TÉCNICO LISBOA

Extending Processing to CAD applications

Hugo Correia and António Leitão

eCAADe 2015 - Wien

Repeat_RecursiveTree | Processing 3.0b6

Java ▾

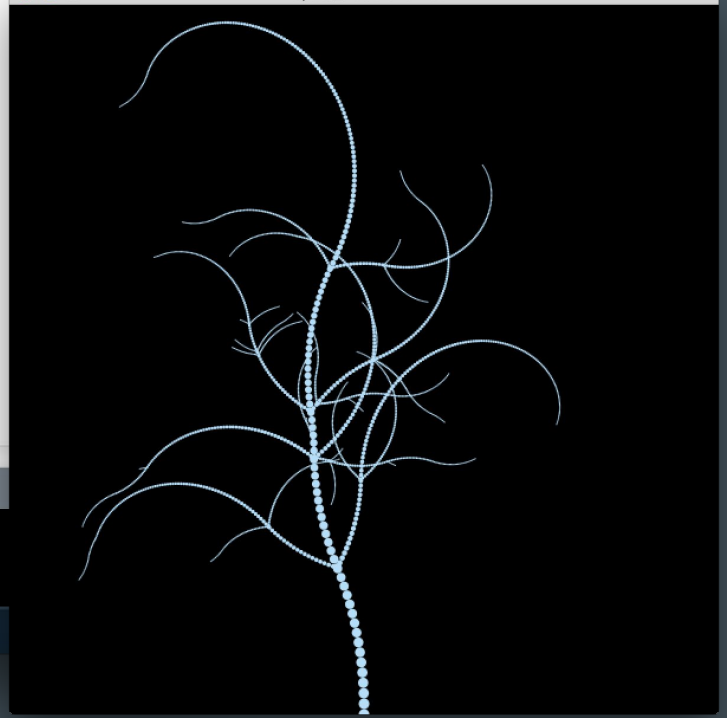
Repeat_RecursiveTree ▾

```
67
68 void seed2(float dotSize, float angle, float x, float y) {
69
70   if (dotSize > 1.0) {
71
72     // Create a random numbers between 0 and 1
73     float r = random(0, 1.0);
74
75     // 95% chance this will happen
76     if (r > 0.05) {
77       ellipse(x, y, dotSize, dotSize);
78       float newx = x + cos(angle) * dotSize;
79       float newy = y + sin(angle) * dotSize;
80       seed2(dotSize * 0.99, angle + angleOffsetA, newx, newy);
81     }
82     // 5% chance this will happen
83     else {
84       ellipse(x, y, dotSize, dotSize);
85       float newx = x + cos(angle);
86       float newy = y + sin(angle);
87       seed1(dotSize * 0.99, angle + angleOffsetA, newx, newy);
88       seed2(dotSize * 0.60, angle + angleOffsetB, newx, newy);
```

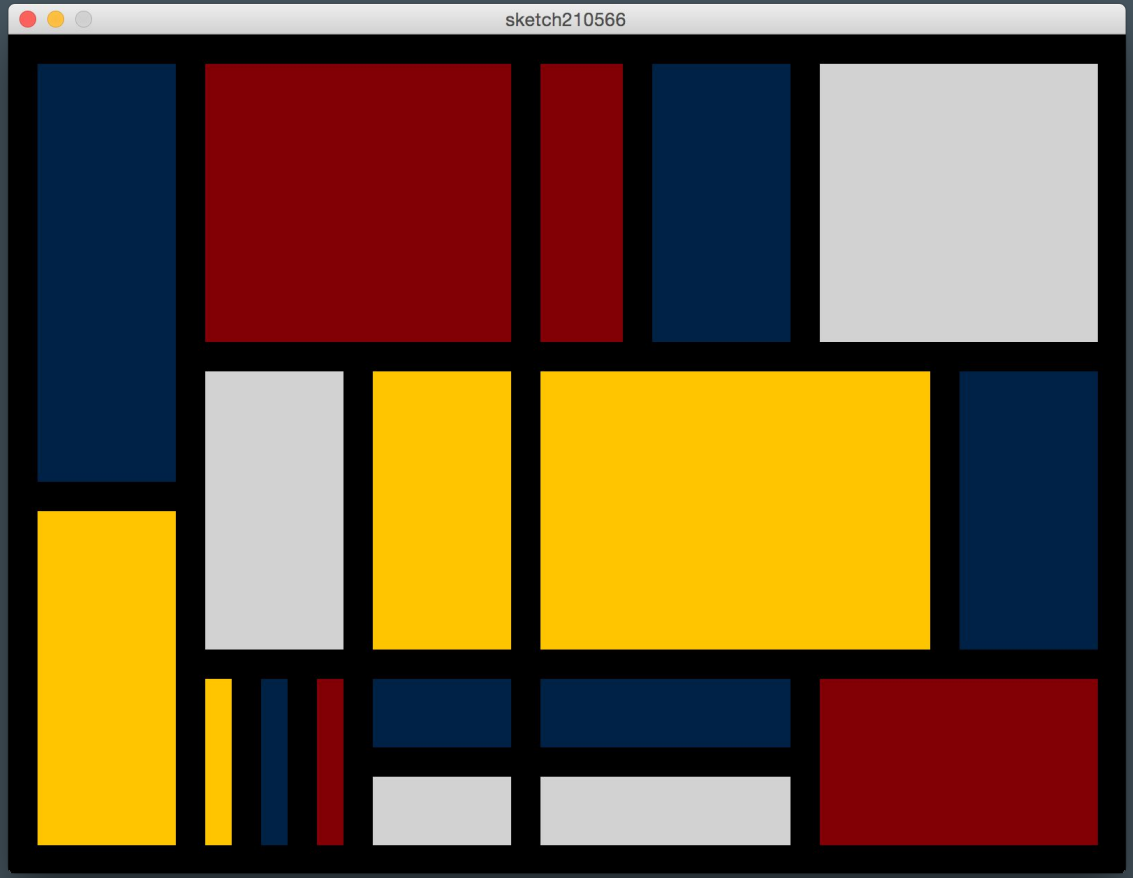
Done saving.

