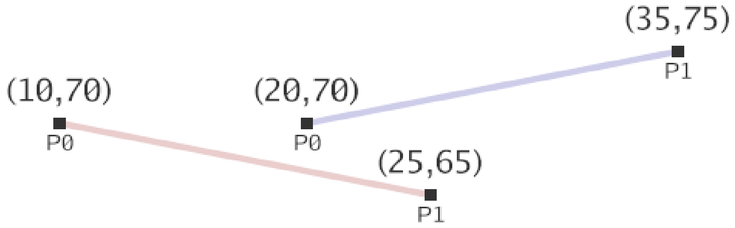
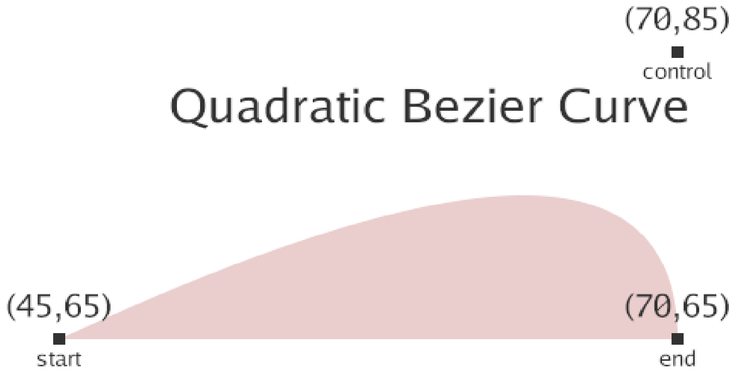
Canvas API

A canvas API for Gio applications using high-level objects and a percentage-based coordinate system (https://github.com/ajstarks/giocanvas)

