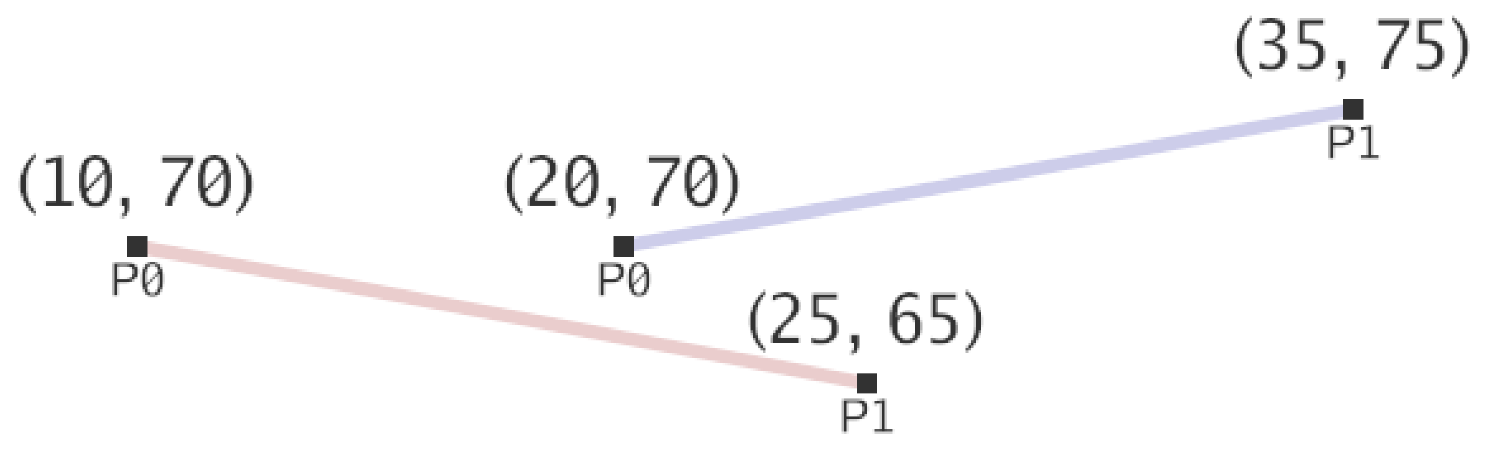
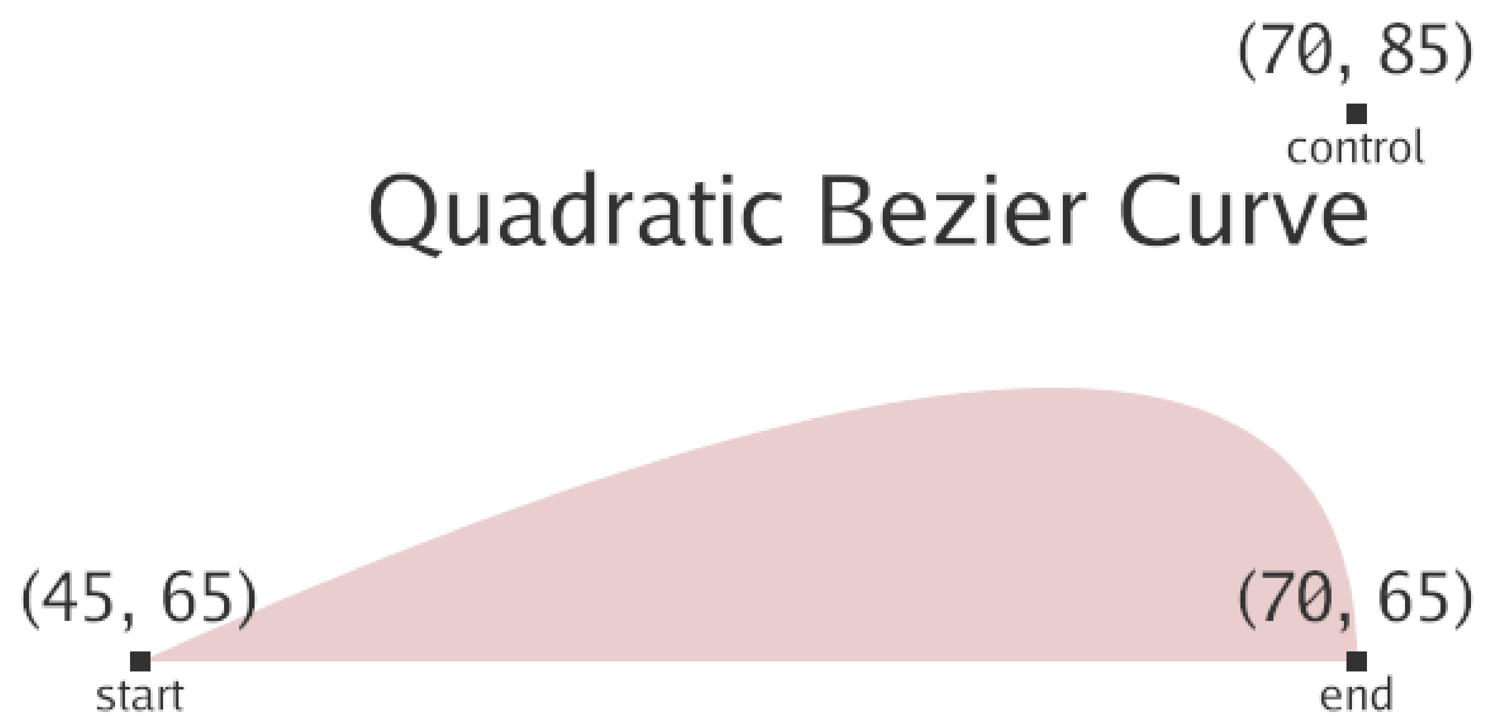
Canvas API