Console | Errors

Repeat_RecursiveTree

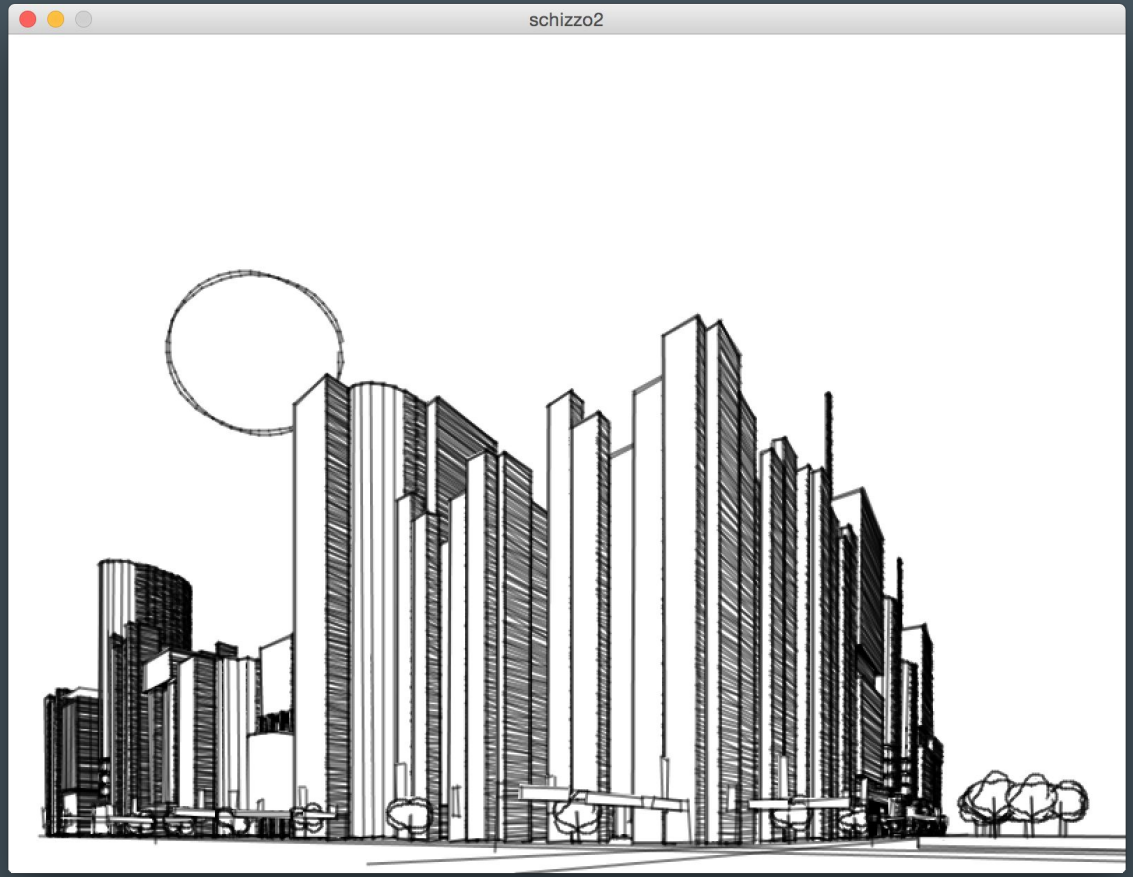


Paintings



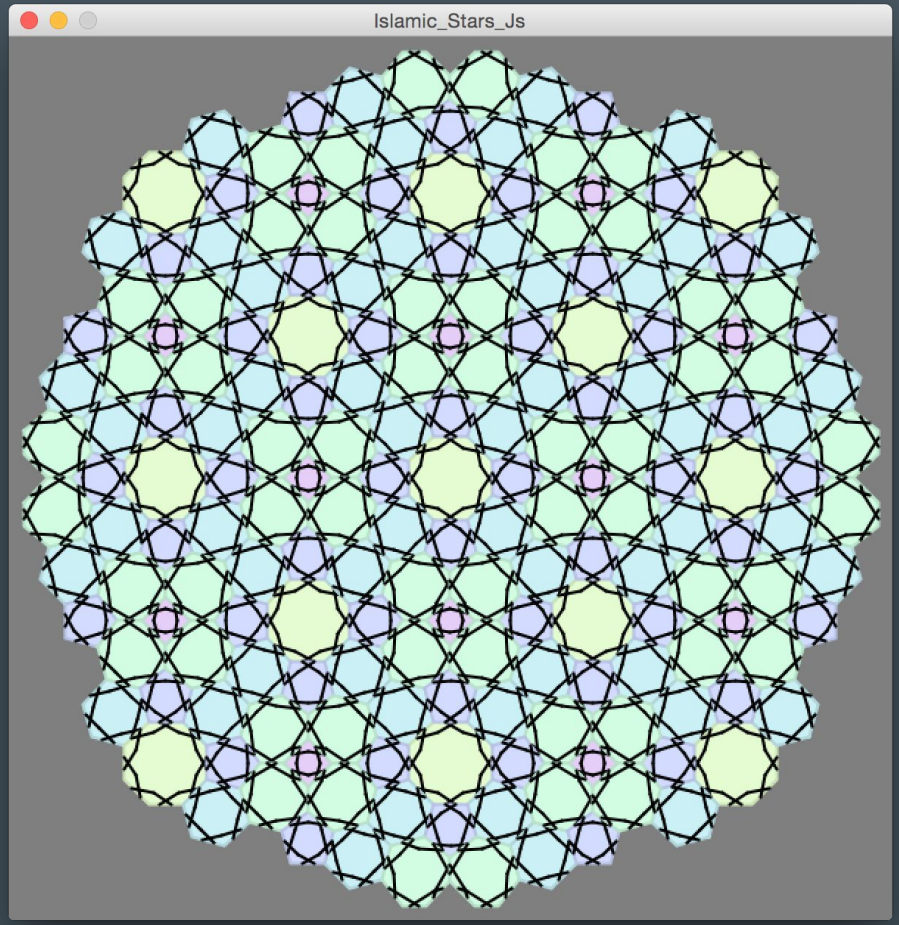
Mondrian by **Justin M Rocha** : www.openprocessing.org/sketch/210566

Sketches



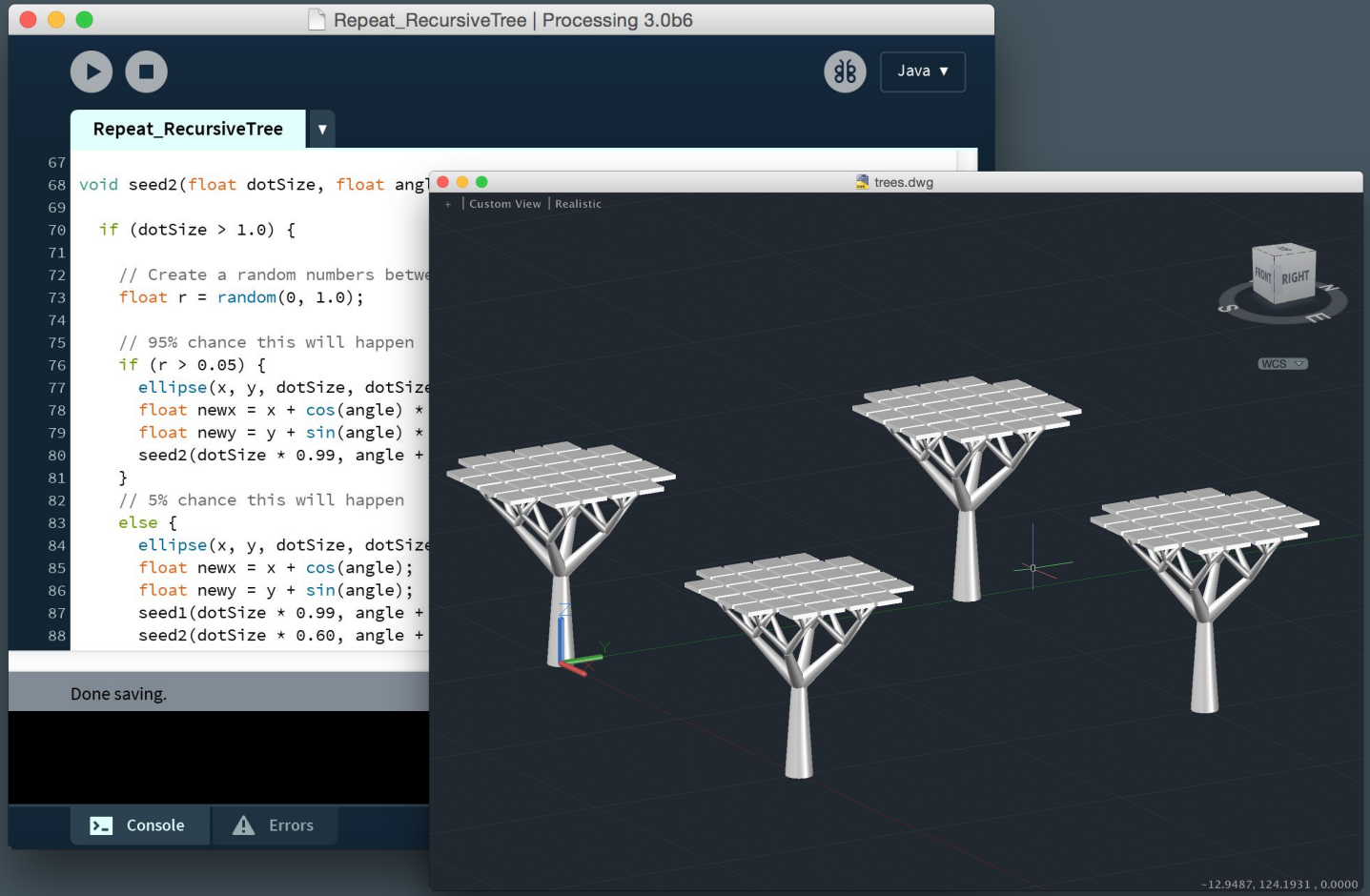
Schizzo2 by **Luca Sassone** : www.openprocessing.org/sketch/12878

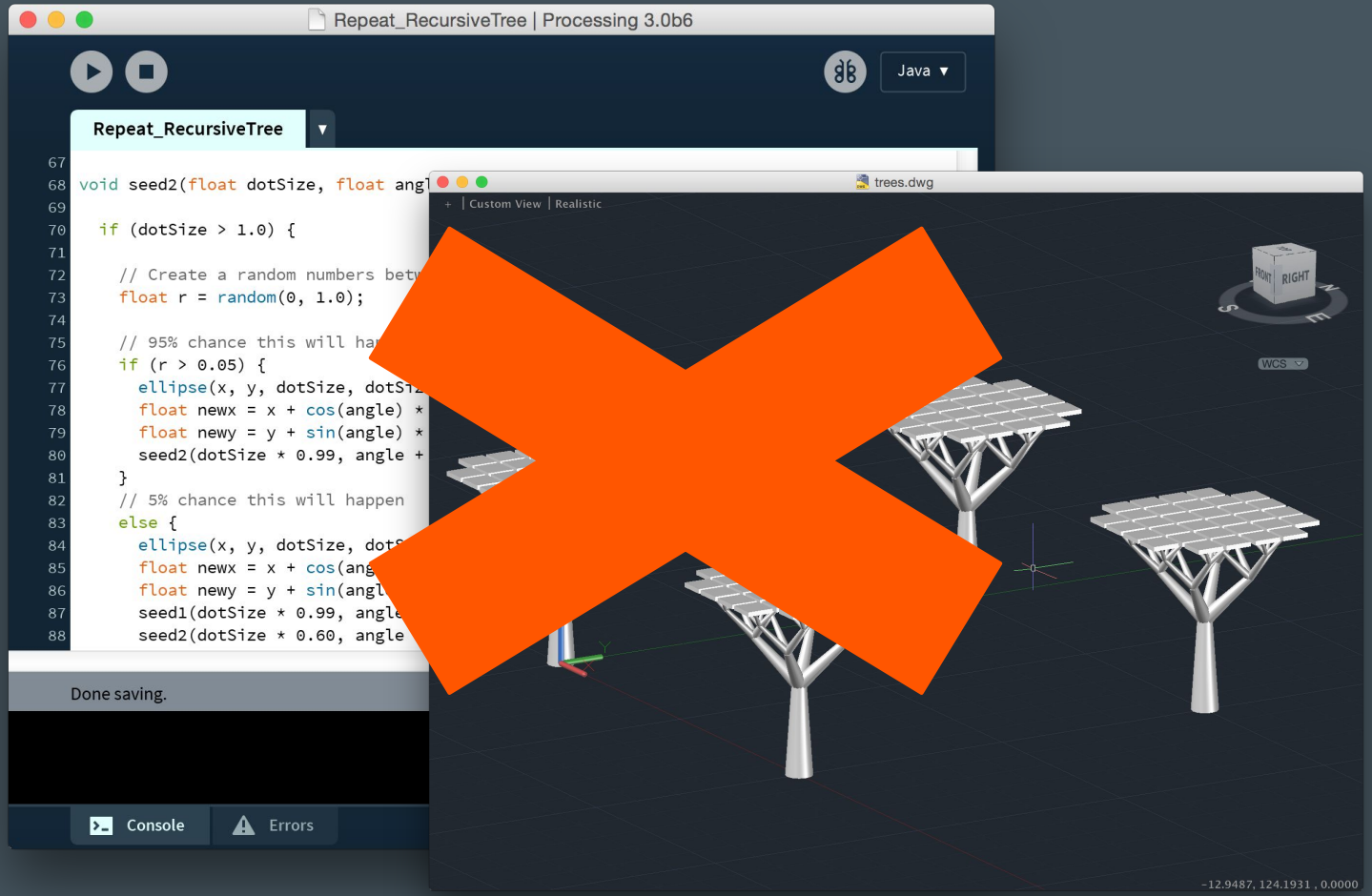
Patterns



Islamic Stars by **Jim Bumgardner** : www.openprocessing.org/sketch/1261

but…


Repeat_RecursiveTree | Processing 3.0b6
Java
Repeat_RecursiveTree
void seed2(float dotSize, float angl
if (dotSize > 1.0) {
// Create a random numbers betwe
float r = random(0, 1.0);
// 95% chance this will happen
if (r > 0.05) {
ellipse(x, y, dotSize, dotSize
float newx = x + cos(angle) *
float newy = y + sin(angle) *
seed2(dotSize * 0.99, angle +
}
// 5% chance this will happen
else {
ellipse(x, y, dotSize, dotSize
float newx = x + cos(angle);
float newy = y + sin(angle);
seed1(dotSize * 0.99, angle +
seed2(dotSize * 0.60, angle +
Done saving.
Console
Errors
trees.dwg
Custom View | Realistic
FRONT
RIGHT
WCS
-12.9487, 124.1931 , 0.0000