Line

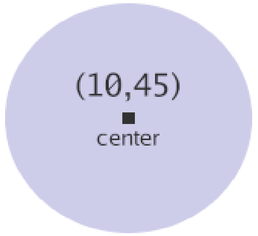


Quadratic Bezier Curve

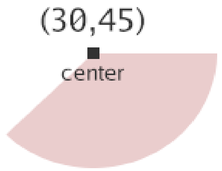


Rectangle

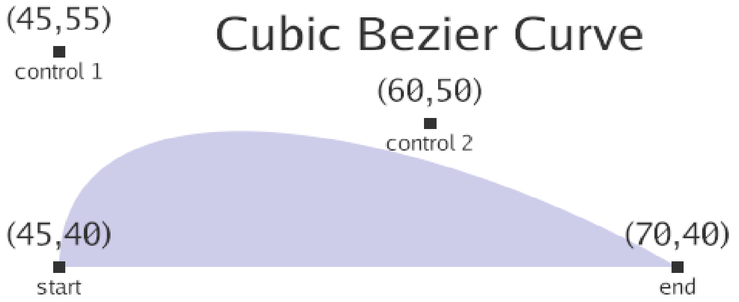
Circle



Arc

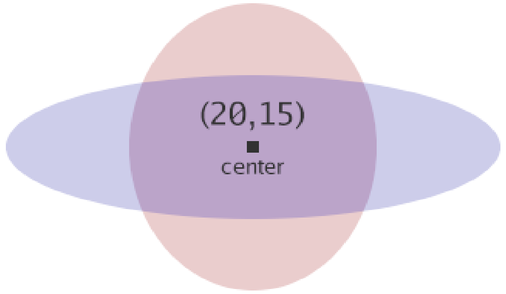


Cubic Bezier Curve

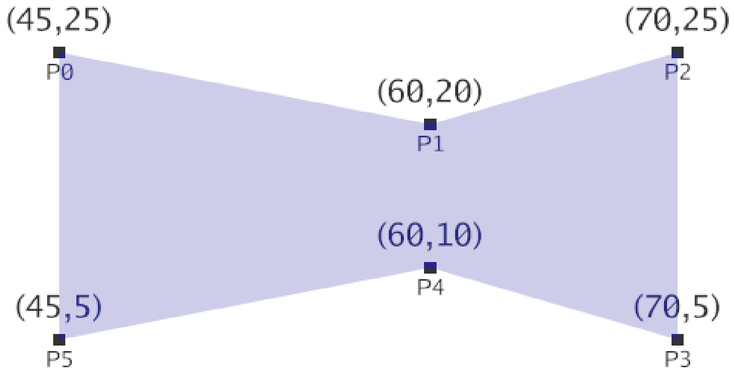


Square

Ellipse



Polygon



Image

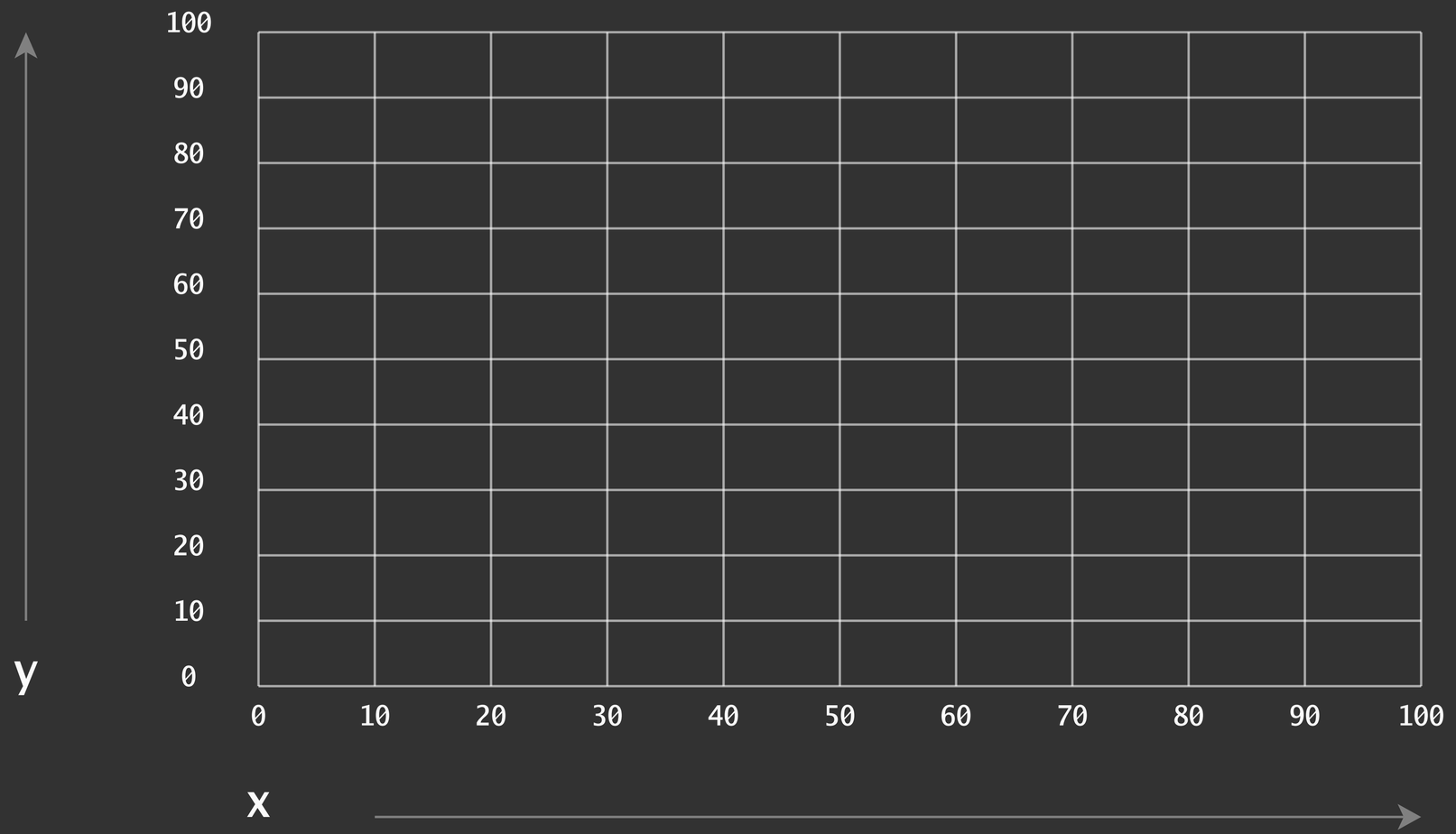
Motivation

The desire for a high–level Go API for developers and designers to think in terms of high level objects that make up a visual display. The objects will be familiar to anyone using a modern illustration program (text, images, lines, arcs, circles, curves, etc). The API should facilitate the artful arrangement of these elements on a scalable 2D canvas.

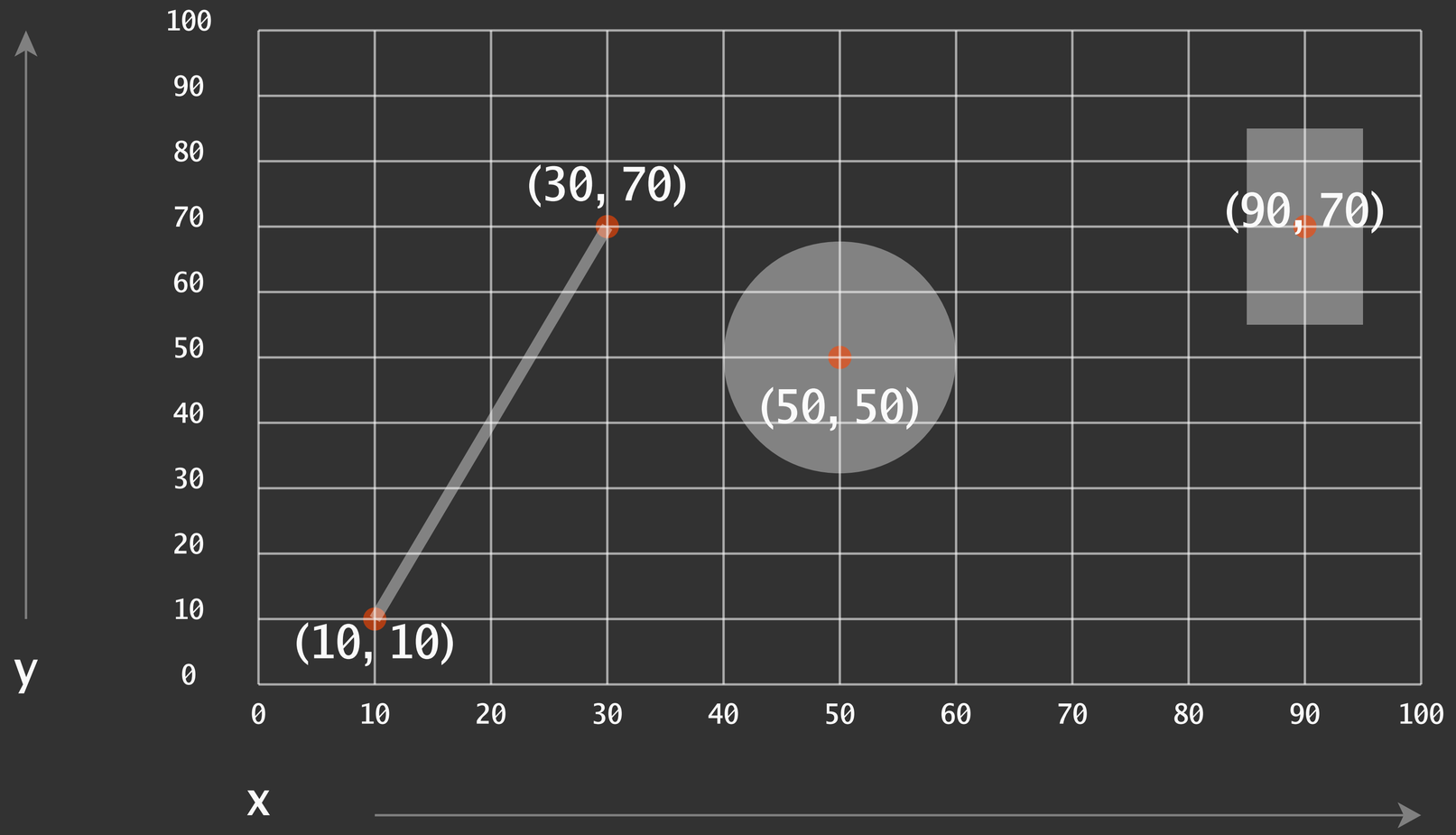
Use Cases: Information Displays, Data Visualization, Creative Coding, Presentations

