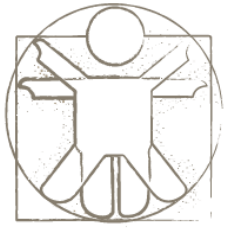

Sketchlet Tutorial
Scripting

sketchlet.sf.net

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Scripts

- In Sketchlet scripting languages can be used to quickly outline the behavior of sketches
- Scripts are proven, highly productive and simple to learn and use end-user development paradigm
- Define more complex interaction scenarios, without requiring intensive programming

Scripts

- We currently support several higher-level scripting languages including Javascript, Python, BeanShell, and Groovy (experimental support for Ruby, TCL, Sleep, Haskell, and Prolog)

Sketchlet Extends Scripting Languages

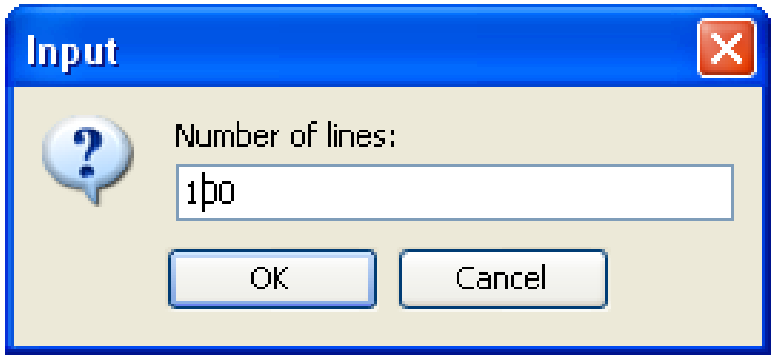
- Sketchlet Scripting Extensions
  - Working with Variables
  - Getting User Input
  - Working with Region and Sketch Properties
  - Pause and Wait
  - Graphics

Extensions – Working with Variables

- **sketchlet.update**(String variable, String value)
- **sketchlet.update**(String variable, int value)
- **sketchlet.update**(String variable, double value)
- String **sketchlet.get**(String variable)
- String **sketchlet.getString**(String variable)
- int **sketchlet.getInteger**(String variable)
- double **sketchlet.getDouble**(String variable)
- int **sketchlet.getCount**(String variable)
- int **sketchlet.getTimestamp**(String variable)

Extensions – Showing Message and Getting User Input

- **sketchlet.showMessage**(String message)
- String **sketchlet.ask**(String question)
- String **sketchlet.askString**(String question)
- int **sketchlet.askInteger**(String question)
- double **sketchlet.askDouble**(String question)



