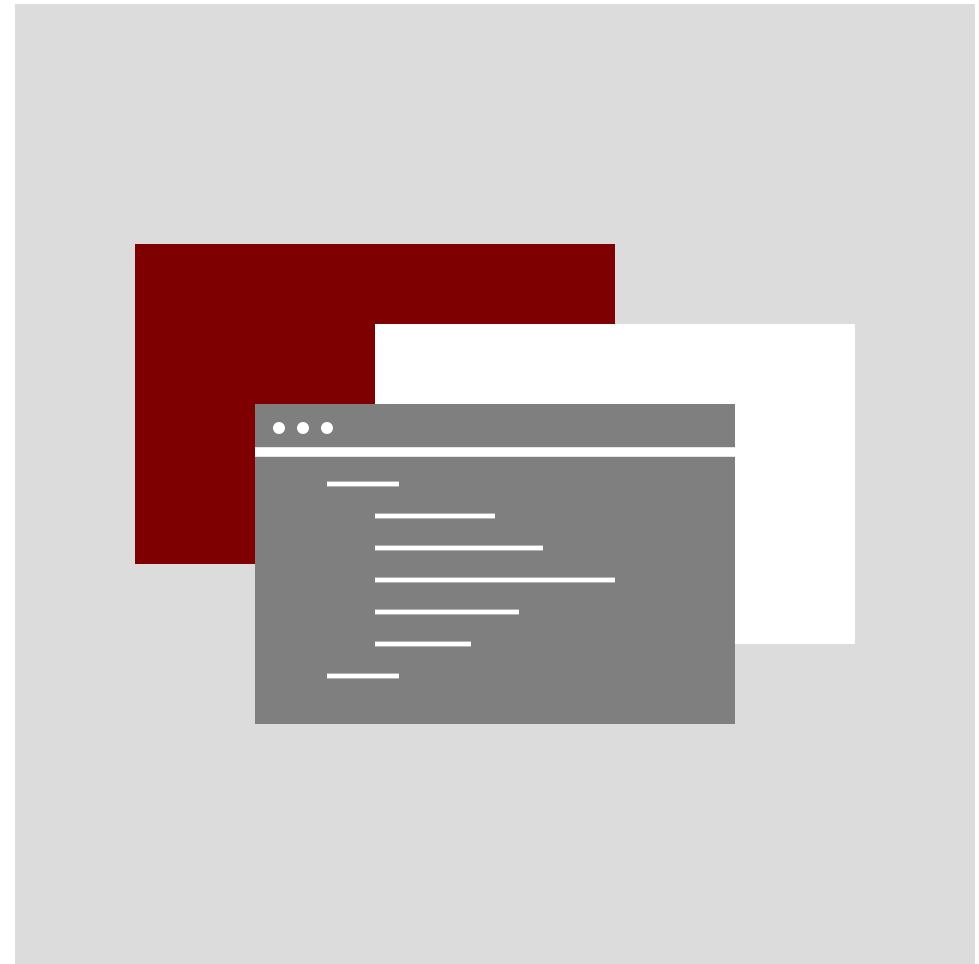


# decksh

a little language for decks



Anthony Starks  
@ajstarks

A language is any mechanism to express intent, and the input to many programs can be viewed profitably as statements in a language. This column is about those “little languages.”

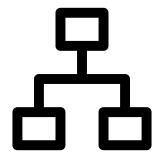
Jon Bentley, Little Languages, Communications of the ACM, August 1986

# Deck



a Go package for presentations

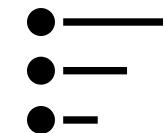
# Elements



Structure



Text



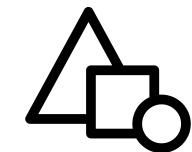
Lists



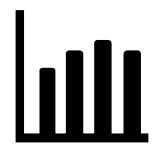
Arrows



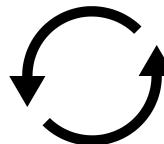
Images



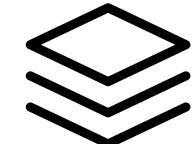
Graphics



Charts



Loops



Data



Utility

decksh → deck markup

SVG

→ PDF

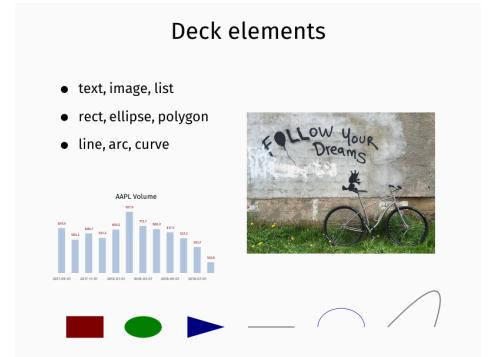
PNG

```
deck
slide "rgb(250,250,250)" "black"
  ctext "Deck elements" 50 90 5
  image "follow.jpg" 70 50 640 480 50
  blist 10 75 3
    li "text, image, list"
    li "rect, ellipse, polygon"
    li "line, arc, curve"
  elist

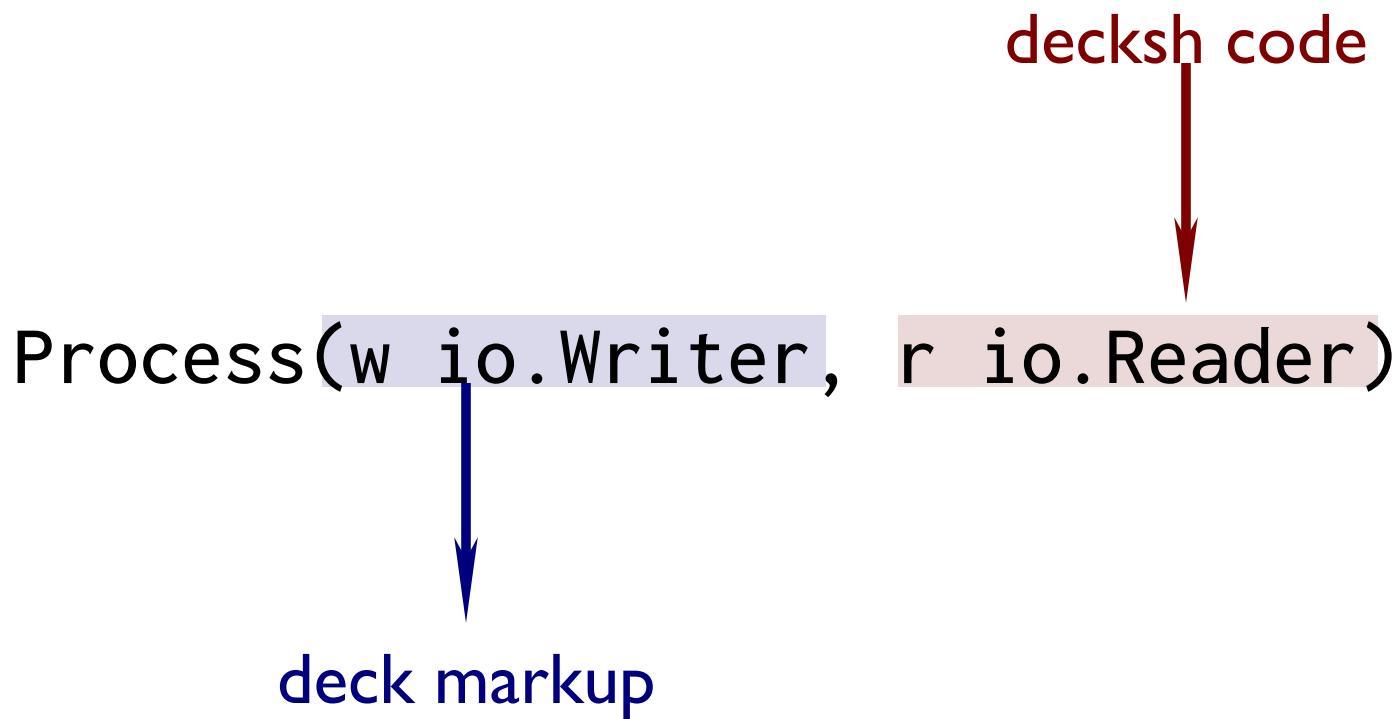
  gy=10
  rect 15 gy 8 6      "rgb(127,0,0)"
  ellipse 27.5 gy 8 6   "rgb(0,127,0)"
  line 50 gy 60 gy
  curve 80 gy 95 30 90 gy
  arc 70 gy 10 8 0 180 0.1 "rgb(0,0,127)"
  polygon "37 37 45" "13 7 10" "rgb(0,0,127)"

  opts="-fulldeck=f -textsize 1 - xlabel=2 -barwidth 1.5"
  dchart -left 10 -right 42 -top 42 -bottom 25 opts AAPL.d
  eslide
edeck
```

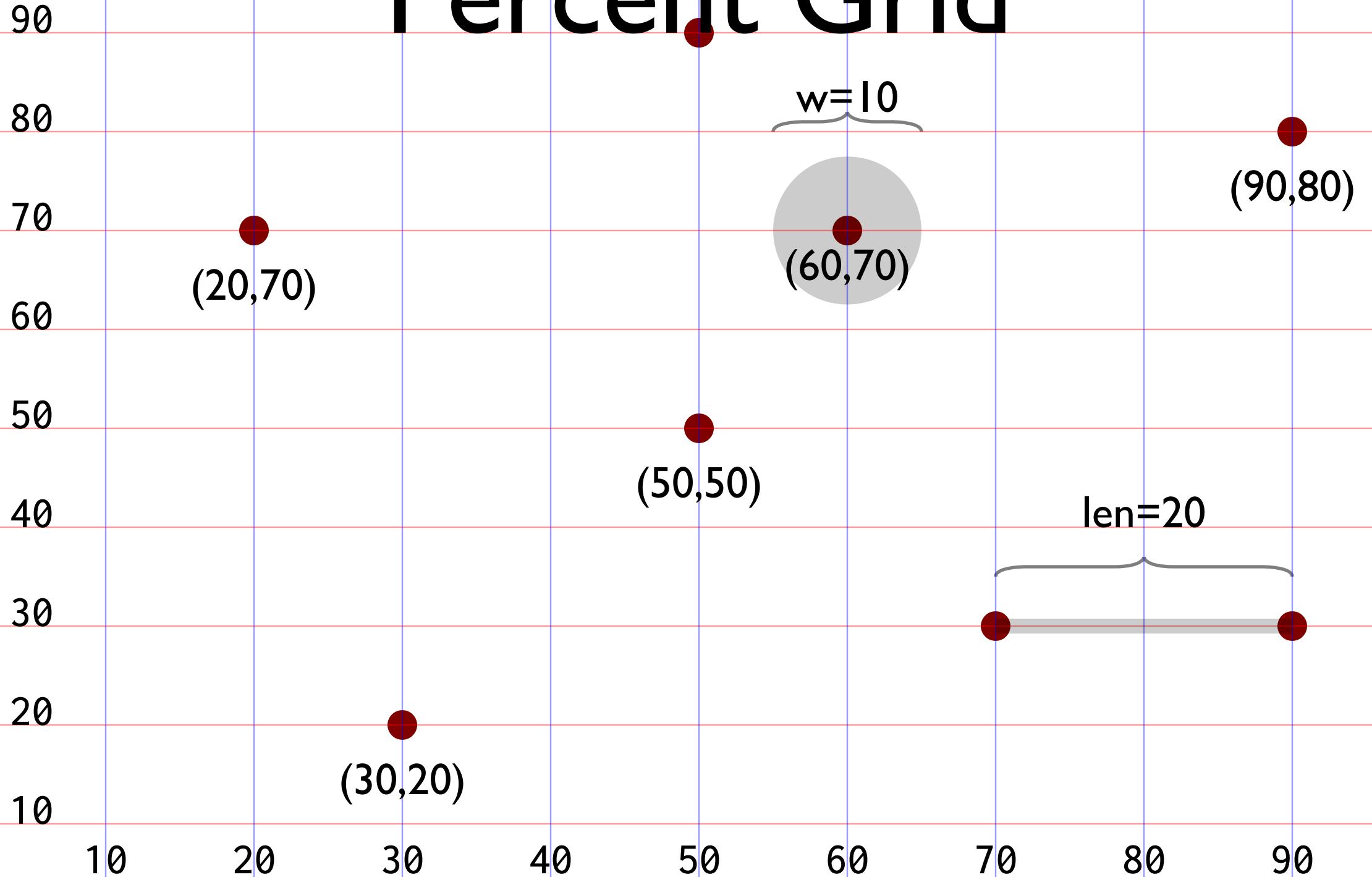
```
<deck>
<slide bg="rgb(250,250,250)" fg="black">
<text align="c" xp="50" yp="90" sp="5">Deck elements</text>
<image name="follow.jpg" xp="70" yp="50" width="640" height="480" scale="50" />
<list type="bullet" xp="10" yp="75" sp="3">
<li>text, image, list</li>
<li>rect, ellipse, polygon</li>
<li>line, arc, curve</li>
</list>
<rect xp="15" yp="10" wp="8" hp="6" color="rgb(127,0,0)" />
<ellipse xp="27.5" yp="10" wp="8" hp="6" color="rgb(0,127,0)" />
<line xp1="50" yp1="10" xp2="60" yp2="10" />
<curve xp1="80" yp1="10" xp2="95" yp2="30" xp3="90" yp3="10" />
<arc xp="70" yp="10" wp="10" hp="8" a1="0" a2="180" sp="0.1" color="rgb(0,0,127)" />
<polygon xc="37 37 45" yc="13 7 10" color="rgb(0,0,127)" />
<text xp="26.00" yp="45.60" sp="1.50" align="center" wp="0.00" font="sans" opacity="100.00" color="black" type="">AAPL Volume</text>
<line xp1="10.00" yp1="25.00" xp2="10.00" yp2="37.46" sp="1.50" opacity="100.00" color="lightsteelblue" />
<text xp="10.00" yp="38.46" sp="0.75" align="center" wp="0.00" font="sans" opacity="100.00" color="rgb(127,0,0)" type="">679.9</text>
<text xp="10.00" yp="23.00" sp="0.80" align="center" wp="0.00" font="sans" opacity="100.00" color="rgb(75,75,75)" type="">2017-09-01</text>
<line xp1="12.91" yp1="25.00" xp2="12.91" yp2="34.24" sp="1.50" opacity="100.00" color="lightsteelblue" />
<text xp="12.91" yp="35.24" sp="0.75" align="center" wp="0.00" font="sans" opacity="100.00" color="rgb(127,0,0)" type="">504.3</text>
...
</slide>
</deck>
```