https://gist.github.com/ajstarks/5bad9b1f5a859b86a17a03bbfbafcee6

The Percent Grid



Using the Percent Grid



Rect(90, 70, ...)

Circle(50, 50, ...)

Line(10, 10, 30, 70, ...)

Methods on *Canvas

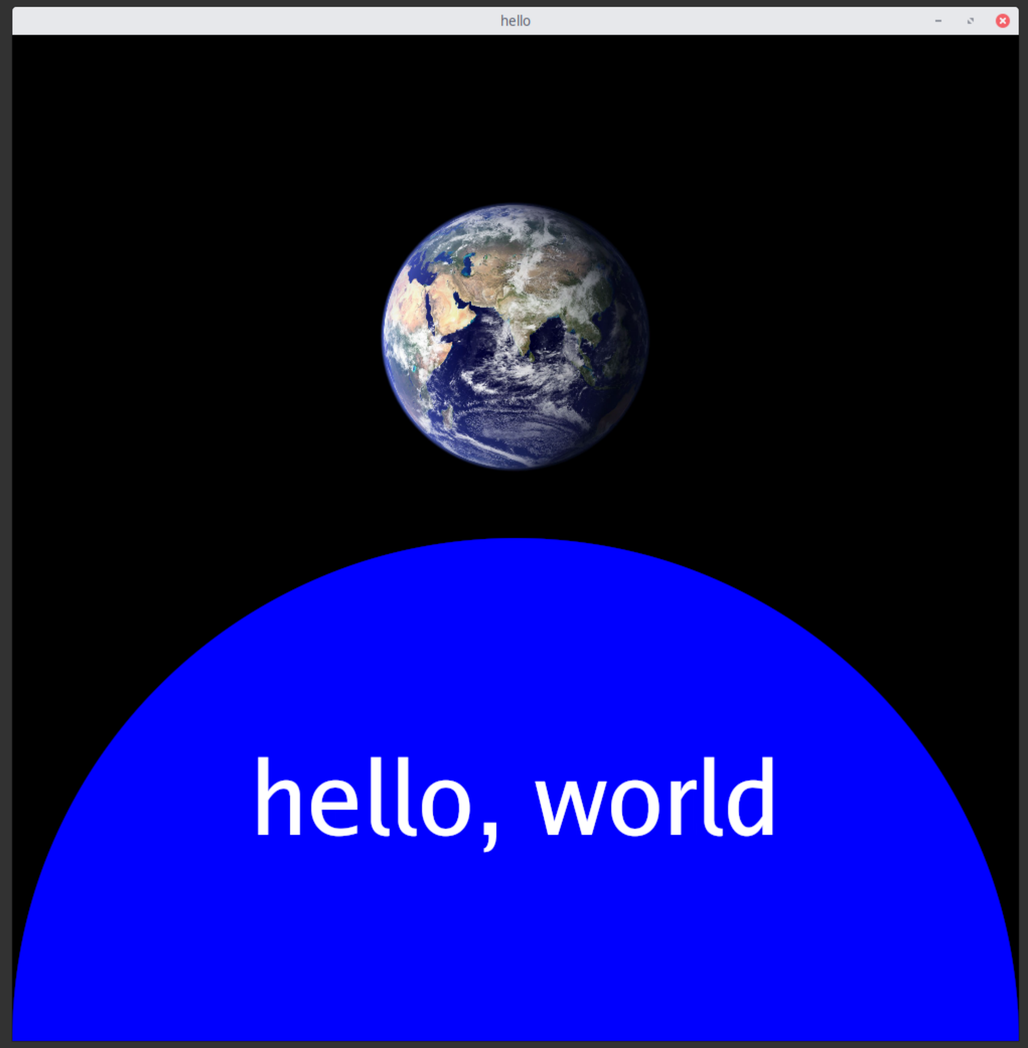
Make a new canvas	`NewCanvas (width, height float32, e system.FrameEvent) *Canvas`
Place an image from file	`Image (name string, x, y float32, w, h int, scale float32)`
Place an image from image.Image	`Img (im image.Image, x, y float32, w, h int, scale float32)`
Line from (x0,y0) to (x1,y1)	`Line (x0, y0, x1, y1, size float32, stroke color.RGBA)`
Circle centered at (x,y), radius r	`Circle (x, y, r float32, fill color.RGBA)`
Ellipse centered at (x,y), radii (w,h)	`Ellipse (x, y, w, h float32, fill color.RGBA)`
Square centered at (x,y)	`Square (x, y, w float32, fill color.RGBA)`
Rectangle centered at (x,y)	`Rect (x, y, w, h float32, fill color.RGBA)`
Arc at (x,y), radius r, angle a1–a2	`Arc (x, y, r float32, a1, a2 float64, fill color.RGBA)`
Cubic Bezier Curve	`CubeCurve (x, y, cx1, cy1, cx2, cy2, ex, ey float32, fill color.RGBA)`
Quadratic Bezier Curve	`Curve (x, y, cx, cy, ex, ey float32, fill color.RGBA)`
Filled Polygon	`Polygon (x, y []float32, fill color.RGBA)`
Left–Aligned Text	`Text (x, y, size float32, s string, fill color.RGBA)`
Centered Text	`CText (x, y, size float32, s string, fill color.RGBA)`
End–Aligned Text	`EText (x, y, size float32, s string, fill color.RGBA)`