Repeat_RecursiveTree | Processing 3.0b6
Java
Repeat_RecursiveTree
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float newy = y + sin(angle) *
seed2(dotSize * 0.99, angle +
}
// 5% chance this will happen
else {
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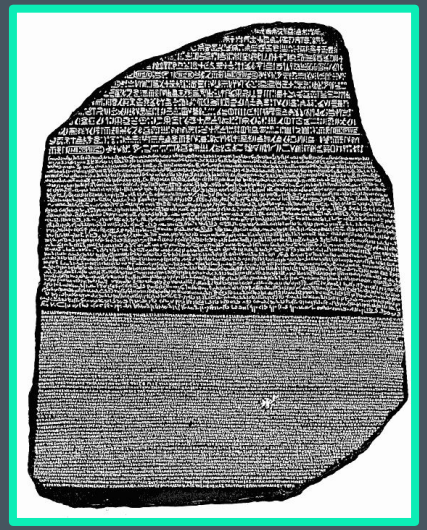
float newx = x + cos(ang
float newy = y + sin(angl
seed1(dotSize * 0.99, angle
seed2(dotSize * 0.60, angle
Done saving.
Console
Errors
trees.dwg
Custom View | Realistic
FRONT
RIGHT
WCS
-12.9487, 124.1931 , 0.0000

