decksh
reference

Keywords

Structure

deck
edeck
slide
eslide
canvas
def
edef
func
grid
import
include

Text

text
btext
ctext
etext
rtext
arctext
textblock
textfile
textcode

Lists

list
blist
nlist
clist
li
elist

Graphics

acircle
arc
circle
curve
ellipse
hline
line
pill
polygon
polyline
rect
rrect
square
star
vline

Braces

lbrace
rbrace
ubrace
dbrace
lbracket
rbracket
dbracket
ubracket

Arrows

arrow
rcarrow
lcarrow
ucarrow
dcarrow

Images

image
cimage

Charts

dchart
legend

Loop

for
efor

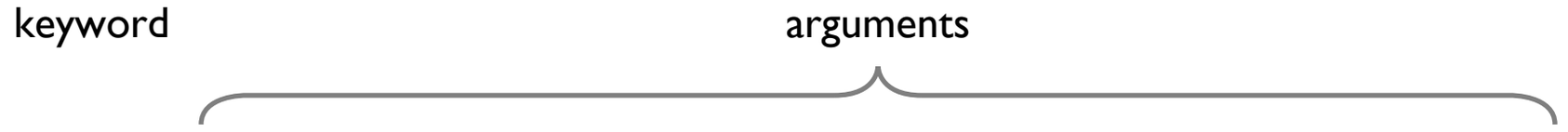
Assignments

polar
polarx
polary
area
format
random
sqrt
vmap

Data

data
edata

Keywords and arguments

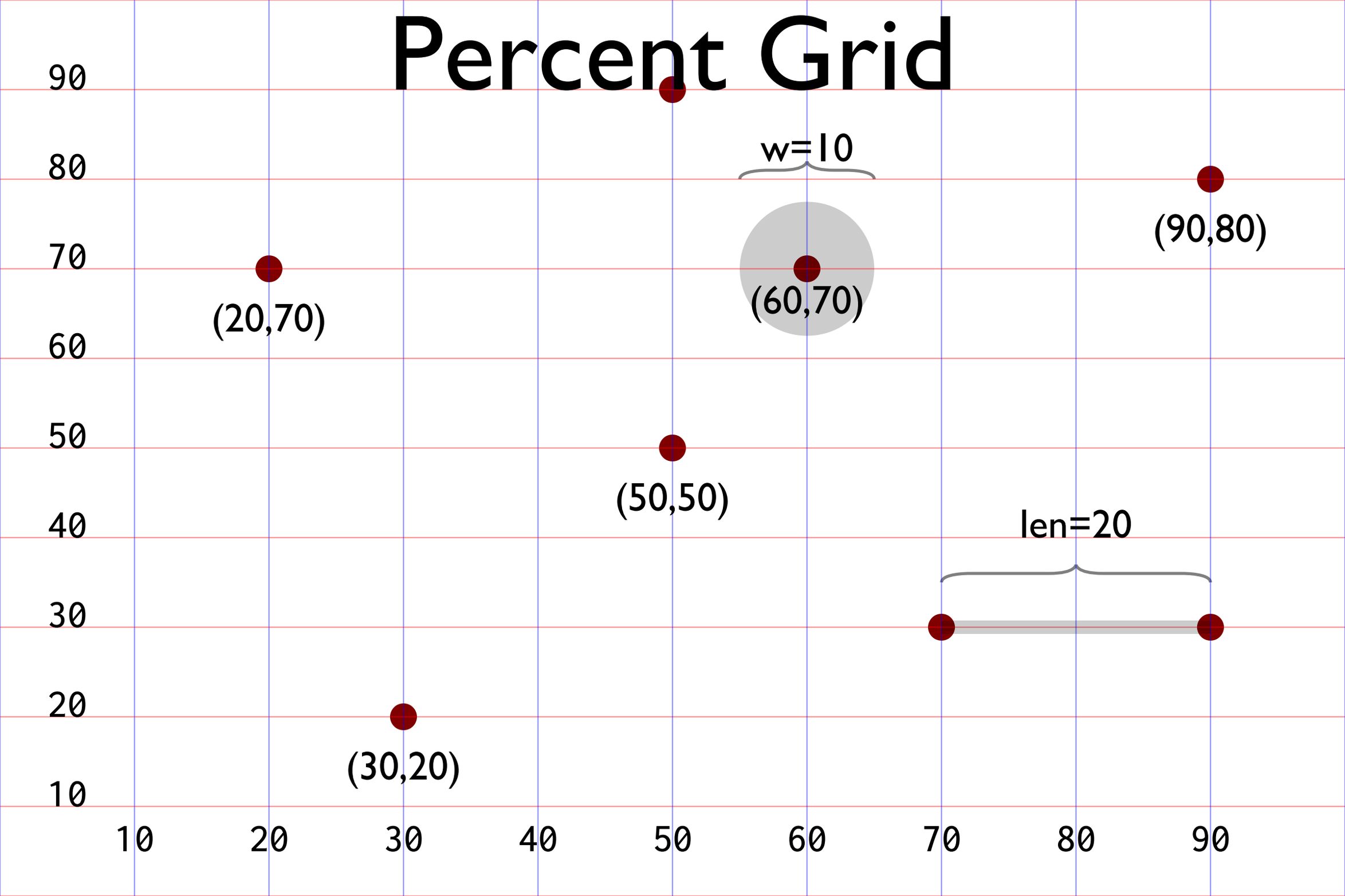



```
text "..string...." x  y  n "font" "color" op


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
```

Structure


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


Percent Grid
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
w=10
(20,70)
(60,70)
(90,80)
(50,50)
len=20
(30,20)

Defining and using variables

name is thing

`x = 3.14159265`	number
`s = "hello"`	string
`y = x`	another variable
`x = a + b`	binary operation
`x *= 10`	assignment operator
`text s x y 2`	variable use

Binary operators

`x = a + b`	addition
`x = a - b`	subtraction
`x = a * b`	multiplication
`x = a / b`	division

Assignment operators

`x += 10`	increase x by 10
`x -= 10`	decrease x by 10
`x *= 10`	multiply x by 10
`x /= 10`	divide x by 10

Special Assignments

`p=(expr, expr)`	coordinates (p_x, p_y)
`p=polar cx cy r theta`	polar coordinate (p_x, p_y)
`x=polarx cx cy r theta`	polar coordinate (x)
`y=polary cx cy r theta`	polar coordinate (y)
`v=random v1 v2`	random number
`v=vmap data v1 v2 v3 v4`	range map
`v=area expr`	area
`v=sqrt expr`	square root

Variables and Assignments

Using variables

```
x=10                // assign 10 to x
y=80.45             // assign 80.45 to y
size=x/5            // x divided by 5 to size
s="Hello"           // s has the string value 'Hello'
text s x y size     // Use the variables
```

Binary operations

```
a=100+200.7         // addition
a=x-10              // subtraction
a=x*10              // multiplication
a=x/y               // division
```

Assignment operations

```
x+=10               // increase x by 10
x-=10               // decrease x by 10
x*=10               // multiply x by 10
x/=y                // divide x by value of y
```

Colors, fonts, opacity, gradient

Colors	Fonts		Opacity (0-100)
`"steelblue"`	`"sans"`	Sans Serif	100 
`"#4682b4"`	`"serif"`	Serif	50 
`"rgb(70,130,180)"`	`"mono"`	Monospace	25 
`"hsv(207,61,71)"`	`"symbol"`	❀✲❀❄❄	10

`"red/blue/90"` 

(applies to rect and square only)

Color Index

name	hex	RGB
aliceblue	#f0f8ff	rgb(240,248,255)
antiquewhite	#faebd7	rgb(250,235,215)
aqua	#00ffff	rgb(0,255,255)
aquamarine	#7fffd4	rgb(127,255,212)
azure	#f0ffff	rgb(240,255,255)
beige	#f5f5dc	rgb(245,245,220)
bisque	#ffe4c4	rgb(255,228,196)
black	#000000	rgb(0,0,0)
blanchedalmond	#ffebcd	rgb(255,235,205)
blue	#0000ff	rgb(0,0,255)
blueviolet	#8a2be2	rgb(138,43,226)
brown	#a52a2a	rgb(165,42,42)
burlywood	#deb887	rgb(222,184,135)
cadetblue	#5f9ea0	rgb(95,158,160)
chartreuse	#7fff00	rgb(127,255,0)
chocolate	#d2691e	rgb(210,105,30)

name	hex	RGB
coral	#ff7f50	rgb(255,127,80)
cornflowerblue	#6495ed	rgb(100,149,237)
cornsilk	#fff8dc	rgb(255,248,220)
crimson	#dc143c	rgb(220,20,60)
cyan	#00ffff	rgb(0,255,255)
darkblue	#00008b	rgb(0,0,139)
darkcyan	#008b8b	rgb(0,139,139)
darkgoldenrod	#b8860b	rgb(184,134,11)
darkgray	#a9a9a9	rgb(169,169,169)
darkgreen	#006400	rgb(0,100,0)
darkgrey	#a9a9a9	rgb(169,169,169)
darkkhaki	#bdb76b	rgb(189,183,107)
darkmagenta	#8b008b	rgb(139,0,139)
darkolivegreen	#556b2f	rgb(85,107,47)
darkorange	#ff8c00	rgb(255,140,0)
darkorchid	#9932cc	rgb(153,50,204)

Color Index (2)

name	hex	RGB
darkred	#8b0000	rgb(139,0,0)
darksalmon	#e9967a	rgb(233,150,122)
darkseagreen	#8fbc8f	rgb(143,188,143)
darkslateblue	#483d8b	rgb(72,61,139)
darkslategray	#2f4f4f	rgb(47,79,79)
darkslategrey	#2f4f4f	rgb(47,79,79)
darkturquoise	#00ced1	rgb(0,206,209)
darkviolet	#9400d3	rgb(148,0,211)
deeppink	#ff1493	rgb(255,20,147)
deepskyblue	#00bfff	rgb(0,191,255)
dimgray	#696969	rgb(105,105,105)
dimgrey	#696969	rgb(105,105,105)
dodgerblue	#1e90ff	rgb(30,144,255)
firebrick	#b22222	rgb(178,34,34)
floralwhite	#fffaf0	rgb(255,250,240)
forestgreen	#228b22	rgb(34,139,34)

name	hex	RGB
fuchsia	#ff00ff	rgb(255,0,255)
gainsboro	#dcdcdc	rgb(220,220,220)
ghostwhite	#f8f8ff	rgb(248,248,255)
gold	#ffd700	rgb(255,215,0)
goldenrod	#daa520	rgb(218,165,32)
gray	#808080	rgb(128,128,128)
green	#008000	rgb(0,128,0)
greenyellow	#adff2f	rgb(173,255,47)
grey	#808080	rgb(128,128,128)
honeydew	#f0fff0	rgb(240,255,240)
hotpink	#ff69b4	rgb(255,105,180)
indianred	#cd5c5c	rgb(205,92,92)
indigo	#4b0082	rgb(75,0,130)
ivory	#fffff0	rgb(255,255,240)
khaki	#f0e68c	rgb(240,230,140)
lavender	#e6e6fa	rgb(230,230,250)

Color Index (3)

name	hex	RGB
lavenderblush	#fff0f5	rgb(255,240,245)
lawngreen	#7cfc00	rgb(124,252,0)
lemonchiffon	#fffacd	rgb(255,250,205)
lightblue	#add8e6	rgb(173,216,230)
lightcoral	#f08080	rgb(240,128,128)
lightcyan	#e0ffff	rgb(224,255,255)
lightgoldenrodyellow	#fafad2	rgb(250,250,210)
lightgray	#d3d3d3	rgb(211,211,211)
lightgreen	#90ee90	rgb(144,238,144)
lightgrey	#d3d3d3	rgb(211,211,211)
lightpink	#ffb6c1	rgb(255,182,193)
lightsalmon	#ffa07a	rgb(255,160,122)
lightseagreen	#20b2aa	rgb(32,178,170)
lightskyblue	#87cefa	rgb(135,206,250)
lightslategray	#778899	rgb(119,136,153)
lightslategrey	#778899	rgb(119,136,153)

name	hex	RGB
lightsteelblue	#b0c4de	rgb(176,196,222)
lightyellow	#ffffe0	rgb(255,255,224)
lime	#00ff00	rgb(0,255,0)
limegreen	#32cd32	rgb(50,205,50)
linen	#faf0e6	rgb(250,240,230)
magenta	#ff00ff	rgb(255,0,255)
maroon	#800000	rgb(128,0,0)
mediumaquamarine	#66cdaa	rgb(102,205,170)
mediumblue	#0000cd	rgb(0,0,205)
mediumorchid	#ba55d3	rgb(186,85,211)
mediumpurple	#9370db	rgb(147,112,219)
mediumseagreen	#3cb371	rgb(60,179,113)
mediumslateblue	#7b68ee	rgb(123,104,238)
mediumspringgreen	#00fa9a	rgb(0,250,154)
mediumturquoise	#48d1cc	rgb(72,209,204)
mediumvioletred	#c71585	rgb(199,21,133)

Color Index (4)

name	hex	RGB
midnightblue	#191970	rgb(25,25,112)
mintcream	#f5fffa	rgb(245,255,250)
mistyrose	#ffe4e1	rgb(255,228,225)
moccasin	#ffe4b5	rgb(255,228,181)
navajowhite	#ffdead	rgb(255,222,173)
navy	#000080	rgb(0,0,128)
oldlace	#fdf5e6	rgb(253,245,230)
olive	#808000	rgb(128,128,0)
olivedrab	#6b8e23	rgb(107,142,35)
orange	#ffa500	rgb(255,165,0)
orangered	#ff4500	rgb(255,69,0)
orchid	#da70d6	rgb(218,112,214)
palegoldenrod	#eee8aa	rgb(238,232,170)
palegreen	#98fb98	rgb(152,251,152)
paleturquoise	#afeeee	rgb(175,238,238)
palevioletred	#db7093	rgb(219,112,147)

name	hex	RGB
papayawhip	#ffefd5	rgb(255,239,213)
peachpuff	#ffdab9	rgb(255,218,185)
peru	#cd853f	rgb(205,133,63)
pink	#ffc0cb	rgb(255,192,203)
plum	#dda0dd	rgb(221,160,221)
powderblue	#b0e0e6	rgb(176,224,230)
purple	#800080	rgb(128,0,128)
red	#ff0000	rgb(255,0,0)
rosybrown	#bc8f8f	rgb(188,143,143)
royalblue	#4169e1	rgb(65,105,225)
saddlebrown	#8b4513	rgb(139,69,19)
salmon	#fa8072	rgb(250,128,114)
sandybrown	#f4a460	rgb(244,164,96)
seagreen	#2e8b57	rgb(46,139,87)
seashell	#fff5ee	rgb(255,245,238)
sienna	#a0522d	rgb(160,82,45)

Color Index (5)

name	hex	RGB
silver	#c0c0c0	rgb(192,192,192)
skyblue	#87ceeb	rgb(135,206,235)
slateblue	#6a5acd	rgb(106,90,205)
slategray	#708090	rgb(112,128,144)
slategrey	#708090	rgb(112,128,144)
snow	#fffafa	rgb(255,250,250)
springgreen	#00ff7f	rgb(0,255,127)
steelblue	#4682b4	rgb(70,130,180)
tan	#d2b48c	rgb(210,180,140)
teal	#008080	rgb(0,128,128)
thistle	#d8bfd8	rgb(216,191,216)
tomato	#ff6347	rgb(255,99,71)
turquoise	#40e0d0	rgb(64,224,208)
violet	#ee82ee	rgb(238,130,238)
wheat	#f5deb3	rgb(245,222,179)
white	#ffffff	rgb(255,255,255)
whitesmoke	#f5f5f5	rgb(245,245,245)
yellow	#ffff00	rgb(255,255,0)
yellowgreen	#9acd32	rgb(154,205,50)

Neutrals

name	hex	RGB
aliceblue	#f0f8ff	rgb(240,248,255)
antiquewhite	#faebd7	rgb(250,235,215)
azure	#f0ffff	rgb(240,255,255)
beige	#f5f5dc	rgb(245,245,220)
bisque	#ffe4c4	rgb(255,228,196)
black	#000000	rgb(0,0,0)
blanchedalmond	#ffebcd	rgb(255,235,205)
brown	#a52a2a	rgb(165,42,42)
burlywood	#deb887	rgb(222,184,135)
chocolate	#d2691e	rgb(210,105,30)
cornsilk	#fff8dc	rgb(255,248,220)
darkgray	#a9a9a9	rgb(169,169,169)
darkgrey	#a9a9a9	rgb(169,169,169)
darksalmon	#e9967a	rgb(233,150,122)
darkslategray	#2f4f4f	rgb(47,79,79)
darkslategrey	#2f4f4f	rgb(47,79,79)

name	hex	RGB
dimgray	#696969	rgb(105,105,105)
dimgrey	#696969	rgb(105,105,105)
floralwhite	#fffaf0	rgb(255,250,240)
gainsboro	#dcdcdc	rgb(220,220,220)
ghostwhite	#f8f8ff	rgb(248,248,255)
gray	#808080	rgb(128,128,128)
grey	#808080	rgb(128,128,128)
honeydew	#f0fff0	rgb(240,255,240)
ivory	#fffff0	rgb(255,255,240)
lavender	#e6e6fa	rgb(230,230,250)
lavenderblush	#fff0f5	rgb(255,240,245)
lightgray	#d3d3d3	rgb(211,211,211)
lightgrey	#d3d3d3	rgb(211,211,211)
lightslategray	#778899	rgb(119,136,153)
lightslategrey	#778899	rgb(119,136,153)
linen	#faf0e6	rgb(250,240,230)