Transformations and Convenience Functions

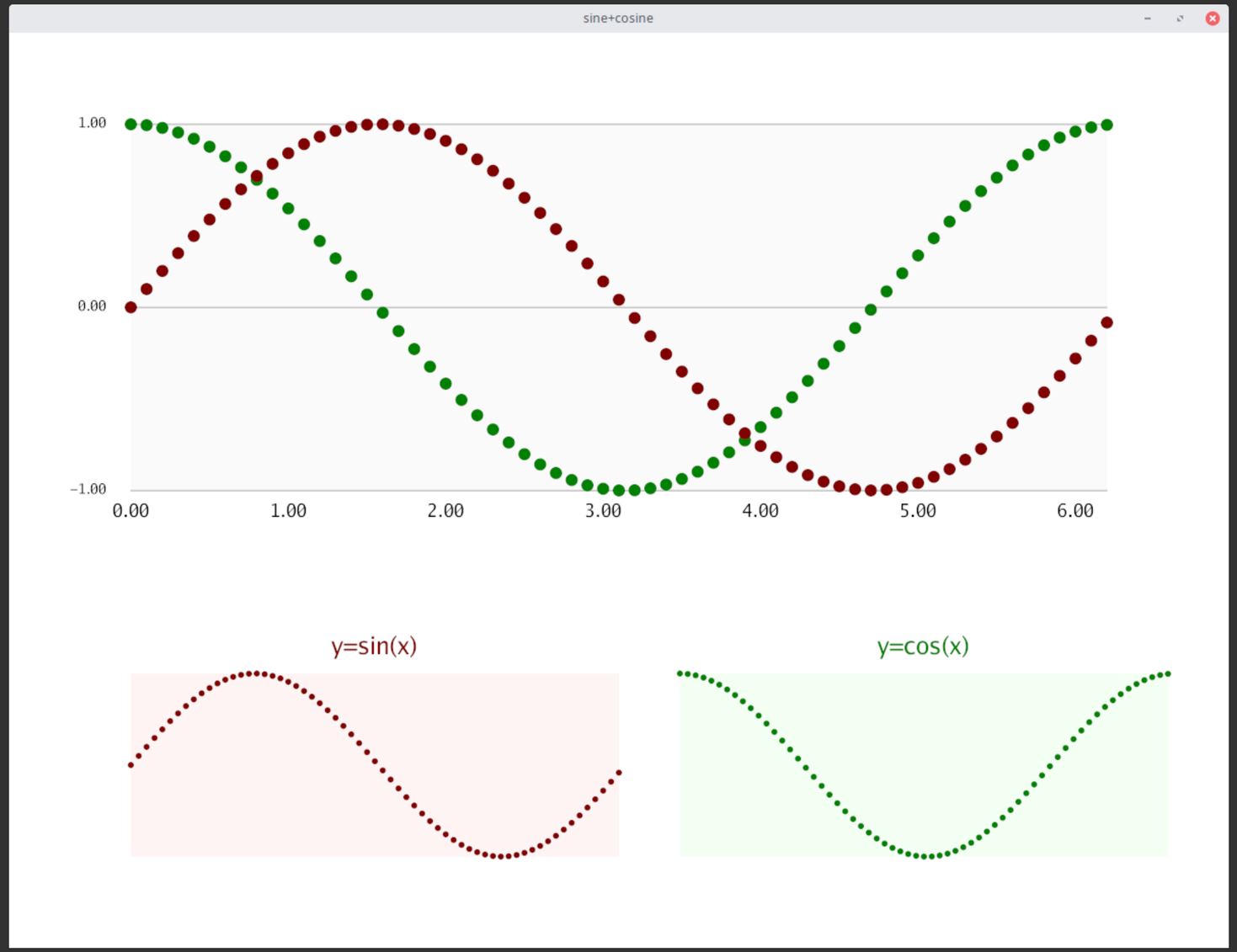
Rotate at (x,y) around angle	`Rotate (x, y, angle float32) op.StackOp`
Scale at (x,y) by factor	`Scale (x, y, factor float32) op.StackOp`
Shear at (x,y) by angle1, angle2	`Shear (x, y, ax, ay float32) op.StackOp`
Translate by (x,y)	`Translate (x, y float32) op.StackOp`
End Transformation	`EndTransform(stack op.StackOp)`
Map one range to another	`MapRange (value, low1, high1, low2, high2 float64) float64`
Show annotated coordinates	`Coord (x, y, size float32, s string, fill color.RGBA)`
Set the background color	`Background (fill color.RGBA)`
Show a grid	`Grid (x, y, w, h, size, interval float32, linecolor color.RGBA)`
Polar to Cartesian (radians)	`Polar (cx, cy, r, theta float32) (float32, float32)`
Polar to Cartesian (degrees)	`PolarDegrees(cx, cy, r, theta float32) (float32, float32)`