Our Goal

Our Goal

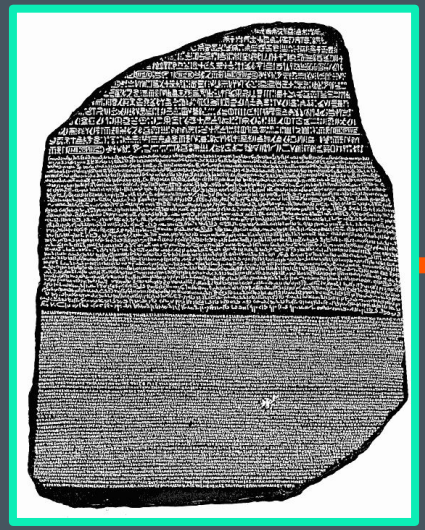
Our Goal

Our Solution



Rosetta

Our Solution



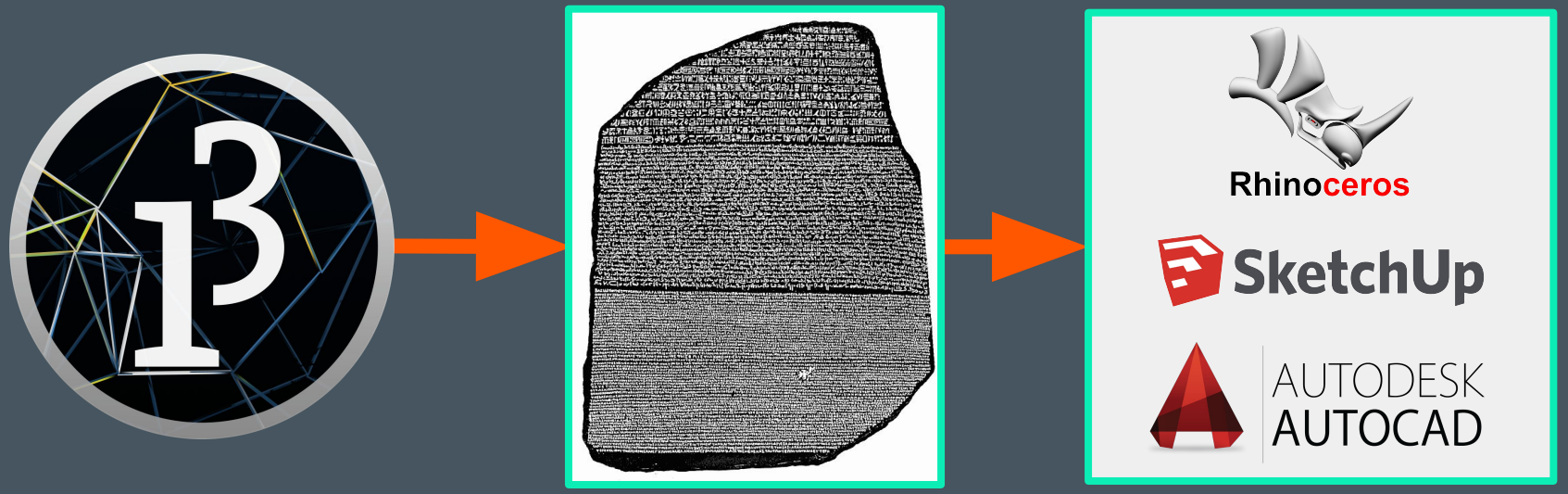
Rosetta

Rhinoceros

SketchUp

AUTODESK
AUTOCAD

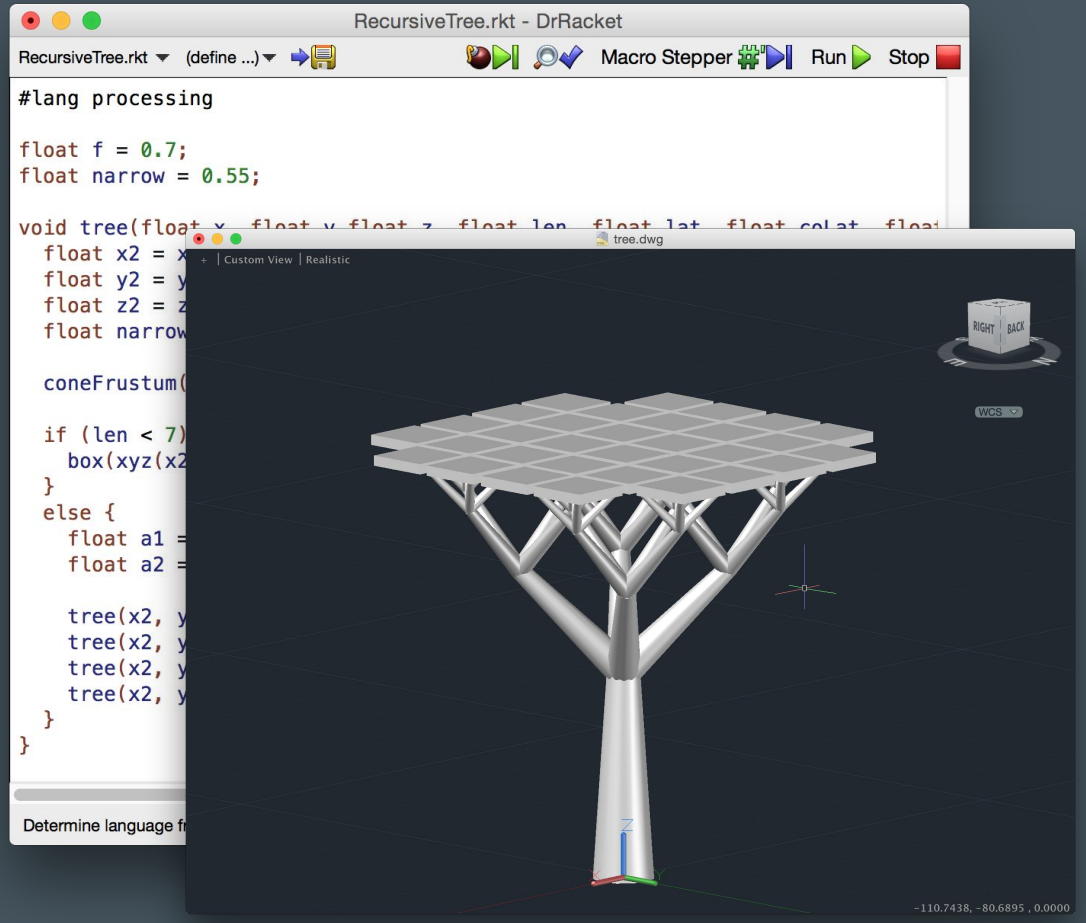
Our Solution



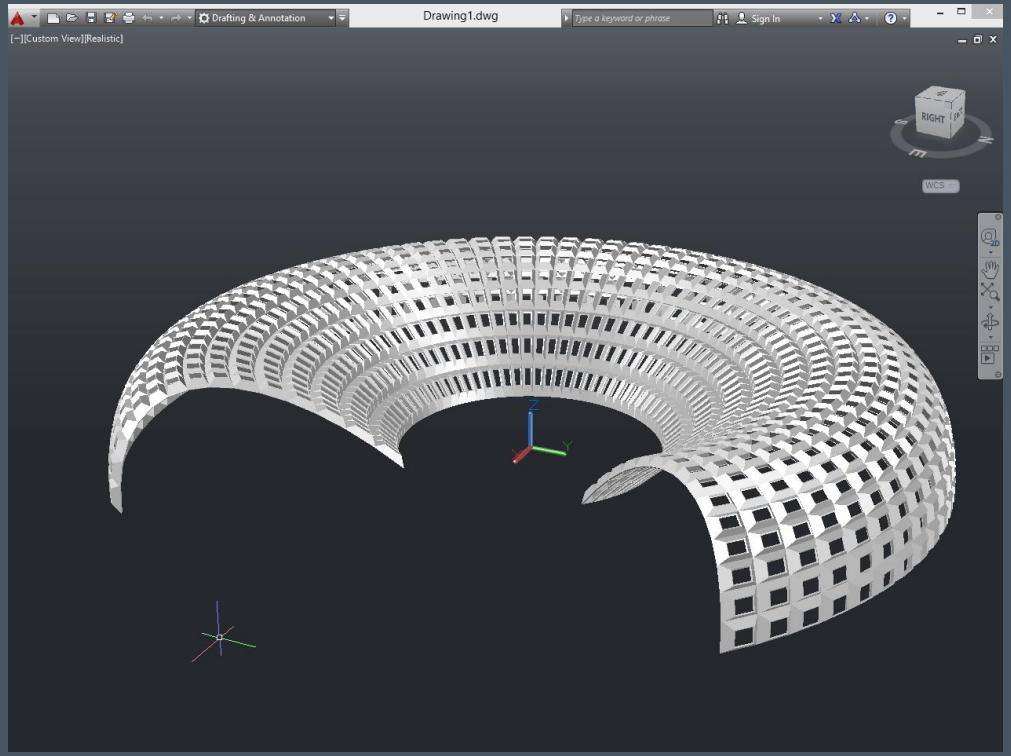
Rosetta

Advantages

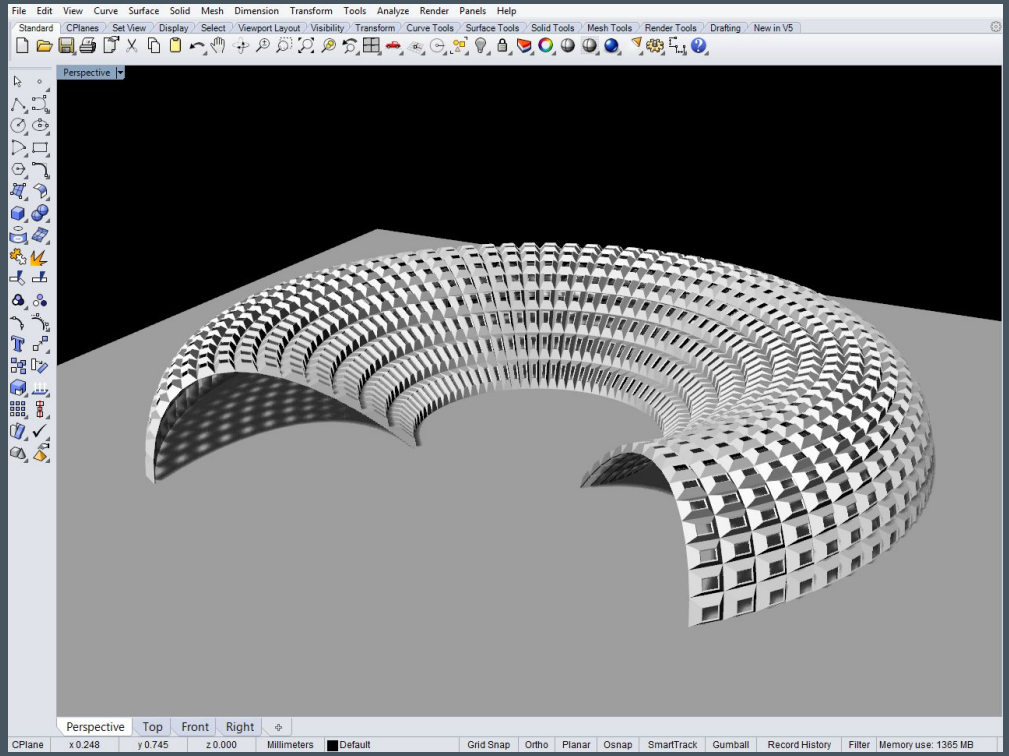
Processing with CAD tools



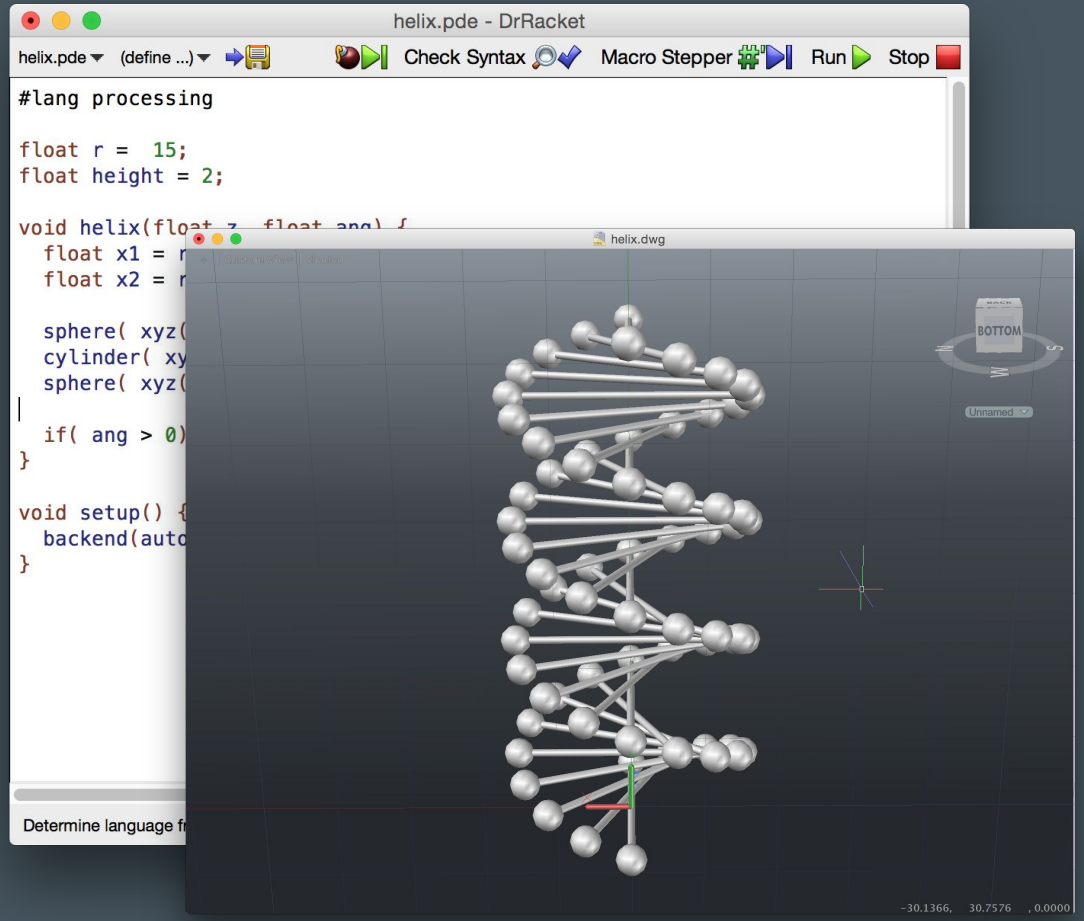
AutoCAD


Drafting & Annotation
Drawing1.dwg
Type a keyword or phrase
Sign In
[−][Custom View][Realistic]
RIGHT
WCS

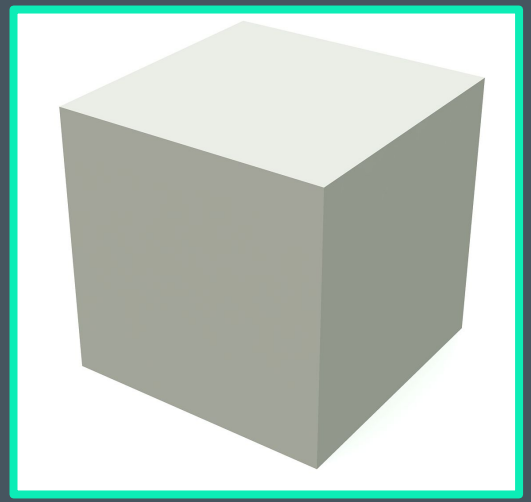
Rhinoceros


File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Panels Help
Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools Mesh Tools Render Tools Drafting New in V5
Perspective
Perspective Top Front Right
CPlane x 0.248 y 0.745 z 0.000 Millimeters Default Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Memory use: 1365 MB