Extensions – Working with Region Properties

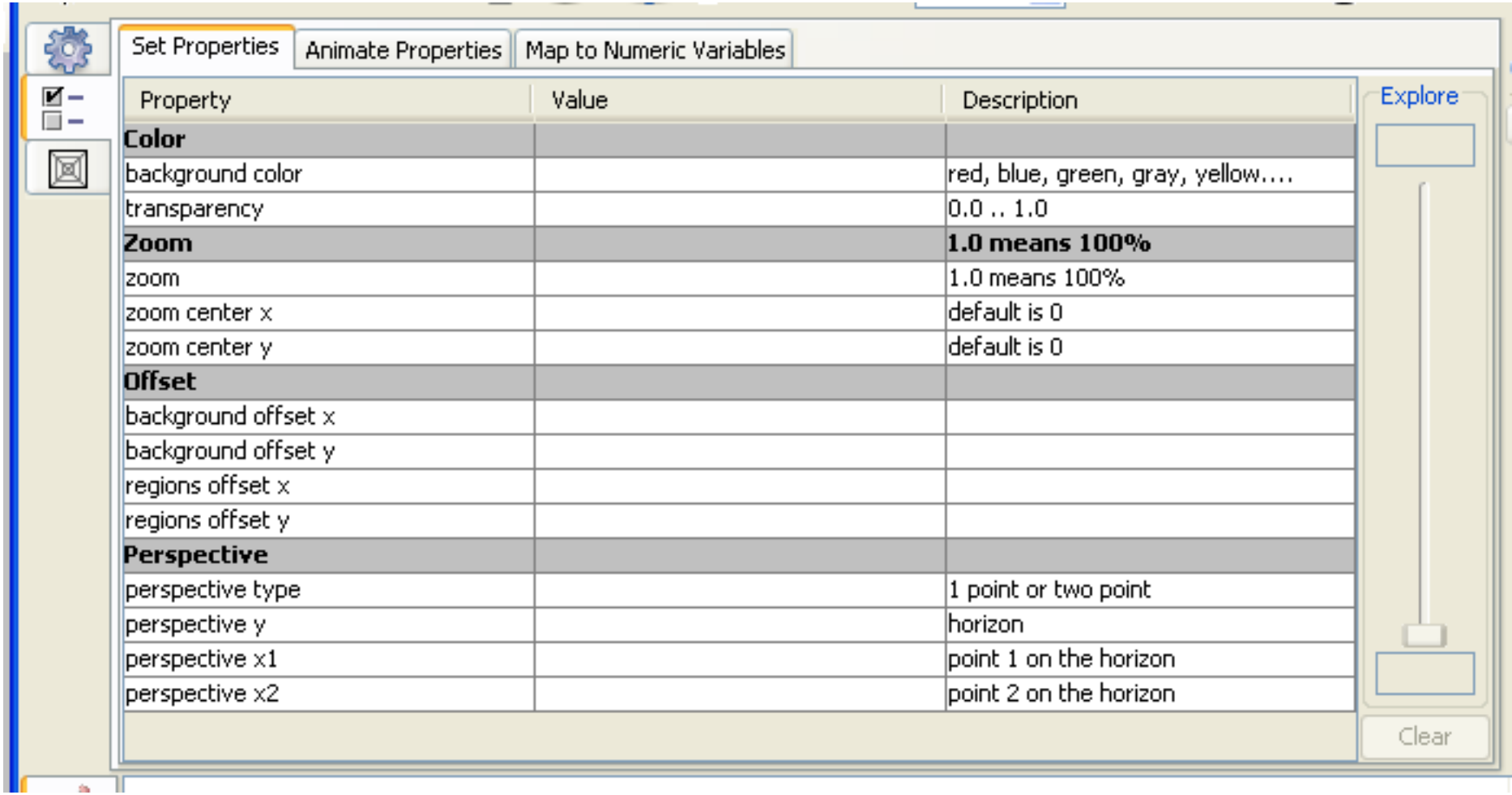
- **setRegionProperty**(int number, String property, String value)
- **setRegionProperty**(int number, String property, int value)
- **setRegionProperty**(int number, String property, double value)
- String **getRegionProperty**(int number, String property)
- String **getRegionPropertyAsString**(int number, String property)
- int **getRegionPropertyAsInteger**(int number, String property)
- double **getRegionPropertyAsDouble**(int number, String property)

Position	
position x	horizontal position (left, 0 to 1000)
position y	vertical position (top, 0 to 1000)
relative x	relative horizontal position (0.0 to 1.0)
relative y	vertical position (0.0 to 1.0)
trajectory position	0.0 to 1.0
Size	
width	region width
height	region height
Orientation	
rotation	angle
Transparency	**0.0 to 1.0**
transparency	0.0 to 1.0
Visible area	
visible area x	
visible area y	
visible area width	
visible area height	
Motion	
speed	pixels per second
direction	angle
Pen	
pen thickness	0, 1, 2...