giocanvas hello, world

```
package main

import (
    "gioui.org/app"
    "gioui.org/io/system"
    "gioui.org/unit"
    gc "github.com/ajstarks/giocanvas"
)

func hello(title string, width, height float32) {
    win := app.NewWindow(app.Title(title), app.Size(unit.Px(width), unit.Px(height)))
    for e := range win.Events() {
        switch e := e.(type) {
        case system.FrameEvent:
            canvas := gc.NewCanvas(width, height, e)
            canvas.Background(gc.ColorLookup("black"))
            canvas.Circle(50, 0, 50, gc.ColorLookup("blue"))
            canvas.TextMid(50, 20, 10, "hello, world", gc.ColorLookup("white"))
            canvas.CenterImage("earth.jpg", 50, 70, 1000, 1000, 30)
            e.Frame(canvas.Context.Ops)
        }
    }
}

func main() {
    go hello("hello", 1000, 1000)
    app.Main()
}
```



giocanvas/chart



giocanvas/chart data structures

```
// NameValue is a name,value pair
type NameValue struct {
    label string
    note  string
    value float64
}

// ChartBox holds the essential data for making a chart
type ChartBox struct {
    Title                   string
    Data                    []NameValue
    Color                   color.RGBA
    Top, Bottom, Left, Right float64
    Minvalue, Maxvalue      float64
    Zerobased               bool
}
```

methods on *ChartBox

Read data int ChartBox	`func DataRead(r io.Reader) (ChartBox, error)`
Bar Chart	`Bar (canvas *gc.Canvas, size float64)`
Horizontal Bar Chart	`HBar (canvas *gc.Canvas, size, linespacing, textsize float64)`
Line Chart	`Line (canvas *gc.Canvas, size float64)`
Area Chart	`Area (canvas *gc.Canvas, opacity float64)`
Scatter Chart	`Scatter (canvas *gc.Canvas, size float64)`
Centered Title	`CTitle (canvas *gc.Canvas, size, offset float64)`
Chart Frame	`Frame (canvas *gc.Canvas, op float64)`
X Axis Label	`Label (canvas *gc.Canvas, size float64, n int)`
Y axis	`YAxis (canvas *gc.Canvas, size, min, max, step float64, format string, gridlines bool)`

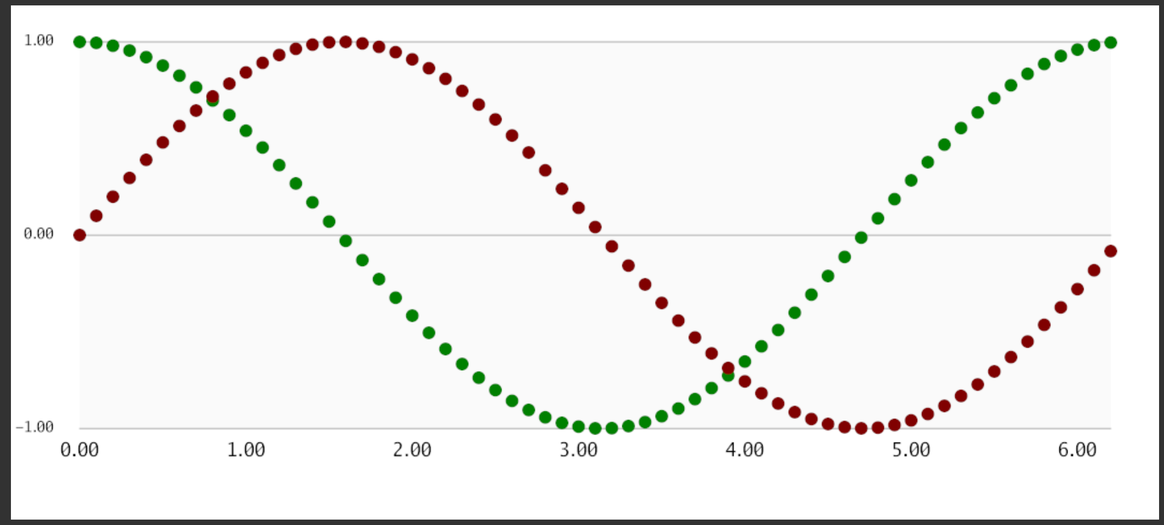
giocanvas/chart: read data

```
sr, err := os.Open("sin.d")
if err != nil {
    return err
}
cr, err := os.Open("cos.d")
if err != nil {
    return err
}
sine, err := chart.DataRead(sr)
if err != nil {
    return err
}
cosine, err := chart.DataRead(cr)
if err != nil {
    return err
}
```

```
# y=sin(x)              # y=cos(x)
0.00    0.0000          0.00    1.0000
0.10    0.0998          0.10    0.9950
0.20    0.1987          0.20    0.9801
0.30    0.2955          0.30    0.9553
0.40    0.3894          0.40    0.9211
0.50    0.4794          0.50    0.8776
0.60    0.5646          0.60    0.8253
0.70    0.6442          0.70    0.7648
0.80    0.7174          0.80    0.6967
0.90    0.7833          0.90    0.6216
1.00    0.8415          1.00    0.5403
...                     ...
6.00    -0.2794         6.00    0.9602
6.10    -0.1822         6.10    0.9833
6.20    -0.0831         6.20    0.9965
```