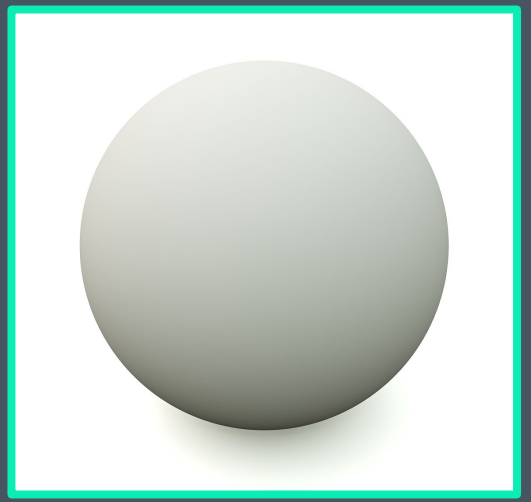
Better 3D primitives



Basic Processing 3D Primitives

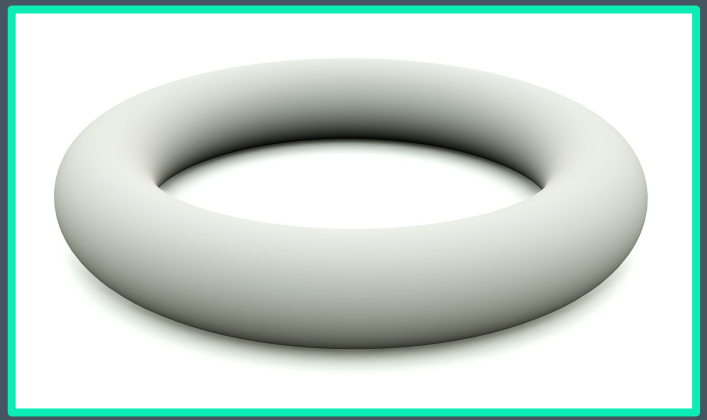


box

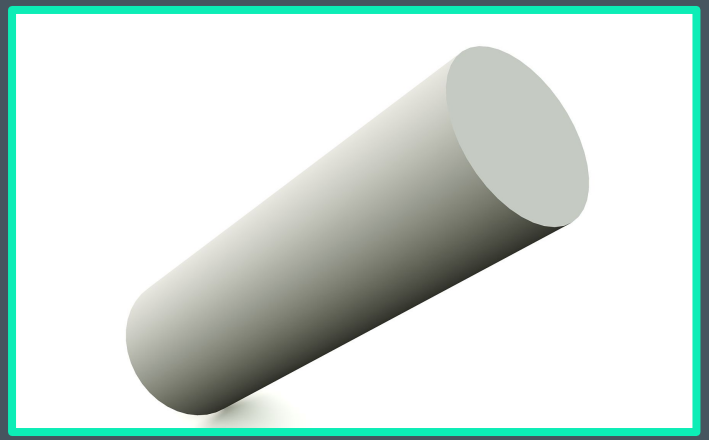


sphere

Additional 3D Primitives

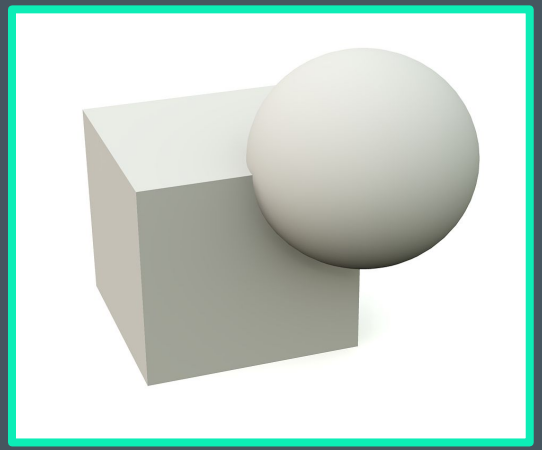


`torus`

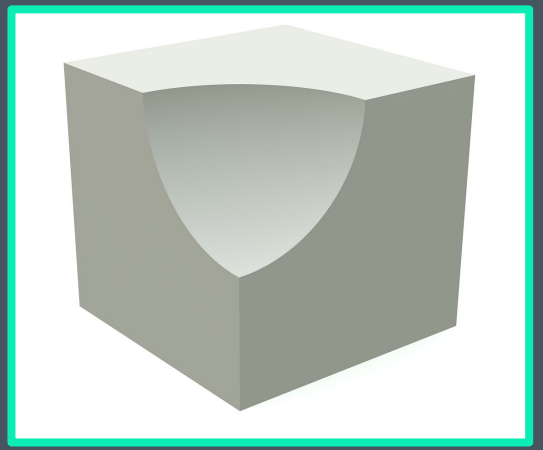


`cylinder`

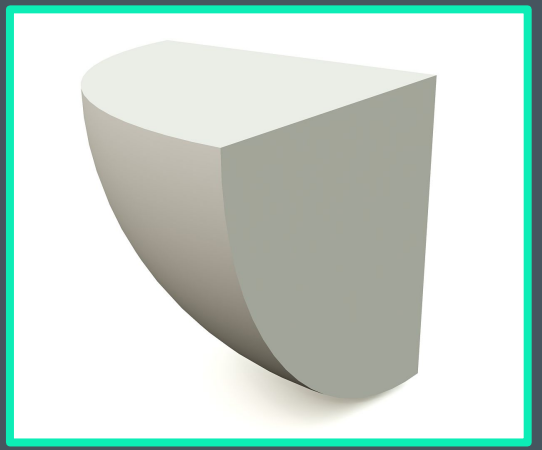
Boolean Operations



union

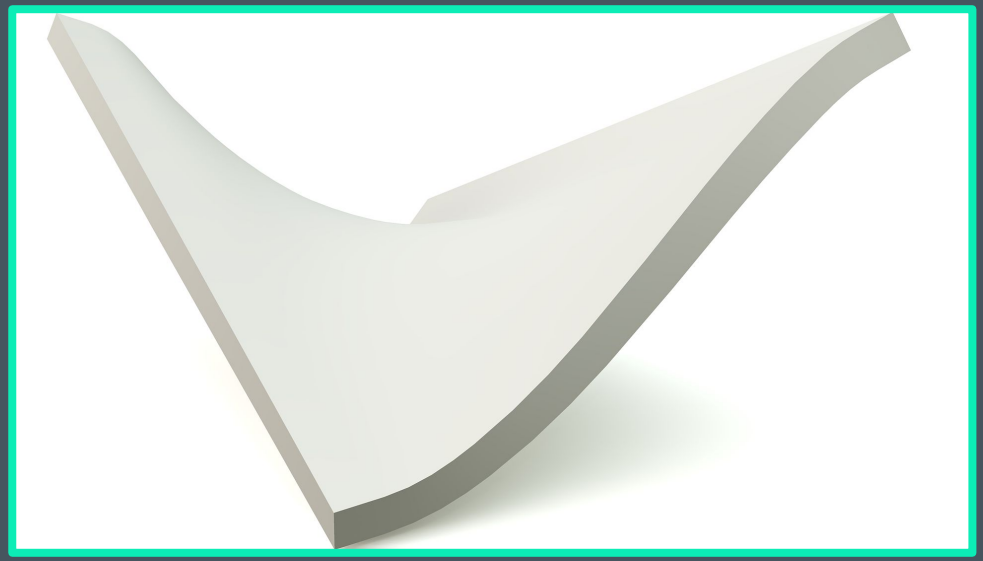


subtraction



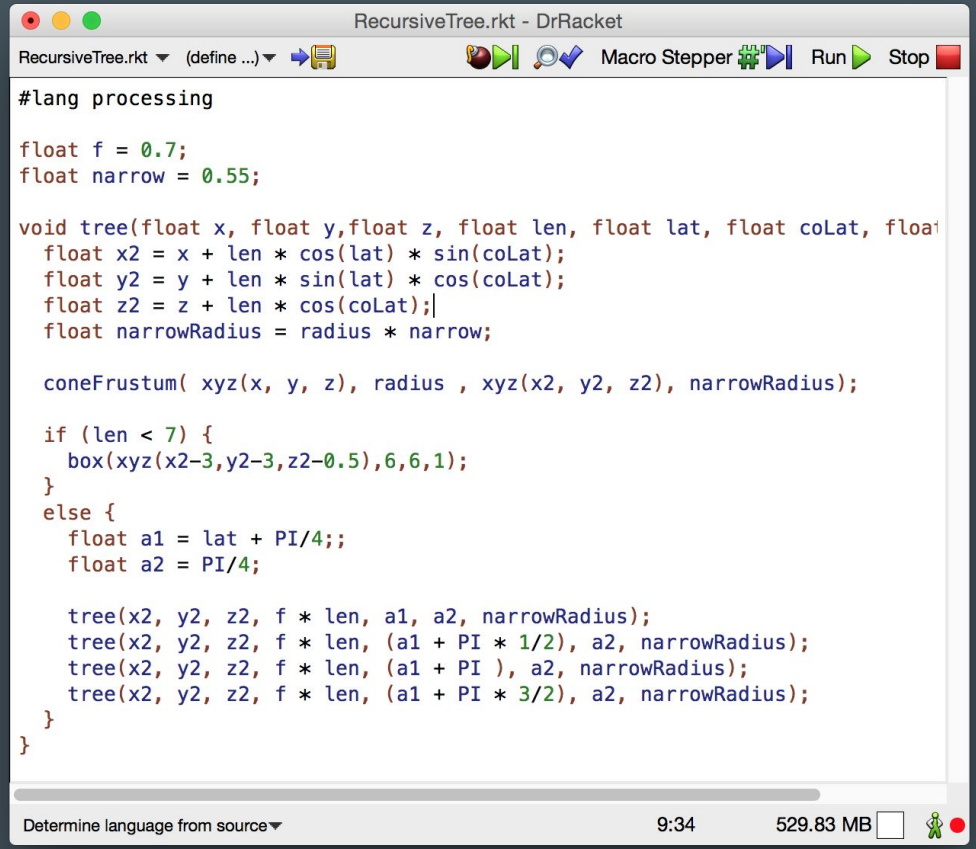
intersection

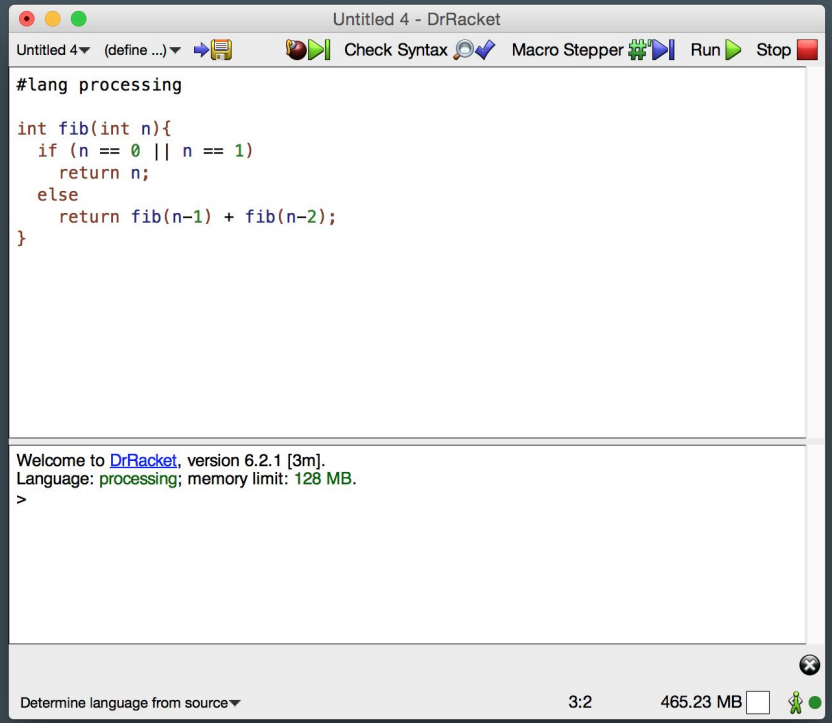
Other Operations

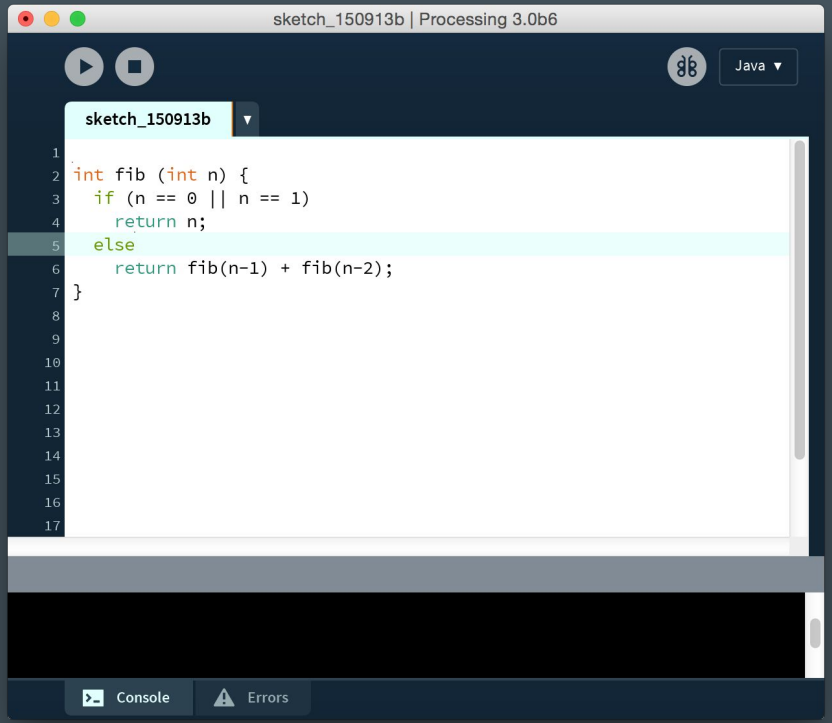