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

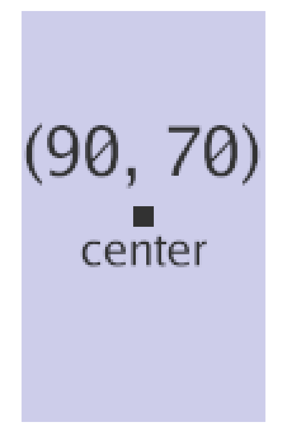
Line



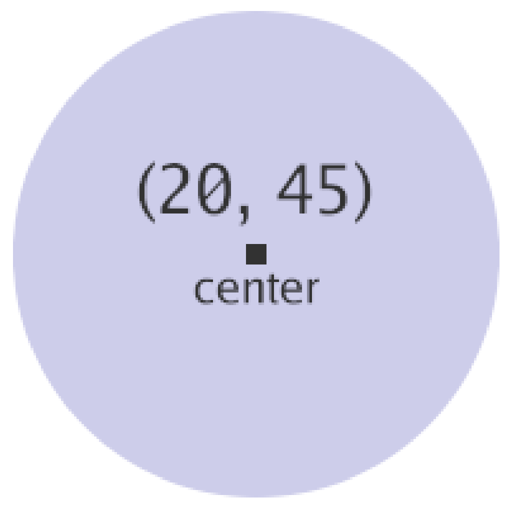
Quadratic Bezier Curve



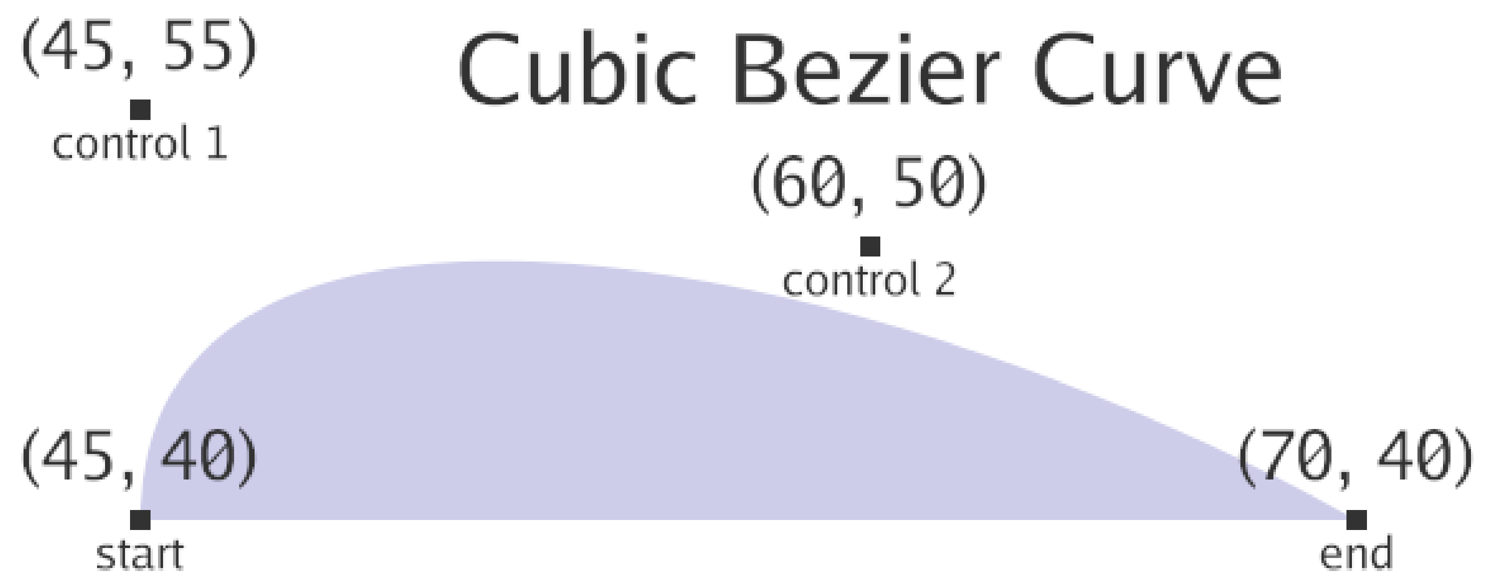
Rectangle



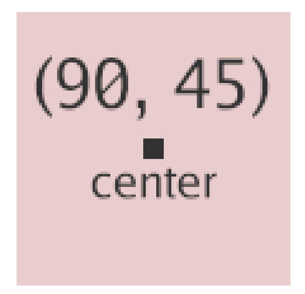
Circle



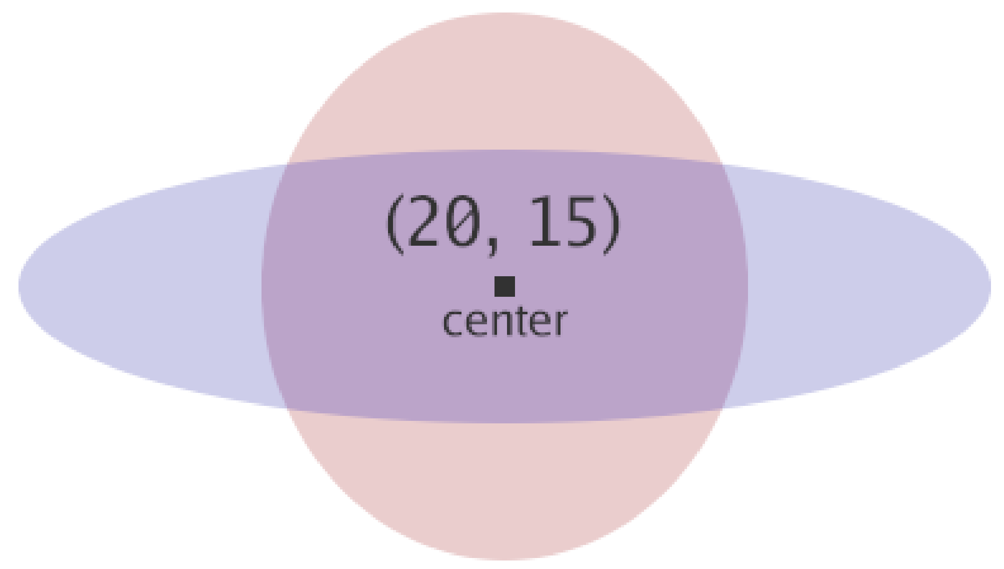