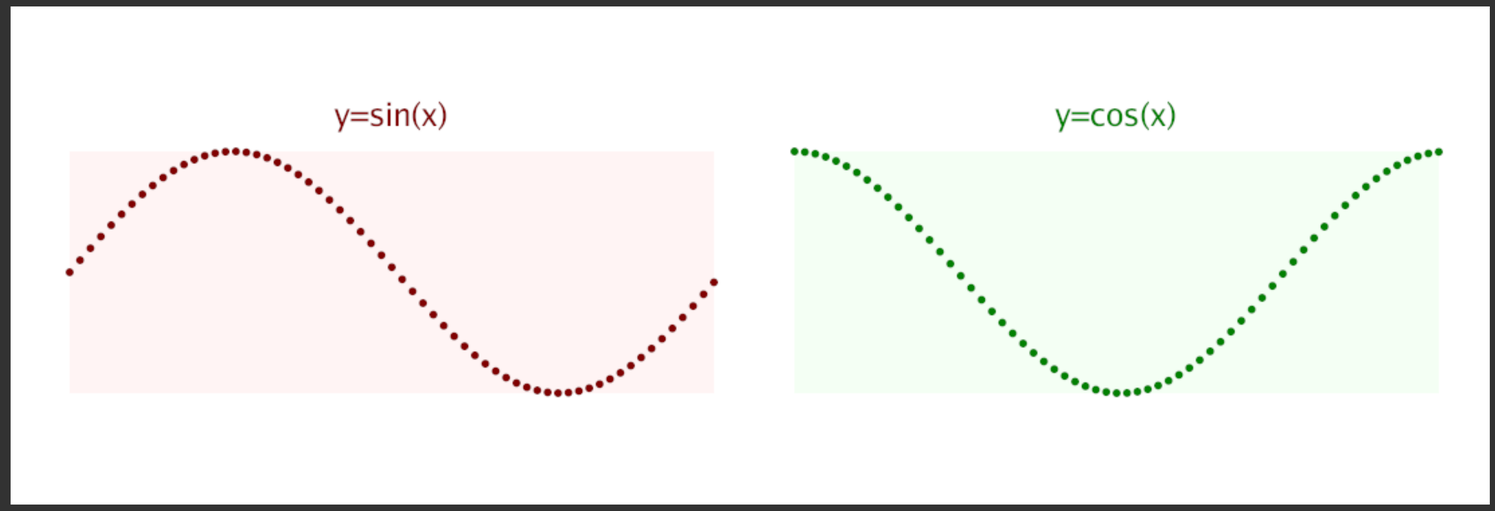
giocanvas/chart: composite charts

```
cosine.Zerobased = false
sine.Zerobased = false
cosine.Frame(canvas, 5)
sine.Label(canvas, 1.5, 10)
cosine.YAxis(canvas, 1.2, -1.0, 1.0, 1.0, "%0.2f", true)
cosine.Color = color.RGBA{0, 128, 0, 255}
sine.Color = color.RGBA{128, 0, 0, 255}
cosine.Scatter(canvas, 0.5)
sine.Scatter(canvas, 0.5)
```