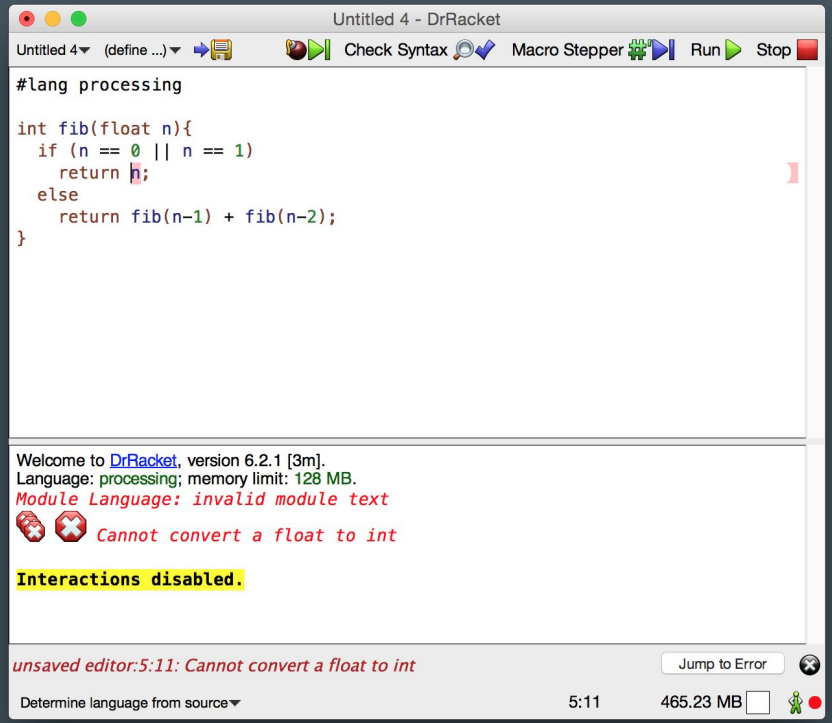
`spline + loft`

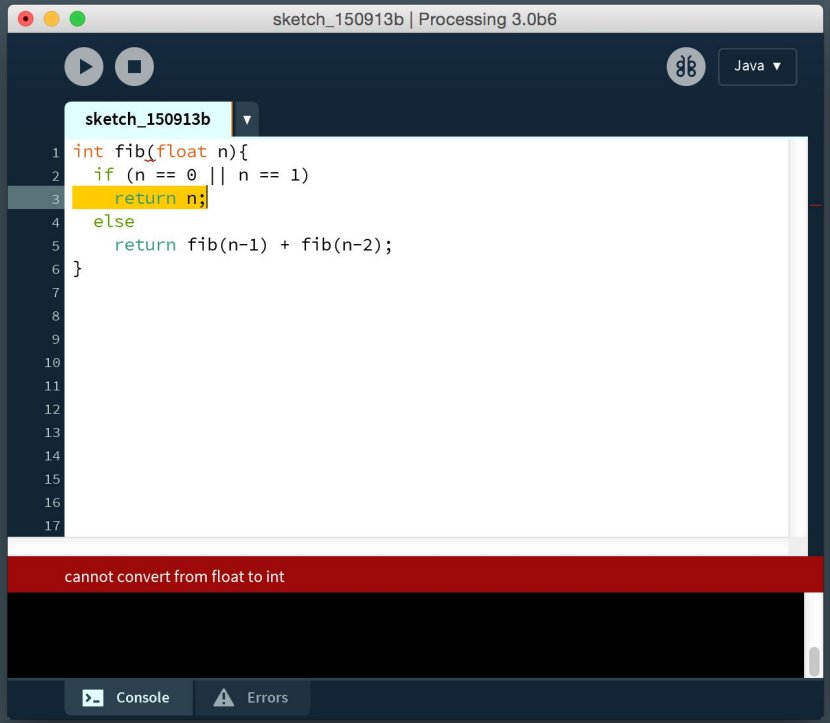
Similar environment

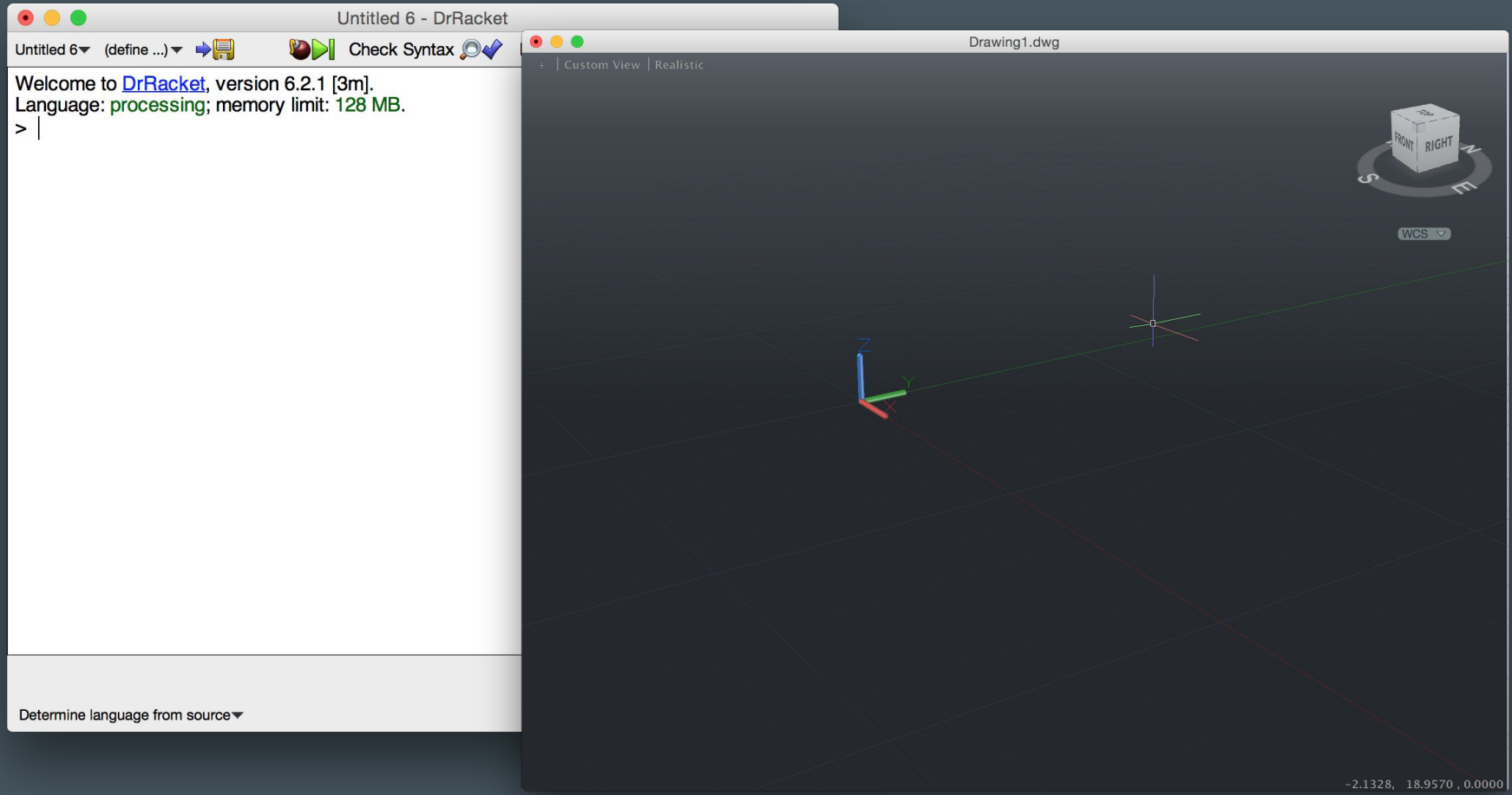



Untitled 4 - DrRacket
Untitled 4
(define ...)
Check Syntax
Macro Stepper
Run
Stop
#lang processing
int fib(int n){
if (n == 0 || n == 1)
return n;
else
return fib(n-1) + fib(n-2);
}
Welcome to DrRacket, version 6.2.1 [3m].
Language: processing; memory limit: 128 MB.
>
Determine language from source
3:2
465.23 MB


sketch_150913b | Processing 3.0b6
Java
sketch_150913b
int fib (int n) {
if (n == 0 || n == 1)
return n;
else
return fib(n-1) + fib(n-2);
}
Console
Errors