# decksh API



# Percent Grid



```
// hello world  
deck  
    slide "black" "white"  
        ctext "hello, world" 50 25 10  
        circle 50 0 100 "blue"  
eslide  
edeck
```

# hello, world

# Running decksh

<code>decksh</code>	read from stdin, write to stdout
<code>decksh in.dsh</code>	read from file, write to stdout
<code>decksh -o out.xml</code>	read from stdin, write to file
<code>decksh -o out.xml in.dsh</code>	read from file, write to file
<code>chmod +x in.dsh; ./in.dsh</code>	executable deck with <code>#!/path/to/decksh</code>

`decksh example.dsh | pdfdeck ...`

hw.dsh - Visual Studio Code

File Edit Selection View Go Debug Terminal Help

hw.dsh

```
// hello world
deck
    slide "black" "white"
        ctext "hello, world" 50 25 10
        circle 50 0 100 "blue"
    eslide
edock
```

PROBLEMS TERMINAL ...

1: bash

```
$ decksh hw.dsh | pdf
$ open f.pdf
$
```

Ln 8, Col 1 Tab Size: 4 UTF-8 LF Plain Text

master\* 0 0 0 0



hw.dsh - Visual Studio Code

File Edit Selection View Go Debug Terminal Help

hw.dsh

```
// hello world
deck
    slide "black" "white"
        ctext "hello, Mars" 50 25 10
        circle 50 0 100 "red"
eslide
edeck
```

PROBLEMS TERMINAL ...

```
1: bash
$ decksh hw.dsh | pdf
$ open f.pdf
$ decksh hw.dsh | pdf
$
```

master\* 0 0 ▲ 0 Ln 5, Col 29 Tab Size: 4 UTF-8 LF Plain Text ☺ 🔔



# Keywords and arguments

keyword

arguments

mandatory

optional

text

"..string...." x y n

"font" "color" op

text

"hello, world" 80 50 2

hello, world

text

"hello, world" 80 40 2

"serif"

hello, world

text

"hello, world" 80 30 2

"serif" "red"

hello, world

text

"hello, world" 80 20 2

"serif" "red" 50

hello, world

# Variables and Assignments

```
x=10                                // number assignment  
y=20  
factor=2  
what="hello world"                   // string assignment  
  
size=x/factor                        // assignment with binop  
text what x y size                  // text "hello world" 10 20 5  
  
y-=10                               // assignment operation  
size+=factor                         // assignment op, substitute  
text what x y size                  // text "hello world" 10 10 7  
  
for v=0 100 5                        // loop from 0 to 100 by 5  
    line 100 v 0 v 0.1 "blue"        // blue horizontal lines  
    line v 100 v 0 0.1 "red"        // red vertical lines  
efor
```

# Keywords

Structure	Text	Lists	Graphics	Braces	Arrows
deck/edeck	text	list	acircle	polygon	lbrace
slide/eslide	btext	blist	arc	polyline	rbrace
canvas	ctext	nlist	circle	rect	ubrace
def/edef	etext	clist	curve	rrect	dbrace
for/efor	rtext	li	ellipse	square	lbracket
func	arctext	elist	hline	star	rbracket
grid	textblock		line	vline	dbracket
import	textblockfile		pill		ubracket
include	textfile				
if/else/eif	textcode				
Images	Charts	Maps	Assignments	Math	Data
image	dchart	geoarc	polar	area	cosine
cimage	legend	geoborder	polarx	format	sine
		geolabel	polary	substr	sqrt
		geoloc	random	vmap	tangent
		geomark		dump	
		geopath			
		geopathfile			
		georegion			

# Structure

```
// This is a comment           ← comment
deck
    canvas 1920 1080          ← canvas size hint (width height)
    variables {                ←
        x=20      // define x ← inline comment
        y=80
    }
    slide {                    ←
        slide 1 {                ←
            text "first" x y 2
            eslides
        }
        slide 2 {                ←
            slide "black" "white"
            include "file.dsh" {←
                ctext "hello, world" 50 25 10
                circle 50 0 100 "blue"
                for x=20 80 10
                    circle x 75 2
                efor
            }
            eslides
        }
    }
edek
```

Text

hello world

hello world

hello world.

text

# ctext

etext

x y size [font] [color] [op] [link]

x y size [font] [color] [op] [link]

x y size [font] [color] [op] [link]

Rotated rectangle(315) named(225) about(135)

# rtext

x y angle size [font] [color] [op] [link]

A circular arrangement of words and symbols on a light blue background. The words are written in a black, cursive-style font. Starting from the top and moving clockwise, the words are: 'there', 'wor1d', 'piwo', 'there', 'hello', 'there', and 'oTTeH'. A single red dot is positioned in the center of the circle.

arctext

cx cy radius beg-angle end-angle size [font] [color] [op] [link]

# Text

## textblock

The quick brown fox  
jump over the lazy  
dog

"text" x y width size [font] [color] [op] [link]

## textfield

This is the contents  
of a file. it has lines of text.  
Reading is fundamental.

"filename" x y size [font] [color] [op] [sp]

## textcode

```
import "fmt"
func main() {
    fmt.Println("Go")
}
```

"filename" x y width size [color]

# Lists

First thing

- First thing

Second thing

- Second thing

Third thing

- Third thing

Fourth

- Fourth

I. First thing

2. Second thing

3. Third thing

4. Fourth

First thing

Second thing

Third thing

Fourth

list

li "..."

elist

blist

li "..."

elist

nlist

li "..."

elist

clist

li "..."

elist

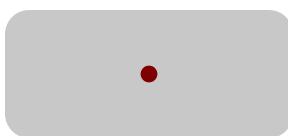
x y size [font] [color] [op] [spacing] x y size [font] [color] [op] [spacing] x y size [font] [color] [op] [spacing] x y size [font] [color] [op] [spacing]

# Graphics (shapes)



rect

x y w h [color] [op]



rect

x y w h r [color]



square

x y w [color] [op]



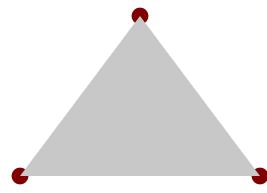
ellipse

x y w h [color] [op]



circle

x y w [color] [op]



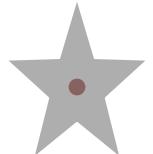
polygon

"xc" "yc" [color] [op]



pill

x y w h [color]



star

x y nsides in out [color] [op]

# Graphics (lines)



**arc**

x y w h a1 a2 [lw] [color] [op]



**curve**

bx by cx cy ex ey [lw] [color] [op]



**line**

x1 y2 x2 y2 [lw] [color] [op]



**hline**

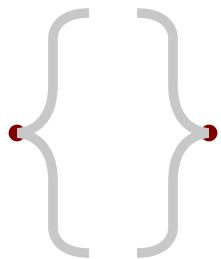
x y len [lw] [color] [op]



**vline**

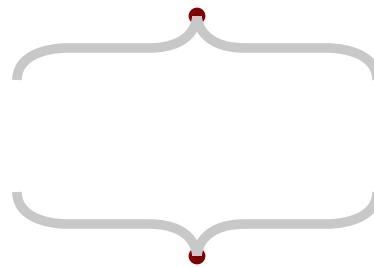
x y len [lw] [color] [op]

# Braces and Brackets



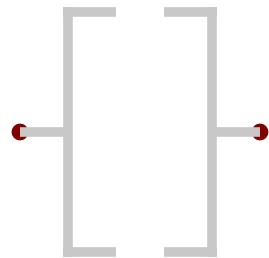
[l-r]brace

x y size aw ah [lw] [color] [op]



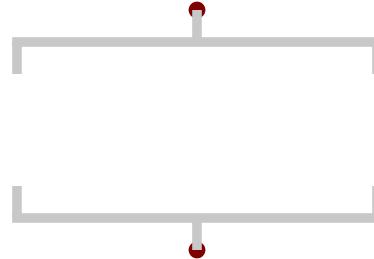
[u-d]brace

x y size aw ah [lw] [color] [op]



[l-r]bracket

x y w h [lw] [color] [op]



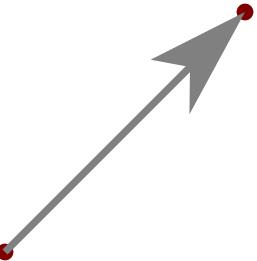
[u-d]bracket

x y w h [lw] [color] [op]

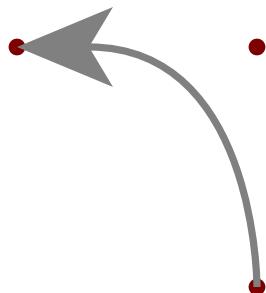
# Arrows



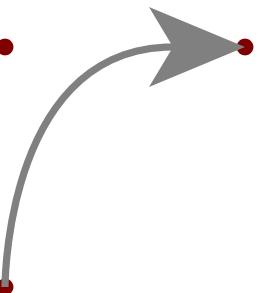
arrow



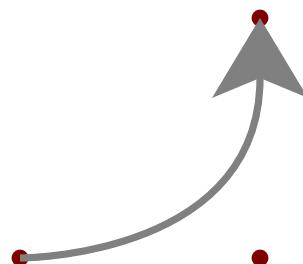
x1 y1 x2 y2 [linewidth] [aw] [ah] [color] [op]



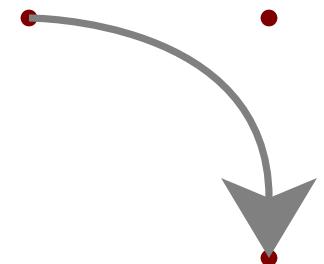
larrow



rcarrow



ucarrow



darrow

x1 y1 x2 y2 x3 y3 [lw] [aw] [ah] [color] [op]

...

...

...

