35.482 YLegendScroller.Render end

Trc 10:11:35.482 XLegendScroller.Arrange(448.77,32.9609375)

Trc 10:11:35.482 XLegend.Arrange(448.77,15.9609375)

Trc 10:11:35.482 XLegend.Arrange(448.77,15.9609375) end

Trc 10:11:35.482 XLegend.Render(448.77,15.9609375)

Trc 10:11:35.482 XLegend.Render end

Trc 10:11:35.482 XLegendScroller.Arrange(448.77,32.9609375) end

Trc 10:11:35.482 XLegendScroller.Render(448.77,32.9609375)

Trc 10:11:35.482 XLegendScroller.Render end

Trc 10:11:35.482 XYGraph.ActualWidth=484

Trc 10:11:35.482 XYGraph.ActualHeight=262

Trc 10:11:35.482 XYGraphGrid.ActualWidth=507.1840625

Trc 10:11:35.482 XYGraphGrid.ActualHeight=262

Trc 10:11:35.482 PlotArea.ActualWidth=448.77

Trc 10:11:35.483 PlotArea.ActualHeight=229.0390625

Trc 10:11:35.483 XLegendScroller.ActualWidth=448.77

Trc 10:11:35.483 XLegendScroller.ActualHeight=32.9609375

Trc 10:11:35.483 XYGraphGrid.Measure(484,262)

Trc 10:11:35.483 YLegendScroller.Measure(+unendlich,+unendlich)

Trc 10:11:35.483 YLegendScroller.Measure(0,0) end

Trc 10:11:35.483 YLegendScroller.Measure(+unendlich,223.04)

Trc 10:11:35.483 YLegend.Measure(+unendlich,223.04)

Trc 10:11:35.483 YLegend.Measure(41.4140625,223.04) end

Trc 10:11:35.483 YLegendScroller.Measure(58.4140625,223.04) end

Trc 10:11:35.483 PlotArea.Measure(448.77,223.04)

Trc 10:11:35.483 PlotArea.Measure(448.77,223.04) end

Trc 10:11:35.483 XYGraphGrid.Measure(507.1840625,262) end

Trc 10:11:35.483 XYGraphGrid.Arrange(507.1840625,262)

Trc 10:11:35.483 YLegendScroller.Arrange(58.4140625,223.04)

Trc 10:11:35.483 YLegend.Arrange(41.4140625,223.04)

Trc 10:11:35.483 YLegend.Arrange(41.4140625,223.04) end

Trc 10:11:35.483 YLegend.Render(41.4140625,223.04)

Trc 10:11:35.483 YLegend.Render end

Trc 10:11:35.483 YLegendScroller.Arrange(58.4140625,223.04) end

Trc 10:11:35.483 YLegendScroller.Render(58.4140625,223.04)

Trc 10:11:35.483 YLegendScroller.Render end

Trc 10:11:35.483 XLegendScroller.Arrange(448.77,32.9609375)

Trc 10:11:35.483 XLegendScroller.Arrange(448.77,32.9609375) end

Trc 10:11:35.483 PlotArea.Arrange(448.77,223.04)

Trc 10:11:35.483 PlotArea.Arrange(448.77,223.04) end

Trc 10:11:35.483 PlotArea.Render(448.77,223.04)

Trc 10:11:35.483 PlotArea.Render end

Trc 10:11:35.483 XYGraphGrid.Arrange(507.1840625,262) end

Trc 10:11:35.483 YLegend.Arrange(41.4140625,223.04)

Trc 10:11:35.483 YLegend.Arrange(41.4140625,223.04) end

Trc 10:11:35.483 YLegend.Render(41.4140625,223.04)

Trc 10:11:35.483 YLegend.Render end

Trc 10:11:35.483 PlotArea.ActualHeight=223.04

Trc 10:11:35.483 XLegend.ActualWidth=448.77

Trc 10:11:35.483 XLegend.ActualHeight=15.9609375

Trc 10:11:35.483 YLegendScroller.ActualWidth=58.4140625

Trc 10:11:35.483 YLegendScroller.ActualHeight=223.04

Trc 10:11:35.483 YLegend.ActualWidth=41.4140625

Trc 10:11:35.483 YLegend.ActualHeight=223.04

Grid classifies cells into four groups depending on

the column / row type a cell belongs to (number corresponds to

group number):

Px Auto Star

+--------+--------+--------+

| | | |

Px | 1 | 1 | 3 |

| | | |

+--------+--------+--------+

| | | |

Auto | 1 | 1 | 3 |

| | | |

+--------+--------+--------+

| | | |

Star | 4 | 2 | 4 |

| | | |

+--------+--------+--------+

The group number indicates the order in which cells are measured.