Cubic Bezier Curve



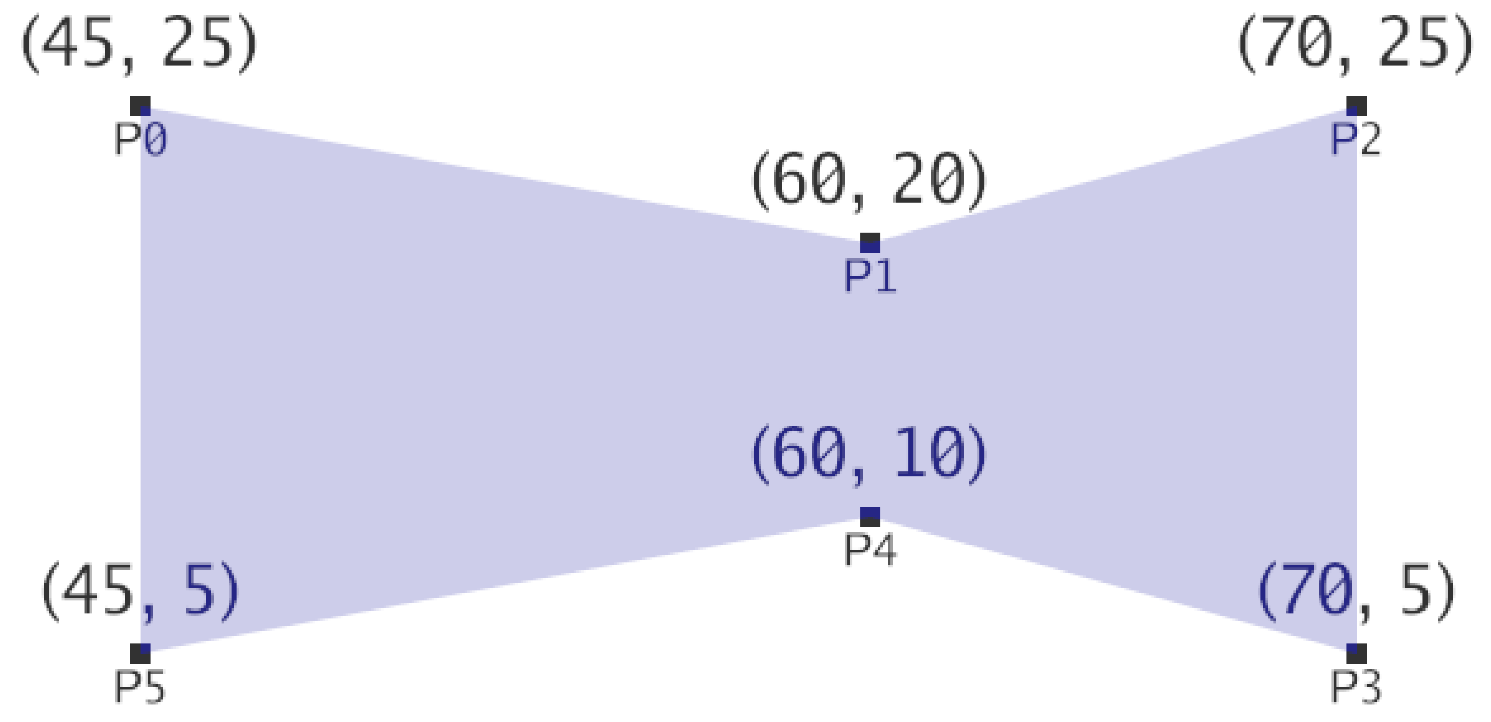
Square



Ellipse



Polygon



Image

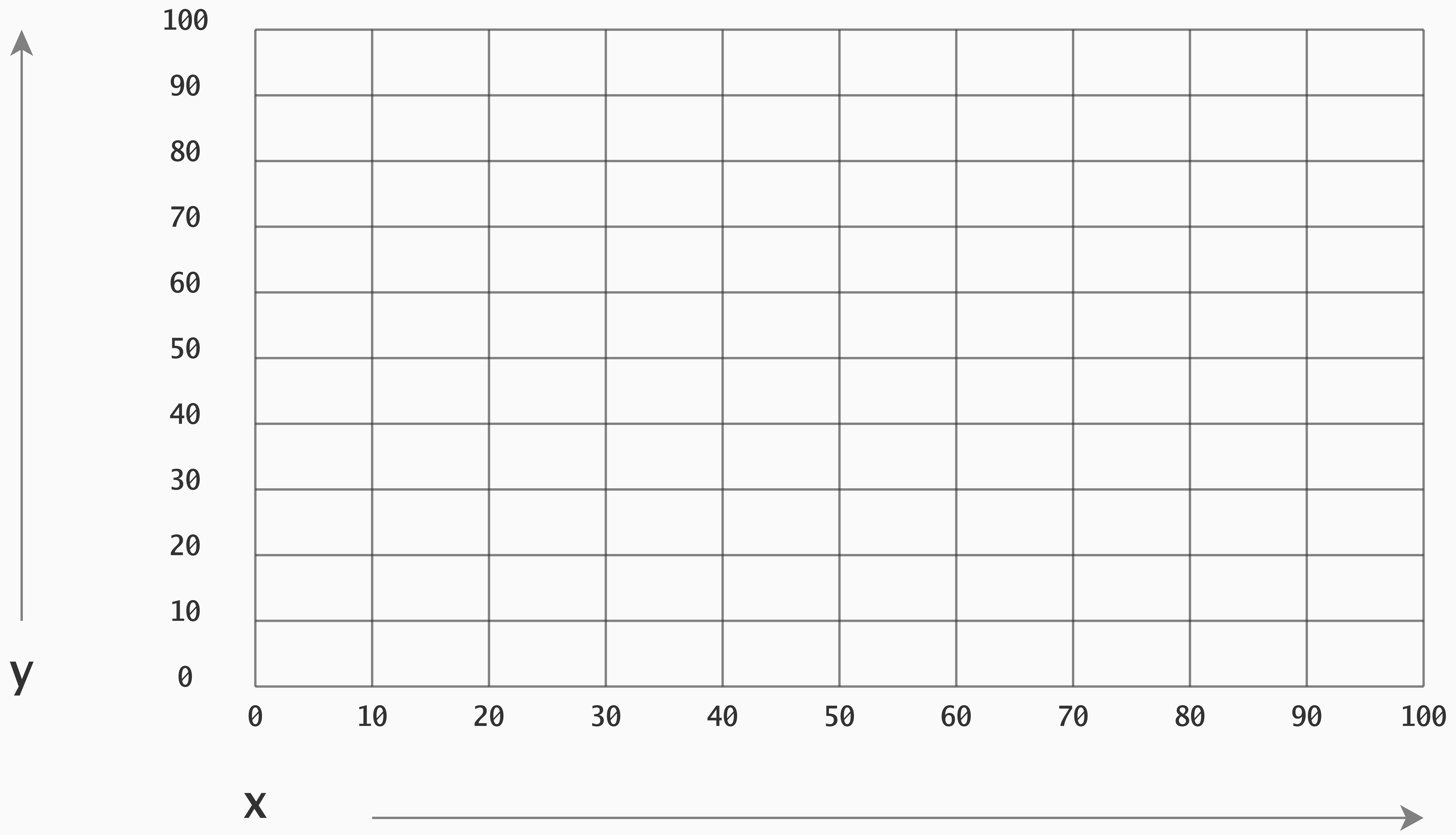
Motivation

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.

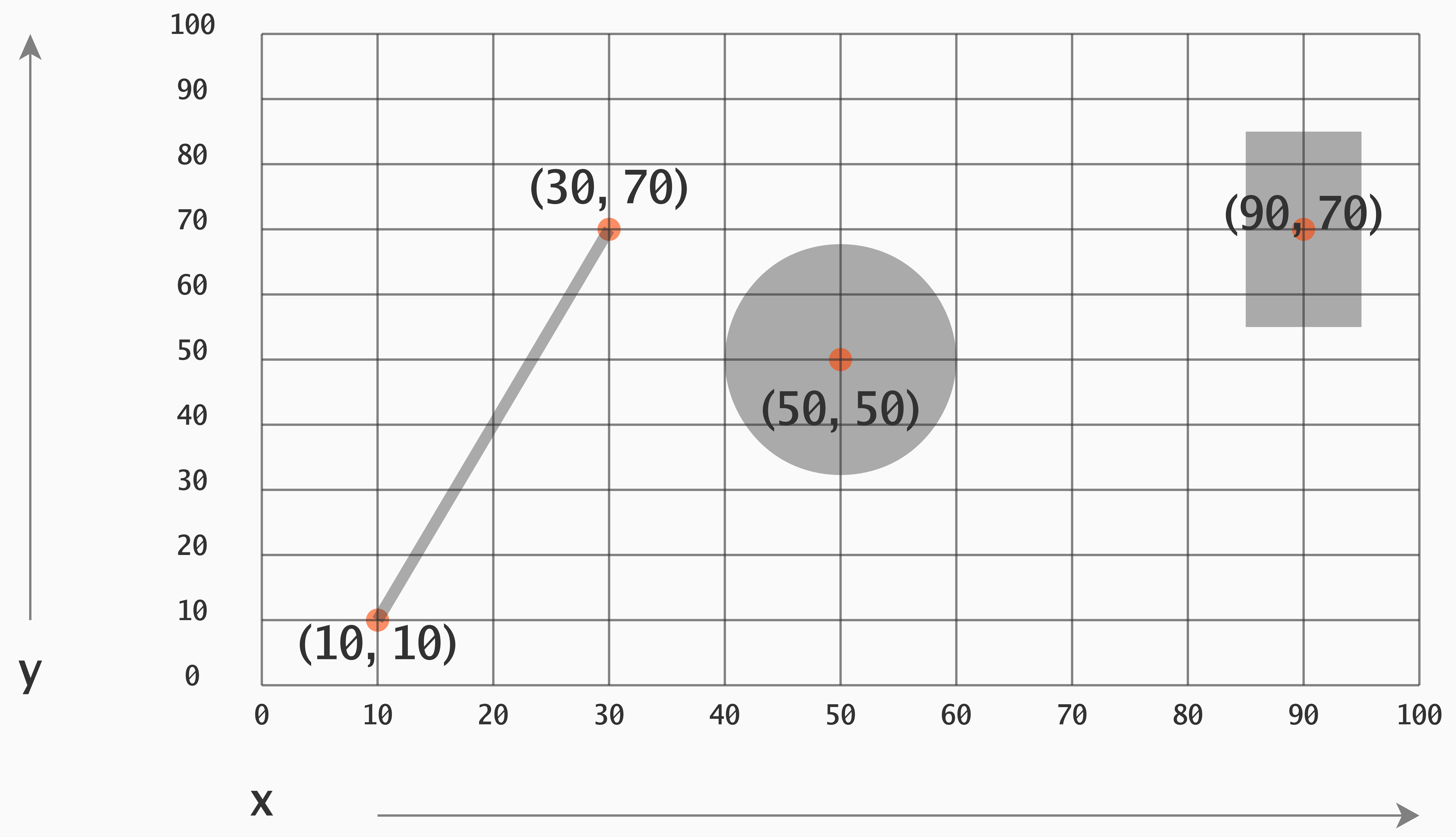
Use Cases: Information Displays, Data Visualization, Creative Coding, Presentations