# Images



Up in the clouds

image

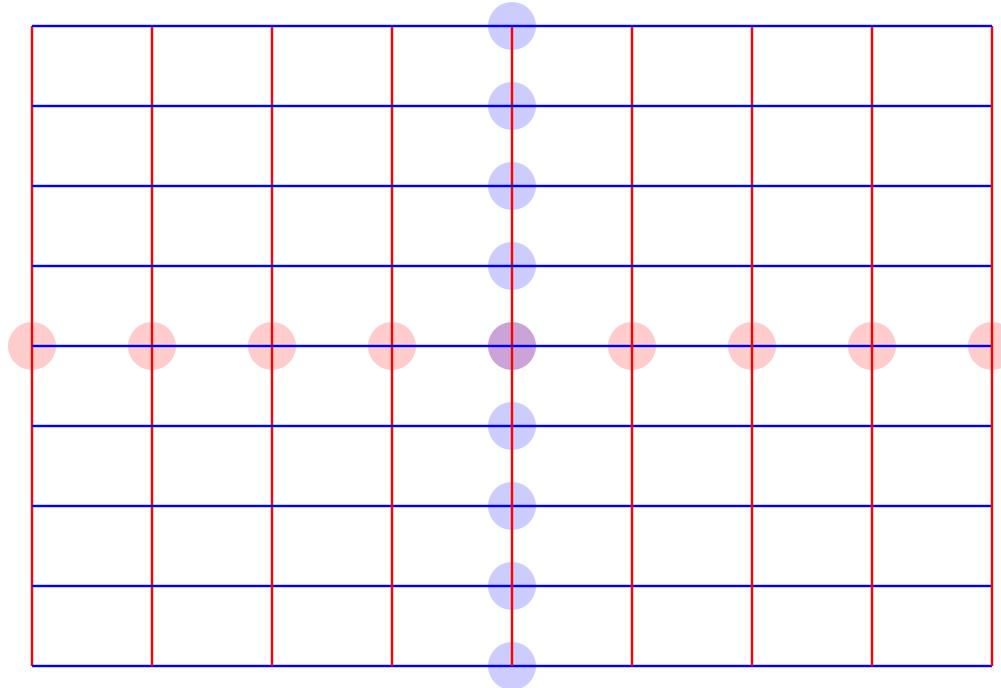
"filename" x y w h [scale] [link]

cimage

"filename" "caption" x y w h [scale] [link] [caption-size]

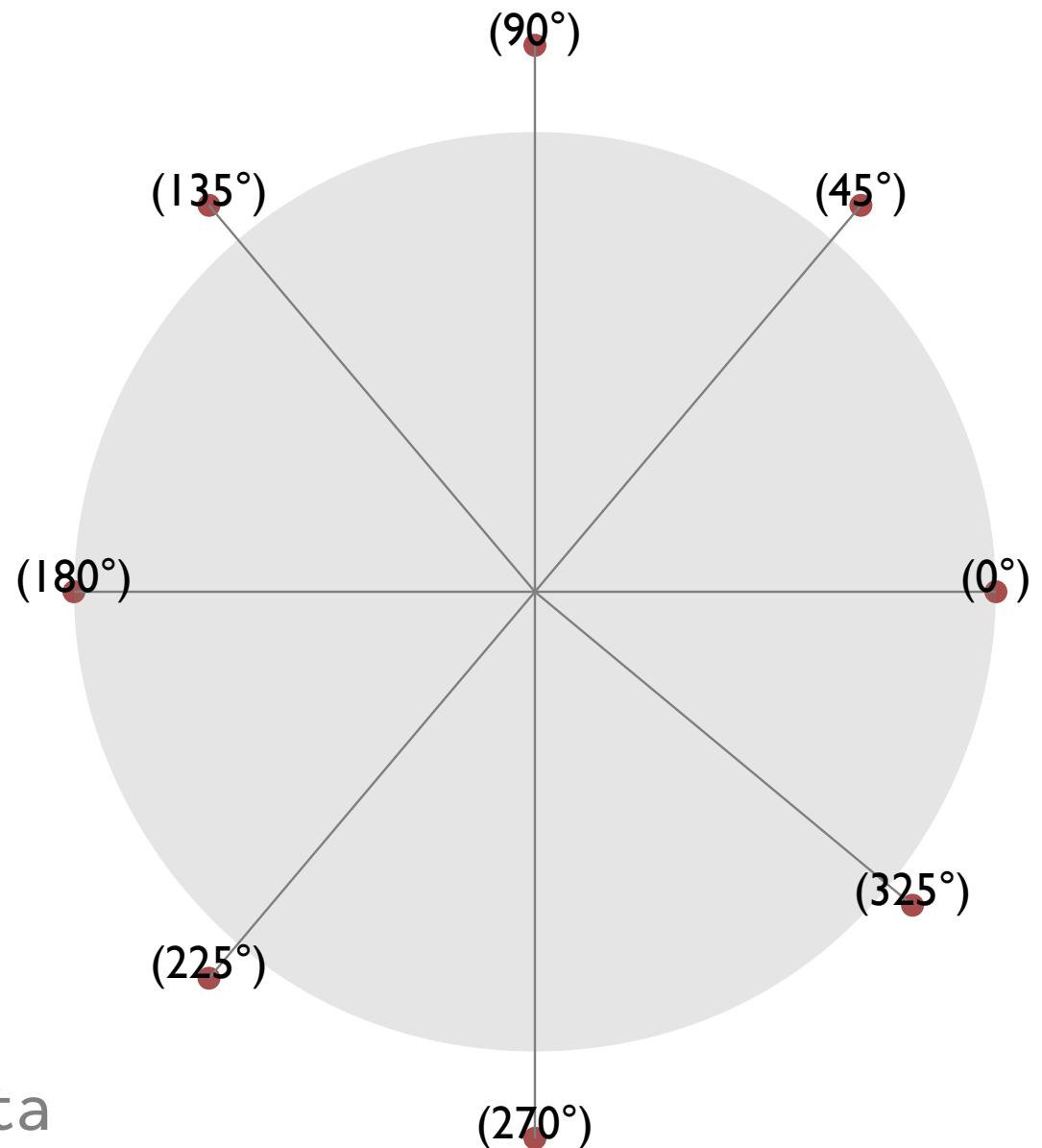
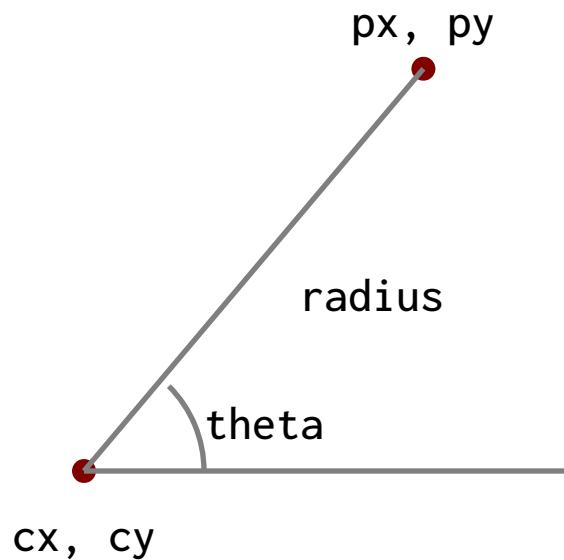
# Loops

```
for v=50 90 5
    vline v 50 40 0.1 "red"
    hline 50 v 40 0.1 "blue"
    circle v 70 2 "red" 20
    circle 70 v 2 "blue" 20
efor
```



```
for v=begin end [increment]
    ...v...
efor
```

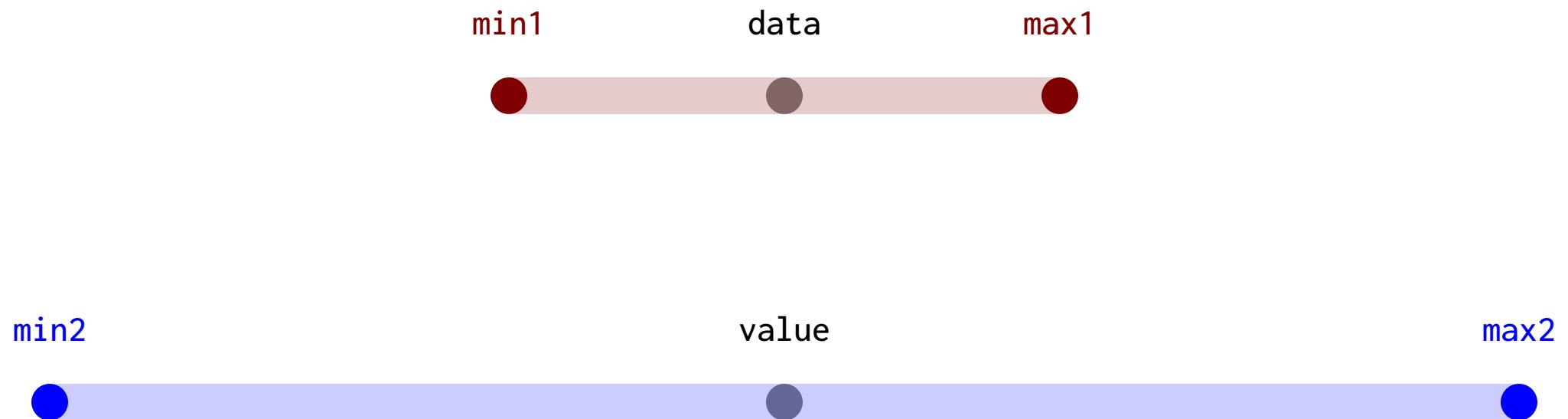
# Polar Coordinates



`px= polarx cx cy radius theta`

`py= polary cx cy radius theta`

# Mapping Ranges



```
value= vmap data min1 max1 min2 max2
```

# Formatted Strings

```
v1=100.3
```

```
v2=200.234
```

```
title=format "%.2f Million (USD)" v1
```

```
subtitle=format "Total value: %.2f" v1+v2
```

```
ctext title 80 70 4 "sans" "maroon"
```

```
ctext subtitle 80 60 3 "sans" "gray"
```

100.30 Million (USD)

Total value: 300.53

**value= `format` fmt expression**

# Random Numbers

```
x1=random 40 70
```

```
y1=random 60 70
```

x1 , y1

```
x2=random 40 50
```

```
y2=random 50 60
```

x2 , y2

```
x3=random 60 70
```

```
y3=random 35 45
```

x3 , y3

value= **random** min max

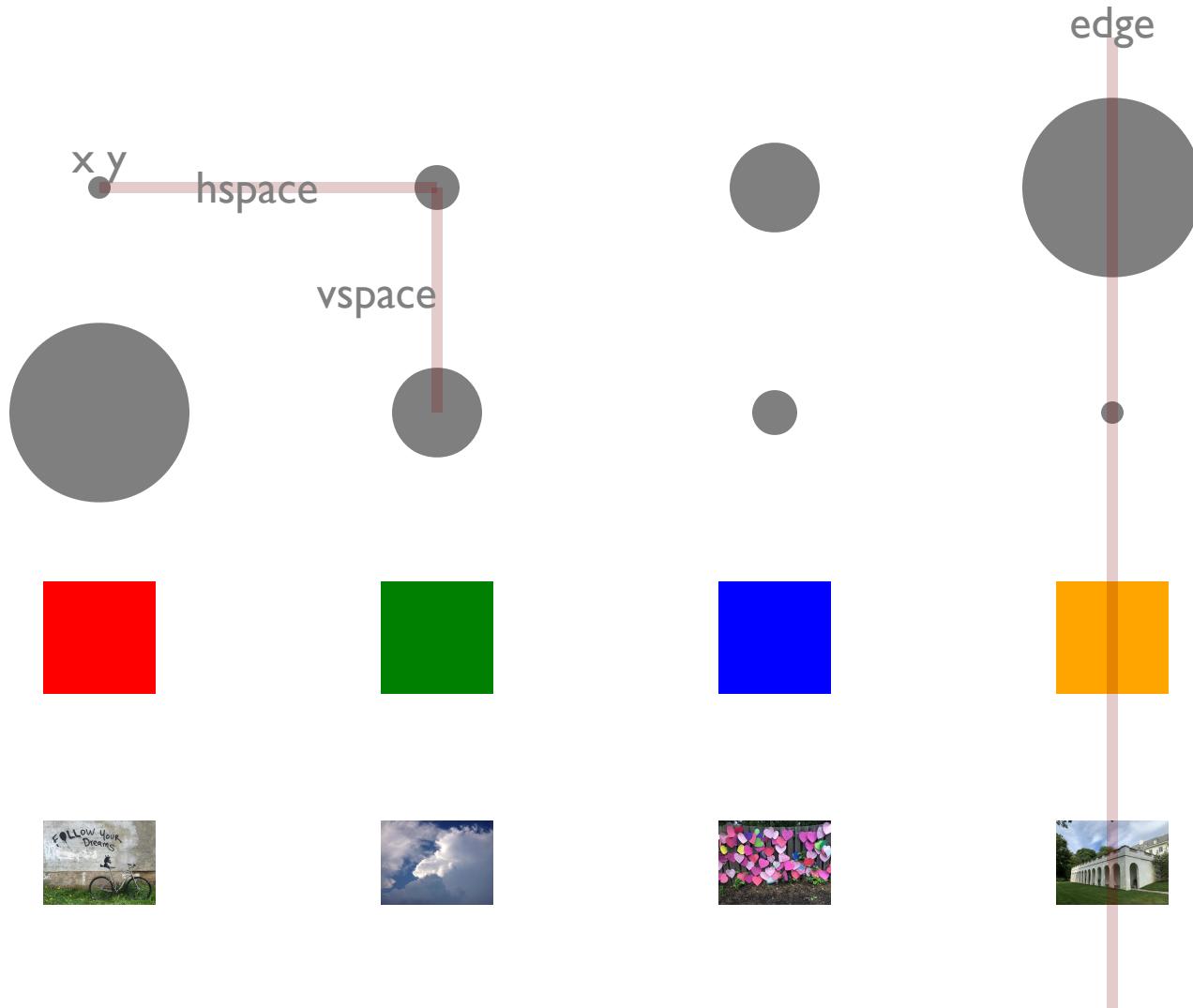
# Flexible Grid

```
circle x y 1  
circle x y 2  
circle x y 4  
circle x y 8
```

```
circle x y 8  
circle x y 4  
circle x y 2  
circle x y 1
```