Untitled 4 - DrRacket
Untitled 4
(define ...)
Check Syntax
Macro Stepper
Run
Stop
#lang processing
int fib(float n){
if (n == 0 || n == 1)
return n;
else
return fib(n-1) + fib(n-2);
}
Welcome to DrRacket, version 6.2.1 [3m].
Language: processing; memory limit: 128 MB.
Module Language: invalid module text
Cannot convert a float to int
Interactions disabled.
unsaved editor:5:11: Cannot convert a float to int
Jump to Error
Determine language from source
5:11
465.23 MB


sketch_150913b | Processing 3.0b6
Java
sketch_150913b
int fib(float n){
if (n == 0 || n == 1)
return n;
else
return fib(n-1) + fib(n-2);
}
cannot convert from float to int
Console
Errors


Untitled 6 - DrRacket
Untitled 6
(define ...)
Check Syntax
Welcome to DrRacket, version 6.2.1 [3m].
Language: processing; memory limit: 128 MB.
>
Determine language from source
Drawing1.dwg
Custom View
Realistic
FRONT
RIGHT
WCS
-2.1328, 18.9570 , 0.0000

Untitled 6 - DrRacket

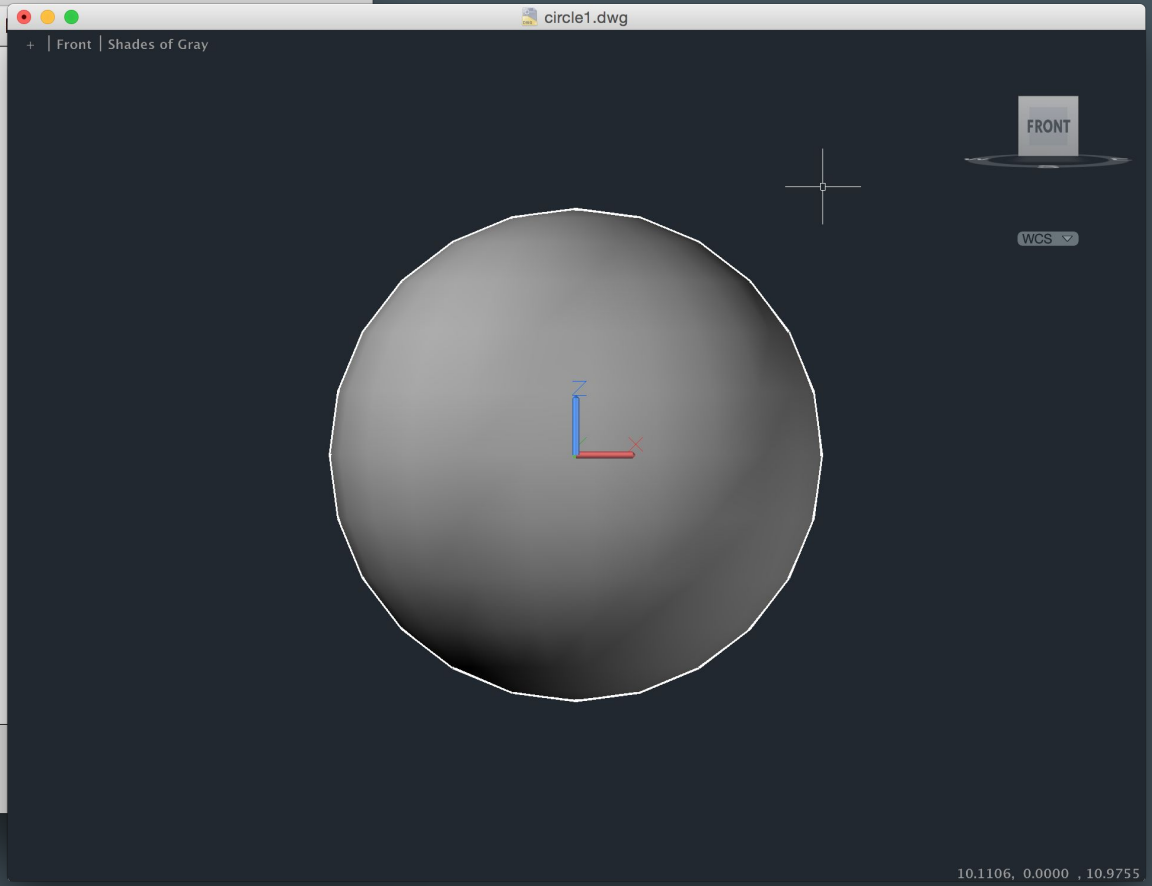
Untitled 6 (define ...) Check Syntax

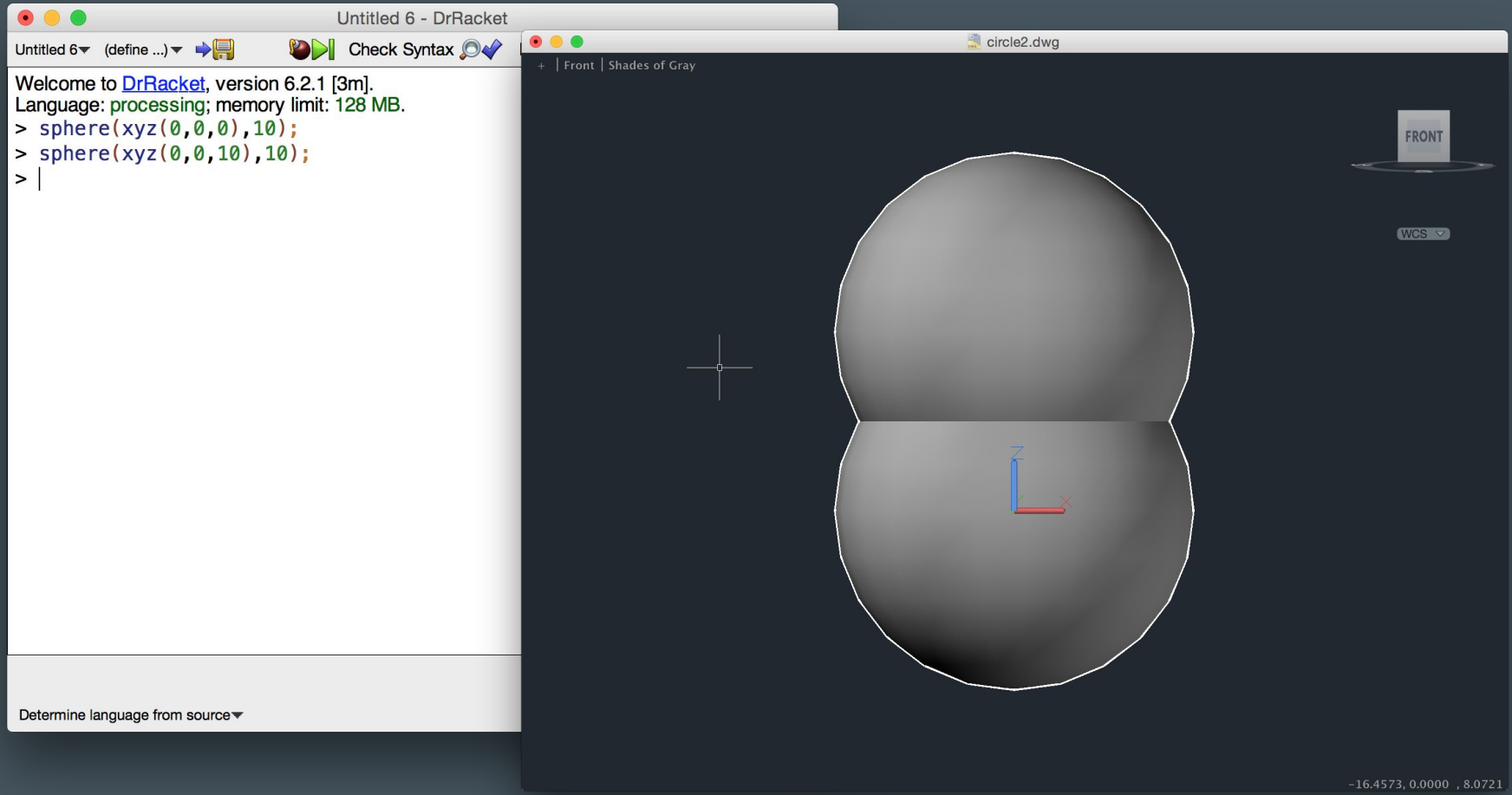
Welcome to DrRacket, version 6.2.1 [3m].
Language: processing; memory limit: 128 MB.

```
> sphere(xyz(0,0,0),10);
>
```

Determine language from source

circle1.dwg




Untitled 6 - DrRacket
Untitled 6
(define ...)
Check Syntax
Welcome to DrRacket, version 6.2.1 [3m].
Language: processing; memory limit: 128 MB.
> sphere(xyz(0,0,0),10);
> sphere(xyz(0,0,10),10);
>
Determine language from source
circle2.dwg
Front | Shades of Gray
FRONT
WCS
-16.4573, 0.0000 , 8.0721