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

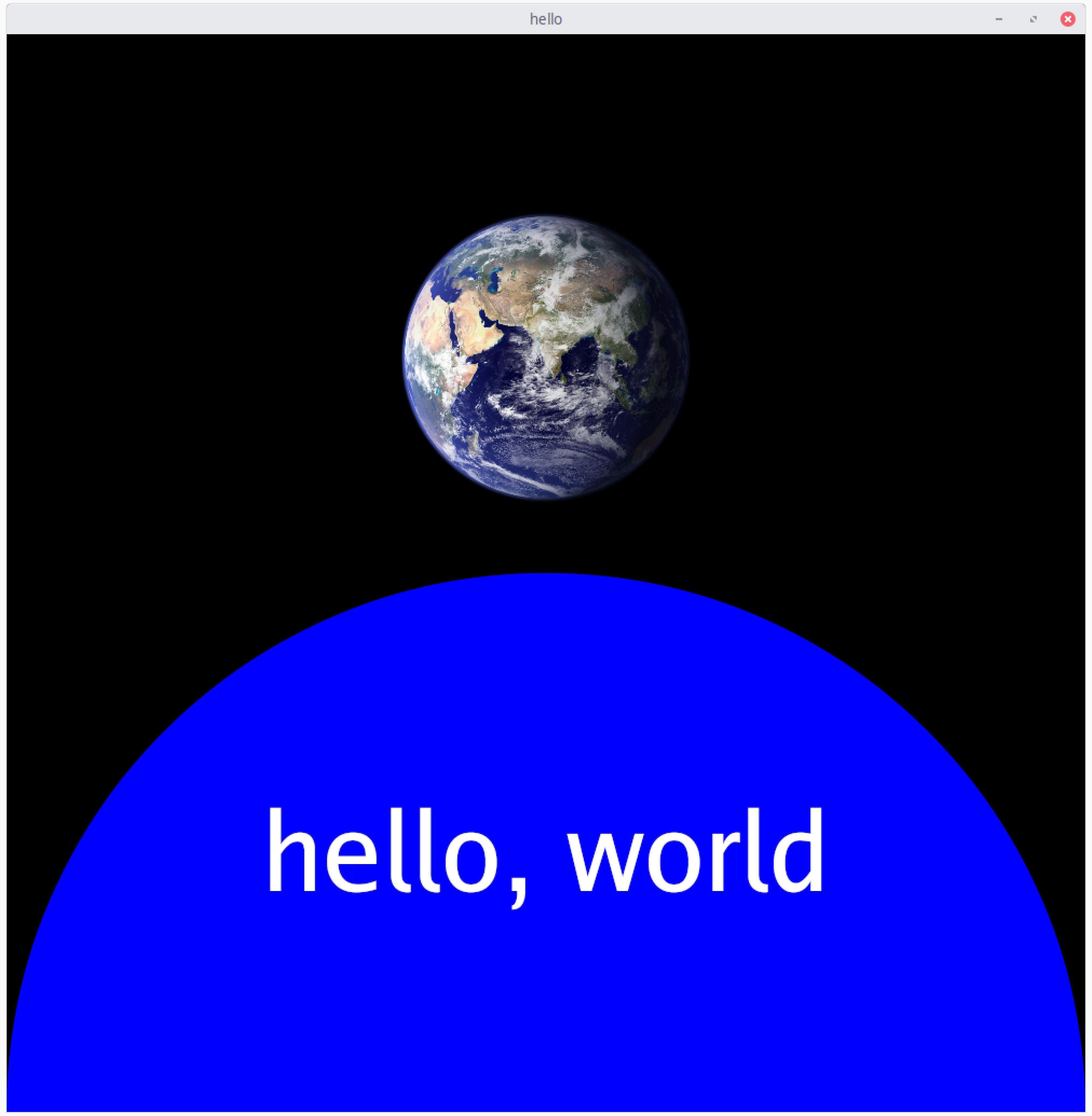
Make a new canvas	`NewCanvas (width, height float32, e system.FrameEvent) *Canvas`
Place an image from file	`Image (name string, x, y float32, w, h int, scale float32)`
Place an image from image.Image	`Img (im image.Image, x, y float32, w, h int, scale float32)`
Line from (x0,y0) to (x1,y1)	`Line (x0, 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)	`CenterRect (x, y, w, h float32, fill color.RGBA)`
Rectangle upper–left at (x,y)	`CornerRect (x, y, w, h float32, 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

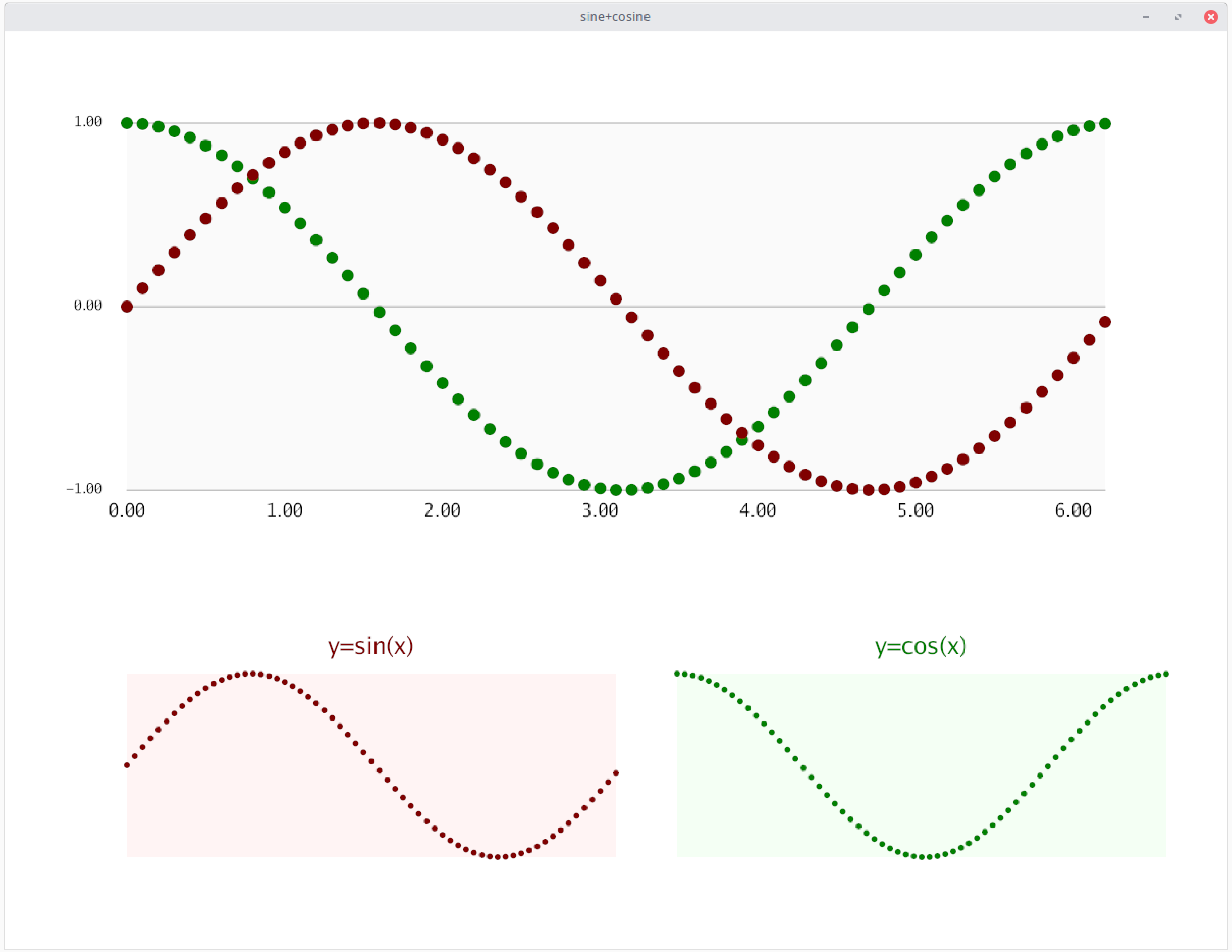
Rotate at (x,y) around angle	`Rotate (x, y, angle float32) op.StackOp`
Scale at (x,y) by factor	`Scale (x, y, factor float32) op.StackOp`
Shear at (x,y) by angle1, angle2	`Shear (x, y, ax, ay float32) op.StackOp`
Translate by (x,y)	`Translate (x, y float32) op.StackOp`
End Transformation	`EndTransform(stack 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.CenterRect(50, 50, 100, 100, 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

```go
// 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

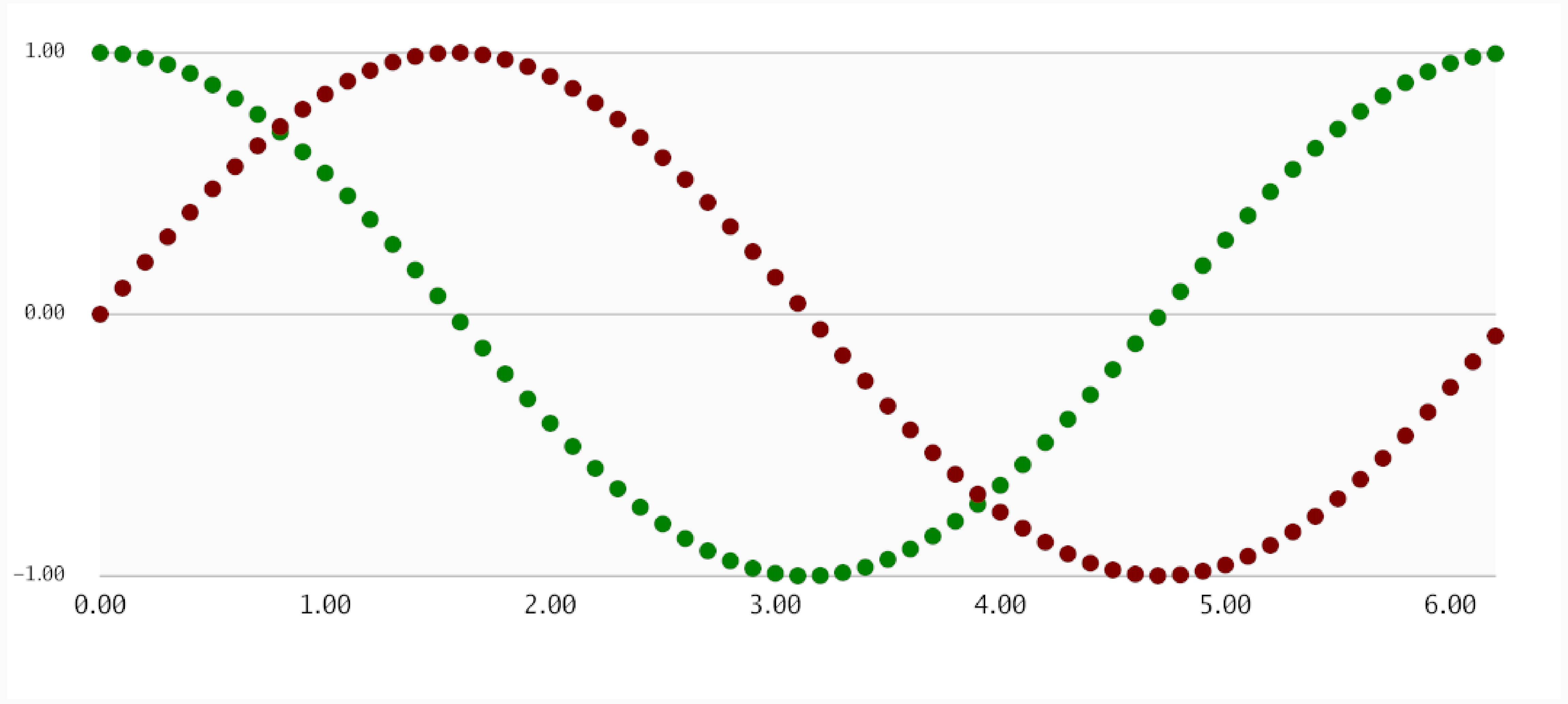
```go
sr, err := os.Open("sin.d")
if err != nil {
    return err
}
cr, err := os.Open("cos.d")
if err != nil {
    return err
}
sine, err := chart.DataRead(sr)
if err != nil {
    return err
}
cosine, err := chart.DataRead(cr)
if err != nil {
    return err
}
```