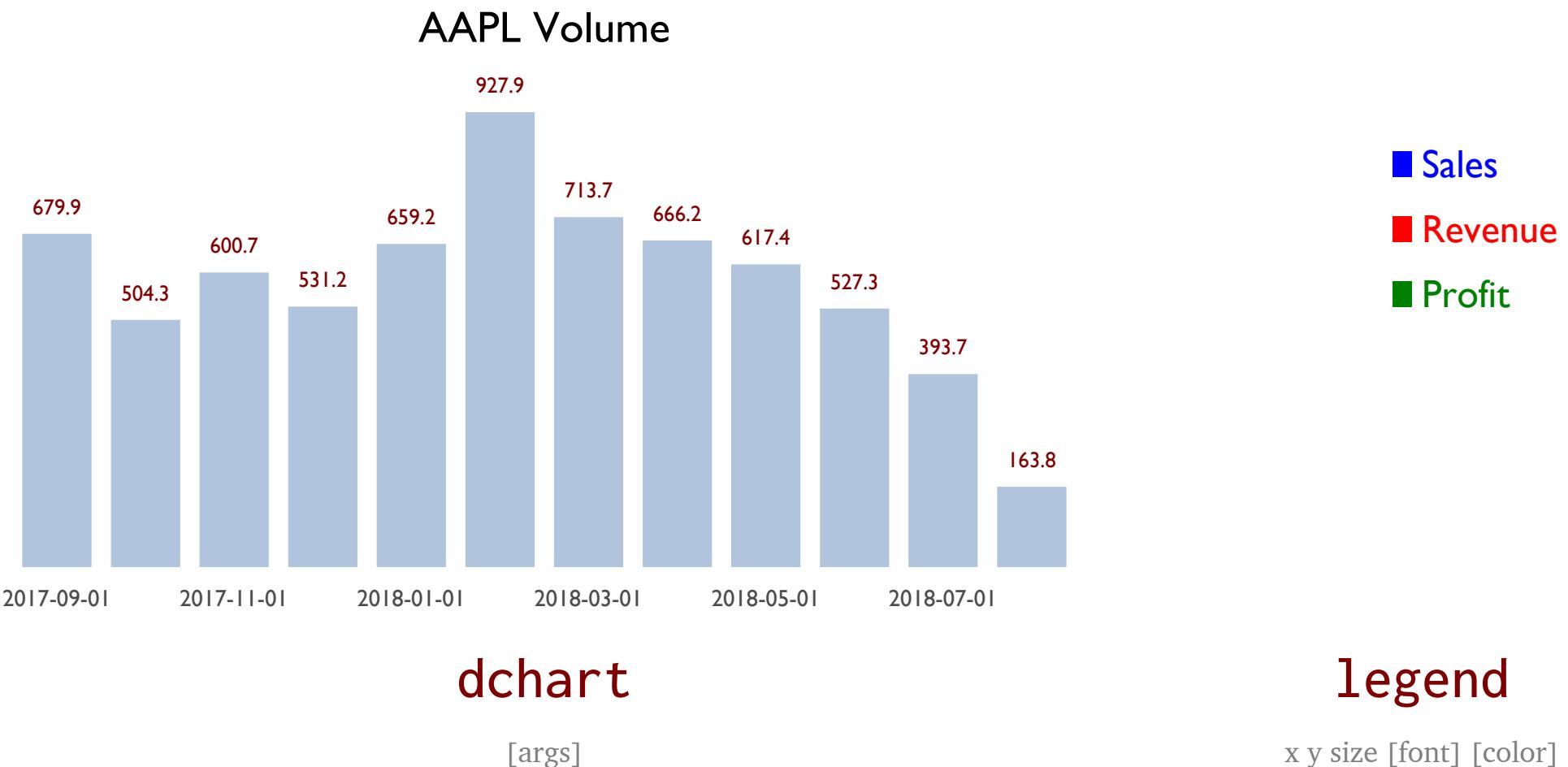
```
square x y 5 "red"  
square x y 5 "green"  
square x y 5 "blue"  
square x y 5 "orange"
```

```
image "images/follow.jpg" x y 640 480 7  
image "images/cloudy.jpg" x y 640 480 7  
image "images/hearts.jpg" x y 640 480 7  
image "images/oldfields.jpg" x y 640 480 7
```



**grid "foo.dsh" x y hspace vspace edge**

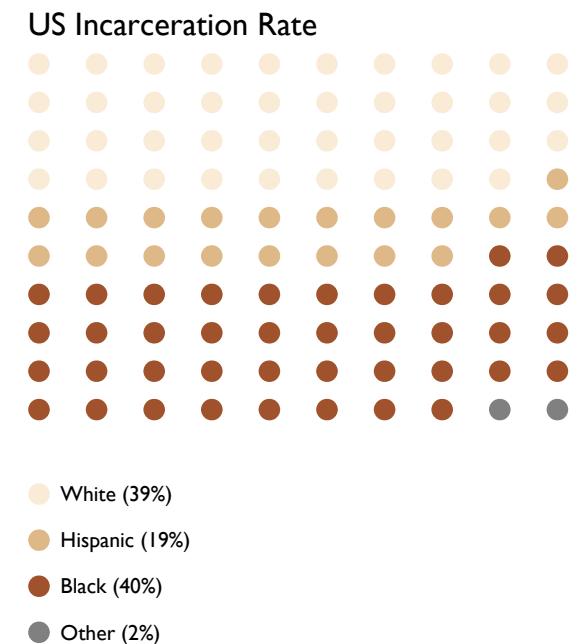
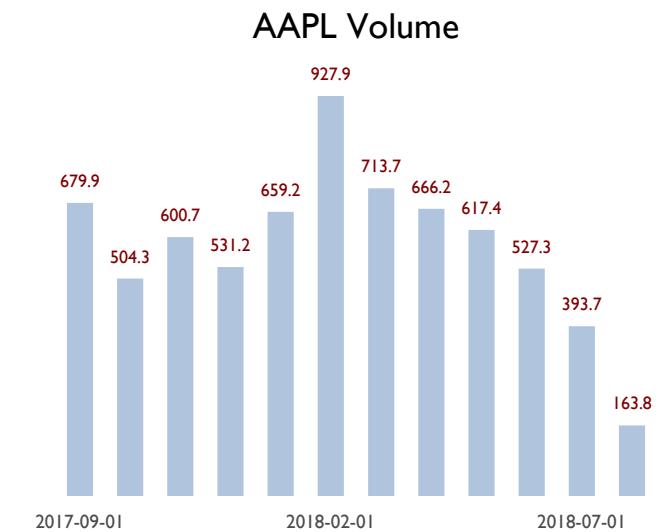
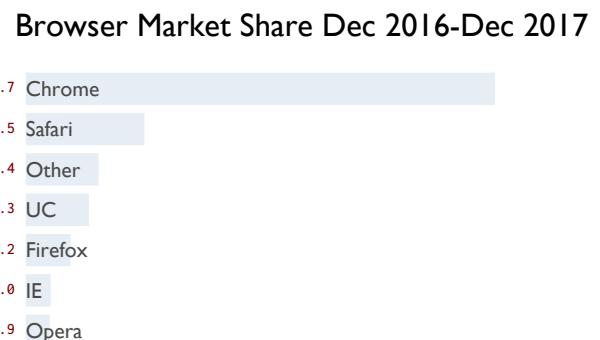
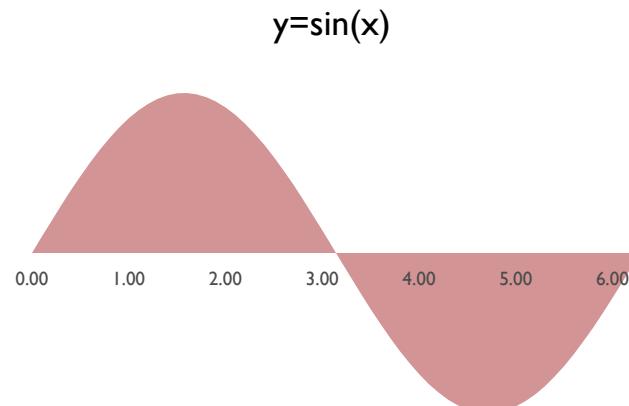
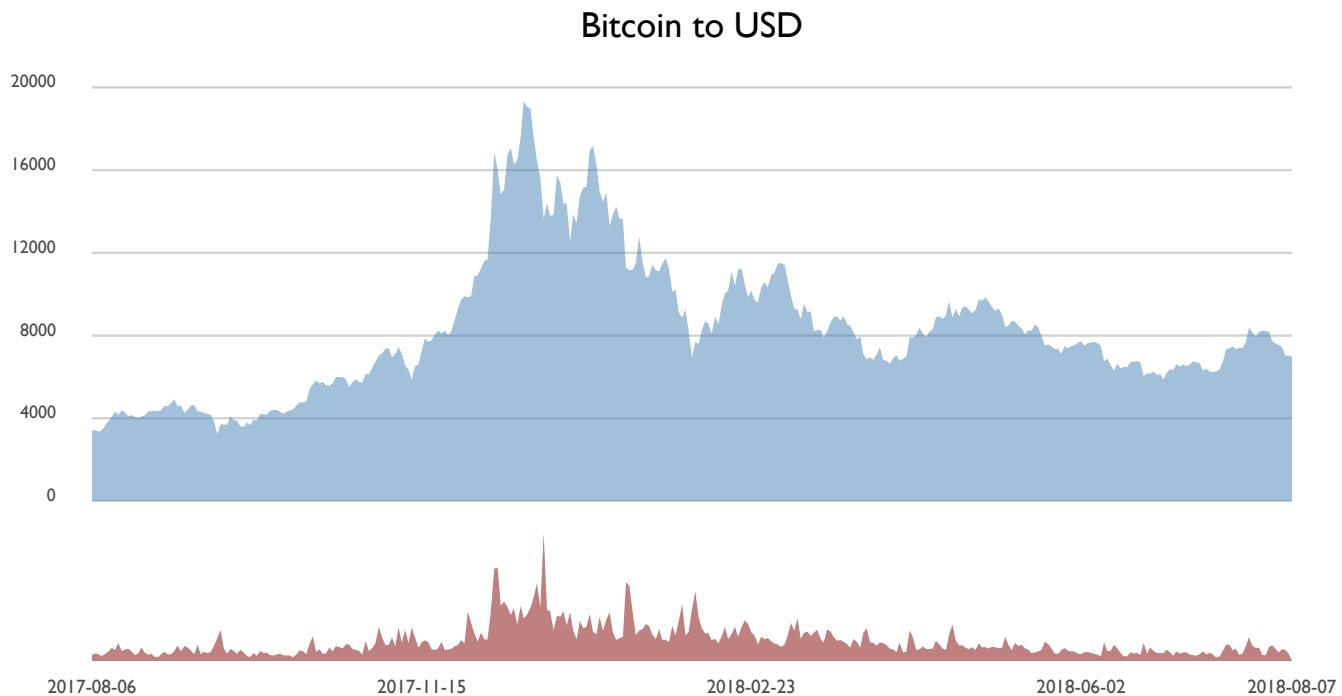
# Charts



# dchart options: chart types

option	default	description
-bar	true	bar chart
-wbar	false	word bar chart
-hbar	false	horizontal bar chart
-donut	false	donut chart
-dot	false	dot chart
-lego	false	lego chart
-line	false	line chart
-pgrid	false	proportional grid
-pmap	false	proportional map
-bowtie	false	bowtie chart
-fan	false	fan chart
-radial	false	radial chart
-scatter	false	scatter chart
-slope	false	slope chart
-vol	false	volume (area) chart