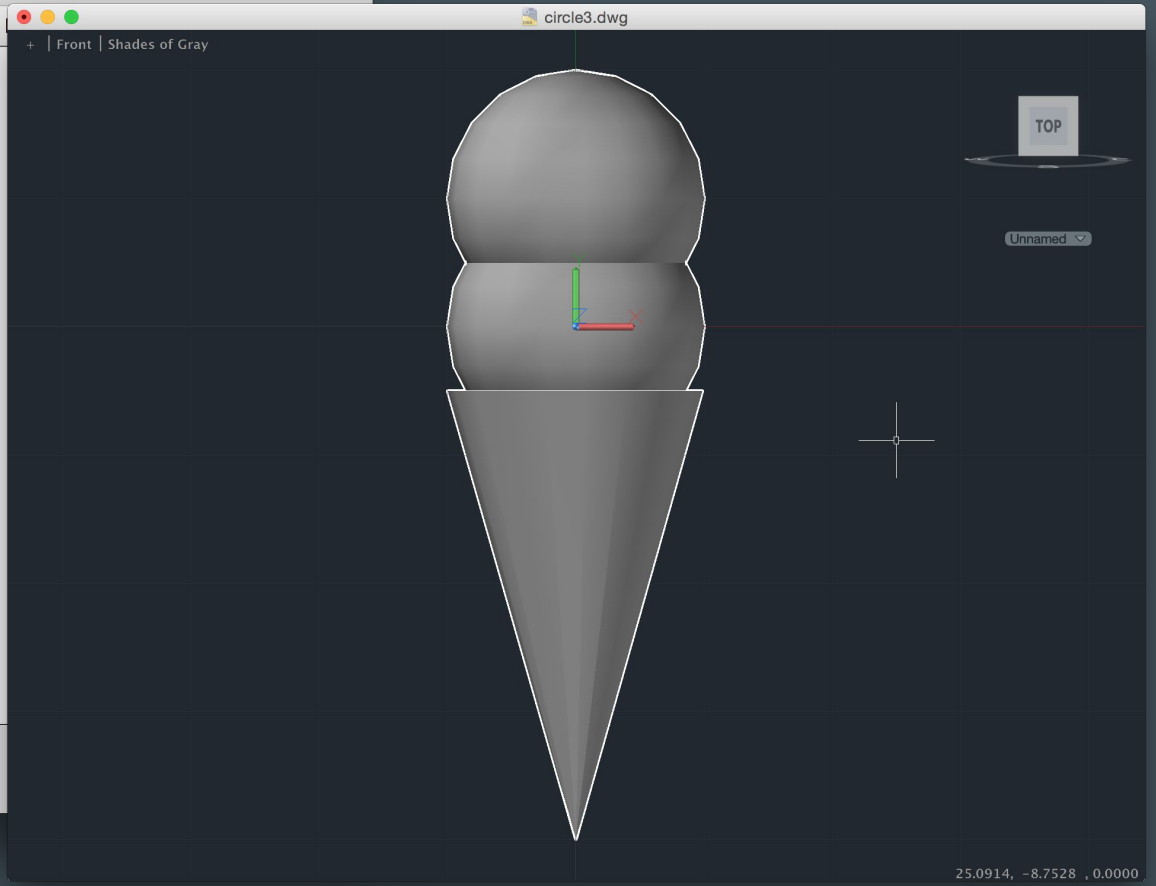
Untitled 6 - DrRacket

Untitled 6 (define ...) Check Syntax

Welcome to DrRacket, version 6.2.1 [3m].
Language: processing; memory limit: 128 MB.

```
> sphere(xyz(0,0,0),10);
> sphere(xyz(0,0,10),10);
> cone(xyz(0,0,-5),10, xyz(0,0,-40));
>
```

Determine language from source



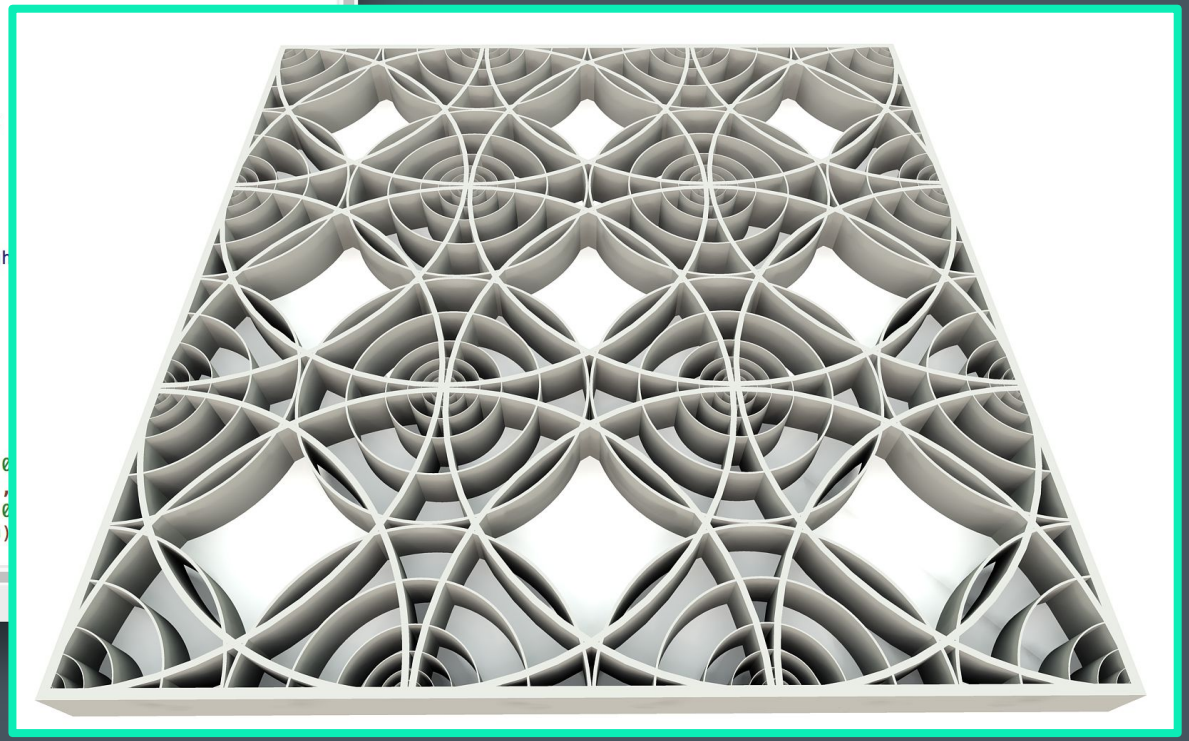
Multiple Languages

mosaic.pde - DrRacket

mosaic.pde (define ...) Check Syntax Macro Stepper Run Stop

```
#lang processing

require "fib.rkt";
require "draw.rkt";

float height = 20;

void echo(int n, Object pos, float ang, float
  if ( n == 1) {
    fullArc( pos, r, ang, HALF_PI, height);
  }
  else {
    float fib = fib(n);
    fullArc( pos, r / fib, ang, HALF_PI, heigh
    echo(n-1, pos, ang, r);
  }
}

void mosaic(float l) {
  int max = 3;
  for(int i = 0; i < max;  i++) {
    for (int j = 0; j < max; j++) {
      echo(10, xyz(i*100.0, j*100.0, 0.0), 0.0
      echo(10, xyz(i*100.0 + l, j*100.0, 0.0),
      echo(10, xyz(i*100.0 + l, j*100.0 + l, 0
      echo(10, xyz(i*100.0 , j*100.0 + l, 0.0)
    }
```

Determine language from source

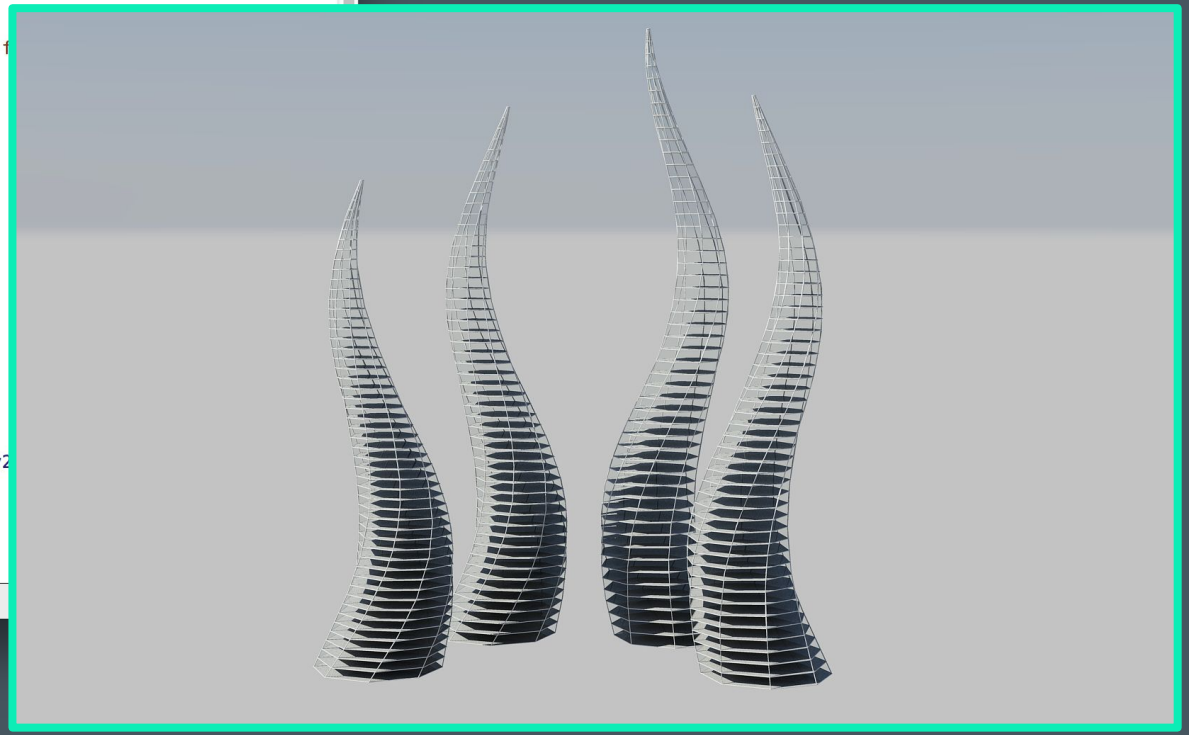


Skyscraper.rkt - DrRacket

Skyscraper.rkt (define ...) Check Syntax Macro Stepper Run Stop

```
#lang processing



void skyscraper(float x, float y, float len, f
  float x2 = x + len * cos(ang);
  float y2 = y + len * sin(ang);

  circle(xyz(x, y, 0), xyz(x2, y2, 0));

  if (len < 10)
    ellipse( xyz(x2, y2, 0), 0.6, 0.6);
  else {
    skyscraper(x2, y2, 0.5 * len, ang + da);
  }

}

void setup(){
    backend(autocad);
}

void top(float x, float, y, float x2, float y2
  circle(xyz(x, y, 0), xyz(x2, y2, 0));

  if (len < 10)
    ellipse( xyz(x2, y2, 0), 0.6, 0.6);
```

Determine language from source



Future Work

Add missing Processing features

Visualize Interactions in the Editor

Improve editor user experience

TÉCNICO LISBOA

Thank you!

Questions?