Advanced / Coordinates	
x1	
y1	
x2	
y2	
Advanced / Sheer	
shear x	0.0 to 1.0
shear y	0.0 to 1.0
Advanced / 3D	
horizontal 3d rotation	0 to 360
vertical 3d rotation	0 to 360
Advanced / Perspective	
perspective x1	0 to 1, x top left corner
perspective y1	0 to 1, y top left corner
perspective x2	0 to 1, x top right corner
perspective y2	0 to 1, x top right corner
perspective x3	0 to 1, x bottom right corner
perspective y3	0 to 1, x bottom right corner
perspective x4	0 to 1, x bottom left corner
perspective y4	0 to 1, x bottom left corner
automatic perspective	left, right, top, bottom, parallel
perspective depth	relative perceptive depth 0.0 to 1.0

Extensions – Working with Sketch Properties

- **setSketchProperty**(String property, String value)
- **setSketchProperty**(String property, int value)
- **setSketchProperty**(String property, double value)
- String **getSketchProperty**(String property)
- String **getSketchPropertyAsString**(String property)
- int **getSketchPropertyAsInteger**(String property)
- double **getSketchPropertyAsDouble**(String property)


Set Properties
Animate Properties
Map to Numeric Variables
Property
Value
Description
Color
background color
red, blue, green, gray, yellow....
transparency
0.0 .. 1.0
Zoom
1.0 means 100%
zoom
1.0 means 100%
zoom center x
default is 0
zoom center y
default is 0
Offset
background offset x
background offset y
regions offset x
regions offset y
Perspective
perspective type
1 point or two point
perspective y
horizon
perspective x1
point 1 on the horizon
perspective x2
point 2 on the horizon
Explore
Clear

Extensions – Pause and Wait

- **sketchlet.pause**(double seconds)
- **sketchlet.waitForUpdate**(String variable)
- **sketchlet.waitUntil**(String expression)

Extensions – Graphics

- **graphics.clearCanvas**()
- **graphics.repaint**()
- **graphics.setColor**(int r, int g, int b)
- **graphics.setColor**(int r, int g, int b, int transparency)
- **graphics.setTransparency**(float transparency)
- **graphics.setLineWidth**(double width)
- **graphics.setFont**(String name, String style, int size)
- **graphics.translate**(int x, int y)
- **graphics.rotate**(double angle, int x, int y)
- **graphics.scale**(double x, double y)
- **graphics.shear**(double x, double y)};

Extensions – Graphics

- **sketchlet.drawText**(String text, int x, int y)
- **sketchlet.drawLine**(int x1, int y1, int x2, int y2)
- **sketchlet.drawRect**(int x, int y, int w, int h)
- **sketchlet.drawEllipse**(int x, int y, int w, int h)
- **sketchlet.drawCircle**(int center_x, int center_y, int r)
- **sketchlet.fillRect**(int x, int y, int w, int h)
- **sketchlet.fillEllipse**(int x, int y, int w, int h)
- **sketchlet.fillCircle**(int center_x, int center_y, int r)
- **sketchlet.drawImage**(String strPathOrURL, int x, int y)
- **sketchlet.drawImage**(String strPathOrURL, int x, int y, int w, int h)
- **sketchlet.getTextWidth**(String text)
- **sketchlet.getTextHeight**(String text)