# dchart: charts for deck



```
deck
```

```
  slide "rgb(250,250,250)" "black"
    ctext  "Deck elements" 50 90 5
    image  "follow.jpg"    70 50 640 480 50
    blist  10 75 3
      li "text, image, list"
      li "rect, ellipse, polygon"
      li "line, arc, curve"
    elist

    gy=10
    rect   15 gy 8 6           "rgb(127,0,0)"
    ellipse 27.5 gy 8 6        "rgb(0,127,0)"
    line    50 gy 60 gy
    curve   80 gy 95 30 90 gy
    arc     70 gy 10 8 0 180 0.1 "rgb(0,0,127)"
    polygon "37 37 45" "13 7 10" "rgb(0,0,127)"

    opts="-fulldeck=f -textsize 1 -xlabel=2 -barwidth 1.5"
    dchart -left 10 -right 42 -top 42 -bottom 25 opts AAPL.d
  eslides
edeck
```

## Deck elements

- text, image, list
- rect, ellipse, polygon
- line, arc, curve



decksh example.dsh | pdf

# Deck elements

- text, image, list
- rect, ellipse, polygon
- line, arc, curve



# Deck elements

list

- text, image, list
- rect, ellipse, polygon
- line, arc, curve

chart



image



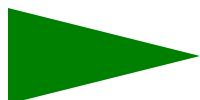
rect



ellipse



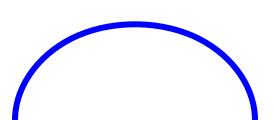
polygon



line



arc



curve



# Examples



# Anthony J. Starks

## Art + Code

---



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ajstarks@gmail.com



@ajstarks



github.com/ajstarks



speakerdeck.com/ajstarks

```

deck
  mx=50      // midpoint
  tx=30      // text left
  ix=20      // image left
  ts=10      // base text size
  ss=ts*0.85 // sub-head text size
  cs=ts*0.55 // contact info text size
  ly=58      // line y

  slide "white" "rgb(100,100,100)"
    image "starx.png"           mx 87 512 512 7.5
    ctext "Anthony J. Starks"   mx 70 ts "sans" "black"
    ctext "Art + Code"         mx 62 ss "sans" "maroon"
    line ix ly 80 ly 0.3 "maroon"

    image "phone.png"          ix 50 1200 1200 1.2
    image "email.png"          ix 40 1200 1200 1.2
    image "twitter.png"        ix 30 1200 1200 1.2
    image "github.png"         ix 20 120 120 10
    image "sd.png"             ix 10 512 512 2.5

    text "+1 908.548.3403"     tx 49 cs
    text "ajstarks@gmail.com"   tx 39 cs
    text "@ajstarks"           tx 29 cs
    text "github.com/ajstarks"  tx 19 cs
    text "speakerdeck.com/ajstarks" tx 9 cs
  eslide
edock

```



## Anthony J. Starks

### Art + Code

---

 +1 908.548.3403

 ajstarks@gmail.com

 @ajstarks

 github.com/ajstarks

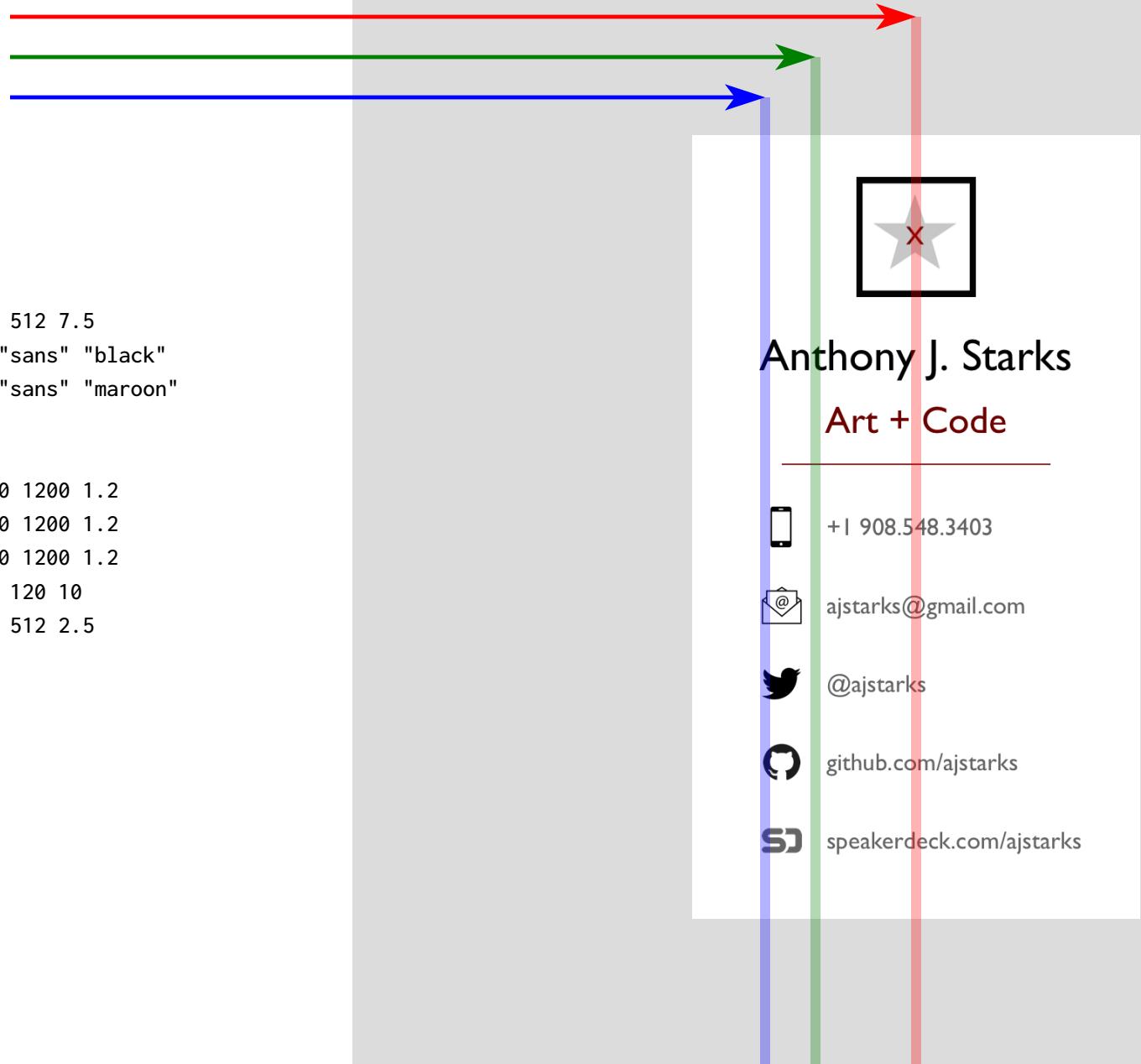
 speakerdeck.com/ajstarks

```
deck
  mx=50          // midpoint
  tx=30          // text left
  ix=20          // image left
  ts=10          // base text size
  ss=ts*0.85    // sub-head text size
  cs=ts*0.55    // contact info text size
  ly=58          // line y

  slide "white" "rgb(100,100,100)"
    image "starx.png"           mx 87 512 512 7.5
    ctext "Anthony J. Starks"   mx 70 ts "sans" "black"
    ctext "Art + Code"         mx 62 ss "sans" "maroon"
    line ix ly 80 ly 0.3 "maroon"

    image "phone.png"          ix 50 1200 1200 1.2
    image "email.png"          ix 40 1200 1200 1.2
    image "twitter.png"        ix 30 1200 1200 1.2
    image "github.png"         ix 20 120 120 10
    image "sd.png"              ix 10 512 512 2.5

    text "+1 908.548.3403"     tx 49 cs
    text "ajstarks@gmail.com"   tx 39 cs
    text "@ajstarks"            tx 29 cs
    text "github.com/ajstarks"  tx 19 cs
    text "speakerdeck.com/ajstarks" tx 9 cs
  eslide
edeck
```



```

deck
  mx=50      // midpoint
  tx=30      // text left
  ix=20      // image left
  ts=10      // base text size
  ss=ts*0.85 // sub-head text size
  cs=ts*0.55 // contact info text size
  ly=58      // line y

  slide "white" "rgb(100,100,100)"
    image "starx.png"           mx 87 512 512 7.5
    ctext "Anthony J. Starks"   mx 70 ts "sans" "black"
    ctext "Art + Code"         mx 62 ss "sans" "maroon"
    line ix ly 80 ly 0.3 "maroon"

    image "phone.png"          ix 50 1200 1200 1.2
    image "email.png"          ix 40 1200 1200 1.2
    image "twitter.png"        ix 30 1200 1200 1.2
    image "github.png"         ix 20 120 120 10
    image "sd.png"             ix 10 512 512 2.5

    text "+1 908.548.3403"     tx 49 cs
    text "ajstarks@gmail.com"   tx 39 cs
    text "@ajstarks"           tx 29 cs
    text "github.com/ajstarks"  tx 19 cs
    text "speakerdeck.com/ajstarks" tx 9 cs
  eslide
edock

```



## Anthony J. Starks

### Art + Code

---

 +1 908.548.3403

 ajstarks@gmail.com

 @ajstarks

 github.com/ajstarks

 speakerdeck.com/ajstarks

```
deck
  mx=25      // midpoint
  tx=62      // text left
  ix=57      // image left
  ts=6       // base text size
  ss=ts*0.85 // sub-head text size
  cs=ts*0.50 // contact info text size
  lx=50      // line x

  slide "white" "rgb(100,100,100)"
    image "starx.png"           mx 75 512 512 7.5
    ctext "Anthony J. Starks"   mx 35 ts "sans" "black"
    ctext "Art + Code"         mx 22 ss "sans" "maroon"
    line lx 90 lx 10 0.3 "maroon"

    image "phone.png"          ix 80 1200 1200 1.2
    image "email.png"          ix 65 1200 1200 1.2
    image "twitter.png"        ix 50 1200 1200 1.2
    image "github.png"         ix 35 120 120 10
    image "sd.png"              ix 20 512 512 2.5

    text "+1 908.548.3403"     tx 79 cs
    text "ajstarks@gmail.com"   tx 64 cs
    text "@ajstarks"            tx 49 cs
    text "github.com/ajstarks"  tx 34 cs
    text "speakerdeck.com/ajstarks" tx 19 cs

  eslide
edock
```

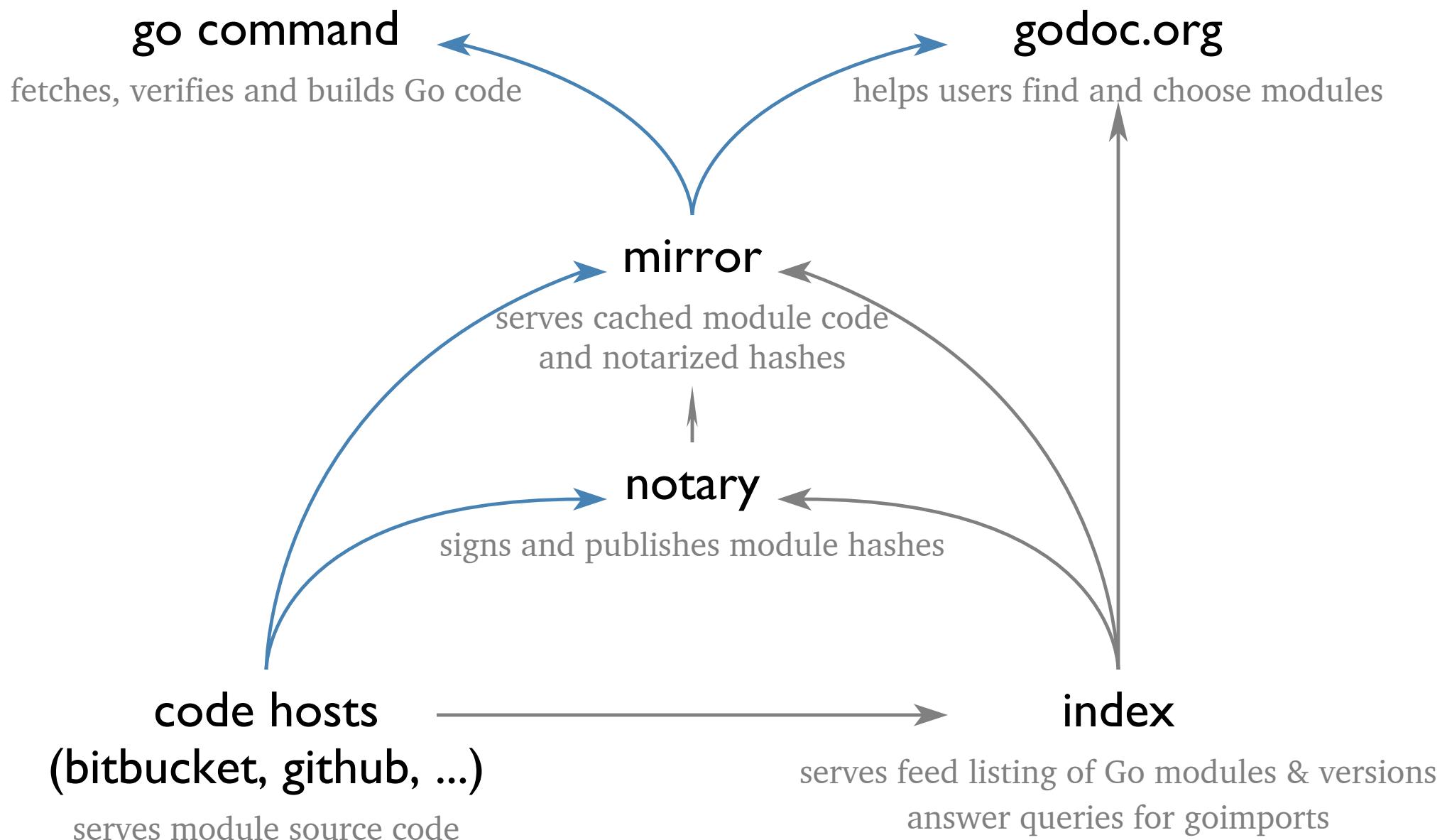


**Anthony J. Starks**  
**Art + Code**

---

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-  @ajstarks
-  github.com/ajstarks
-  speakerdeck.com/ajstarks