Neutrals (2)

name	hex	RGB
mintcream	#f5fffa	rgb(245,255,250)
mistyrose	#ffe4e1	rgb(255,228,225)
moccasin	#ffe4b5	rgb(255,228,181)
navajowhite	#ffdead	rgb(255,222,173)
oldlace	#fdf5e6	rgb(253,245,230)
papayawhip	#ffefd5	rgb(255,239,213)
peachpuff	#ffdab9	rgb(255,218,185)
peru	#cd853f	rgb(205,133,63)
rosybrown	#bc8f8f	rgb(188,143,143)
saddlebrown	#8b4513	rgb(139,69,19)
salmon	#fa8072	rgb(250,128,114)
sandybrown	#f4a460	rgb(244,164,96)
seashell	#fff5ee	rgb(255,245,238)
sienna	#a0522d	rgb(160,82,45)
silver	#c0c0c0	rgb(192,192,192)
slategray	#708090	rgb(112,128,144)

name	hex	RGB
slategrey	#708090	rgb(112,128,144)
snow	#fffafa	rgb(255,250,250)
tan	#d2b48c	rgb(210,180,140)
wheat	#f5deb3	rgb(245,222,179)
white	#ffffff	rgb(255,255,255)
whitesmoke	#f5f5f5	rgb(245,245,245)

Reds

name	hex	RGB
coral	#ff7f50	rgb(255,127,80)
crimson	#dc143c	rgb(220,20,60)
darkmagenta	#8b008b	rgb(139,0,139)
darkred	#8b0000	rgb(139,0,0)
deeppink	#ff1493	rgb(255,20,147)
firebrick	#b22222	rgb(178,34,34)
fuchsia	#ff00ff	rgb(255,0,255)
hotpink	#ff69b4	rgb(255,105,180)
indianred	#cd5c5c	rgb(205,92,92)
lightcoral	#f08080	rgb(240,128,128)
lightpink	#ffb6c1	rgb(255,182,193)
lightsalmon	#ffa07a	rgb(255,160,122)
magenta	#ff00ff	rgb(255,0,255)
maroon	#800000	rgb(128,0,0)
orangered	#ff4500	rgb(255,69,0)
orchid	#da70d6	rgb(218,112,214)

name	hex	RGB
palevioletred	#db7093	rgb(219,112,147)
pink	#ffc0cb	rgb(255,192,203)
plum	#dda0dd	rgb(221,160,221)
red	#ff0000	rgb(255,0,0)
thistle	#d8bfd8	rgb(216,191,216)
tomato	#ff6347	rgb(255,99,71)

Greens

name	hex	RGB
aquamarine	#7fffd4	rgb(127,255,212)
chartreuse	#7fff00	rgb(127,255,0)
darkgreen	#006400	rgb(0,100,0)
darkkhaki	#bdb76b	rgb(189,183,107)
darkolivegreen	#556b2f	rgb(85,107,47)
darkseagreen	#8fbc8f	rgb(143,188,143)
forestgreen	#228b22	rgb(34,139,34)
green	#008000	rgb(0,128,0)
greenyellow	#adff2f	rgb(173,255,47)
lawngreen	#7cfc00	rgb(124,252,0)
lightgreen	#90ee90	rgb(144,238,144)
lightseagreen	#20b2aa	rgb(32,178,170)
lime	#00ff00	rgb(0,255,0)
limegreen	#32cd32	rgb(50,205,50)
mediumseagreen	#3cb371	rgb(60,179,113)
mediumspringgreen	#00fa9a	rgb(0,250,154)

name	hex	RGB
olive	#808000	rgb(128,128,0)
olivedrab	#6b8e23	rgb(107,142,35)
palegreen	#98fb98	rgb(152,251,152)
seagreen	#2e8b57	rgb(46,139,87)
springgreen	#00ff7f	rgb(0,255,127)
teal	#008080	rgb(0,128,128)
yellowgreen	#9acd32	rgb(154,205,50)

Blues

name	hex	RGB
aqua	#00ffff	rgb(0,255,255)
blue	#0000ff	rgb(0,0,255)
cadetblue	#5f9ea0	rgb(95,158,160)
cornflowerblue	#6495ed	rgb(100,149,237)
cyan	#00ffff	rgb(0,255,255)
darkblue	#00008b	rgb(0,0,139)
darkcyan	#008b8b	rgb(0,139,139)
darkslateblue	#483d8b	rgb(72,61,139)
darkturquoise	#00ced1	rgb(0,206,209)
deepskyblue	#00bfff	rgb(0,191,255)
dodgerblue	#1e90ff	rgb(30,144,255)
lightblue	#add8e6	rgb(173,216,230)
lightcyan	#e0ffff	rgb(224,255,255)
lightskyblue	#87cefa	rgb(135,206,250)
lightsteelblue	#b0c4de	rgb(176,196,222)
mediumaquamarine	#66cdaa	rgb(102,205,170)

name	hex	RGB
mediumblue	#0000cd	rgb(0,0,205)
mediumslateblue	#7b68ee	rgb(123,104,238)
mediumturquoise	#48d1cc	rgb(72,209,204)
midnightblue	#191970	rgb(25,25,112)
navy	#000080	rgb(0,0,128)
paleturquoise	#afeeee	rgb(175,238,238)
powderblue	#b0e0e6	rgb(176,224,230)
royalblue	#4169e1	rgb(65,105,225)
skyblue	#87ceeb	rgb(135,206,235)
slateblue	#6a5acd	rgb(106,90,205)
steelblue	#4682b4	rgb(70,130,180)
turquoise	#40e0d0	rgb(64,224,208)

Violets

name	hex	RGB
blueviolet	#8a2be2	rgb(138,43,226)
darkorchid	#9932cc	rgb(153,50,204)
darkviolet	#9400d3	rgb(148,0,211)
indigo	#4b0082	rgb(75,0,130)
mediumorchid	#ba55d3	rgb(186,85,211)
mediumpurple	#9370db	rgb(147,112,219)
mediumvioletred	#c71585	rgb(199,21,133)
purple	#800080	rgb(128,0,128)
violet	#ee82ee	rgb(238,130,238)

Yellows

name	hex	RGB
darkgoldenrod	#b8860b	rgb(184,134,11)
darkorange	#ff8c00	rgb(255,140,0)
gold	#ffd700	rgb(255,215,0)
goldenrod	#daa520	rgb(218,165,32)
khaki	#f0e68c	rgb(240,230,140)
lemonchiffon	#fffacd	rgb(255,250,205)
lightgoldenrodyellow	#fafad2	rgb(250,250,210)
lightyellow	#ffffe0	rgb(255,255,224)
orange	#ffa500	rgb(255,165,0)
palegoldenrod	#eee8aa	rgb(238,232,170)
yellow	#ffff00	rgb(255,255,0)

(b)text ctext etext rtext arctext textbox textfile textcode line

begin center end

rotate

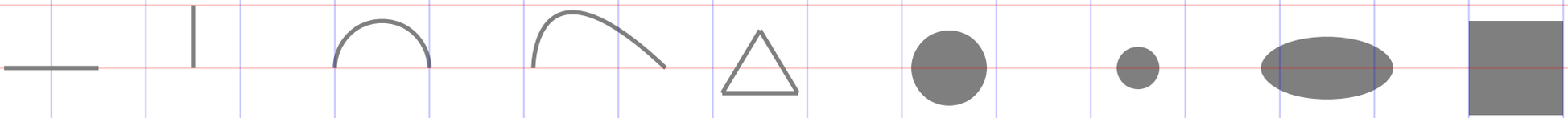
hello, world

Now is the time
for all good men
to come

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

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

hline vline arc curve polyline circle acircle ellipse square

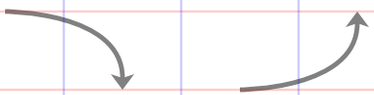


rect rrect pill polygon star image cimage lbrace rbrace

sky

ubrace dbrace lbracket rbracket ubracket dbracket arrow lcarrow rcarrow

dcarrow ucarrow list blist nlist clist



one
two
three

- one
- two
- three

1. one
2. two
3. three

first
second item
thrid

Textual Elements

description	keyword	mandatory	optional
Left-aligned	`text`	`"..." x y fontsize`	`font color op link`
Centered	`ctext`	`"..." x y fontsize`	`font color op link`
End-aligned	`etext`	`"..." x y fontsize`	`font color op link`
Rotated	`rtext`	`"..." x y angle fontsize`	`font color op link`
Text on an arc	`arctext`	`"..." x y rad a1 a2 fontsize`	`font color op link`
Block text	`textblock`	`"..." x y w fontsize`	`font color op link`
File contents	`textfile`	`"file" x y fontsize`	`font color op spacing`
Code listing	`textcode`	`"file" x y w fontsize`	`font color`

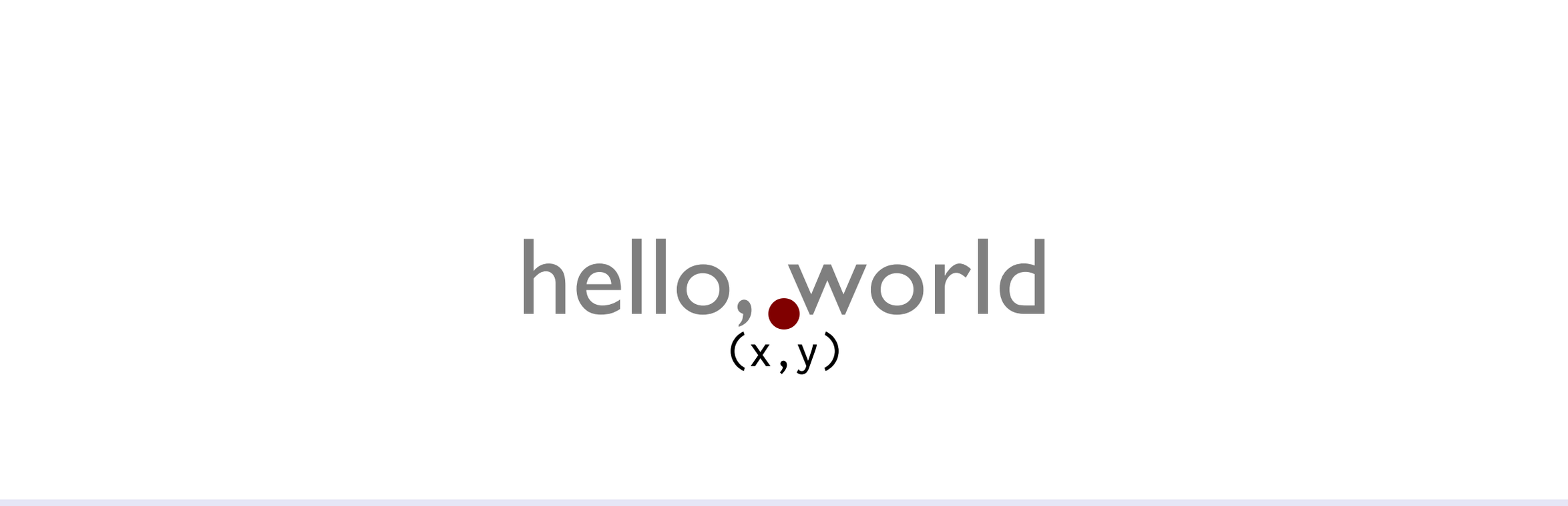

```
text "..." x y fontsize font color op link
```

abc

```
text "abc" 20 20 4
```

abc

```
text "abc" 75 20 7 "mono" "maroon"
```



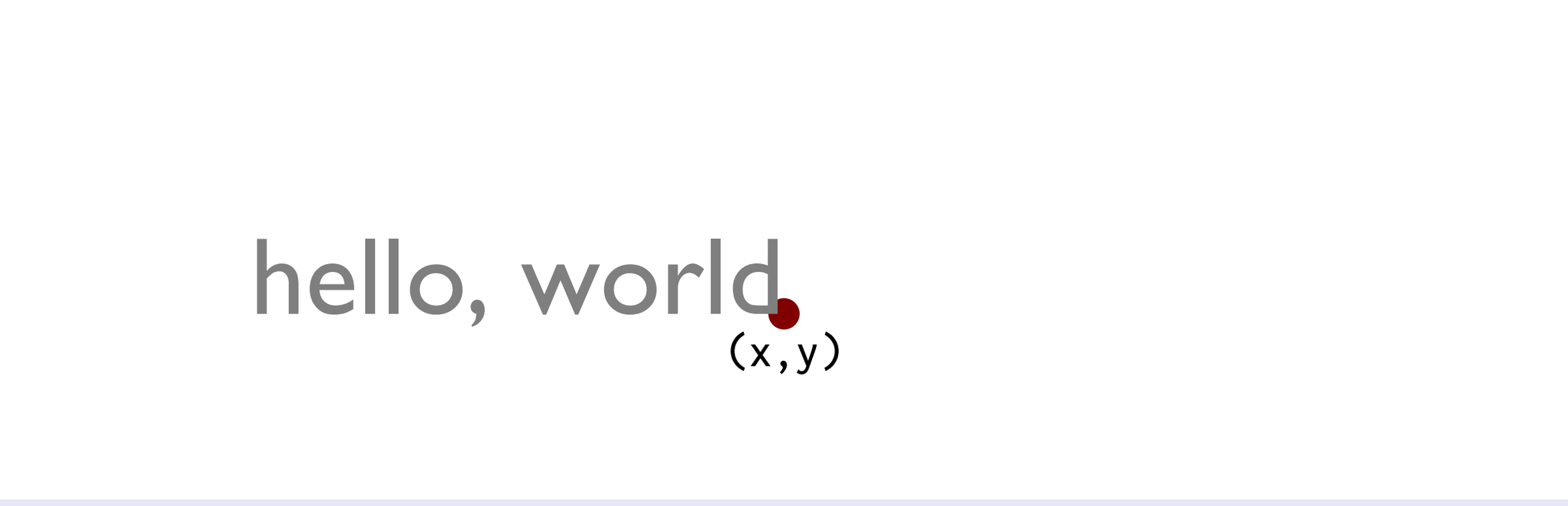

```
ctext "..." x y fontsize  font color op link
```

abc

```
ctext "abc" 20 20 4
```

abc

```
ctext "abc" 80 20 7 "mono" "maroon"
```




```
etext "..." x y fontsize  font color op link
```

abc

```
etext "abc" 20 20 4
```

abc

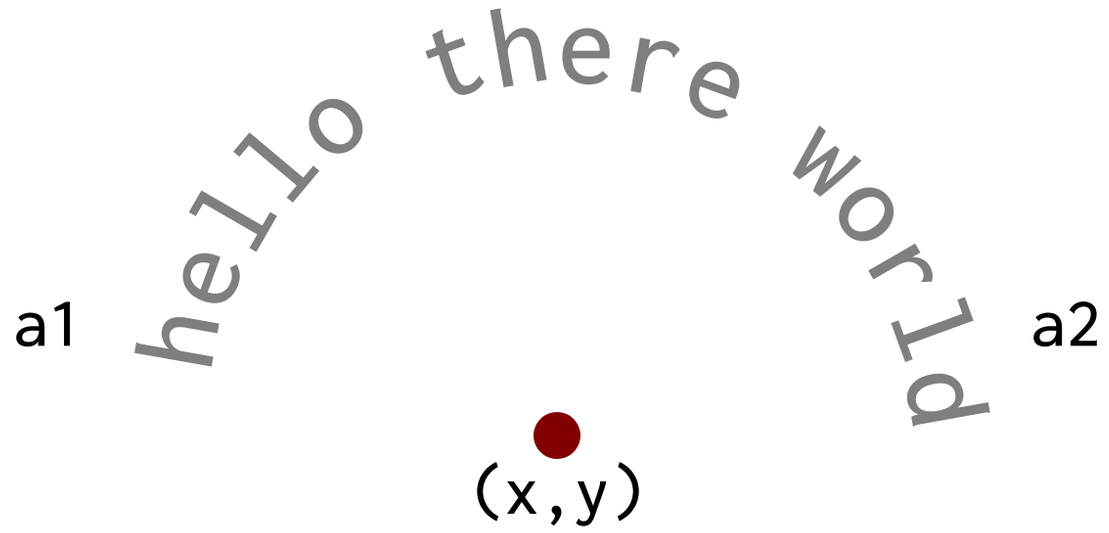
```
etext "abc" 80 20 7 "mono" "maroon"
```


```
rtext "..." x y angle fontsize  font color op link
```


```
ctext 20 20 30 3
```

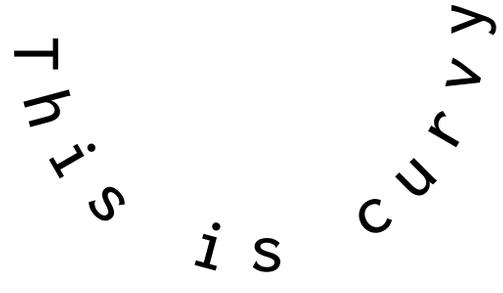

```
ctext 50 20 90 5
```


```
ctext 80 20 270 4 "sans" "maroon"
```