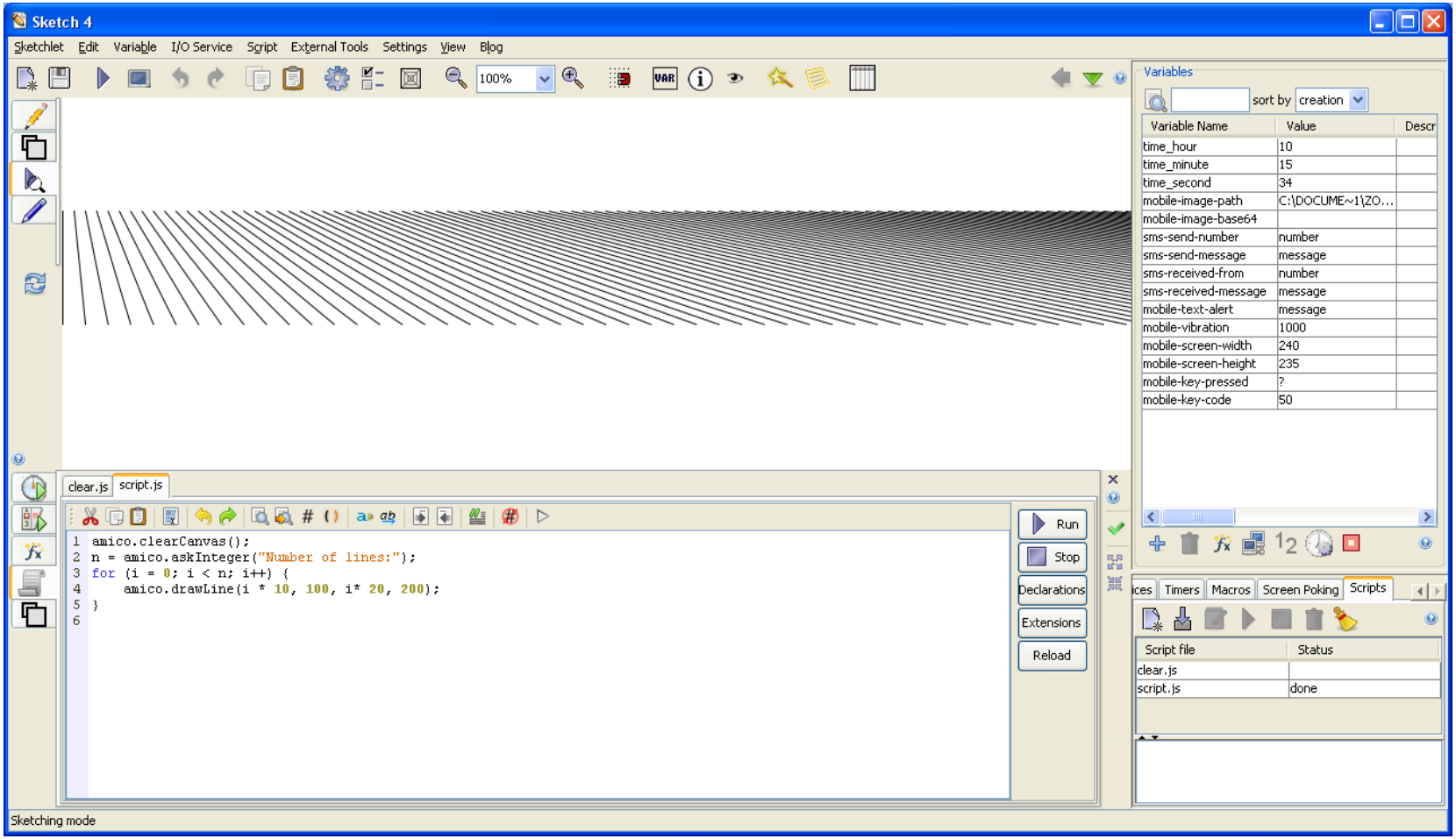
Variable Declarations Inside Scripts

- When a script is called, Sketchlet variables will be redeclared within the script
  - Variables may be renamed to satify naming convention of scripting languages

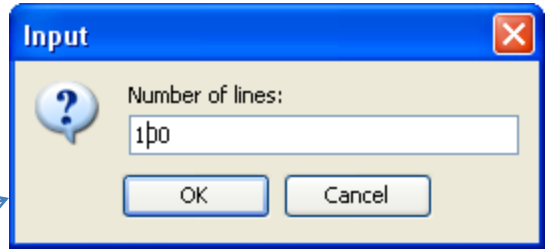
Sketchlet Variable Name	Declaration in scripts
position x	position_x
motion-intensity	motion_intensity
a	a