# Go Module Information Flows



■ modules/code

■ metadata

BOS



SFO

Virgin America 351

Gate B38

8:35am

On Time

JFK



IND

US Airways 1207

Gate C31C

5:35pm

Delayed

# Flight Information

Los Angeles (LAX)  New York/Newark (EWR)



Distance Traveled

1,958 mi

3,151 km

Distance to Destination

596 mi

798 km



Time to Destination

1:20

Estimated time of arrival

12:14 am

Local time of arrival

12:14 am

Ground speed



Headwind



Outside Temperature



Current Altitude





Pulp Fiction (1993)



The Matrix (1999)



Roma (2018)

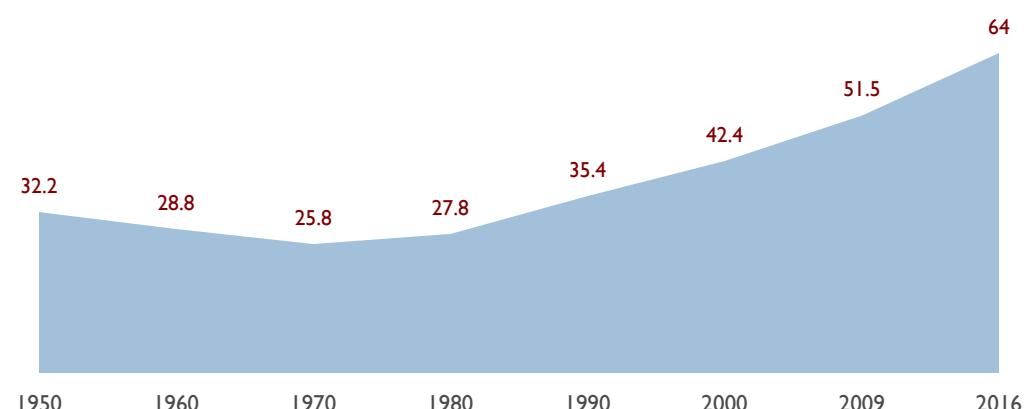
pulp04.png,1920,1080,Pulp Fiction (1993)  
matrix12.png,1920,1080,The Matrix (1999)  
roma04.png,1920,1080,Roma (2018)

caption movies.csv | decksh | pdf ...

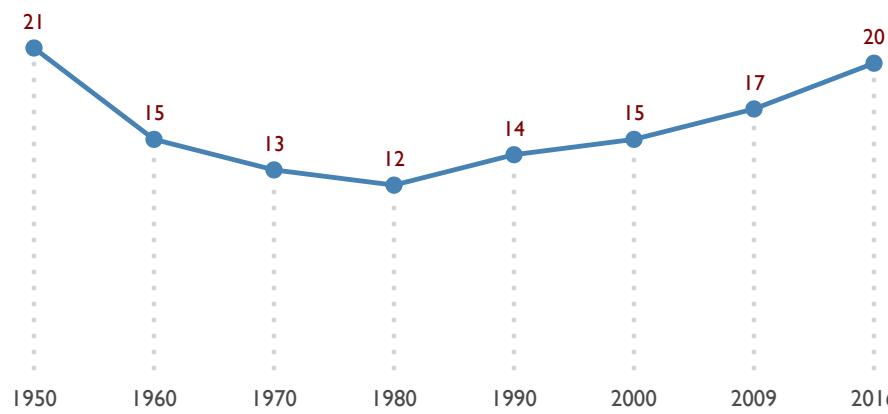
# A record 64 million Americans live in multigenerational households

The number and share of Americans living in multi-generational family households have continued to rise, despite improvements in the U.S. economy since the Great Recession. In 2016, a record 64 million people, or 20% of the U.S. population, lived with multiple generations under one roof, according to a new Pew Research Center analysis of census data.

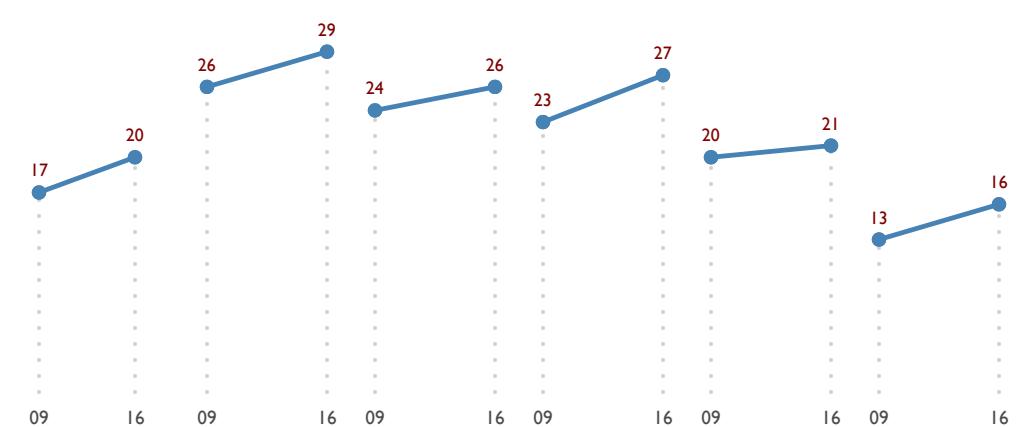
Multigenerational households (millions)



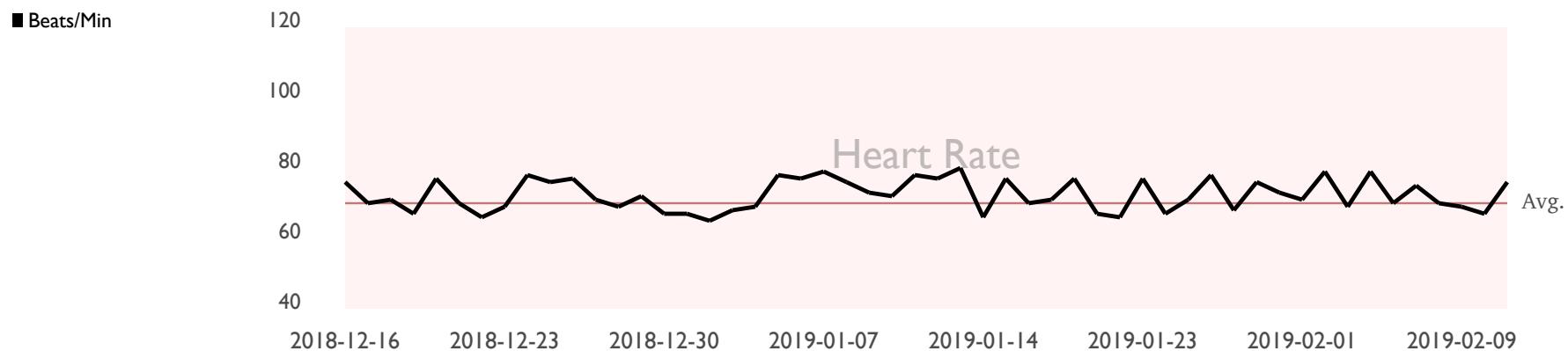
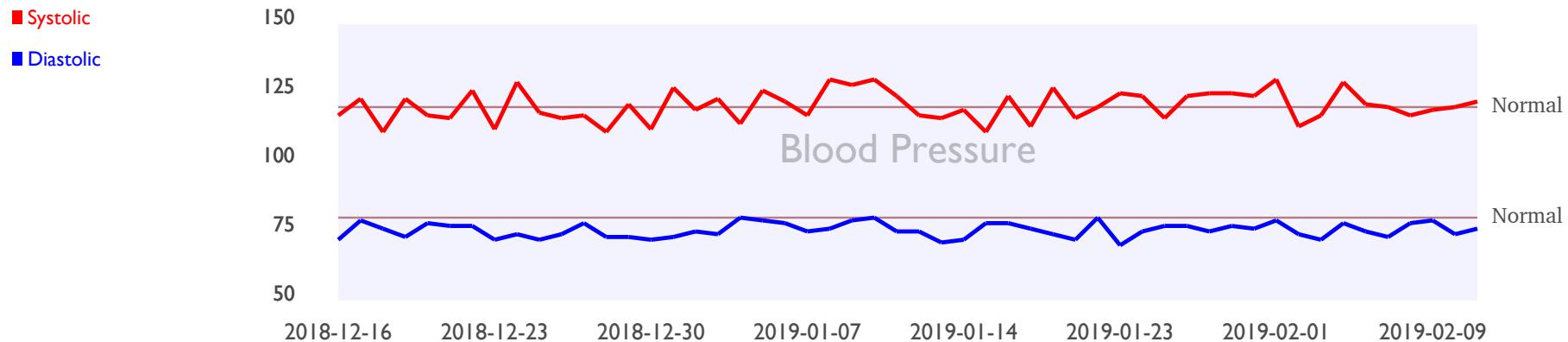
% of Americans in multigenerational households



Total      Asian      Black      Hispanic      Other      White

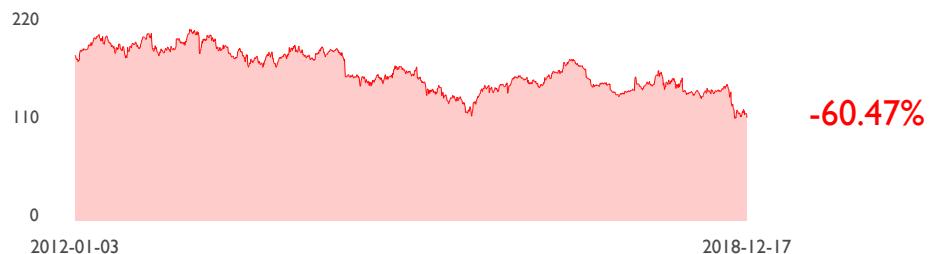


# Jane Doe





Rometty



The first woman to lead IBM, Rometty shifted IBM away from shrinking businesses such as computers and operating system software, and into higher-growth areas like artificial intelligence. Her tenure has also been met by fierce criticism relating to executive compensation bonuses, layoffs, outsourcing, and presiding over 24 consecutive quarters of revenue decline.



Palmisano



Palmisano's mandate was to move into new unique businesses with high profit margins and potential for innovation. This included purchasing PwC Consulting in 2002, so that IBM could go beyond selling computers and software and help customers use technology to solve business challenges in areas such as marketing, procurement and manufacturing.



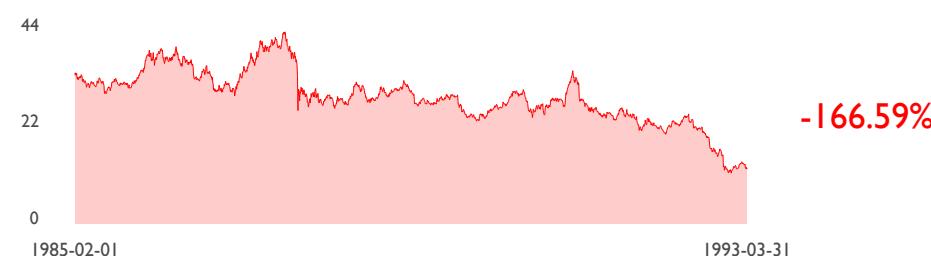
Gerstner



Gerstner's choice to keep the company together was the defining decision of his tenure, as these gave IBM the capabilities to deliver complete IT solutions to customers. Services could be sold as an add-on to companies that had already bought IBM computers, while barely profitable pieces of hardware were used to open the door to more profitable deals.