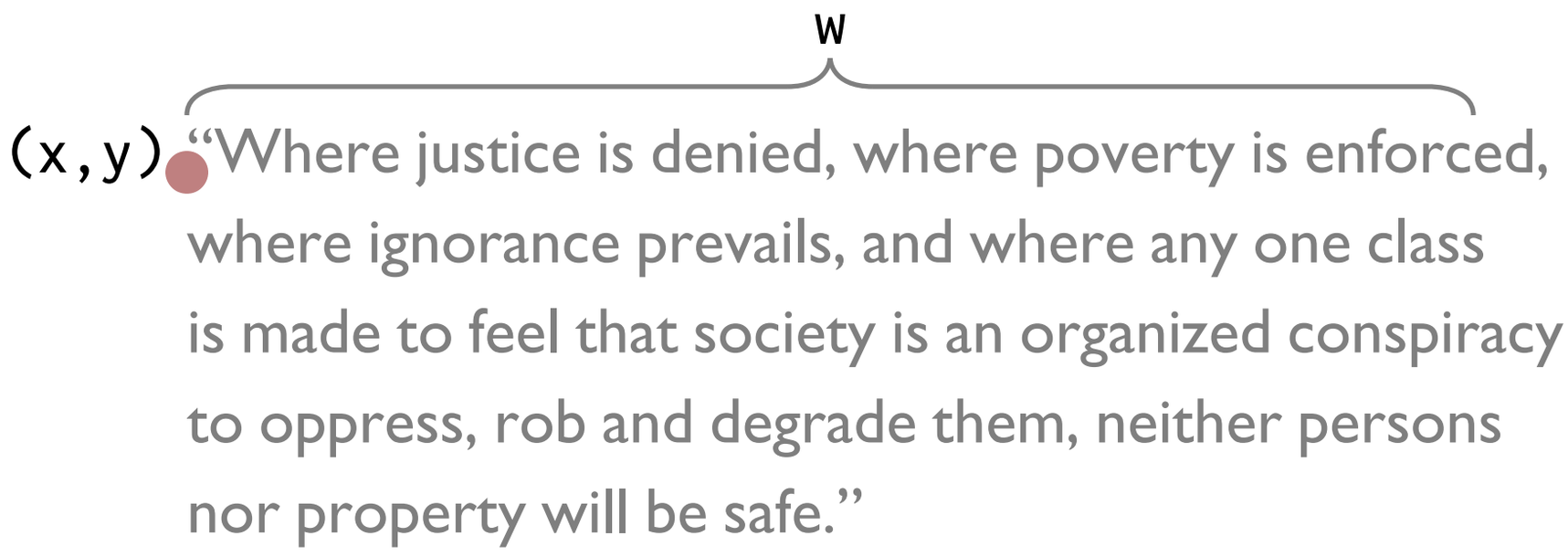



```
arctext "..." x y radius a1 a2 fontsize font color op link
```


```
arctext "What is up" 25 20 10 180 90 3 "mono"
```




```
arctext "This is curvy" 75 30 10 180 360 3 "mono"
```



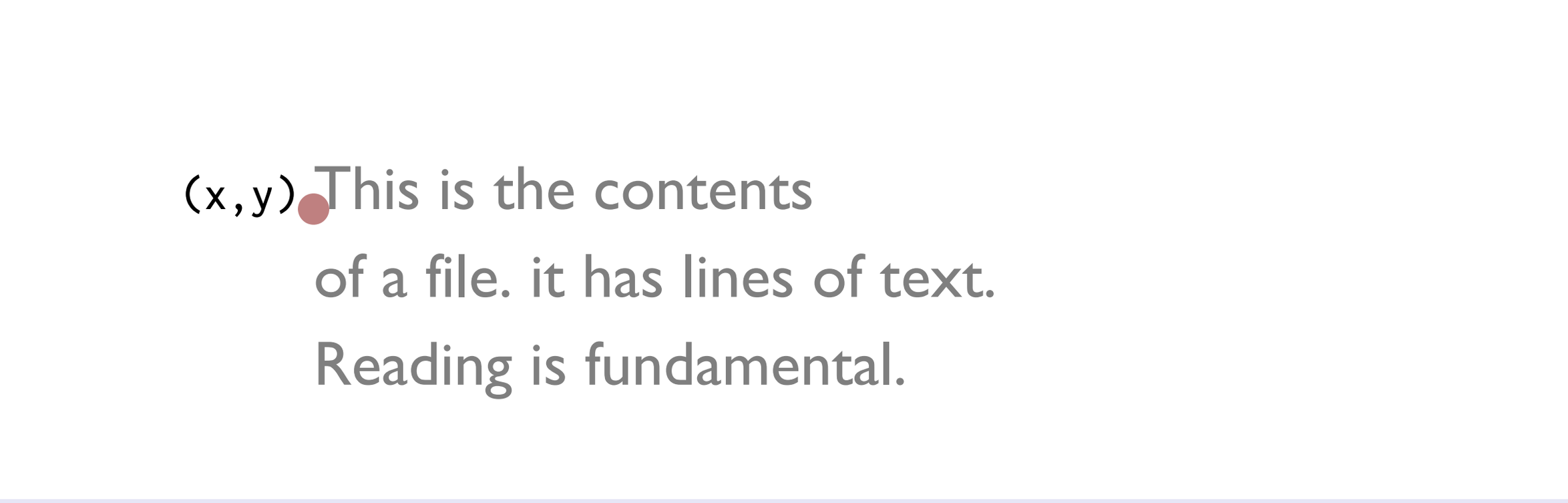

```
textblock "..." x y w fontsize font color op link
```

“Where justice is denied, where poverty is enforced, where ignorance prevails, and where any one class is made to feel that society is an organized conspiracy to oppress, rob and degrade them, neither persons nor property will be safe.”

```
textblock "..." 10 35 30 2
```

“Where justice is denied, where poverty is enforced, where ignorance prevails, and where any one class is made to feel that society is an organized conspiracy to oppress, rob and degrade them, neither persons nor property will be safe.”

```
textblock "..." 50 35 10 1 "sans" "maroon"
```



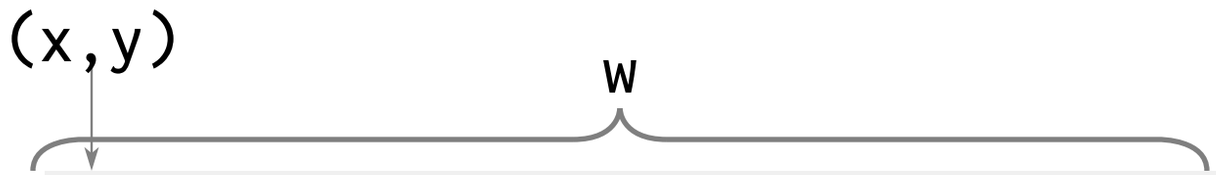

```
textfile "..." x y fontsize font color op link
```

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

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

```
textfile "example.txt" 10 35 2
```

```
textfile "hw-go" 55 35 1.6 "mono" "maroon"
```




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

textcode "..." x y w fontsize font color

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

textcode "hw-go" 10 35 25 1.0

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

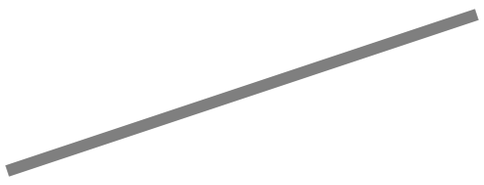
textcode "hw-go" 55 35 40 1.6 "maroon"

Graphical Elements

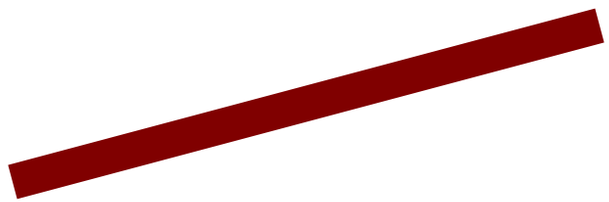
description	keyword	mandatory	optional
Line	line	x1 y1 x2 y2 lw	color op
Horizontal line	hline	x y w	lw color op
Vertical line	vline	x y h	lw color op
Elliptical arc	arc	x y w h a1 a2	lw color op
Quadratic Bezier	curve	bx by cx cy ex ey	lw color op
Circle	circle	x y w	color op
Area circle	acircle	x y area	color op
Ellipse	ellipse	x y w h	color op
Square	square	x y w	color op
Rectangle	rect	x y w h	color op
Rounded rectangle	rrect	x y w h radius	color
Pill shape	pill	x y w h	color
Polygon	polygon	"x1 x2...xn" "y1 y2...yn"	color op
Polyline	polyline	"x1 x2...xn" "y1 y2...yn"	lw color op
N-sided star	star	x y sides inner outer	color op


```
line x1 y1 x2 y2 lw  color op
```

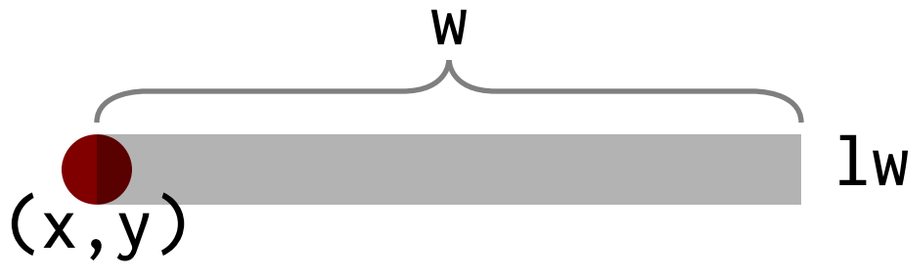

line 10 20 30 20



line 40 20 60 30 0.5



line 70 20 95 30 1.5 "maroon"




```
hline x y w lw color op
```

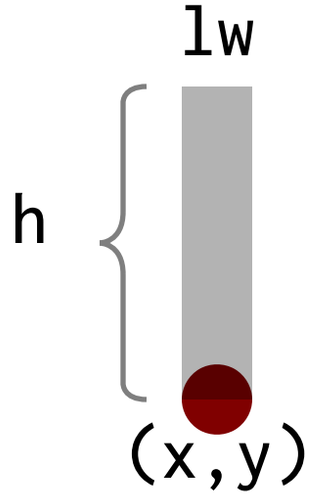


```
hline 15 20 10
```

```
hline 40 20 20 1
```



```
hline 70 20 20 5 "maroon" 20
```

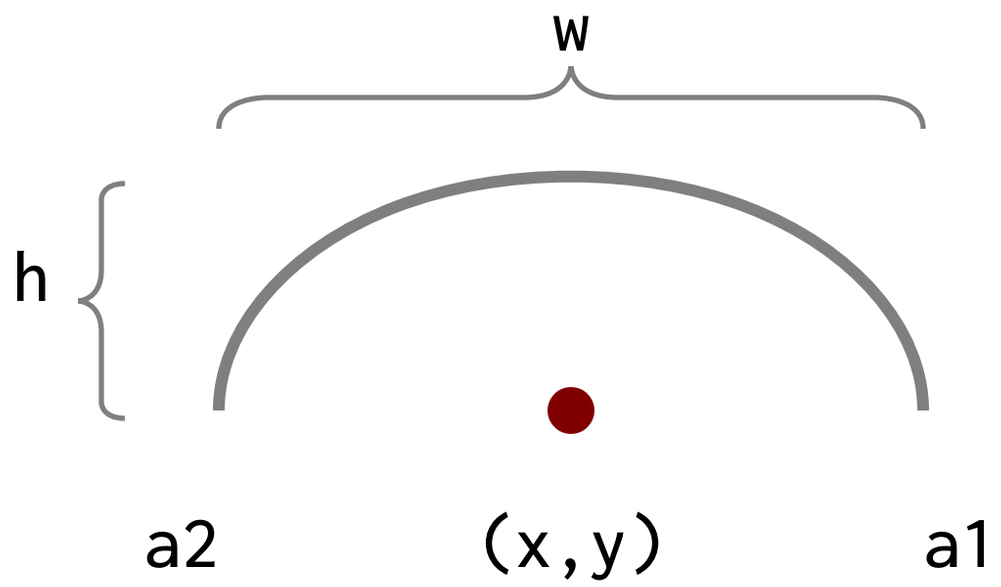


vline x y w lw color op

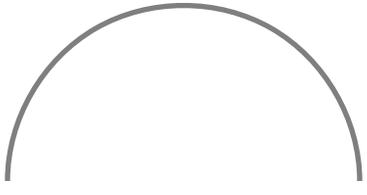
vline 20 20 15

vline 50 20 15 2

vline 80 20 15 10 "maroon" 20

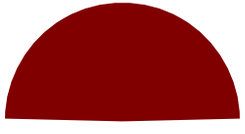



```
arc x y w h a1 a2 lw color op
```

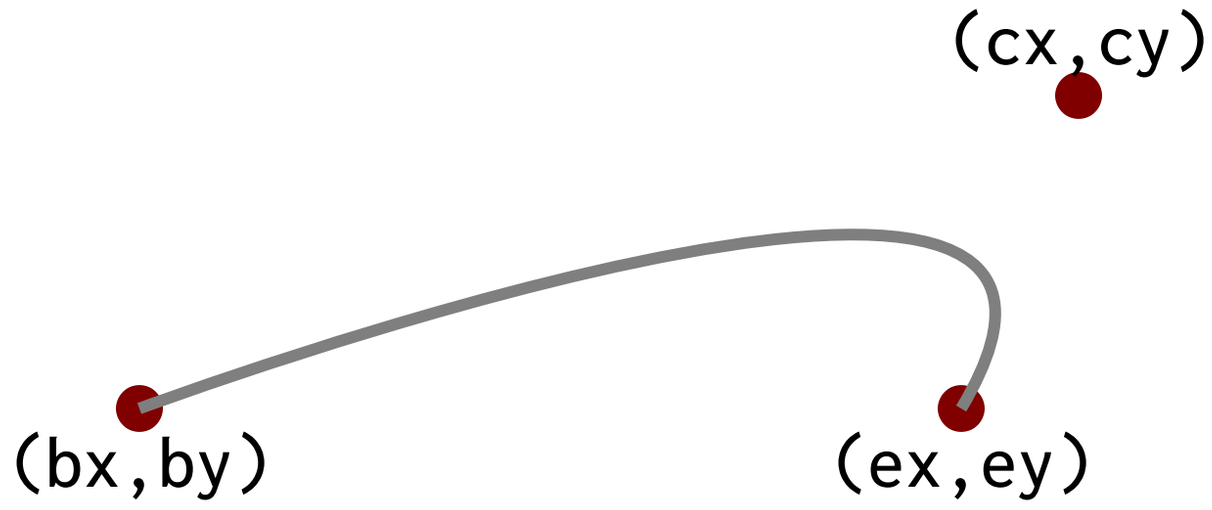


arc 20 20 15 15 0 180

arc 50 20 15 15 0 90 1



arc 80 20 5 5 0 180 5 "maroon"

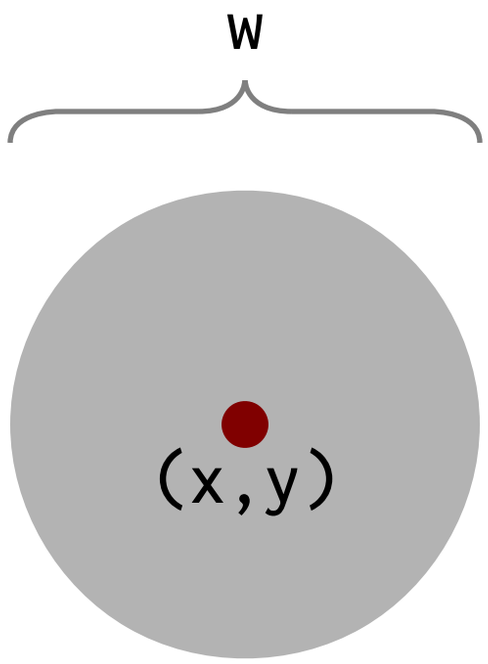


curve bx by cx cy ex ey lw color op

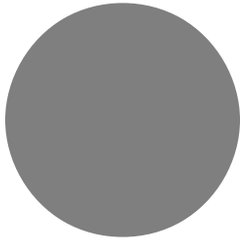
curve 15 20 25 30 30 25

curve 15 20 25 30 30 25

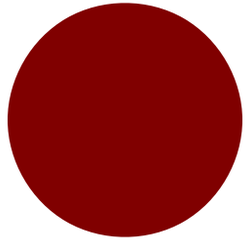
curve 70 20 70 30 90 25 0.5 "maroon"




```
circle x y w  color op
```