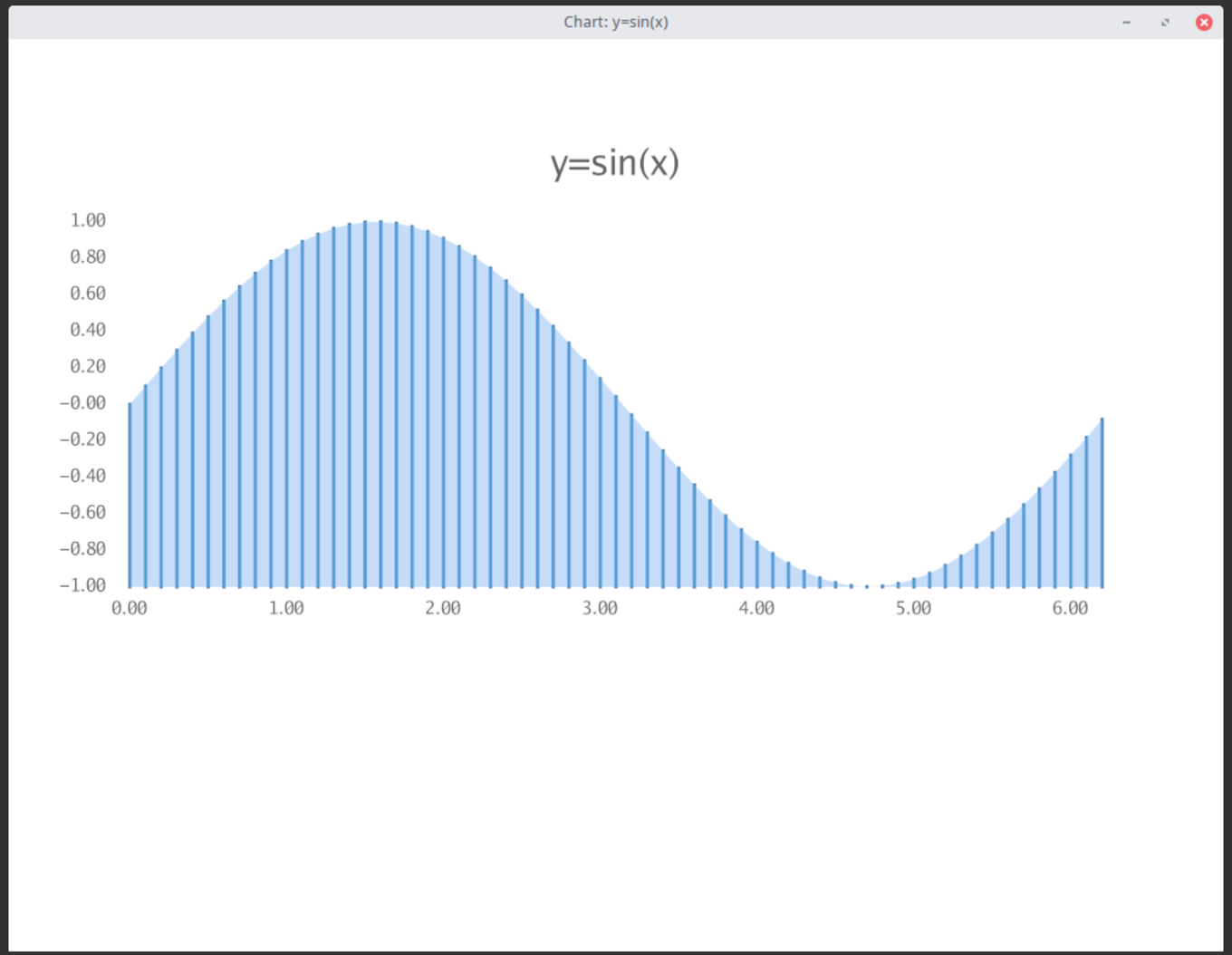


giocanvas/chart: side by side

```
sine.Left = 10
sine.Right = sine.Left + 40
sine.Top, cosine.Top = 30, 30
sine.Bottom, cosine.Bottom = 10, 10

sine.CTitle(canvas, 2, 2)
sine.Frame(canvas, 10)
sine.Scatter(canvas, 0.25)

offset := 45.0
cosine.Left = sine.Left + offset
cosine.Right = sine.Right + offset

cosine.CTitle(canvas, 2, 2)
cosine.Frame(canvas, 10)
cosine.Scatter(canvas, 0.25)
```

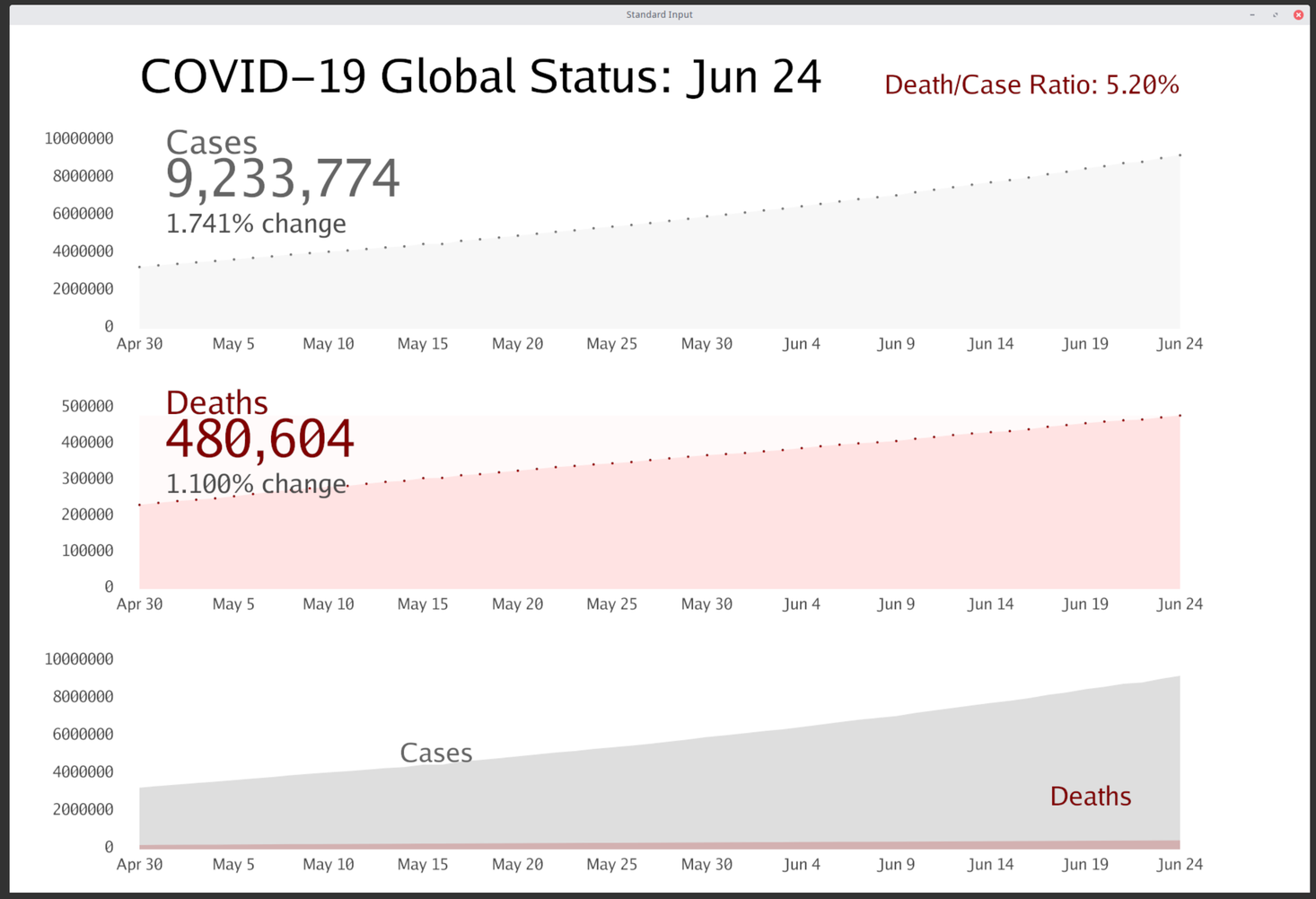


gchart




```
gchart -area -bar -barwidth=0.2 -zero=f -xlabel=10 -yrange=-1,1,0.2 -yfmt=%.2f -h 750 sin.d
```