Certain order is necessary to be able to dynamically resolve star

columns / rows sizes which are used as input for measuring of

the cells belonging to them.

However, there are cases when topology of a grid causes cyclical

size dependences. For example:

column width="Auto" column width="\*"

+----------------------+----------------------+

| | |

| | |

| | |

| | |

row height="Auto" | | cell 1 2 |

| | |

| | |

| | |

| | |

+----------------------+----------------------+

| | |

| | |

| | |

| | |

row height="\*" | cell 2 1 | |

| | |

| | |

| | |

| | |

+----------------------+----------------------+

In order to accurately calculate constraint width for "cell 1 2"

(which is the remaining of grid's available width and calculated

value of Auto column), "cell 2 1" needs to be calculated first,

as it contributes to the Auto column's calculated value.

At the same time in order to accurately calculate constraint

height for "cell 2 1", "cell 1 2" needs to be calcualted first,

as it contributes to Auto row height, which is used in the

computation of Star row resolved height.

to "break" this cyclical dependency we are making (arbitrary)

decision to treat cells like "cell 2 1" as if they appear in Auto

rows. And then recalculate them one more time when star row

heights are resolved.

(Or more strictly) the code below implement the following logic:

+---------+

| enter |

+---------+

|

V

+----------------+

| Measure Group1 |

+----------------+

|

V

/ - \

/ \

Y / Can \ N

+--------| Resolve |-----------+

| \ StarsV? / |

| \ / |

| \ - / |

V V

+----------------+ / - \

| Resolve StarsV | / \

+----------------+ Y / Can \ N

| +----| Resolve |------+

V | \ StarsU? / |

+----------------+ | \ / |

| Measure Group2 | | \ - / |

+----------------+ | V

| | +-----------------+

V | | Measure Group2' |

+----------------+ | +-----------------+

| Resolve StarsU | | |

+----------------+ V V

| +----------------+ +----------------+

V | Resolve StarsU | | Resolve StarsU |

+----------------+ +----------------+ +----------------+

| Measure Group3 | | |

+----------------+ V V

| +----------------+ +----------------+

| | Measure Group3 | | Measure Group3 |

| +----------------+ +----------------+

| | |

| V V

| +----------------+ +----------------+

| | Resolve StarsV | | Resolve StarsV |

| +----------------+ +----------------+

| | |

| | V

| | +------------------+

| | | Measure Group2'' |

| | +------------------+

| | |

+----------------------+-------------------------+

|

V

+----------------+

| Measure Group4 |

+----------------+

|

V

+--------+

| exit |

+--------+

where:

\* all [Measure GroupN] - regular children measure process -

each cell is measured given contraint size as an input

and each cell's desired size is accumulated on the

corresponding column / row;

\* [Measure Group2'] - is when each cell is measured with

infinit height as a constraint and a cell's desired

height is ignored;

\* [Measure Groups''] - is when each cell is measured (second

time during single Grid.MeasureOverride) regularly but its

returned width is ignored;

This algorithm is believed to be as close to ideal as possible.

It has the following drawbacks:

\* cells belonging to Group2 can be called to measure twice;

\* iff during second measure a cell belonging to Group2 returns

desired width greater than desired width returned the first

time, such a cell is going to be clipped, even though it

appears in Auto column.

XYGraph consists of:

|  |  |  |
| --- | --- | --- |
|  | Column0, width=\* | Column1, width=auto |
| Row0, height=\* | PlotArea | YLegendScroller |
| Row1, height=auto | XLegendScroller | Total Zoombuttons |

The **height** of the XLegendScroller is the addition of the labels and the srollbar height. The label height depends on the height of a character.

The **width** of the YLegendScroller is the addition of the labels and the srollbar width. The label width depends on the width of a character and the number of characters, .i.e how many digits get displayed.