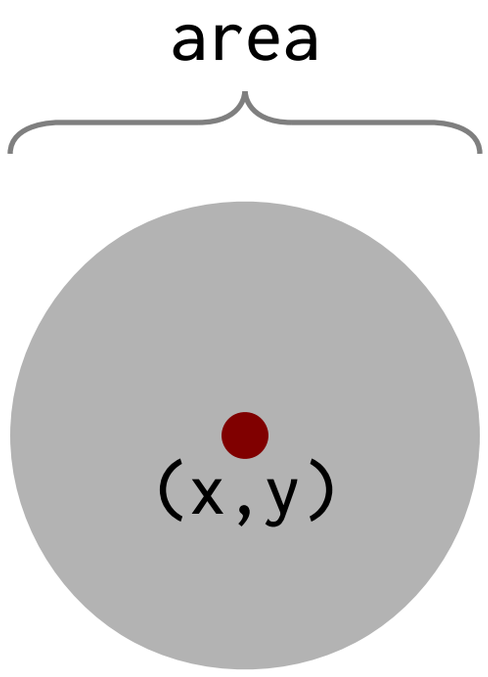


circle 20 20 10



circle 50 20 10 "maroon"

circle 80 20 5 "maroon" 20



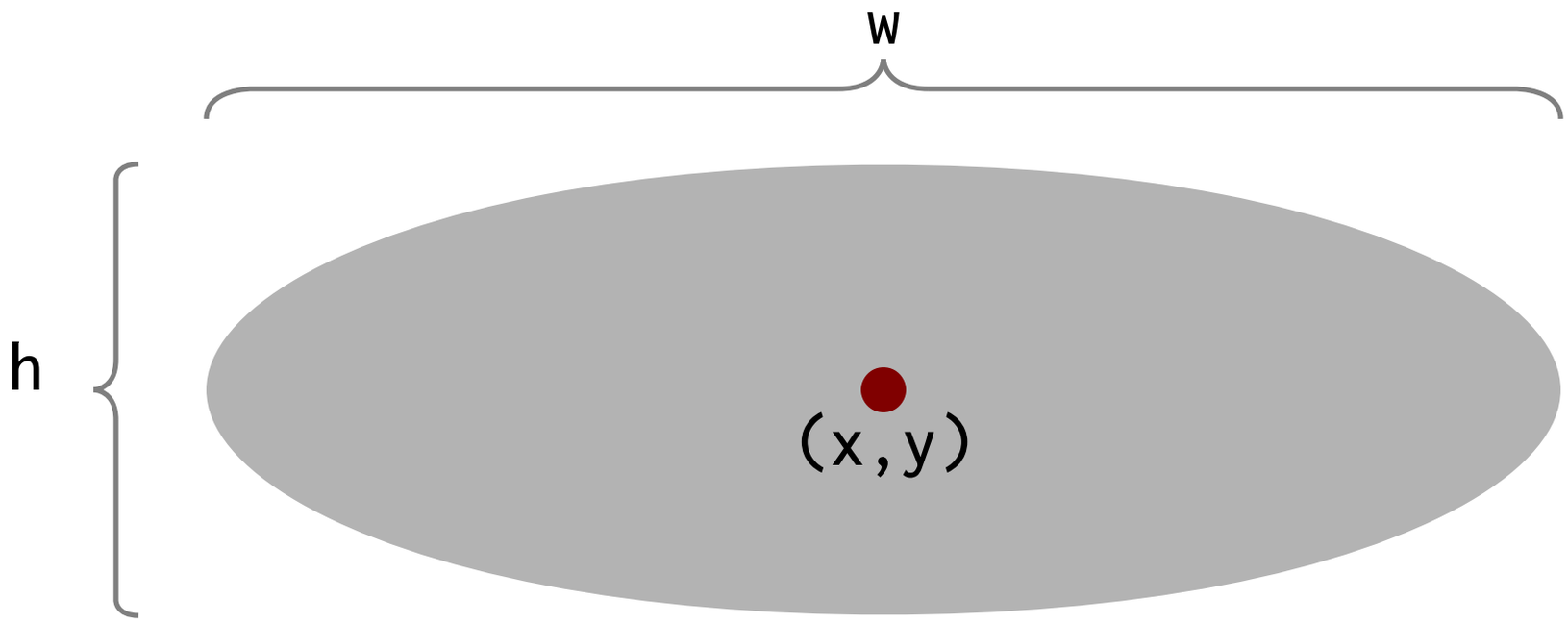

```
circle x y area color op
```

```
acircle 20 20 10
```

```
acircle 50 20 10 "maroon"
```



```
acircle 80 20 5 "maroon" 20
```



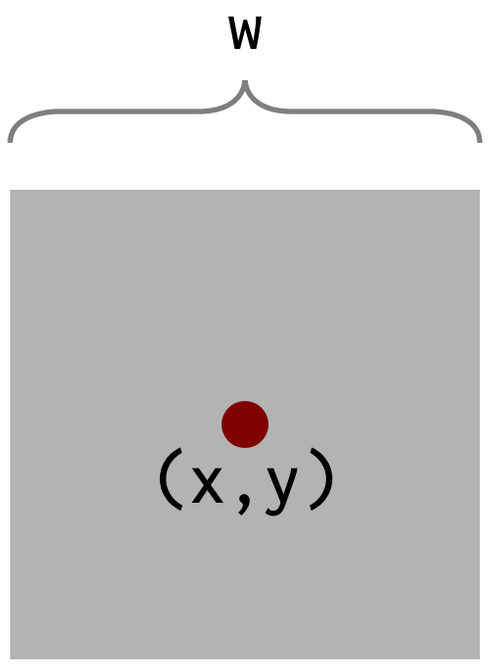

```
ellipse x y w h color op
```

```
ellipse 20 20 10 5
```

```
ellipse 50 20 10 5 "maroon"
```



```
ellipse 80 20 5 10 "maroon" 20
```

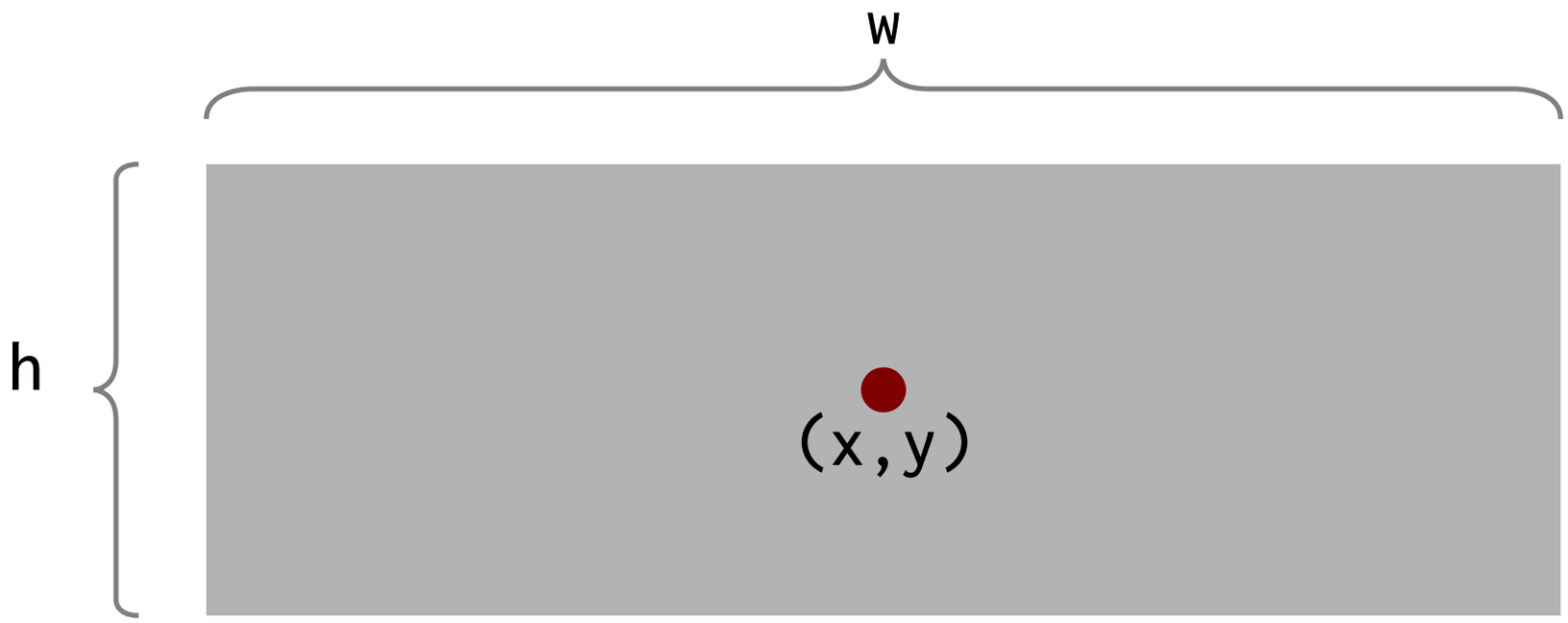



```
square x y w color op
```

square 20 20 10

square 50 20 10 "maroon"

square 80 20 5 "maroon" 20



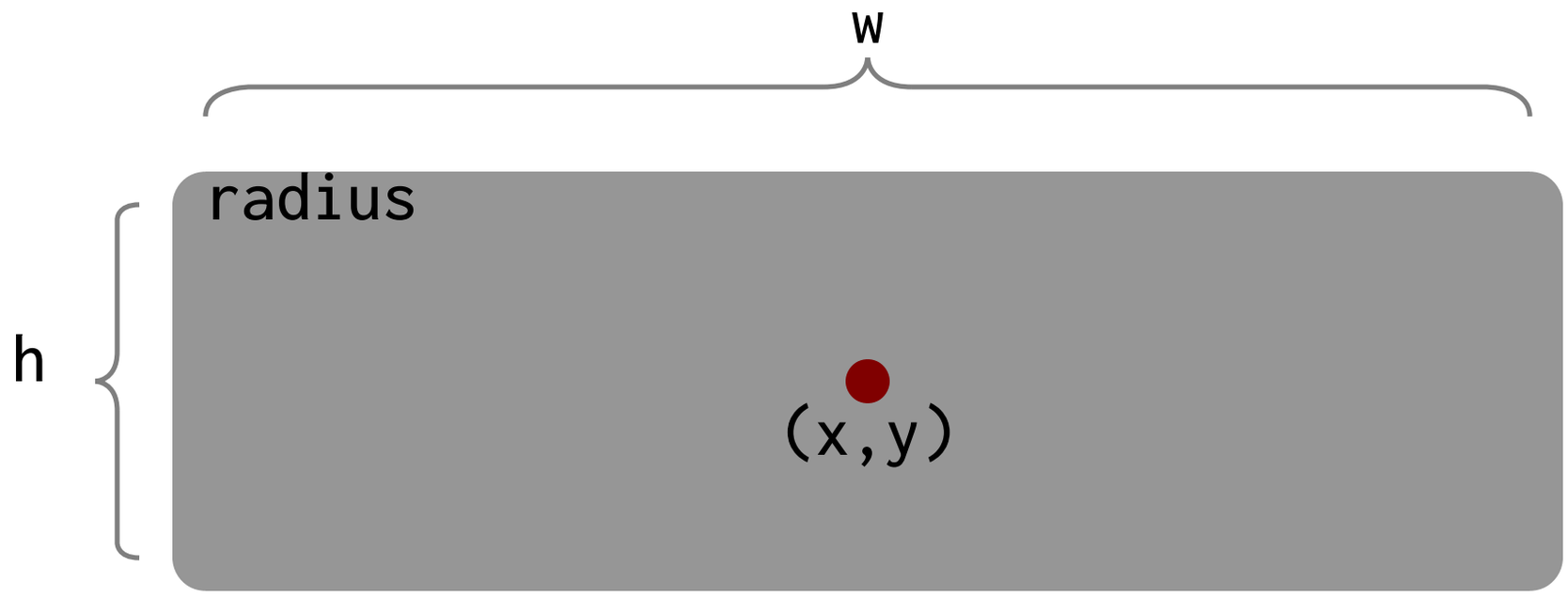

```
rect x y w h color op
```

```
rect 20 20 10 5
```

```
rect 50 20 10 5 "maroon"
```

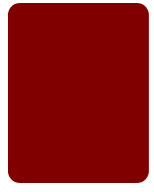


```
rect 80 20 5 10 "maroon" 20
```

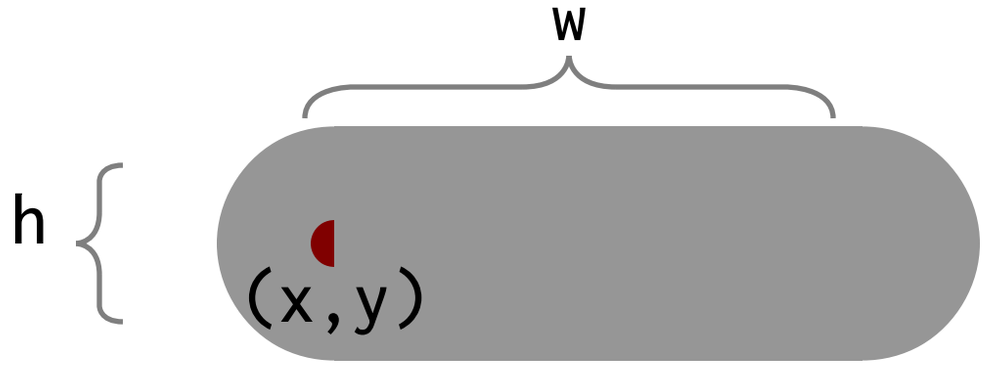



```
rrect x y w h radius color op
```

```
rrect 20 20 10 5 1
```

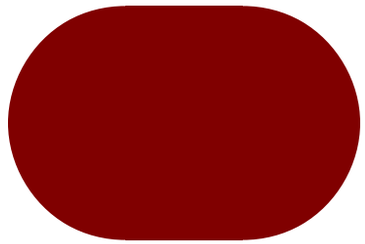


```
rrect 80 20 5 10 1 "maroon"
```

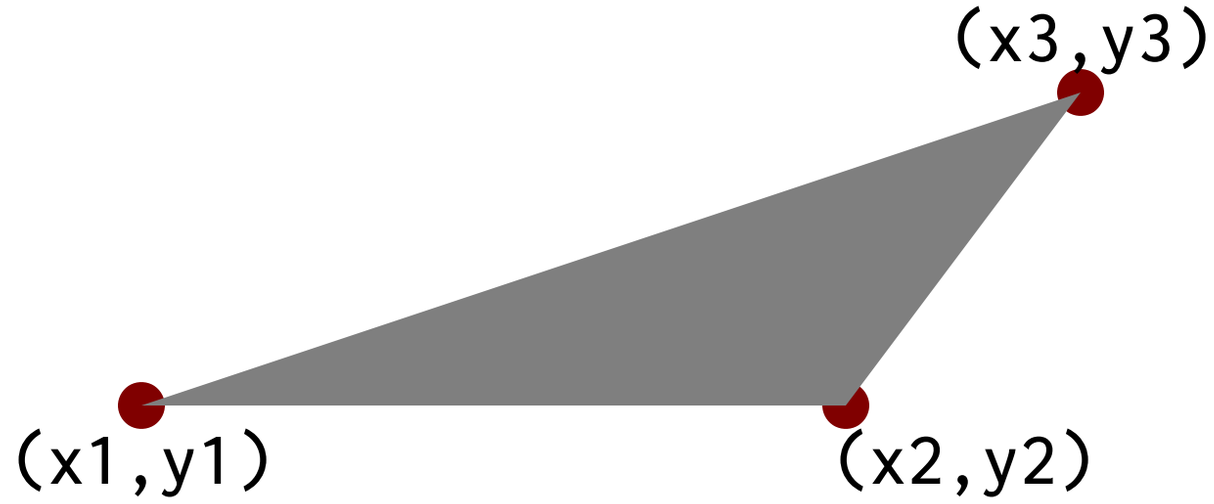



```
pill x y w h color
```

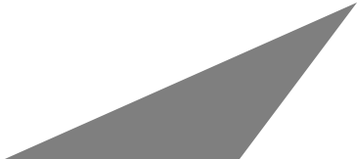
```
pill 20 20 10 5
```



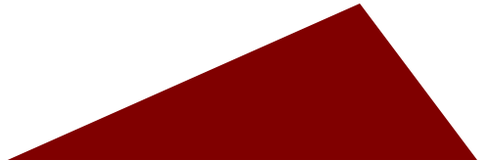
```
pill 80 20 5 10 "maroon"
```



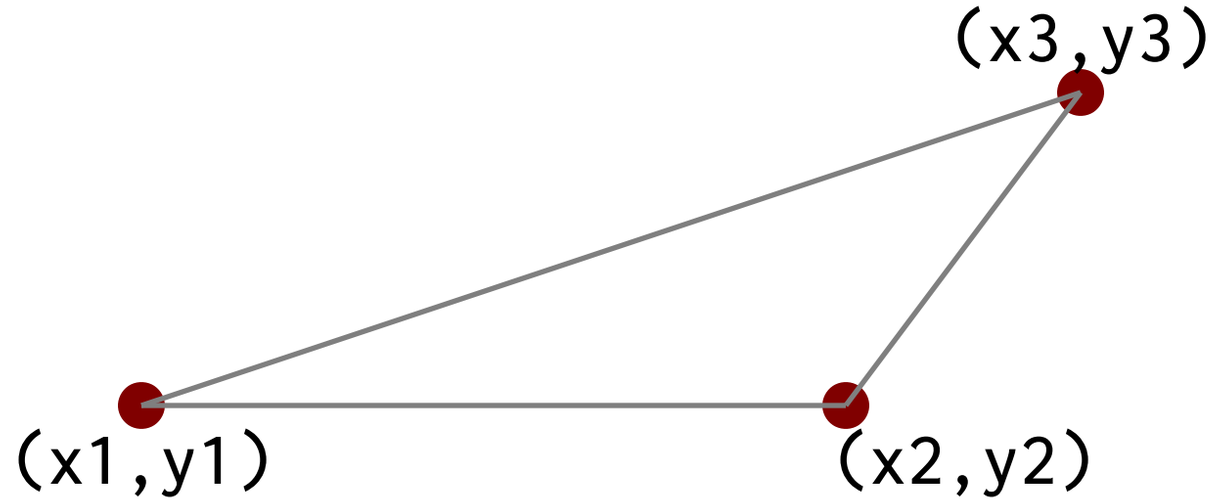

```
polygon x1 x2...xn" "y1 y2...yn color op
```