```
# y=sin(x)
0.00    0.0000
0.10    0.0998
0.20    0.1987
0.30    0.2955
0.40    0.3894
0.50    0.4794
0.60    0.5646
0.70    0.6442
0.80    0.7174
0.90    0.7833
1.00    0.8415
...
6.00    -0.2794
6.10    -0.1822
6.20    -0.0831
```

```
# y=cos(x)
0.00    1.0000
0.10    0.9950
0.20    0.9801
0.30    0.9553
0.40    0.9211
0.50    0.8776
0.60    0.8253
0.70    0.7648
0.80    0.6967
0.90    0.6216
1.00    0.5403
...
6.00    0.9602
6.10    0.9833
6.20    0.9965
```

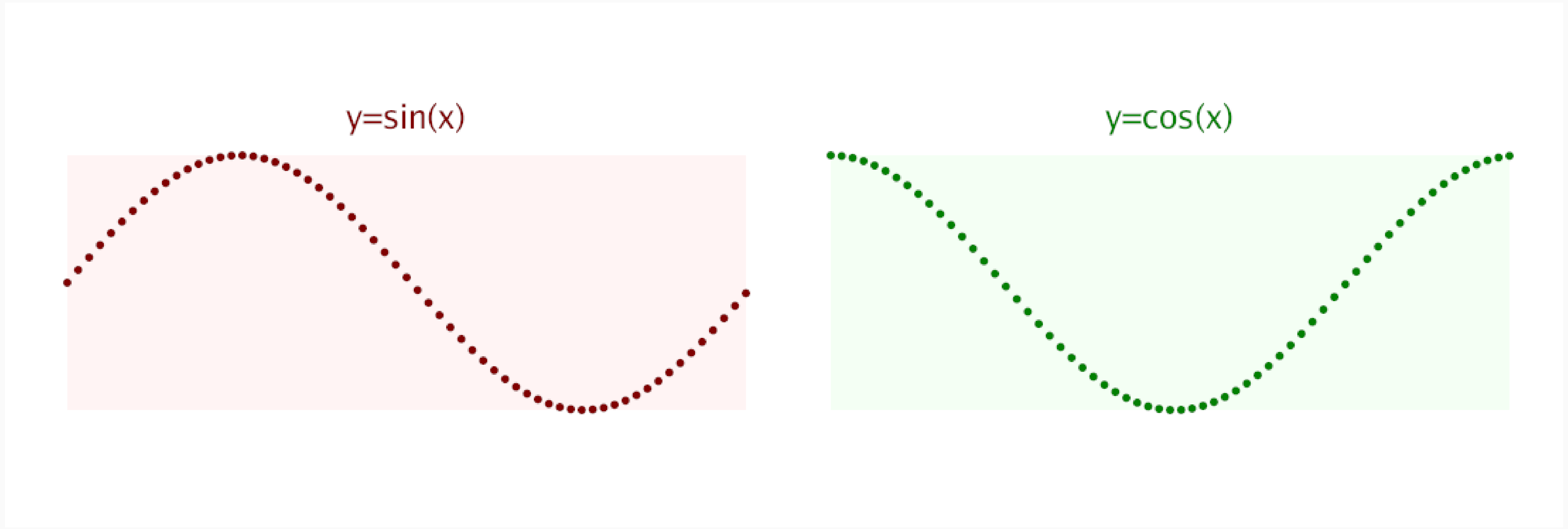
giocanvas/chart: composite charts

```
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)
```

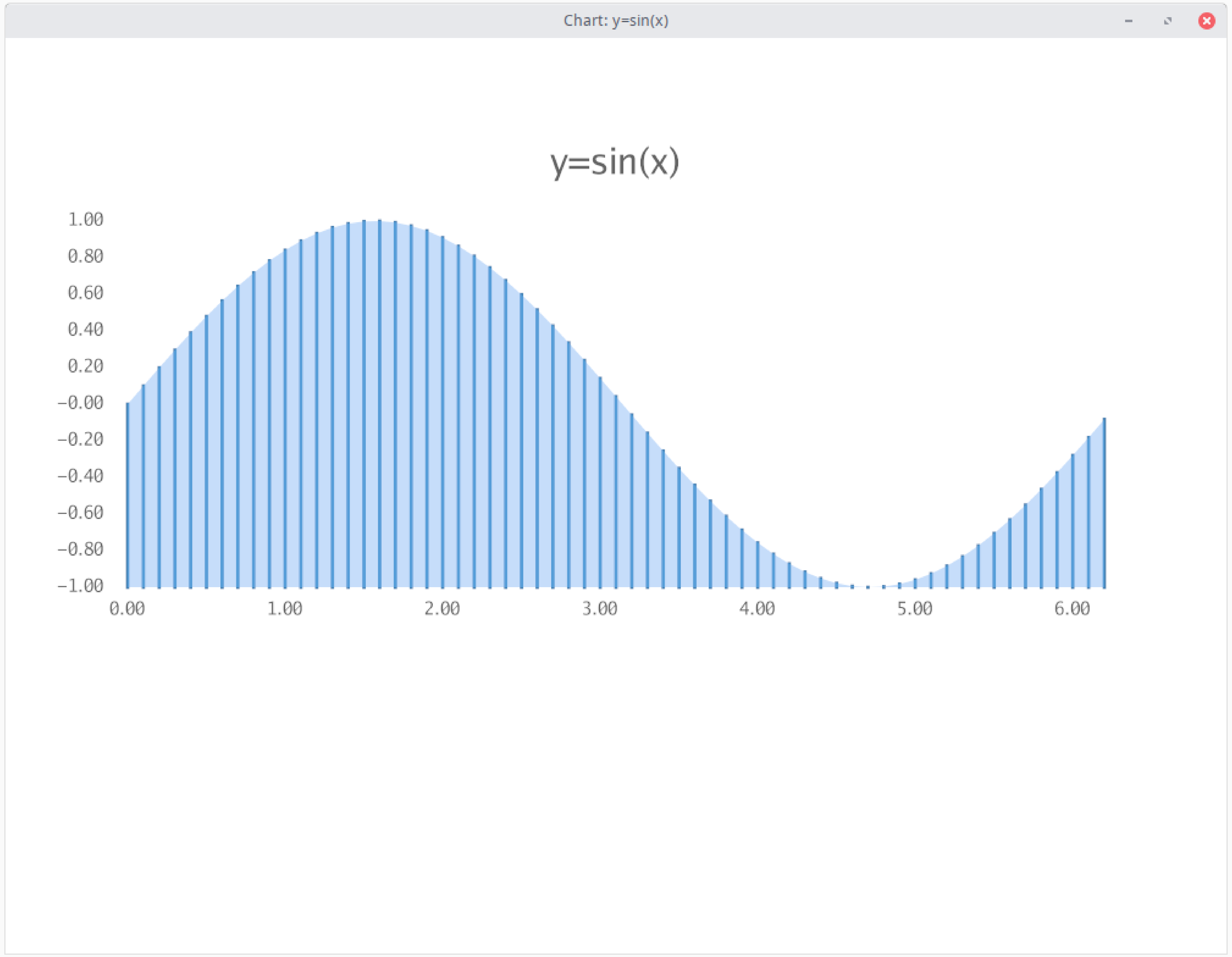


giocanvas/chart: side by side