- Read-only, use *sketchlet.update* to change the value of a Sketchlet variable

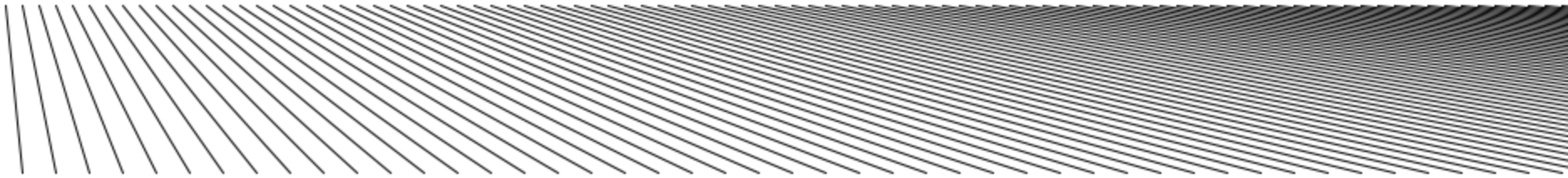
Script Editor



Example

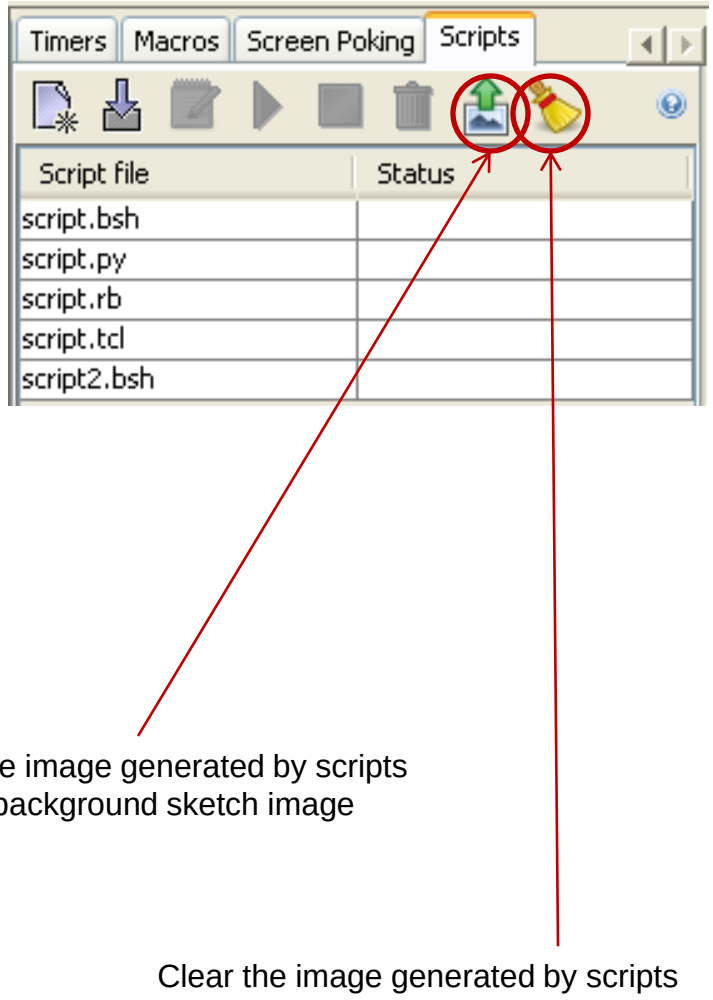



```
graphics.clearCanvas();
n = sketchlet.askInteger("Number of lines:");
for (i = 0; i < n; i++) {
    graphics.drawLine(i * 10, 100, i* 20, 200);
}
```



Merging Image Generated by Scripts and Background Sketch Image

- Scripts draw in a separate layer on top of the sketch
- The image from this layer can be merged with the background sketch image (i.e. it becomes a part of that image)