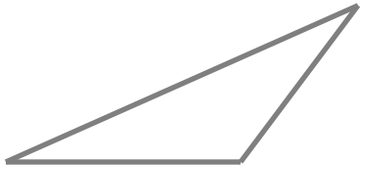
```
polygon "10 25 20" "20 30 20"
```



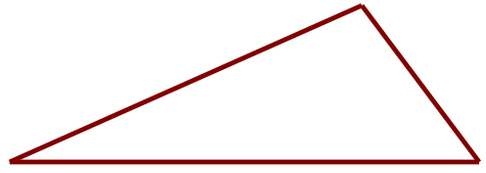
```
polygon "70 85 90" "20 30 20" "maroon"
```



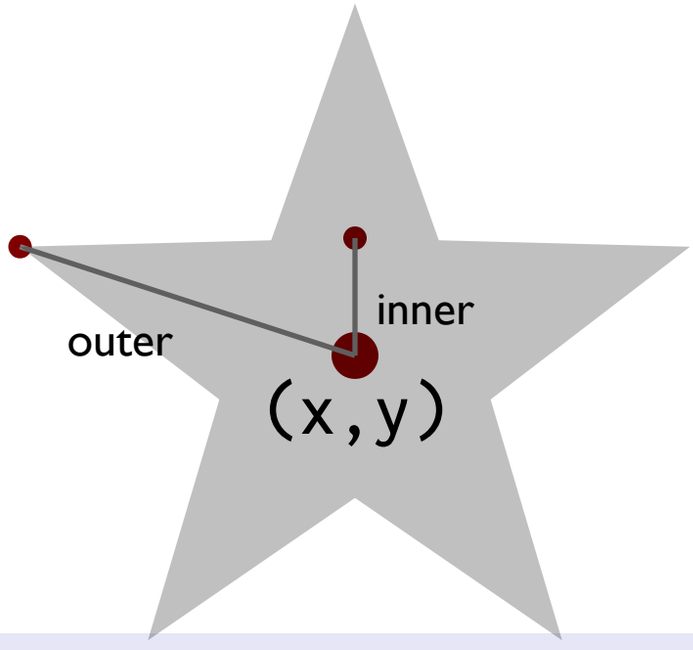

```
polyline x1 x2...xn" "y1 y2...yn  lw color op
```



```
polyline "10 25 20" "20 30 20"
```

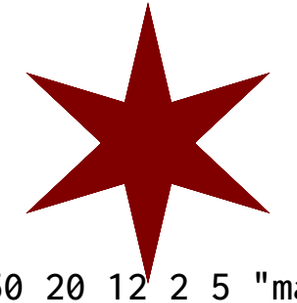


```
polyline "70 85 90" "20 30 20" 0.2 "maroon"
```




```
star x y sides inner outer color op
```

```
star 20 20 5 2 6
```



```
star 50 20 12 2 5 "maroon"
```

```
star 80 ey 24 2 8 "maroon" 20
```

Images

description	keyword	mandatory	optional
Image	`image`	`"file" x y w h`	`scale "link"`
Captioned image	`cimage`	`"file" "caption" x y w h`	`scale "link" capsize`

If h = 0, w specifies the image width in terms of canvas width.

The scale value is a percentage from 1-100, and link is a URL. capsize is the text size of the caption

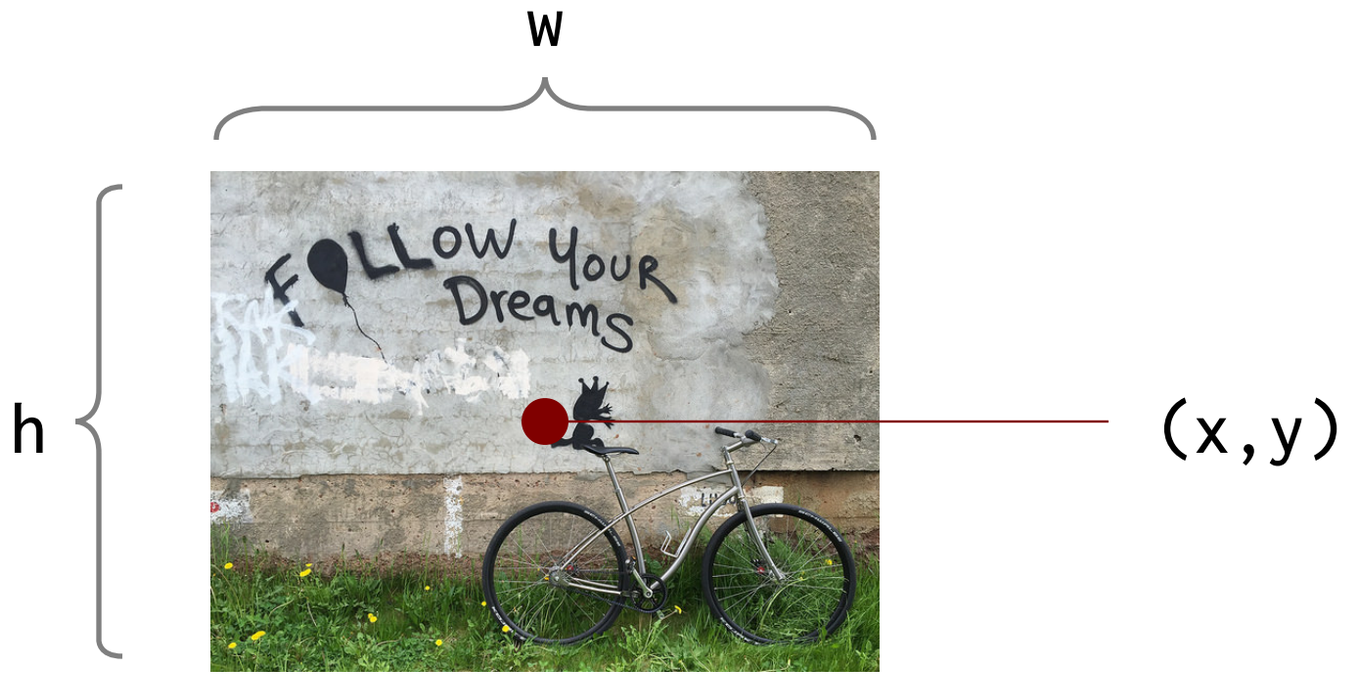
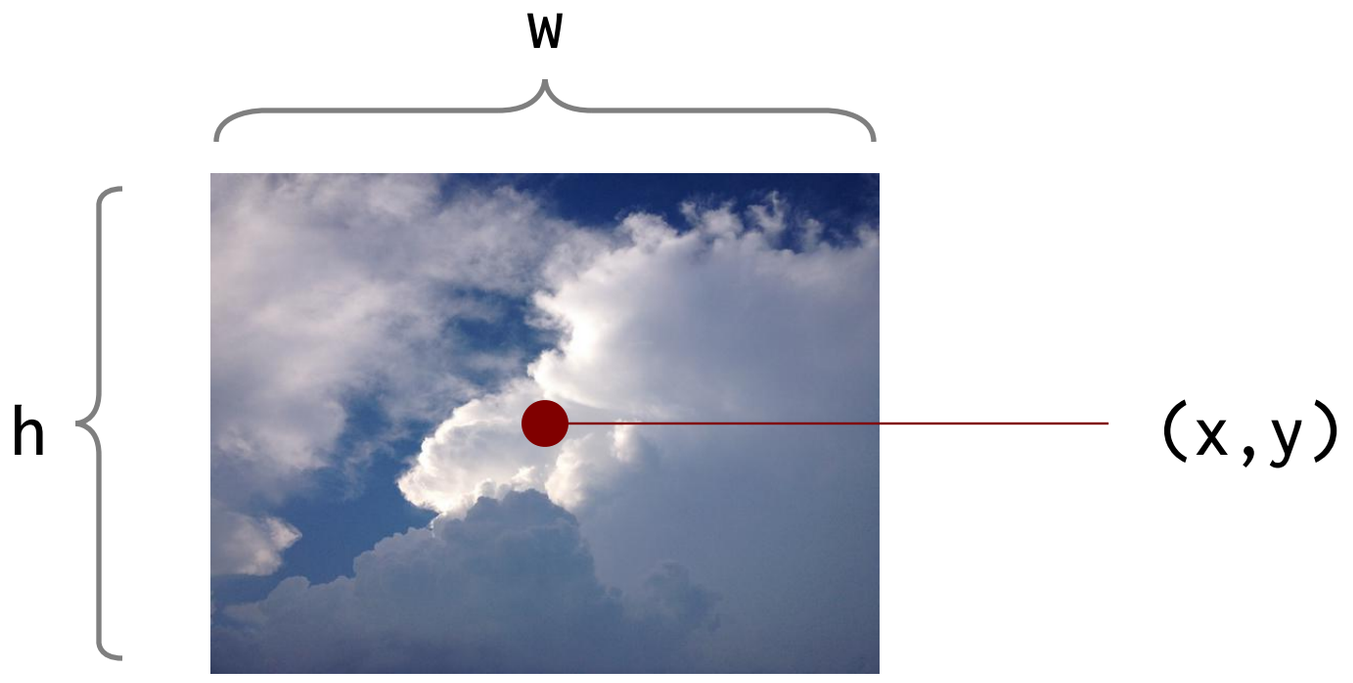


image x y w h scale link

image "follow.jpg" 20 25 640 480 10

image "follow.jpg" 75 25 640 480 30



sky

```
cimage x y w h scale link
```

sky

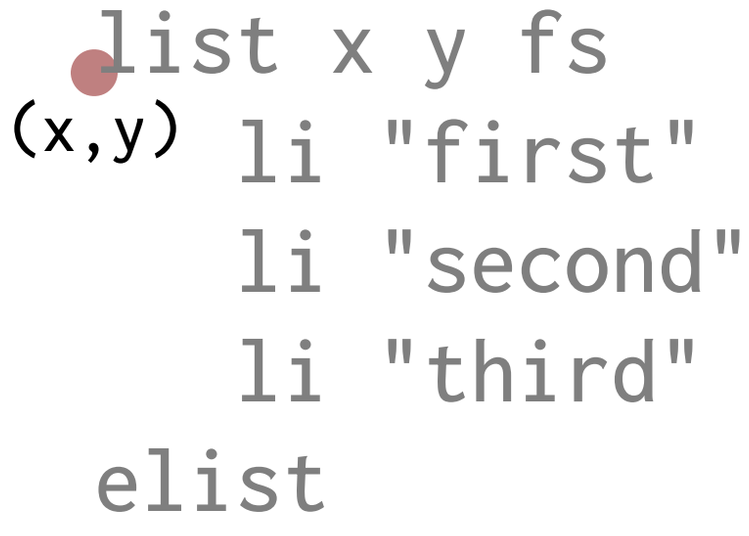
```
cimage "cloudy.jpg" "sky" 20 25 640 480 10
```

sky

```
cimage "cloudy.jpg" "sky" 75 25 640 480 30 "" 1.5
```

Lists

description	keyword	mandatory	optional
Plain list	`list`	`x y fontsize`	`font color op spacing`
Bullet list	`blist`	`x y fontsize`	`font color op spacing`
Numbered list	`nlist`	`x y fontsize`	`font color op spacing`
Centered list	`clist`	`x y fontsize`	`font color op spacing`



list x y fontsize font color op spacing

```
list 20 30 2.5
    li "one"
    li "two"
    li "three"
elist
```

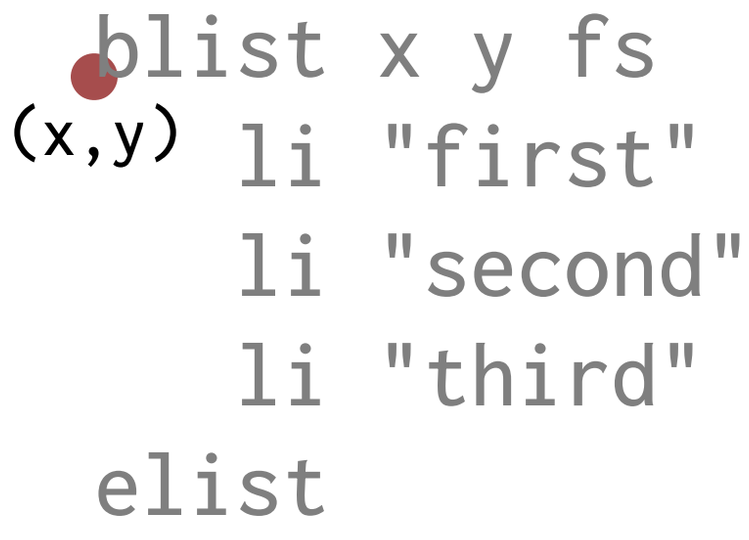
one

two

three

```
list 85 30 2.5 "serif" "maroon" 100 1.0
    li "one"
    li "two"
    li "three"
elist
```

one
two
three



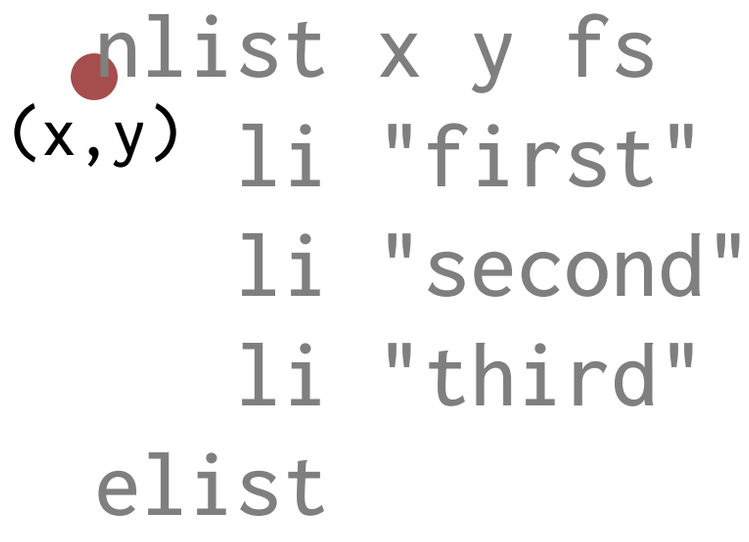
blist x y **fontsize** font color op spacing

```
blist 20 30 2.5
    li "one"
    li "two"
    li "three"
elist
```

- one
- two
- three

```
blist 85 30 2.5 "serif" "maroon" 100 1.0
    li "one"
    li "two"
    li "three"
elist
```

- one
- two
- three



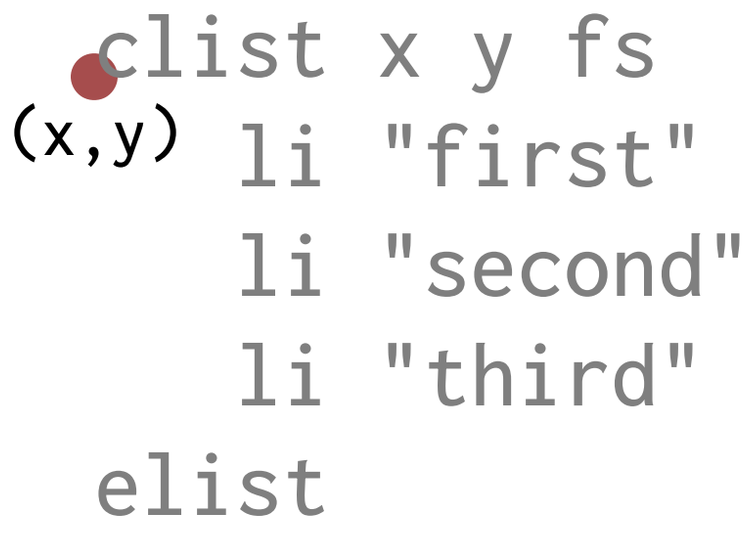
nlist x y **fontsize** font color op spacing

```
nlist 20 30 2.5
    li "one"
    li "two"
    li "three"
elist
```

1. one
2. two
3. three

```
nlist 85 30 2.5 "serif" "maroon" 100 1.0
    li "one"
    li "two"
    li "three"
elist
```

1. one
2. two
3. three



clist x y fontsize font color op spacing

```
clist 30 30 2.5
    li "first one"
    li "next"
    li "and last"
elist
```

first one

next

and last

```
clist 90 30 2.5 "serif" "maroon" 100 1.0
    li "first"
    li "next"
    li "and last"
elist
```