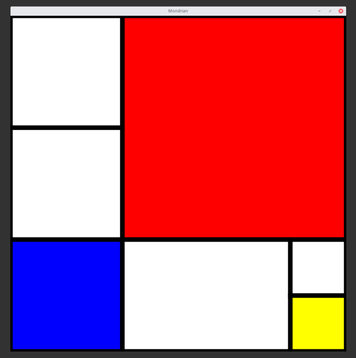
gcdeck: deck viewer

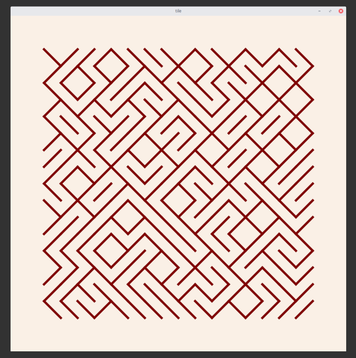


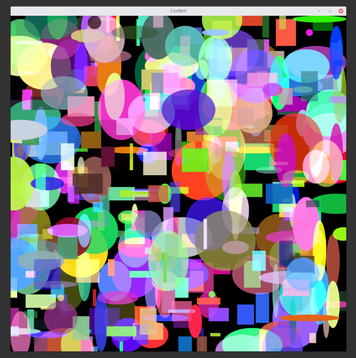

```
c19chart -cyr=0,1e7,2e6 -dyr=0,5e5,1e5 | gcdeck -pagesize 1800,1200
```

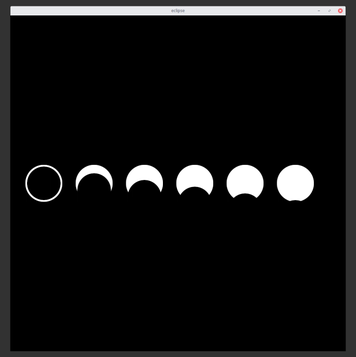
Clients

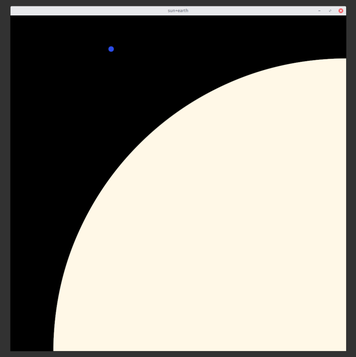

hello
hello, world

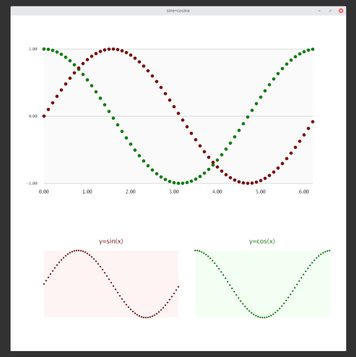

Mondrian

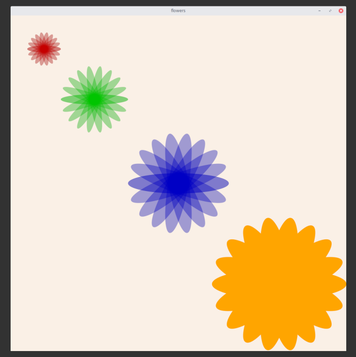

Mit

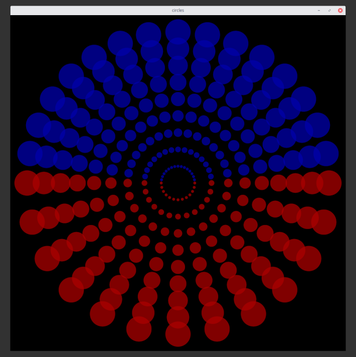

Cookies

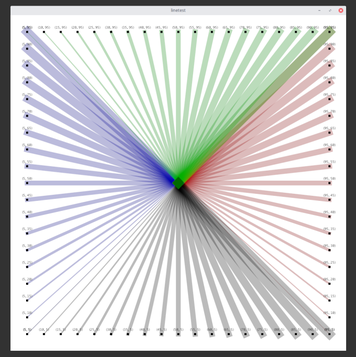

eclipse

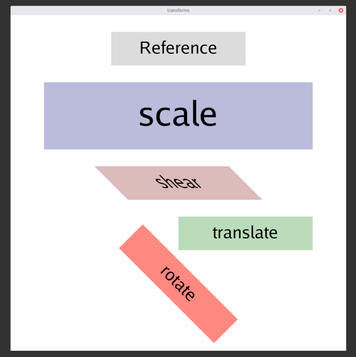

sun+earth

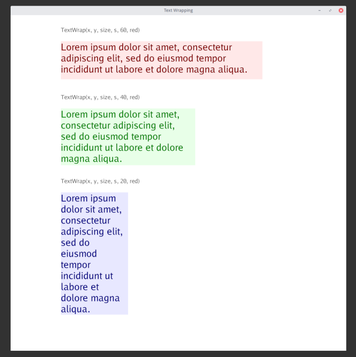

sine+cosine
1.00
0.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
y=sin(x)
y=cos(x)


flowers


circles


lineset


transforms
Reference
scale
shear
translate
rotate


Text Wrapping
TextWrap(x, y, size, s, 68, red)
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
TextWrap(x, y, size, s, 48, red)
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
TextWrap(x, y, size, s, 28, red)
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

go get it

github.com/ajstarks/giocanvas