```
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)
```

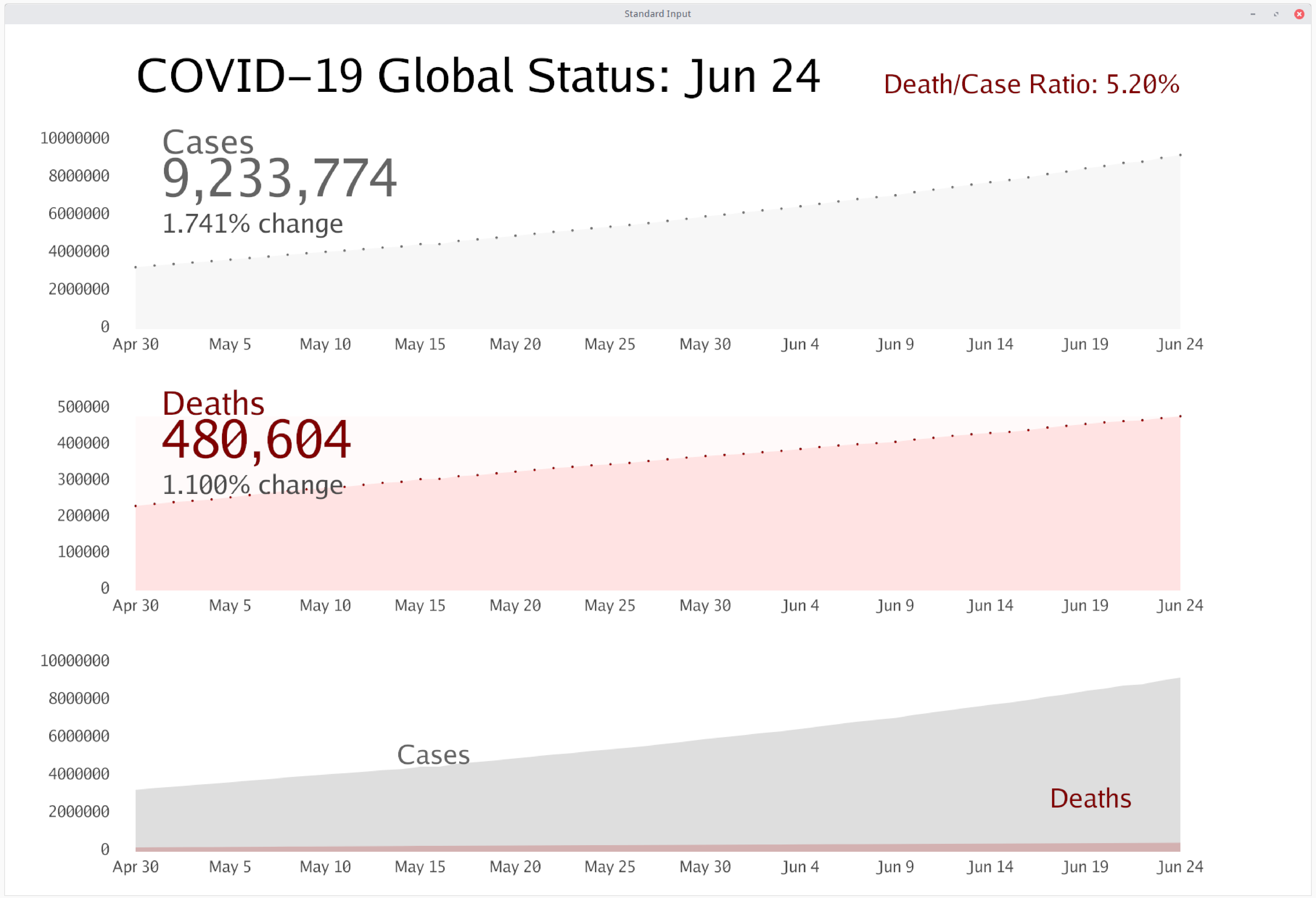


gchart



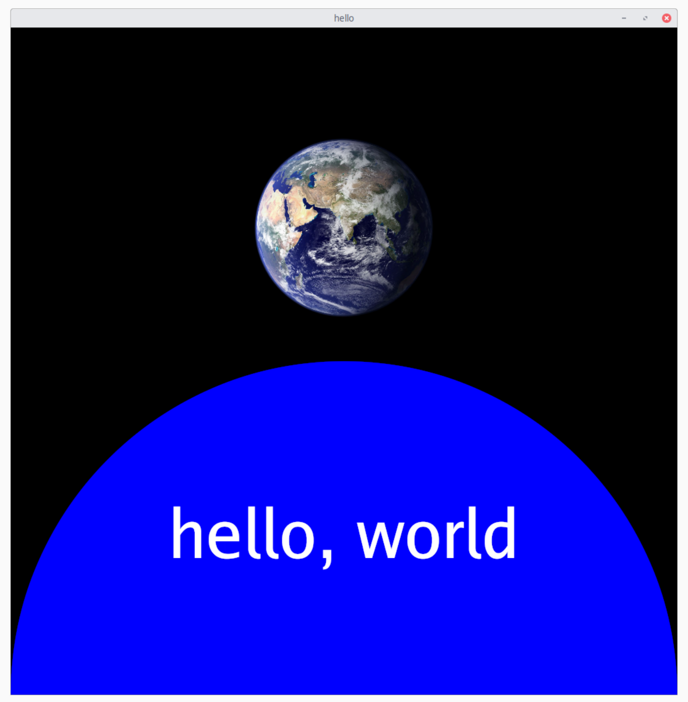
```
gchart -area -bar -barwidth=0.2 -zero=f -xlabel=10 -yrange=-1,1,0.2 -yfmt=%.2f -h 750 sin.d
```

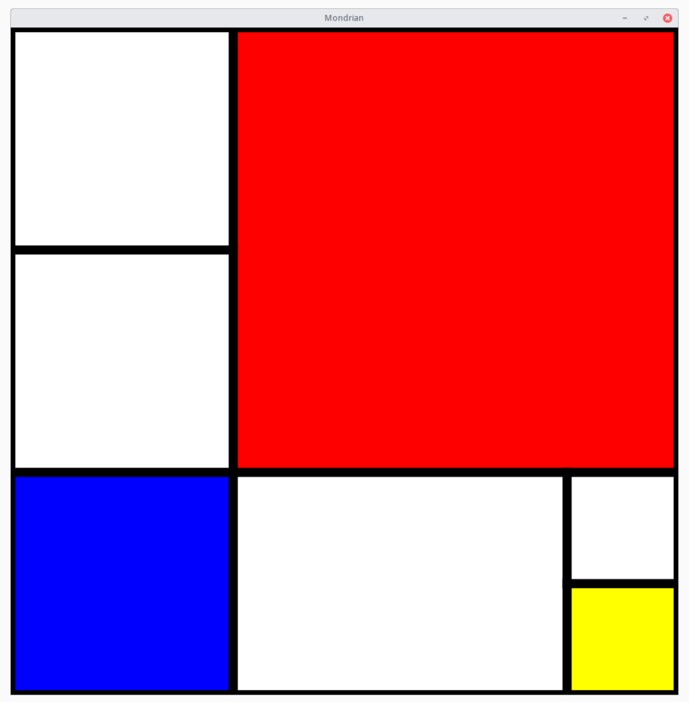
gcdeck: deck viewer

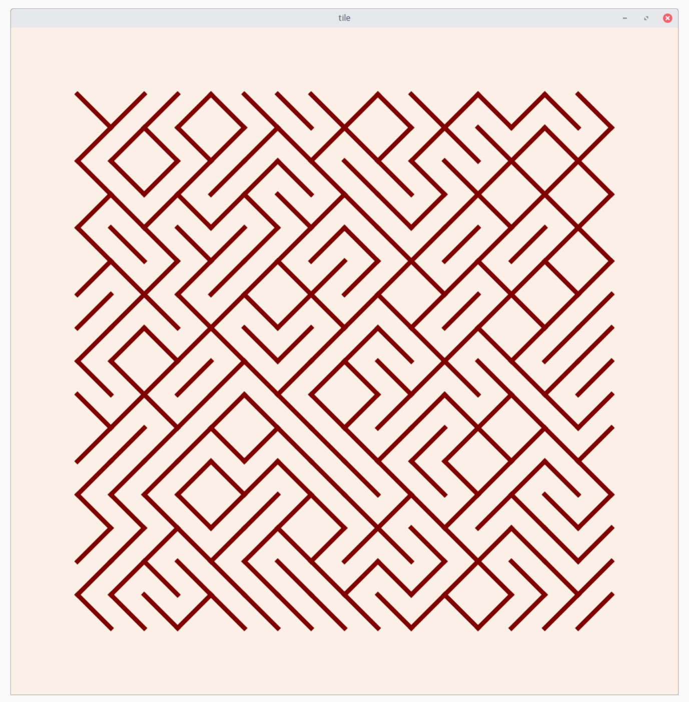


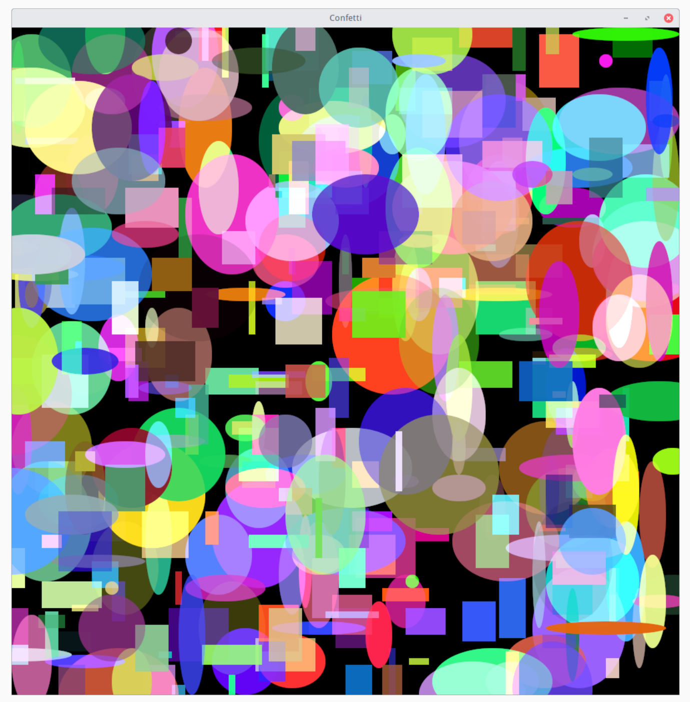