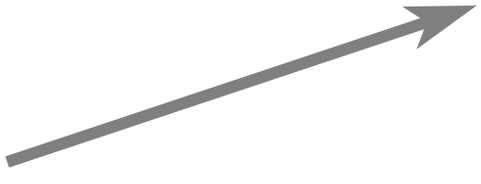
first
next
and last

Arrows

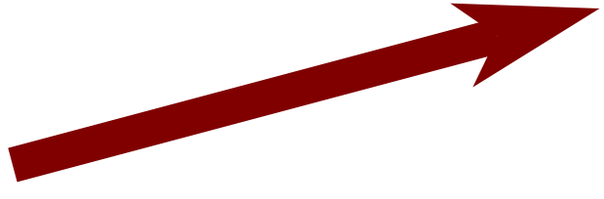
description	keyword	mandatory	optional
Straight	`arrow`	`x1 y1 x2 y2`	`lw aw ah color op`
Left curved	`lcarrow`	`bx by cx cy ex ey`	`lw aw ah color op`
Right curved	`rcarrow`	`bx by cx cy ex ey`	`lw aw ah color op`
Up curved	`ucarrow`	`bx by cx cy ex ey`	`lw aw ah color op`
Down curved	`dcarrow`	`bx by cx cy ex ey`	`lw aw ah color op`


```
arrow  x1 y1 x2 y2  lw aw ah color op
```

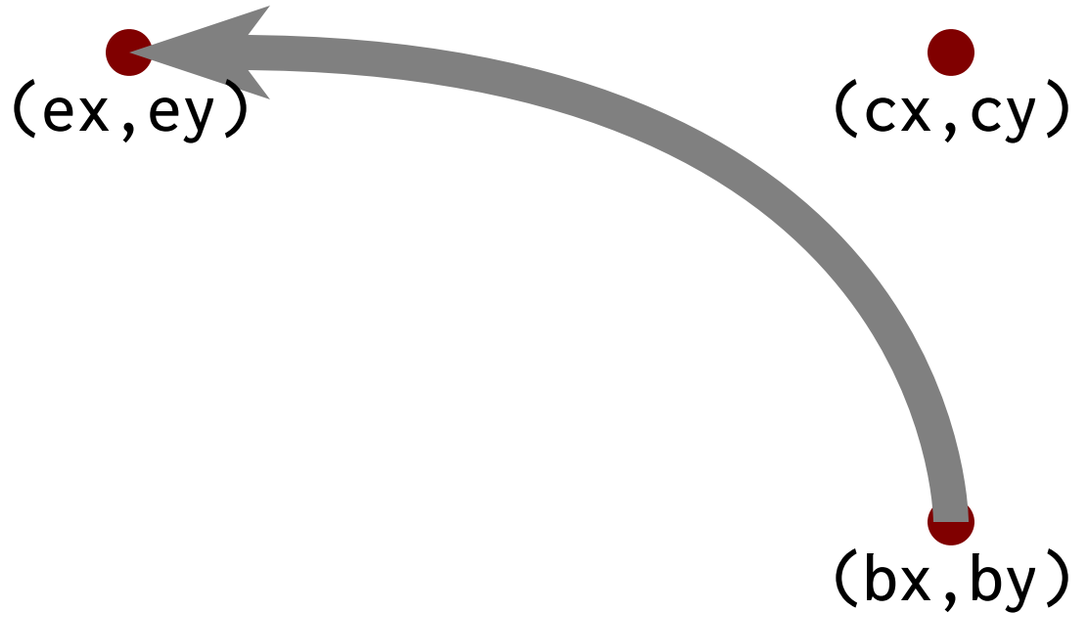
```
arrow 10 20 30 20
```



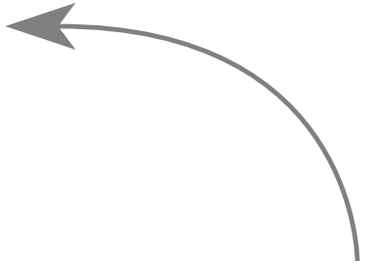
```
arrow 40 20 60 30 0.5
```



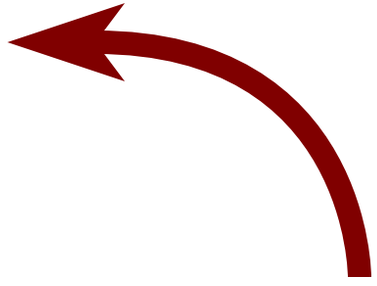
```
arrow 70 20 95 30 1.5 6 6 "maroon"
```



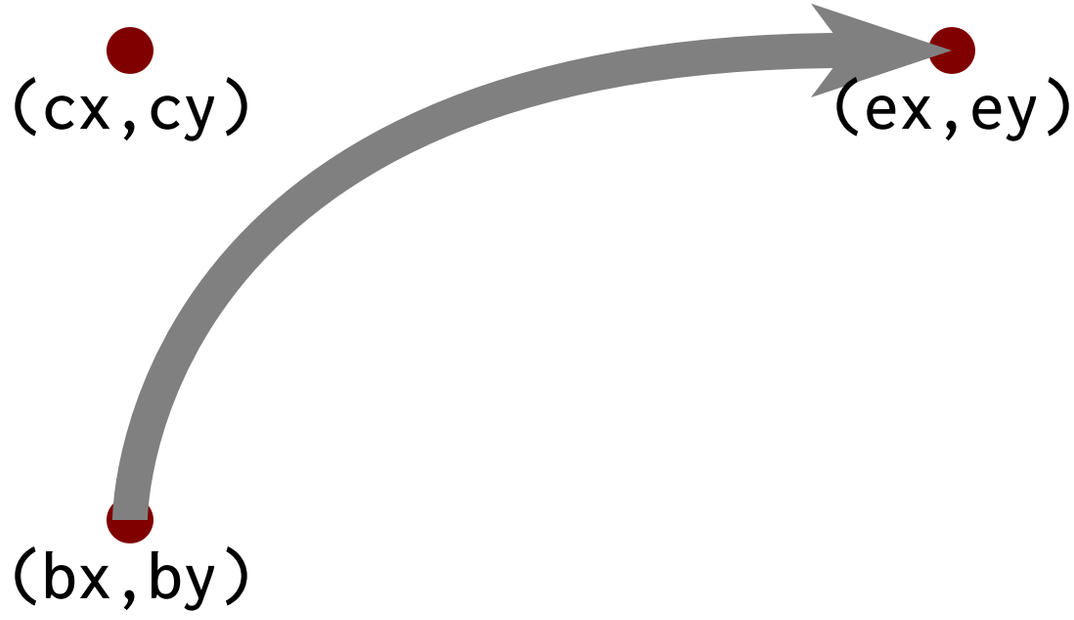

```
lcarrow  bx by cx cy ex ey lw aw ah color op
```



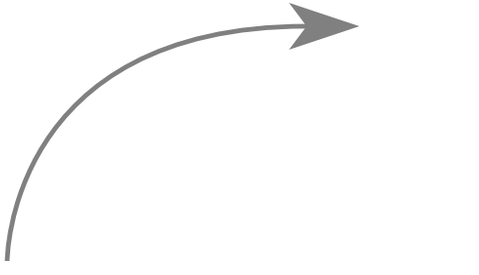
```
lcarrow 30 20 30 35 15 35
```



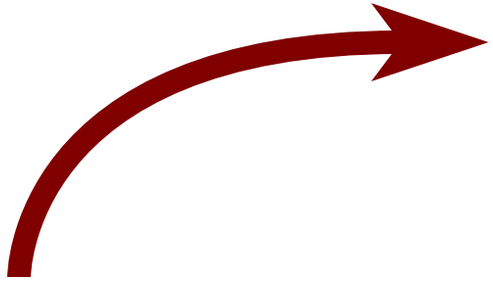
```
lcarrow 70 20 70 35 55 35 1 5 5 "maroon"
```



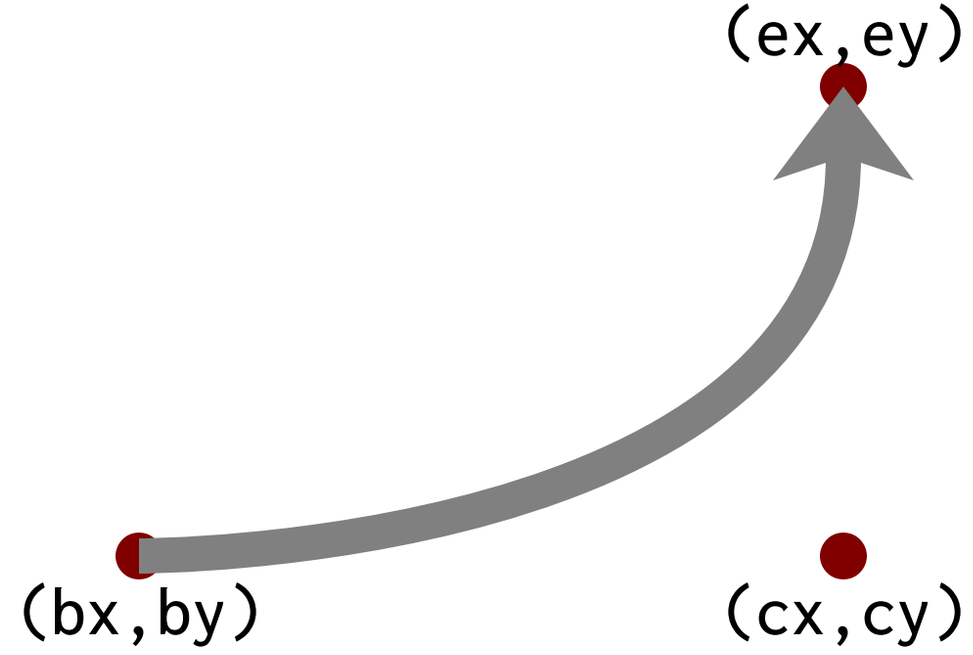

```
rcarrow  bx by cx cy ex ey lw aw ah color op
```



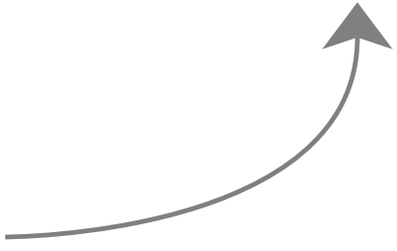
```
rcarrow 15 20 15 35 30 35
```



```
rcarrow 50 20 50 35 70 35 1 5 5 "maroon"
```

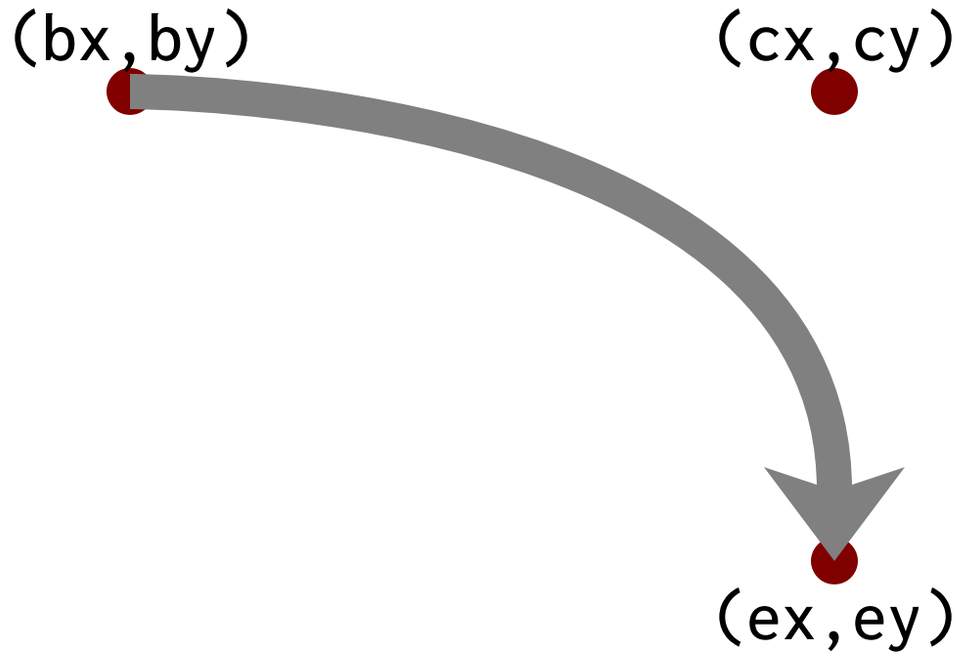



```
ucarrow  bx by cx cy ex ey lw aw ah color op
```



```
ucarrow 15 20 30 20 30 35
```

```
rcarrow 50 20 70 20 70 35 1 5 5 "maroon"
```



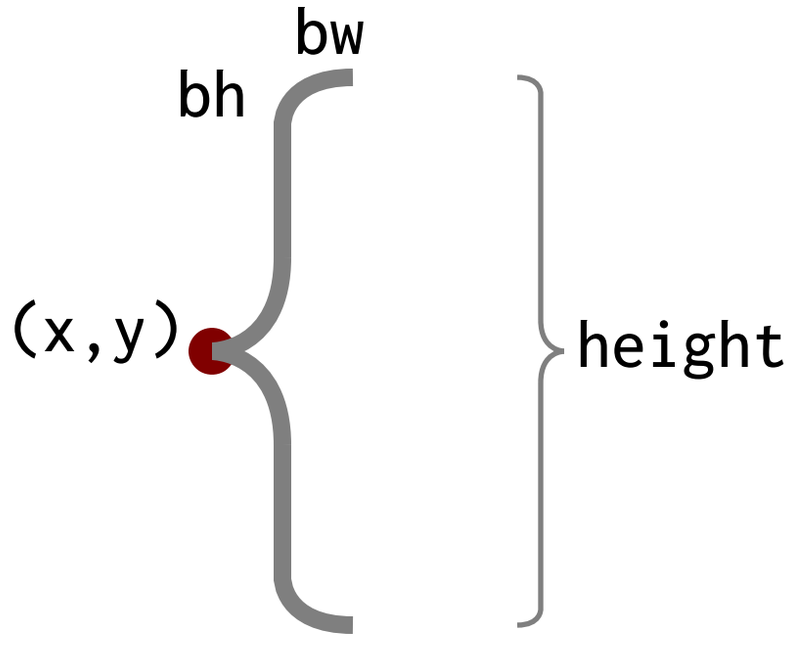

```
dcarrow  bx by cx cy ex ey lw aw ah color op
```

```
dcarrow 15 35 30 30 20
```

```
dcarrow 50 35 70 35 70 20 1 5 5 "maroon"
```

Braces and Brackets

description	keyword	mandatory	optional
Left brace	`lbrace`	`x y height bw bh`	`lw color op`
Right brace	`rbrace`	`x y height bw bh`	`lw color op`
Up brace	`ubrace`	`x y width bw bh`	`lw color op`
Down brace	`dbrace`	`x y width bw bh`	`lw color op`
Left bracket	`lbracket`	`x y width height`	`lw color op`
Right bracket	`rbracket`	`x y width height`	`lw color op`
Up bracket	`ubracket`	`x y width height`	`lw color op`
Down bracket	`dbracket`	`x y width height`	`lw color op`

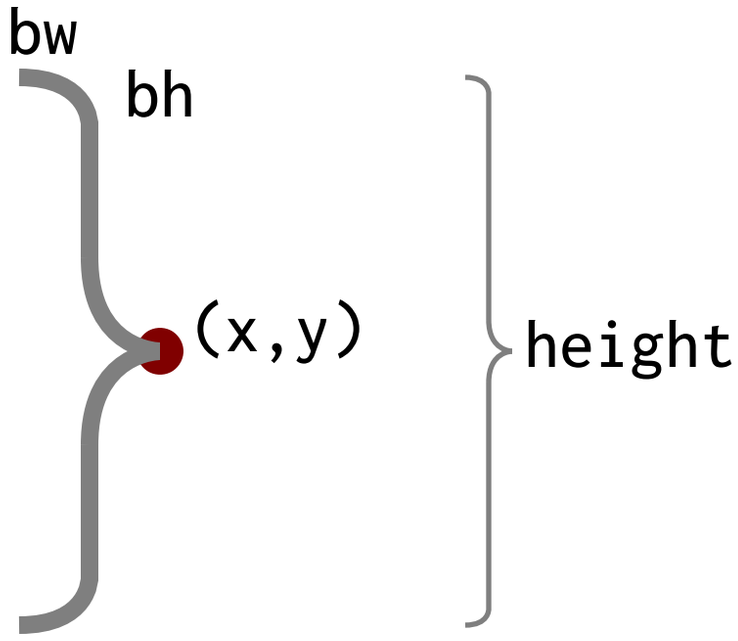



```
lbrace  x y height bw bh   lw color op
```

```
lbrace 20 25 20 2 2
```

```
lbrace 50 25 20 4 4 1
```

```
lbrace 80 25 20 6 3 1 "maroon"
```

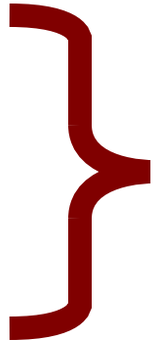



```
rbrace  x y height bw bh   lw color op
```