Akers

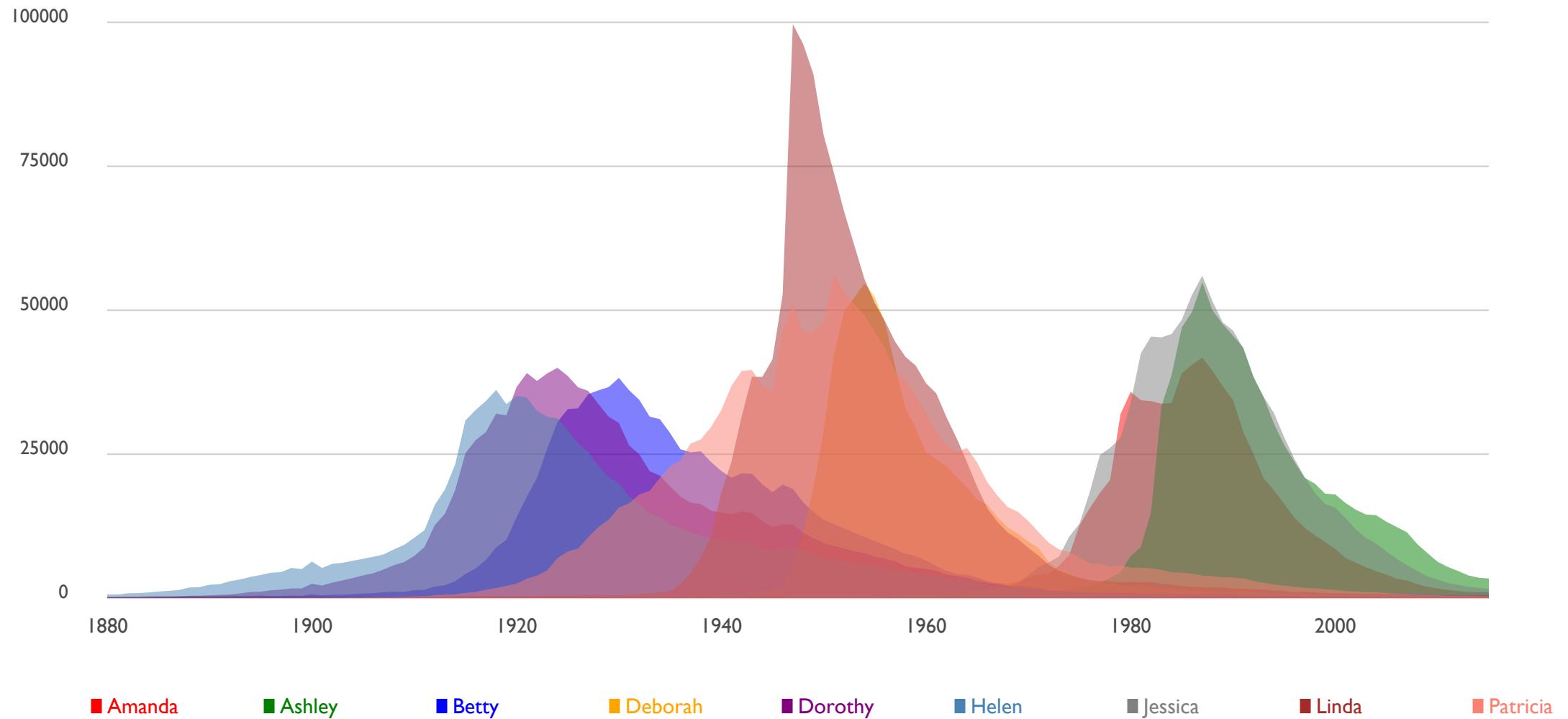


Akers was credited with simplifying the company's bureaucracy to focus more on profits. In a restructuring intended to reverse three years of disappointing performance, he created five new, autonomous organizations responsible for the company's innovation, design and manufacturing. Akers was forced to resign, after the company posted an unprecedented \$5 billion annual loss.