```
c19chart -cyr=0,1e7,2e6 -dyr=0,5e5,1e5 | gcdeck -pagesize 1800,1200
```

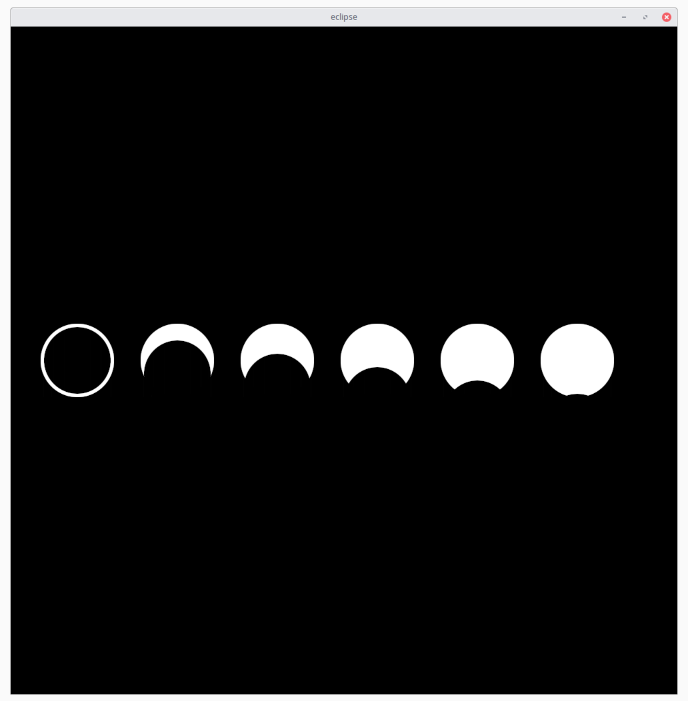
Clients

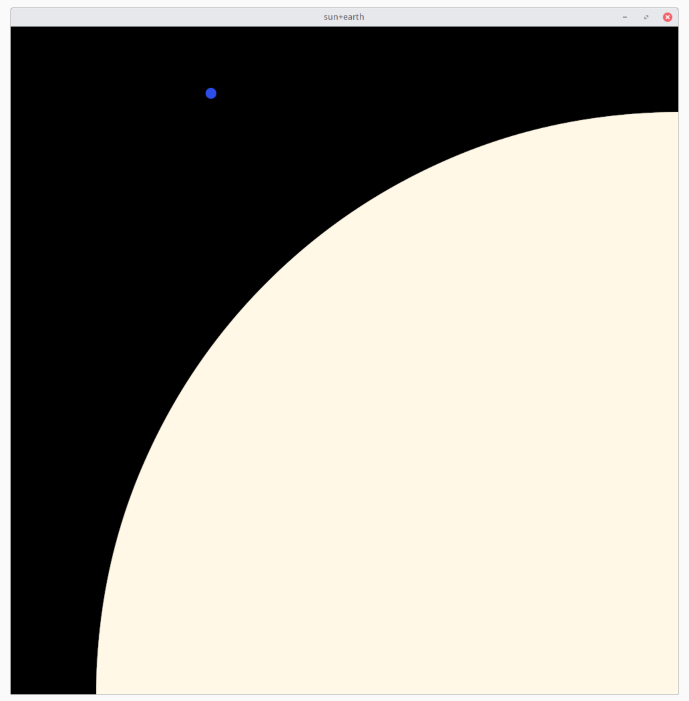


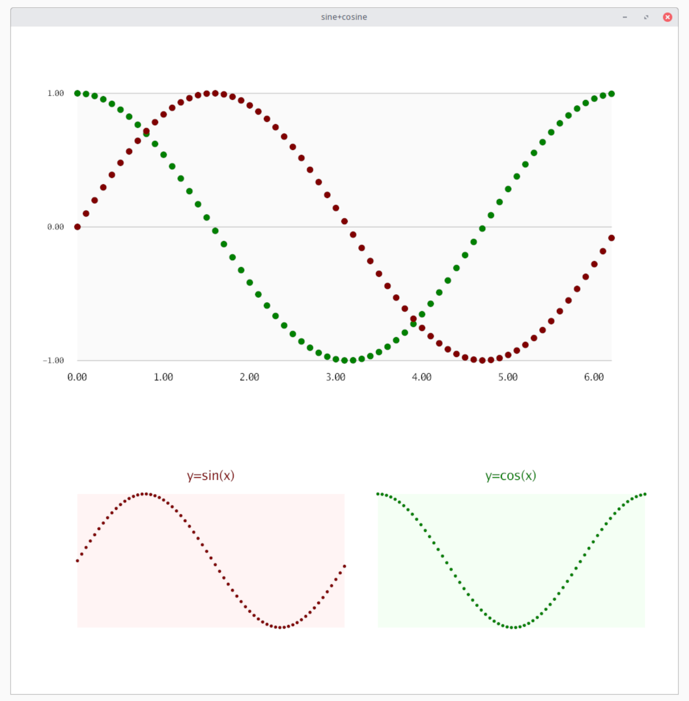


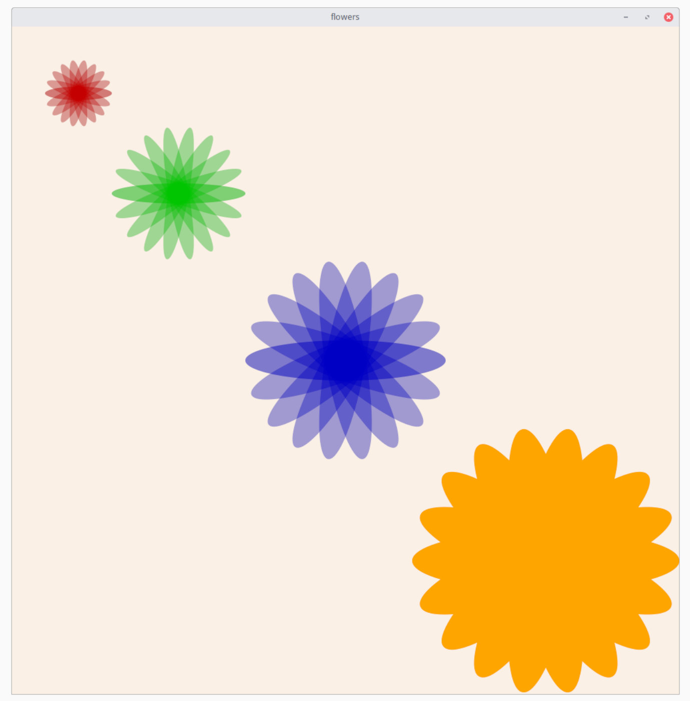


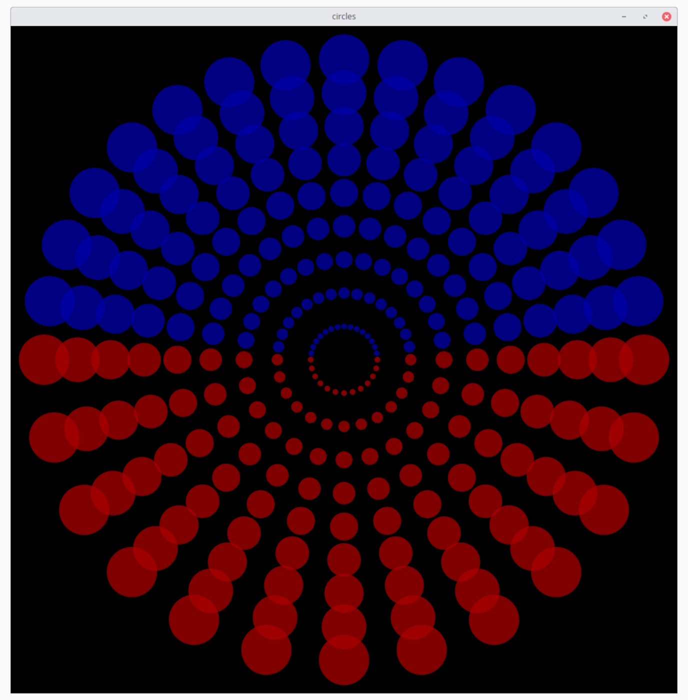


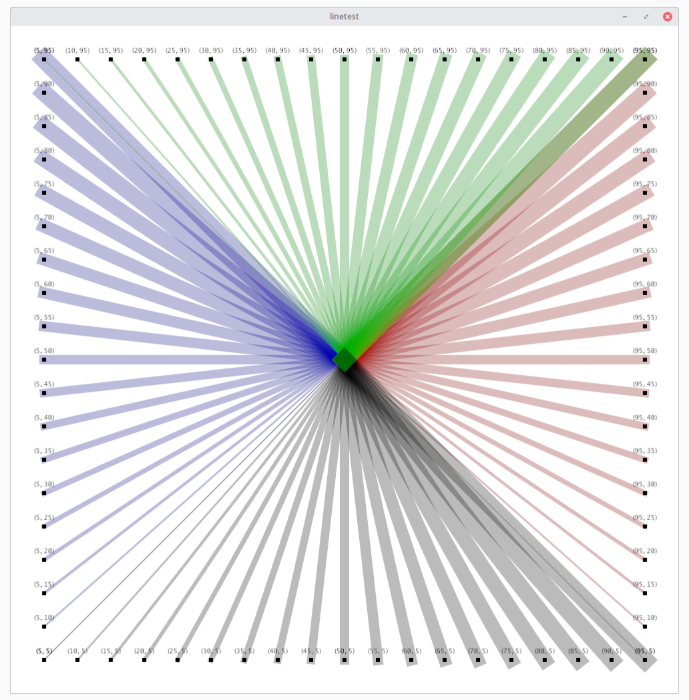


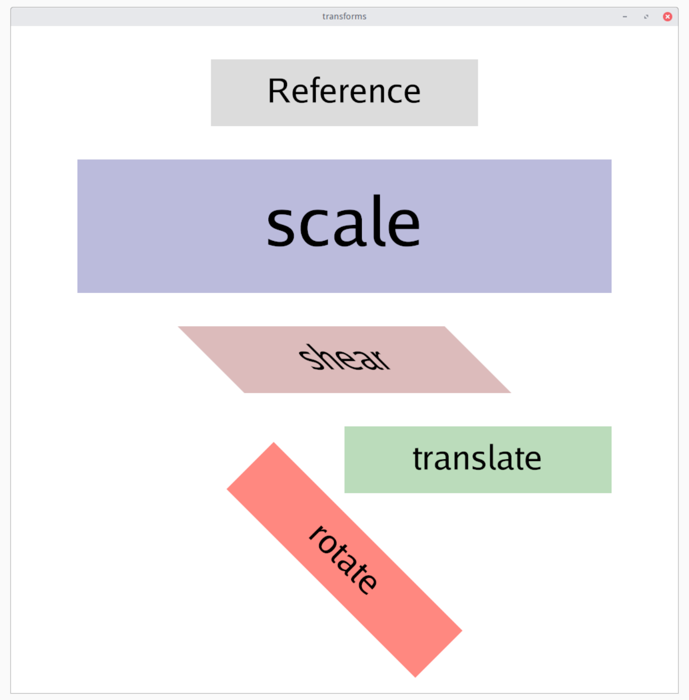