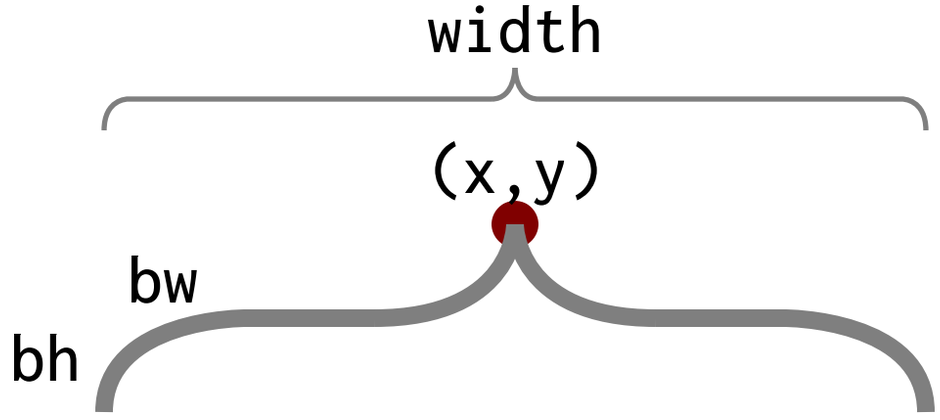
```
rbrace 20 25 20 2 2
```



```
rbrace 50 25 20 4 4 1
```



```
rbrace 80 25 20 6 3 1 "maroon"
```

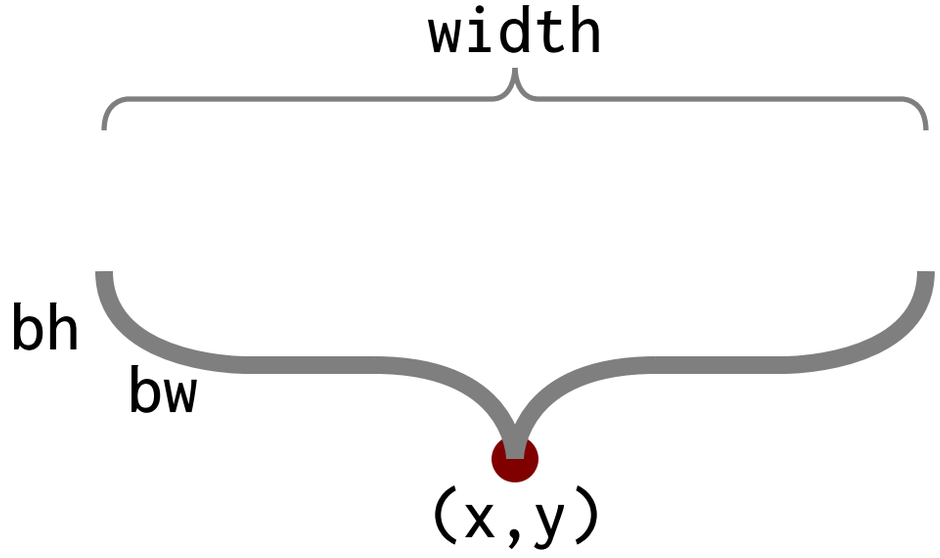


ubrace x y width bw bh lw color op

ubrace 20 25 20 2 4

ubrace 50 25 20 4 8 1

ubrace 80 25 20 4 8 1 "maroon"

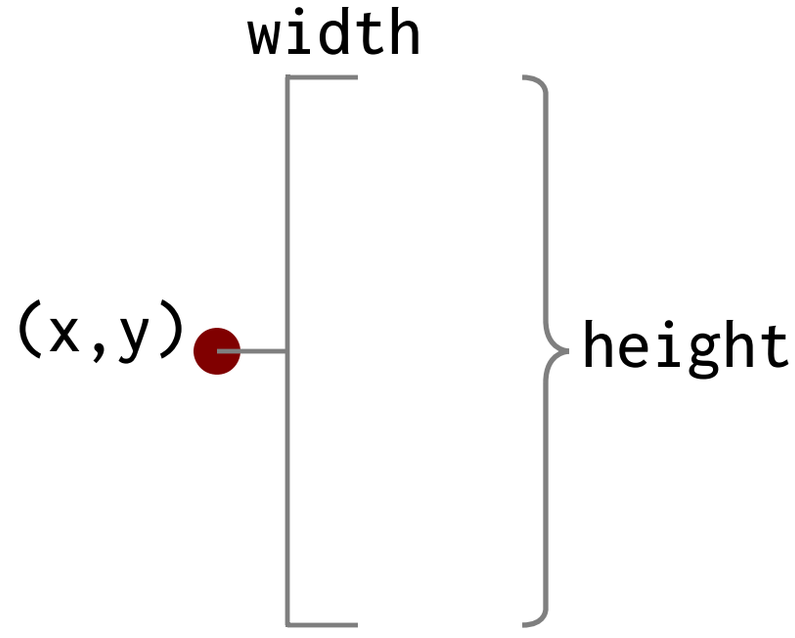


dbrace x y width bw bh lw color op

dbrace 20 25 20 2 4

dbrace 50 25 20 4 8 1

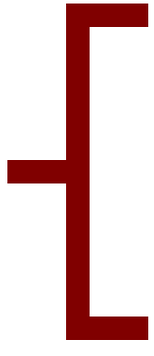
dbrace 80 25 20 4 8 1 "maroon"



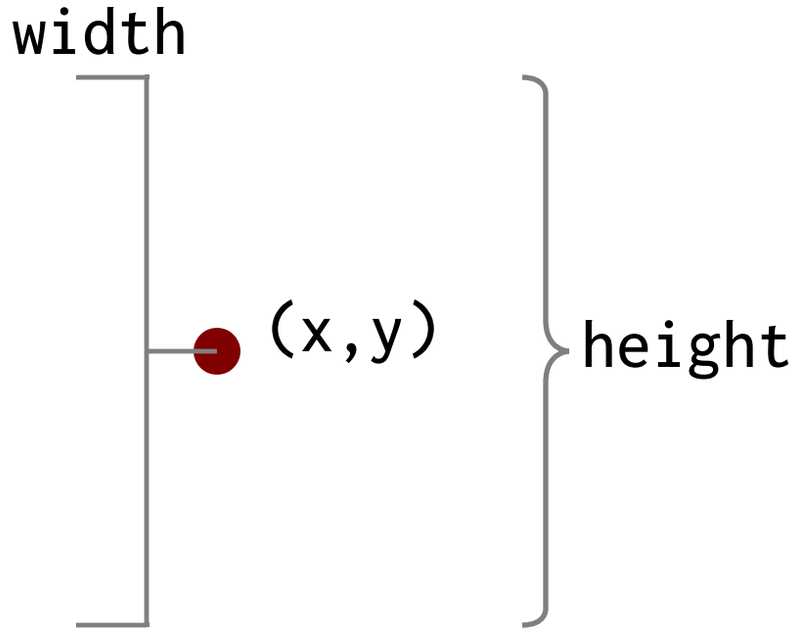

```
lbracket  x y width height   lw color op
```

lbrace 20 25 2 20

lbracket 50 25 4 20 1



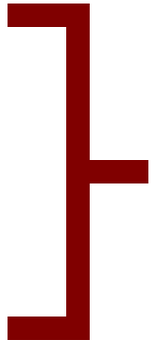
lbracket 80 25 6 20 1 "maroon"



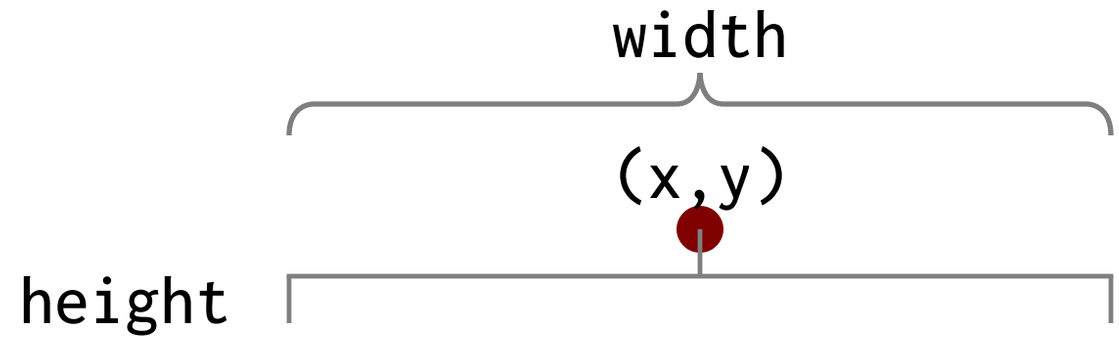

```
rbracket  x y width height   lw color op
```

lbrace 20 25 2 20

rbracket 50 25 4 20 1



rbracket 80 25 6 20 1 "maroon"

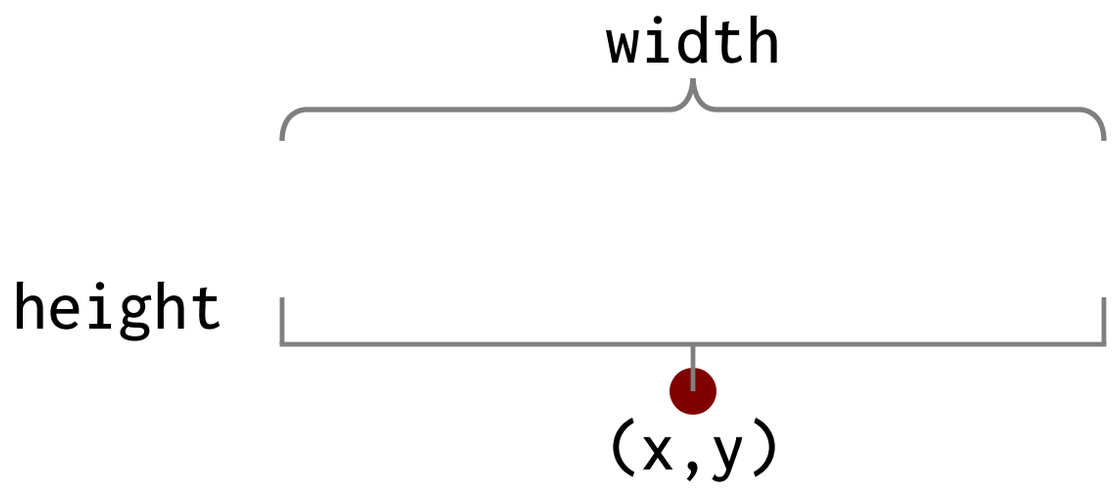



```
ubracket  x y width height   lw color op
```

ubracket 20 25 20 4

ubracket 50 25 20 4 0.3

ubracket 80 25 20 4 1 "maroon"




```
dbracket  x y width height   lw color op
```

dbracket 20 25 20 4

dbracket 50 25 20 4 0.3

dbracket 80 25 20 4 1 "maroon"

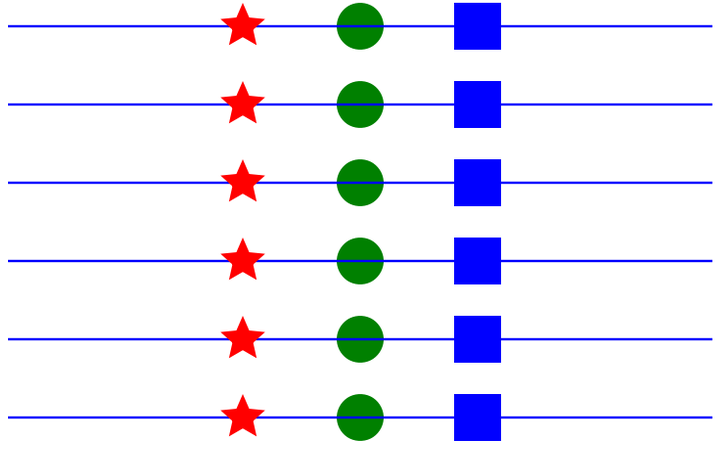
Loop, Built-ins, Data, Function and Grid

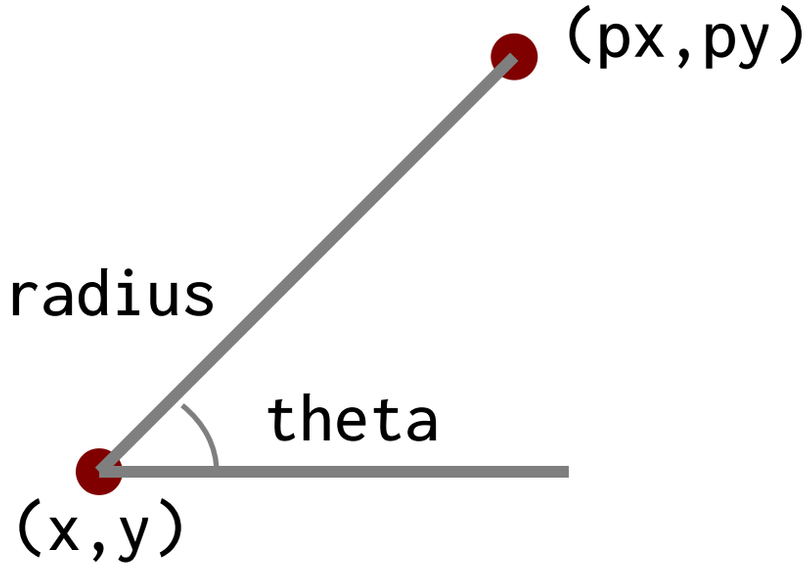
description	keyword	mandatory
Loop	`for v=`	`begin end [increment] ... efor`
Coordinate	`p=`	`(x,y)`
Polar coordinate (x)	`x=polarx`	`x y radius angle`
Polar coordinate (y)	`y=polary`	`x y radius angle`
Polar coordinates	`value=polar`	`x y radius angle`
Area	`value=area`	`expression`
Formatted text	`value=format`	`fmt expression`
Random number	`value=random`	`min max`
Square Root	`value=sqrt`	`expression`
Value mapping	`value=vmap`	`data min1 max1 min2 max2`
Define function	`def`	`name arg1 ... argn ... edef`
Import function	`import`	`"file"`
In-line data	`data`	`"file" ... edata`
Objects on a grid	`grid`	`"file" x y hspace vspace edge`

```
for v=begin end [increment]
...items to repeat using v
efor
```

for v=begin end increment ...efor

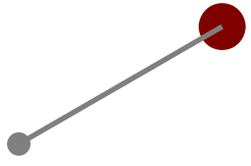
```
for v=10 35 5
    hline  50 v 30 0.1  "blue"
    star   60 v 5 1 0.4 "red"
    circle 65 v 2 "green"
    square 70 v 2 "blue"
efor
```

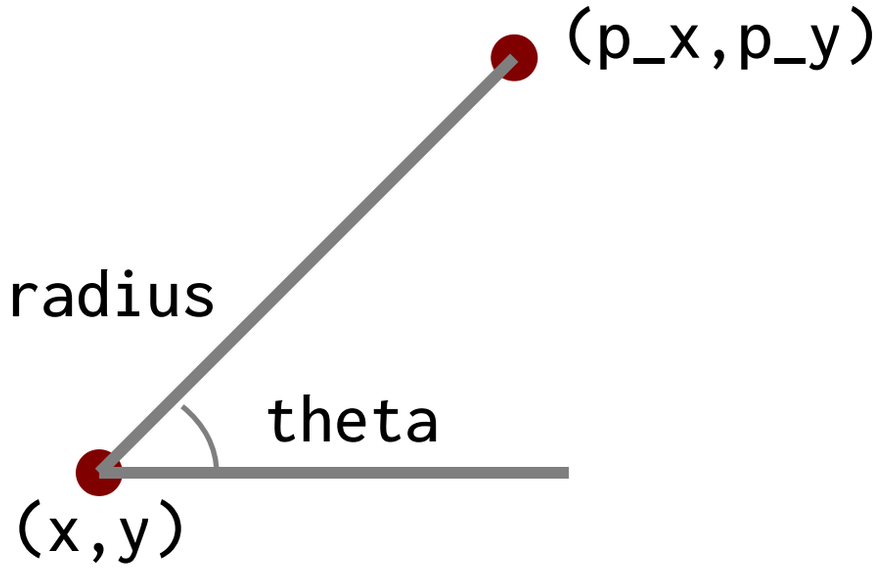





```
px=polarx x y radius theta
py=polary x y radius theta
```

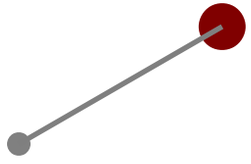
```
cpx=60
cpy=20
px1=polarx cpx cpy 10 30
py1=polary cpx cpy 10 30
line cpx cpy px1 py1
circle cpx cpy 1  "gray"
circle px1 py1 2 "maroon"
```





p=polar x y radius theta

```
cpx=60
cpy=20
point=polar cpx cpy 10 30
line cpx cpy point_x point_y
circle cpx cpy 1  "gray"
circle point_x point_y 2 "maroon"
```

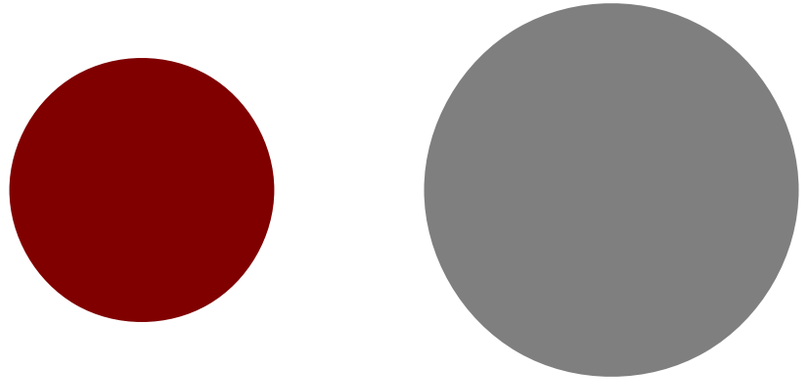


```
v=123.45
a=area v
```

area original value

value=area expression

```
m1=100
m2=200
a1=area m1
a2=area m2
circle 60 20 a1 "maroon"
circle 80 20 a2
```



```
x=3.14159
y=2.0
title=format "Value=%.2f" x*y
```