# Sales over time



# Evolution of Baby Names in the US: 1880-2015

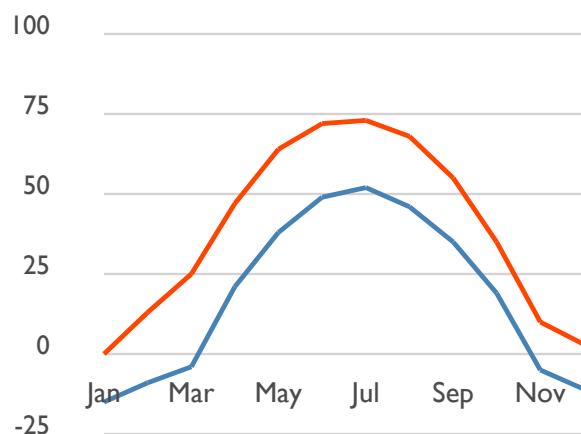


# Evolution of Baby Names in the US: 1880-2015

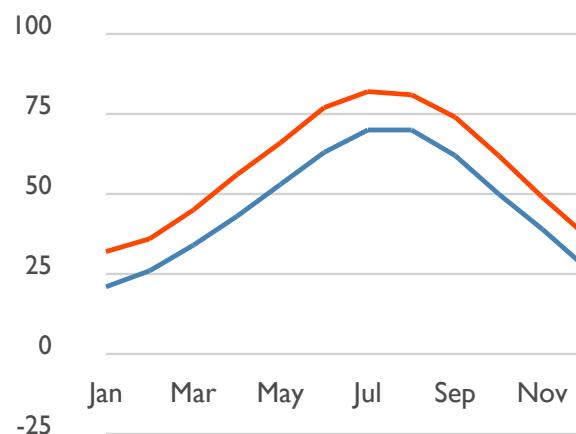


# Average High/Low Temperatures (°F)

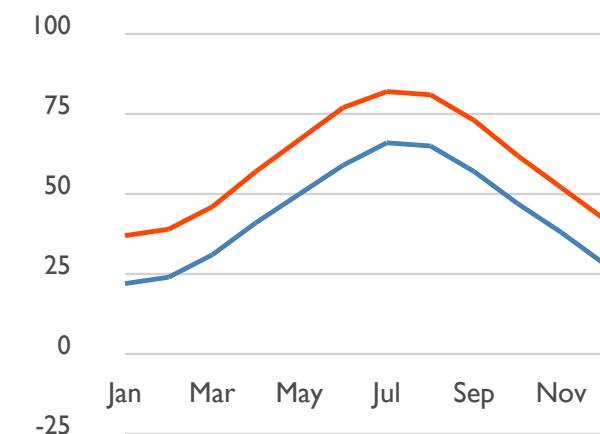
## Fairbanks



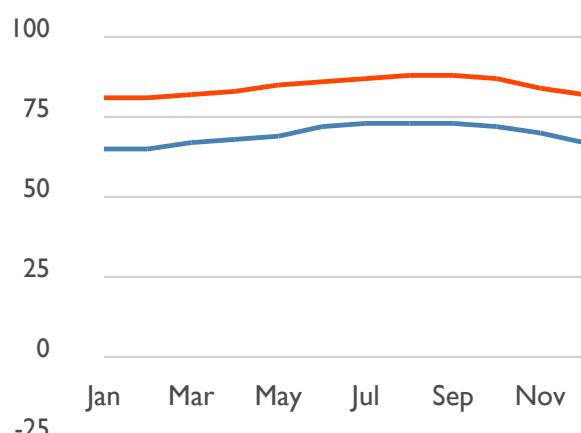
## Chicago



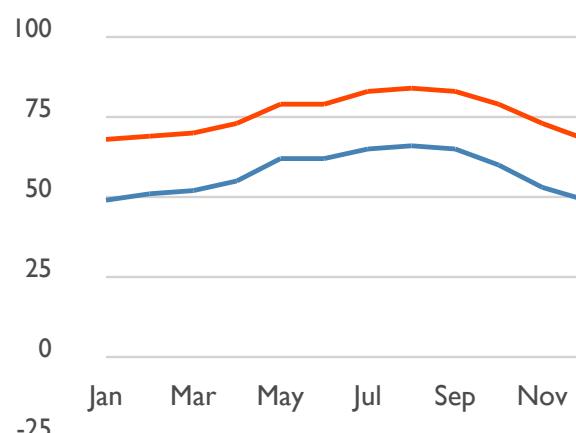
## Boston



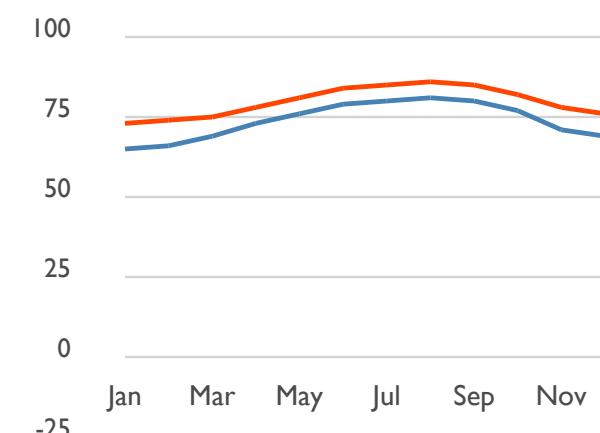
## Honolulu



## Los Angeles



## Miami



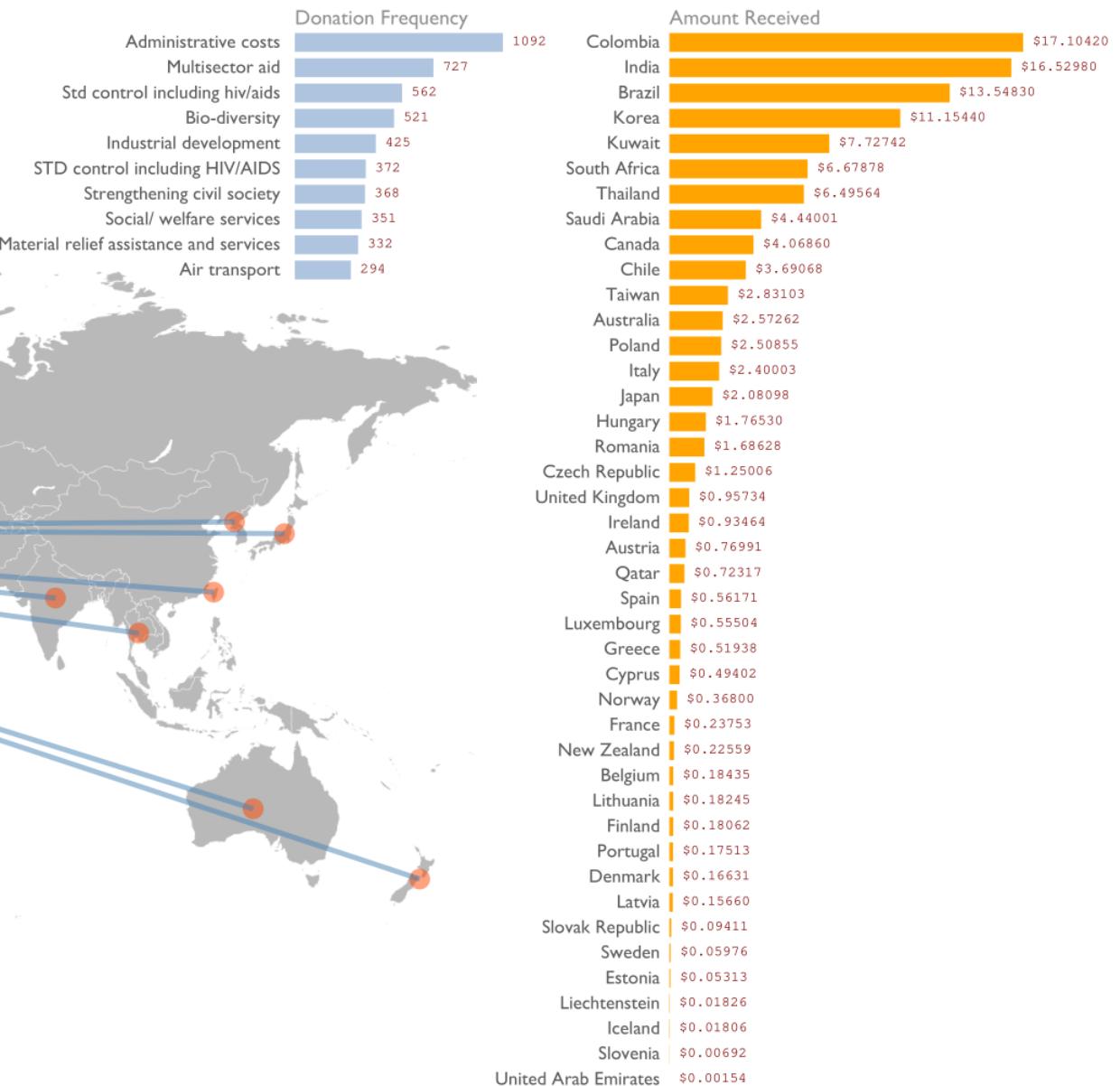
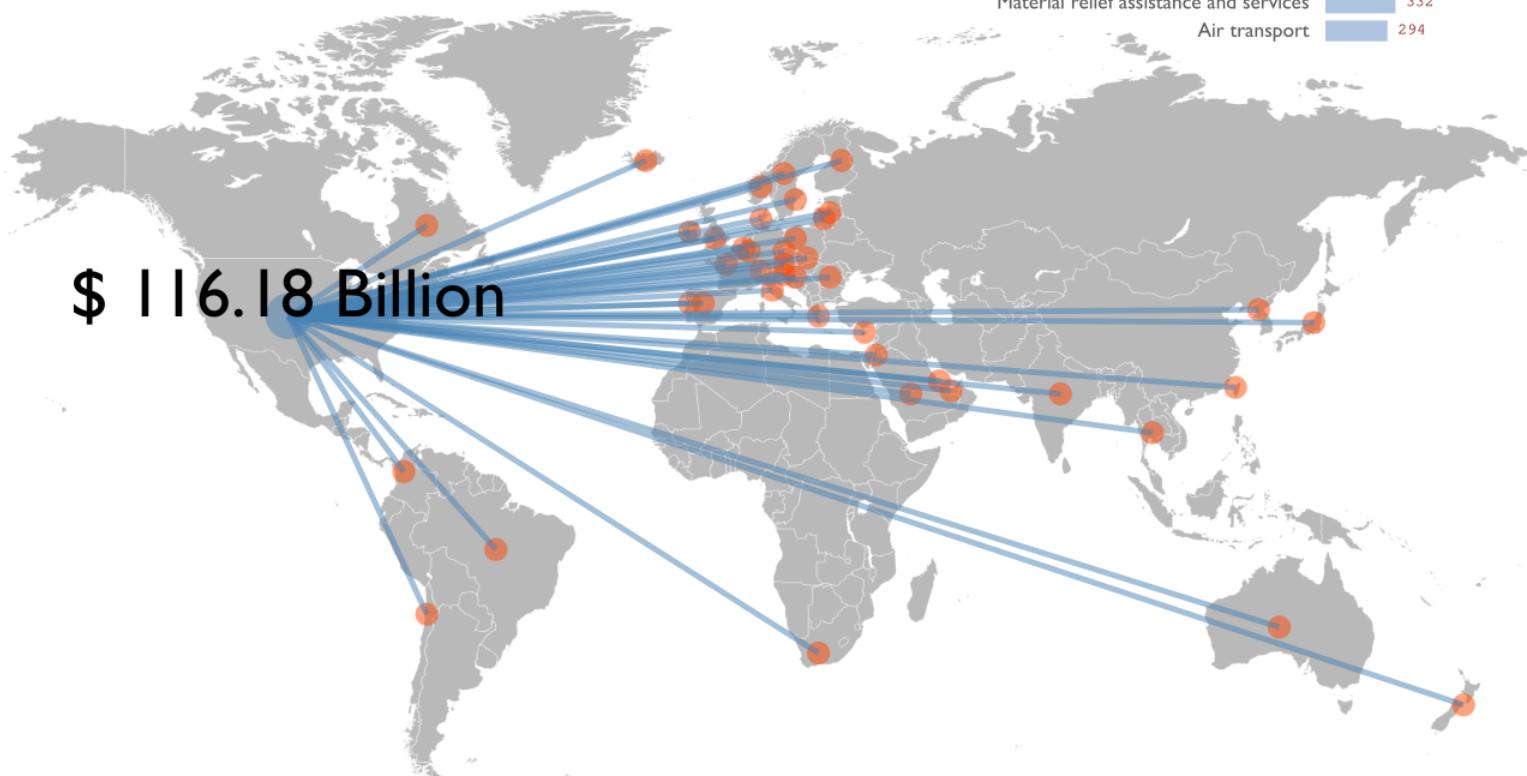
■ Avg. High

■ Avg. Low

# German Wildfires 2012-2018



# United States



PROPORTION OF FREEMEN AND SLAVES AMONG AMERICAN NEGROES .

PROPORTION DES NÈGRES LIBRES ET DES ESCLAVES EN AMÉRIQUE .

DONE BY ATLANTA UNIVERSITY .



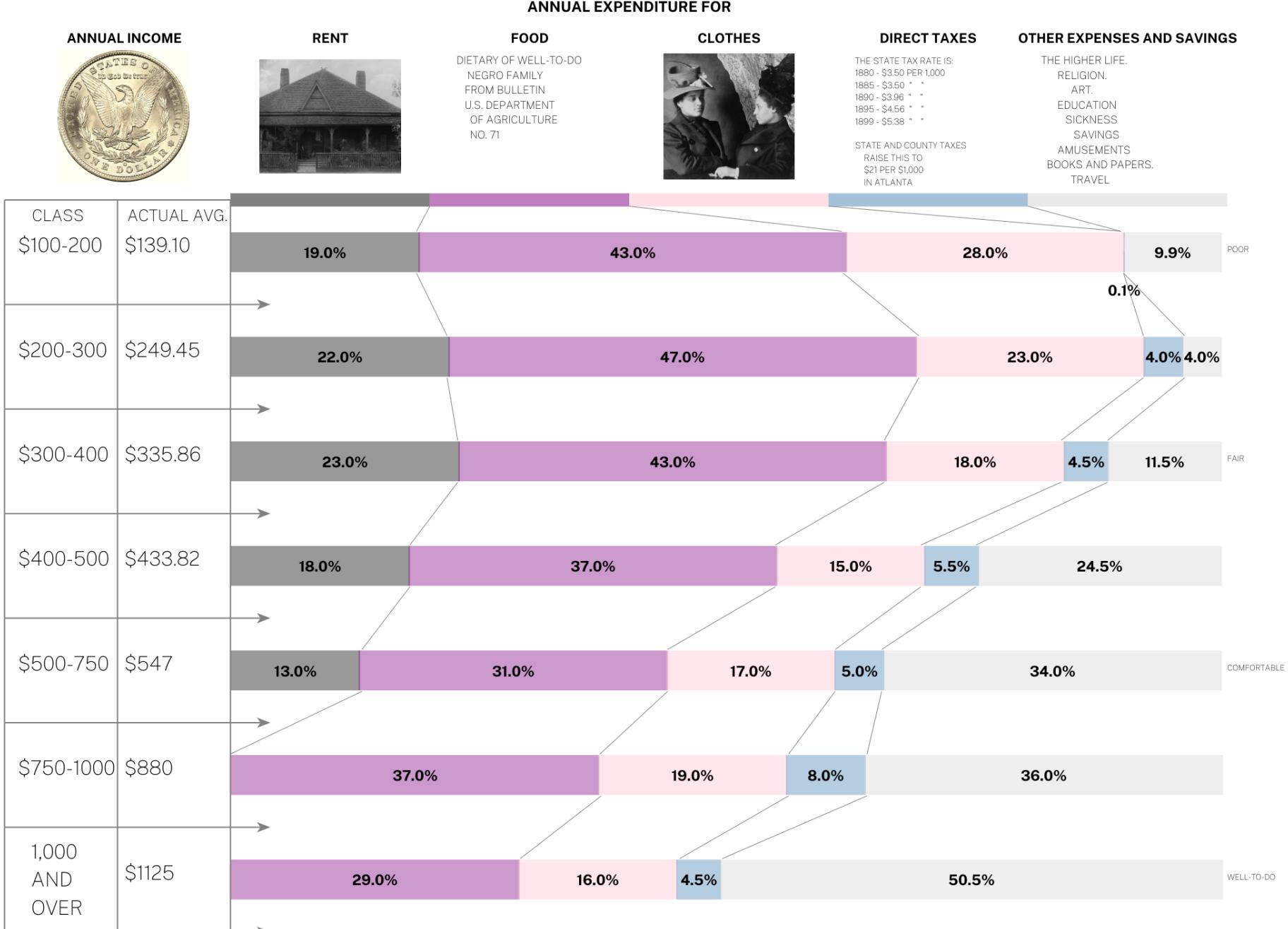
PROPORTION OF FREEMEN AND SLAVES AMONG AMERICAN NEGROES.

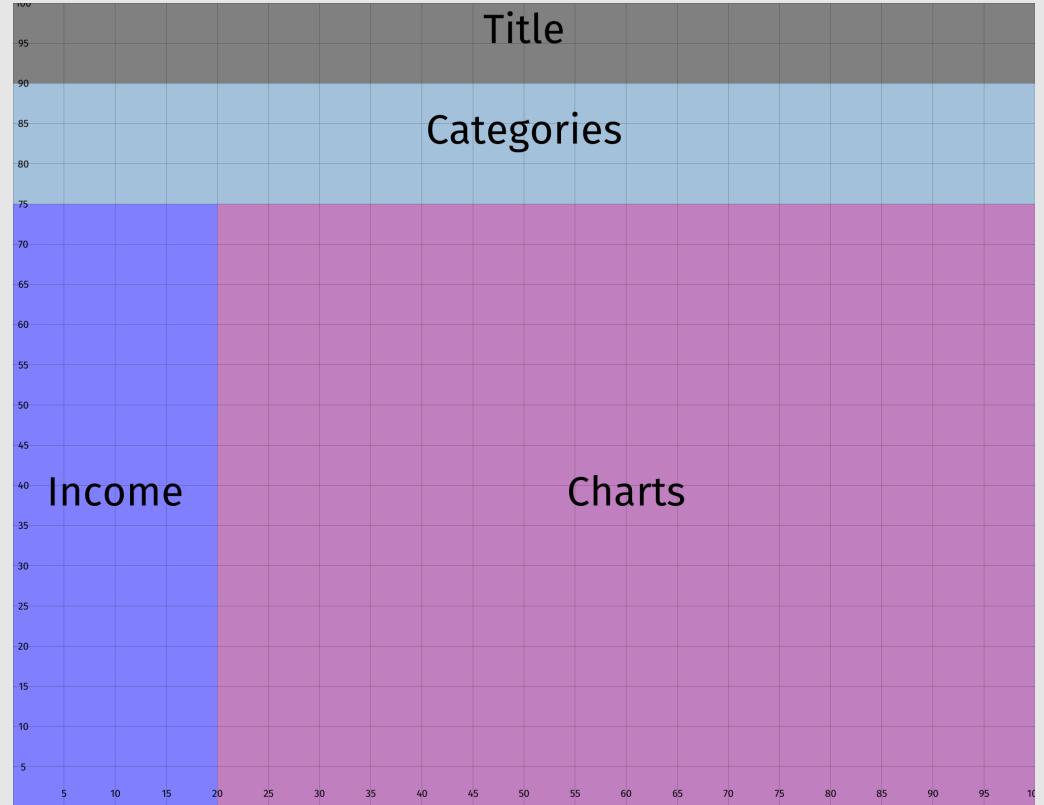
PROPORTION DES NÈGRES LIBRES ET DES ESCLAVES EN AMÉRIQUE.

DONE BY ATLANTA UNIVERSITY.



# INCOME AND EXPENDITURE OF 150 NEGRO FAMILIES IN ATLANTA, GA., U.S.A.





# go get it

**decksh**

[github.com/ajstarks/decksh](https://github.com/ajstarks/decksh)

**dchart**

[github.com/ajstarks/dchart](https://github.com/ajstarks/dchart)

**pdfdeck**

[github.com/ajstarks/deck/cmd/pdfdeck](https://github.com/ajstarks/deck/cmd/pdfdeck)

**examples**

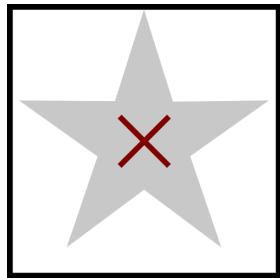
[github.com/ajstarks/deckviz](https://github.com/ajstarks/deckviz)

**fonts**

[github.com/ajstarks/deckfonts](https://github.com/ajstarks/deckfonts)

# Anthony J. Starks

## Art + Code



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[github.com/ajstarks](https://github.com/ajstarks)



[speakerdeck.com/ajstarks](https://speakerdeck.com/ajstarks)