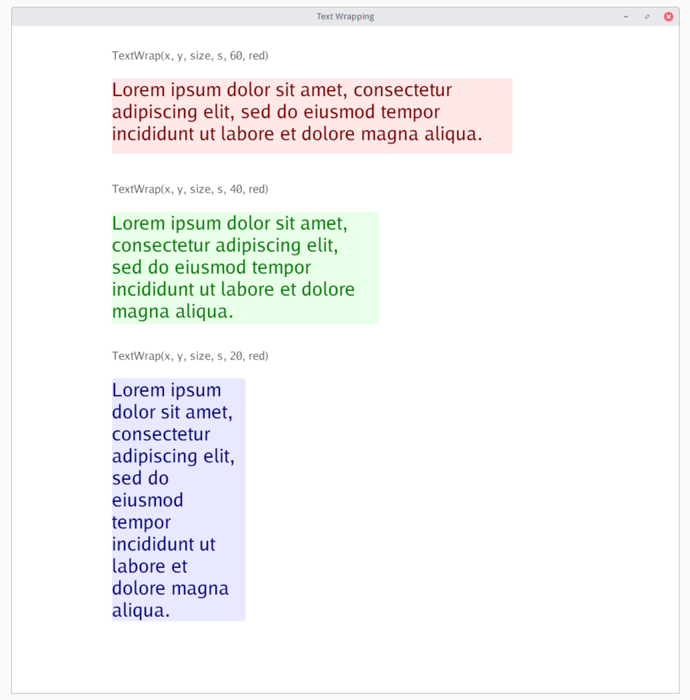












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TextWrap(x, y, size, s, 40, red)

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sed do eiusmod tempor
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magna aliqua.

TextWrap(x, y, size, s, 20, red)

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aliqua.

go get it

```
github.com/ajstarks/giocanvas
```