Value=6.28 — format string — expression

value=format fmt expression

```
v1=100.3
v2=200.234
title=format "%.2f Million (USD)" v1
subtitle=format "Total value: %.2f" v1+v2

ctext title    80 30 4 "sans" "maroon"
ctext subtitle 80 20 3 "sans" "gray"
```

100.30 Million (USD)

Total value: 300.53

value=random min max

```
rx1=random 5 30
ry1=random 15 35
circle rx1 ry1 3 "maroon"
```

```
rx2=random 40 60
ry2=random 15 35
circle rx2 ry2 3 "green"
```

```
rx1=random 75 95
ry1=random 15 35
circle rx3 ry3 3 "blue"
```

```
a=10
b=71
x=sqrt 4
y=sqrt a
n=sqrt a+b
```

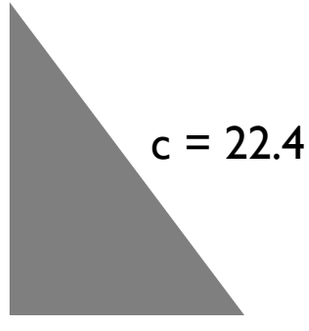
x = 2

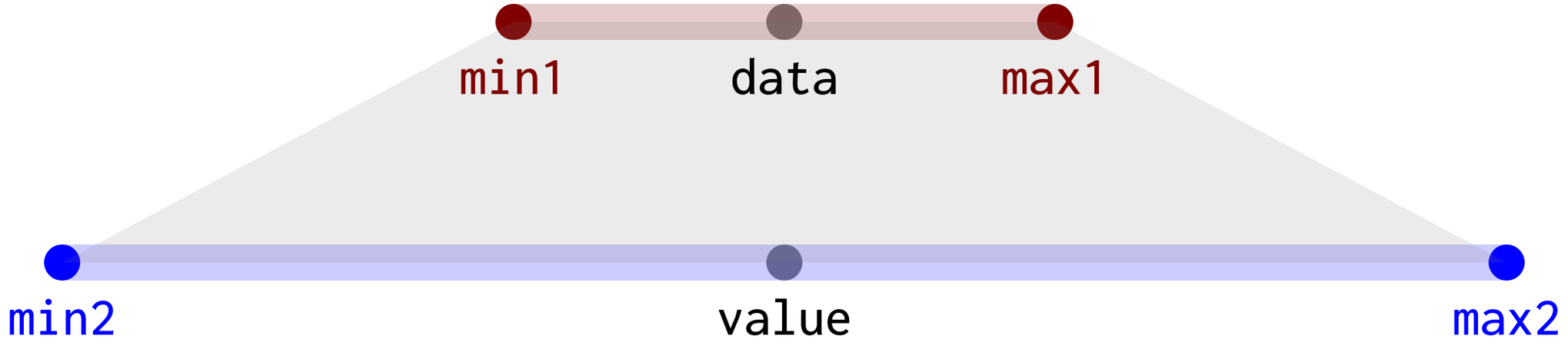
y = 3.1622776

n = 9

```
value=sqrt number or expression
```

```
a_squared=10*10
b_squared=20*20
c=sqrt a_squared + b_squared
w=70+10
h=15+20
polygon "70 w 70" "15 15 h"
clabel=format "c = %.1f" c
text clabel 76 25 2
```





value=vmap data min1 max1 min2 max2

```
yrmin=1776
yrmax=2021
smin=60
smax=90
vp=vmap 1945 yrmin yrmax smin smax
line   smin 20 smax 20 0.5 "gray" 20
circle smin 20 1
circle smax 20 1
circle vp 20 2 "maroon"
```

import "doit.dsh"

contents of "doit.dsh"

```
def doit fx fy fs ft
    ctext ft fx fy fs "serif" "purple"
edef
```

doit 50 20 2.5 "hello"

```
fx=50
fy=20
fs=2.5
ft="hello"
ctext ft fx fy fs "serif" "purple"
```

```
import "file"
```

calling the function

call again

```
doit 50 30 5 "calling the function"
doit 50 20 4 "call again"
```

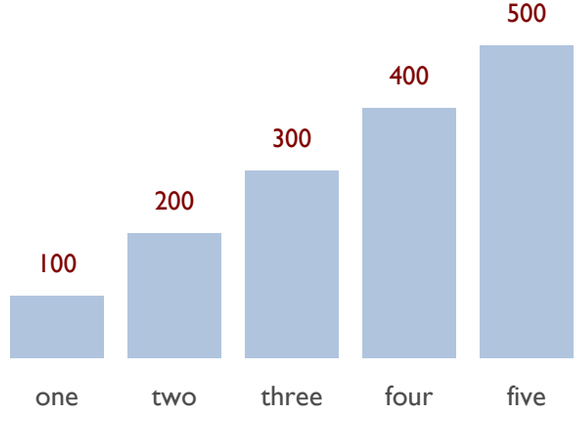
```
data "file.d"
first 20
second 100
third 200
edata
```

data file

data values

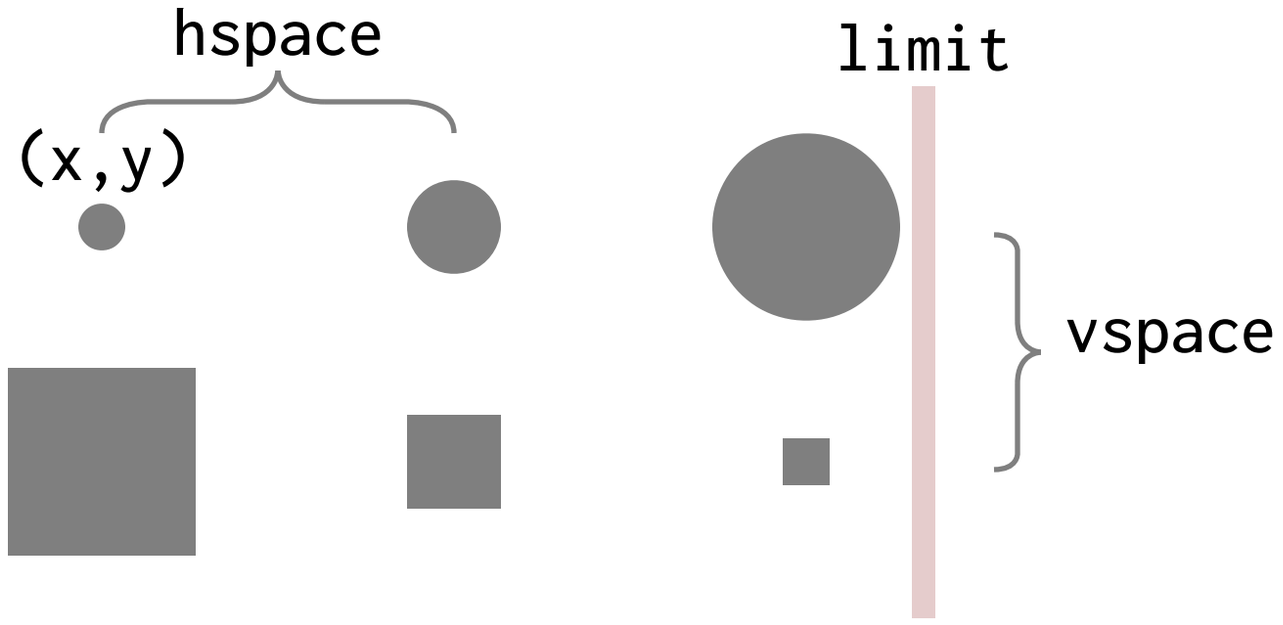
data "file" ... edata

```
data "test.d"
    one   100
    two   200
    three 300
    four  400
    five  500
edata
dchart -bar -left 50 -bottom 15 -right 70 -top 35 "test.d"
```



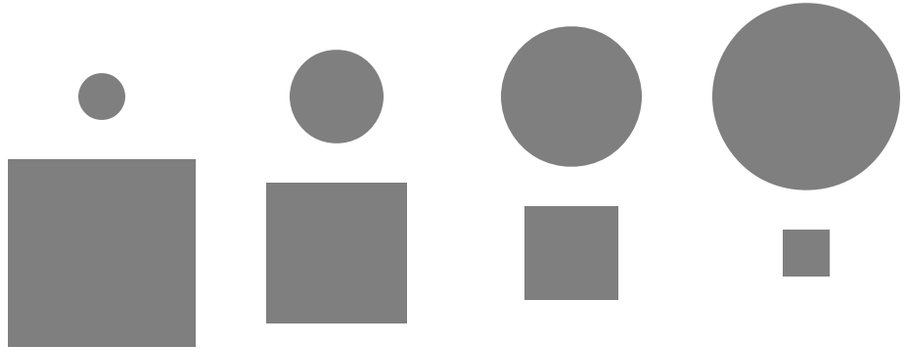
file

```
circle x y 2
circle x y 4
circle x y 8
square x y 8
square x y 4
square x y 2
```



grid "file" x y hspace vspace limit

```
circle x y 2
circle x y 4
circle x y 6
circle x y 8
square x y 8
square x y 6
square x y 4
square x y 2
```



```
grid "code/grid-ex.dsh" 35 33 10 10 65
```

Charts

description	keyword	arguments
Charts	`dchart`	`options "file" (see next page)`
Chart Legends	`legend`	`"text" x y size font color`

Chart Types

-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

Chart Elements

-csv	false	read CSV files
-frame	false	show a colored frame
-fulldeck	true	generate full deck markup
-grid	false	show gridlines on the y axis
-note	true	show annotations
-pct	false	show computed percentage
-rline	false	show a regression line
-solidpmap	false	show solid pmap colors
-spokes	false	show spokes in radial chart
-title	true	show the title
-val	true	show values
-xlast	false	show the last x label
-xstagger	false	stagger x axis labels
-yaxis	false	show a y axis
-chartitle	override title in data	specify the title
-datacond	low,high,color	conditional data colors
-hline	value,label	label horizontal line at value
-valpos	t=top, b=bottom, m=middle	value position
-xlabel	default=1, 0 to suppress	x axis label interval
-yrange	min,max.step	specify the y axis label range

Position and Scaling

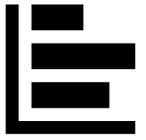
-top	80	top of the chart
-bottom	30	bottom of the chart
-left	20	left margin
-right	80	right margin
-min	data min	set the minimum data value
-max	data max	set the maximum data value

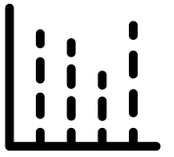
Measures and Attributes

-bgcolor	white	background color
-barwidth	computed from data size	barwidth
-color	lightsteelblue	data color
-csvcol	label,label2	specify csv columns
-datafmt	%.1f	data format for values
-dmin	false	use data minimum, not zero
-framecolor	rgb(127,127,127)	frame color
-lcolor	rgb(75,75,75)	label color
-linewidth	0.2	linewidth
-ls	2.4	linespacing
-noteloc	c=center, r=right, l=left	annotation location
-pmlen	20	pmap label length
-psize	30	diameter of the donut
-pwidth	3	width of the donut or pmap
-rlcolor	rgb(127,0,0)	regression line color
-textsize	1.5	text size
-xlabrot	0	xlabel rotation (deg.)
-vcolor	rgb(127,0,0)	value color
-volop	50	volume opacity %

dchart types

 Column

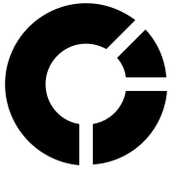
 Bar

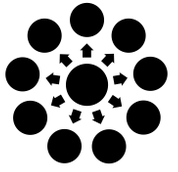
 Dot

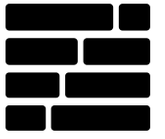
 Line

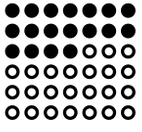
 Scatter

 Area

 Donut/Pie

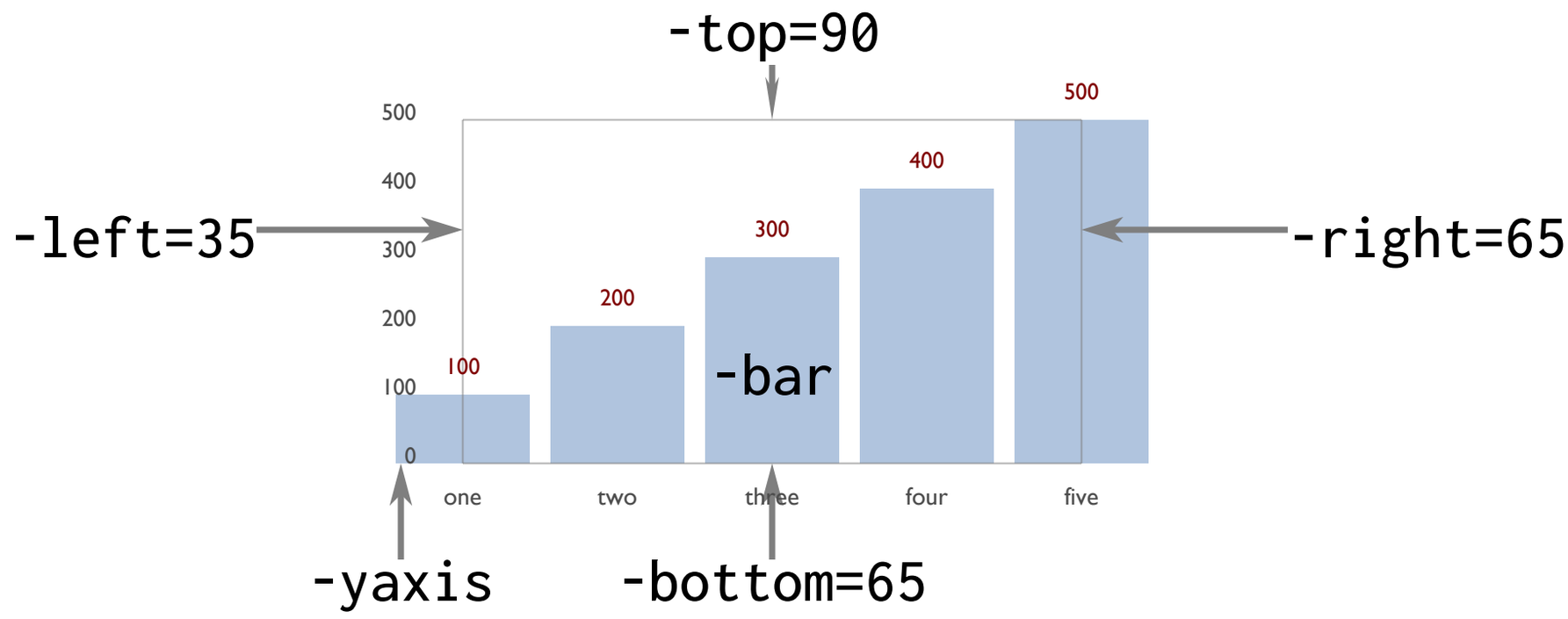
 Radial

 Pmap

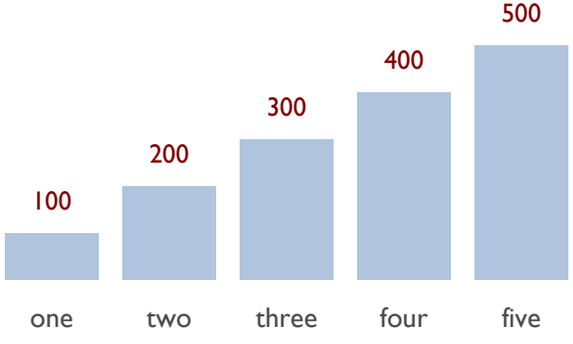
 Waffle/Lego

 Fan

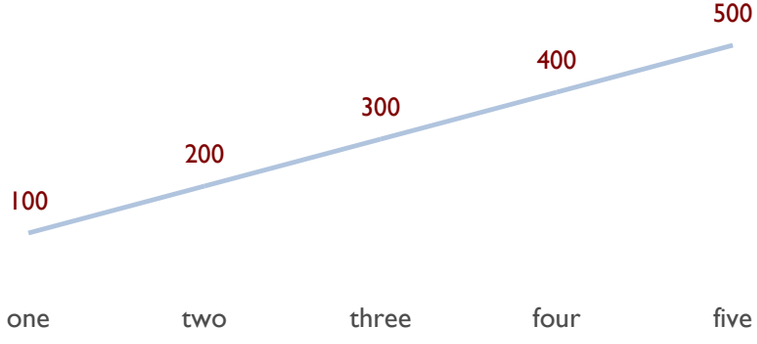
 Bowtie



dchart options "file"




```
dchart -left=10 -right=30 -top=35 -bottom=20 "test.d"
```




```
dchart -left=55 -right=85 -top=35 -bottom=20 -bar=f -line "test.d"
```


```
legend  x y fontsize font color
```

■ Item on the chart

■ Thing

```
legend "Item on the chart" 20 30 3 "sans" "red"
```

```
legend "Thing" 70 30 2 "serif" "blue"
```