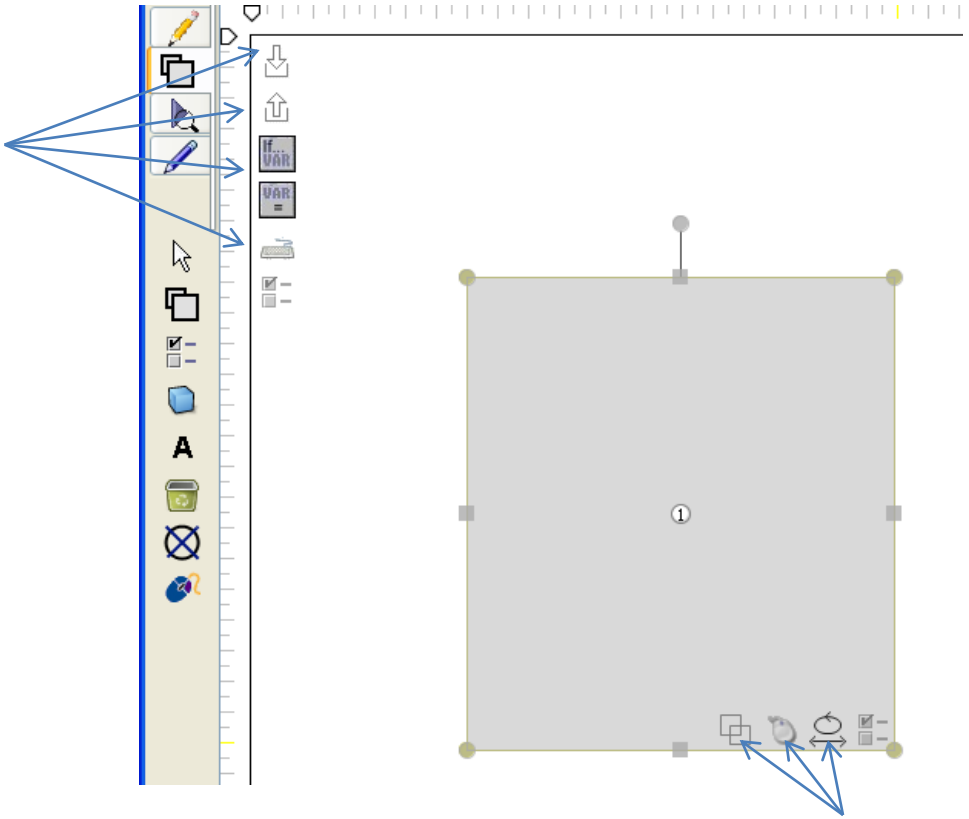


Calling Scripts

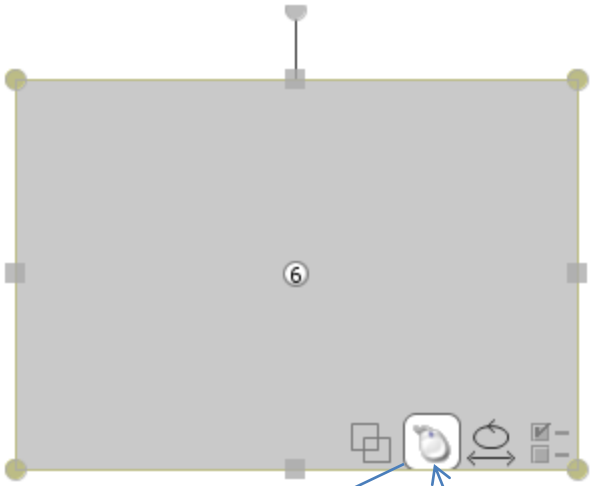
- Scripts can be called from several places
  - On active region mouse events
  - On sketch events (entry or exit)
  - On variable updates ("On Variable Update" actions)
  - On keyboard events
  - From other macros, as one of the commands
- Drag-and-Drop on any sketch or region event
- Directly specify in settings

Drop Event Anchors

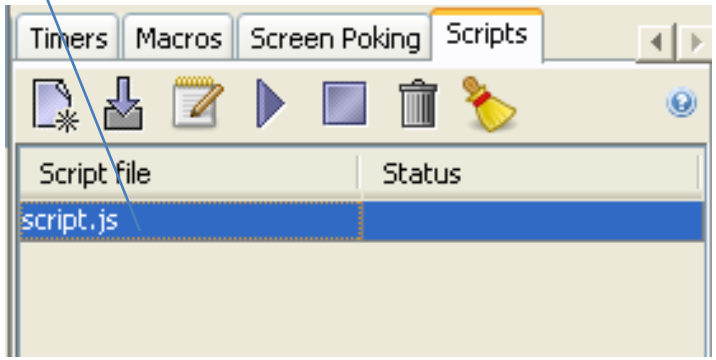
Anchors for connecting sketch events (on entry, on exit, on variable update, on keyboard event) by drag-and-drop of variables, timers and macros. You can also double-click on these icons to open current settings for these events and properties.



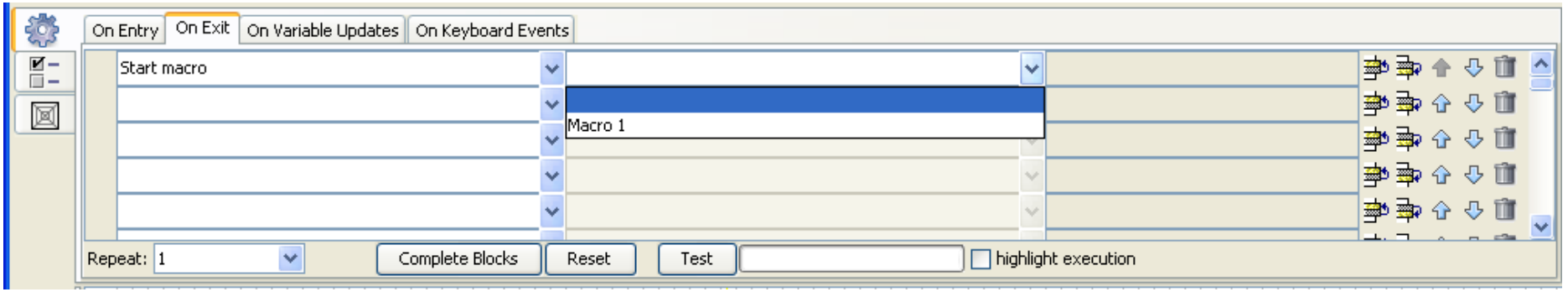
Anchors for connecting region events (region overlap, discrete mouse events, continues mouse events) by drag-and-drop of variables, timers and macros. You can also double-click on these icons to open current settings for these events and properties.

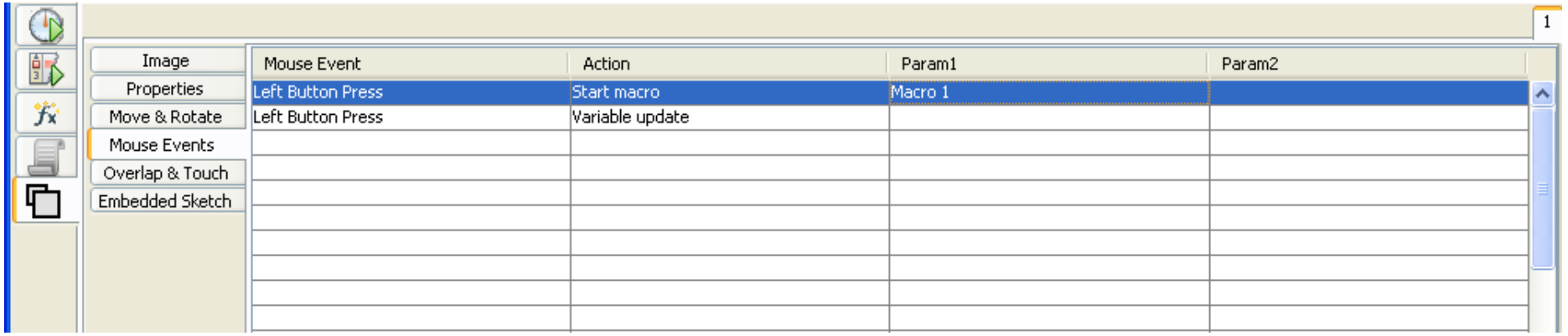


Drag-and-drop of the script on the mouse event icon of the active region.



Directly Specify in Settings





To Learn More About Scripting Languages

- JavaScript
  - http://www.w3schools.com/js
  - https://developer.mozilla.org/en/JavaScript
  - https://developer.mozilla.org/en/A_re-introduction_to_JavaScript
- BeanShell
  - http://www.beanshell.org/
- Groovy
  - http://groovy.codehaus.org/
- Python
  - http://www.python.org/
- …