



**ΠΑΝΕΠΙΣΤΗΜΙΟ ΜΑΚΕΔΟΝΙΑΣ**  
**ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ**  
**ΤΜΗΜΑΤΟΣ ΕΦΑΡΜΟΣΜΕΝΗΣ ΠΛΗΡΟΦΟΡΙΚΗΣ**

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Automatic display of synaesthesia through mathematical  
graphical structures in HTML5

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# Introduction

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# Introduction

## Synaesthesia

Synesthesia is the general name for a set (a "complex") of over 80 related cognitive traits. Synesthesia may be divided into two general, somewhat overlapping groups. The first, sometimes called "synesthesia proper", is when stimuli to a sensory input will also trigger sensations in one or more other sensory modes. The second group of synesthesia, called "cognitive" or "category synesthesia", involves synesthetic additions to culture-bound cognitive categorizational systems. **(Sean A. Day, 2021)**

### Applications of synaesthesia:

- science
- psychology
- cognition
- medicine
- art

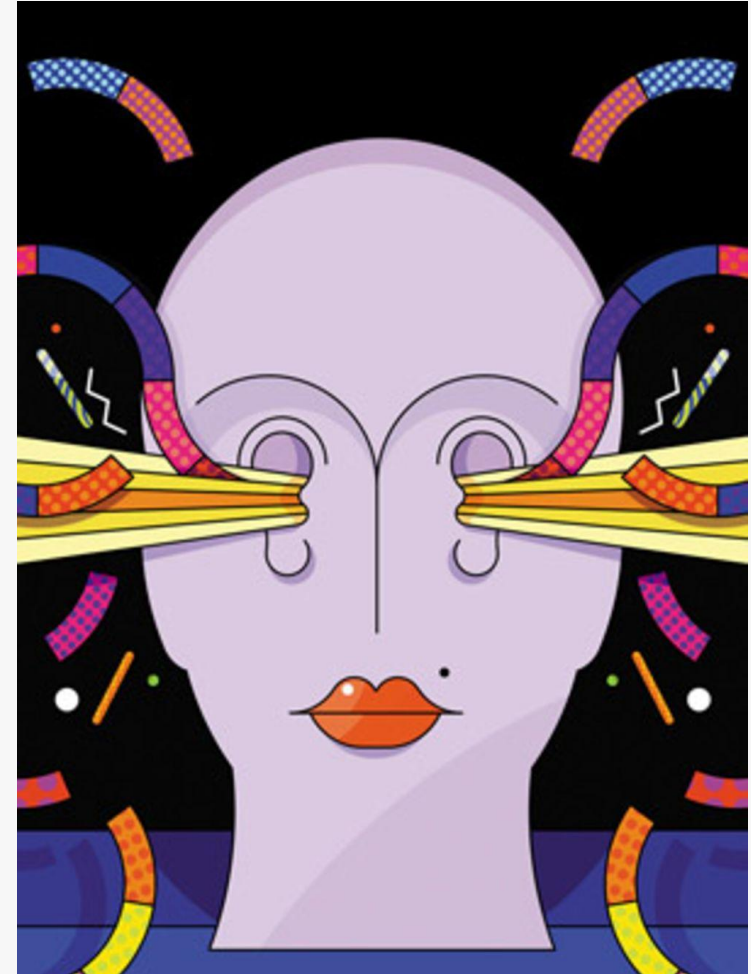


# Introduction

## From synaesthesia vision to HTML5 depiction

1. The most common way to come in touch with stimuli is through sight.
2. Everyone consumes a big part of their time in front of screens.
3. Synaesthetes could express and pass their vision through screens.
4. The majority of the things that are built “behind” those screens is developed with HTML5 technologies.

So HTML5 is used for the development of the geometrical SVG library and the depiction application.

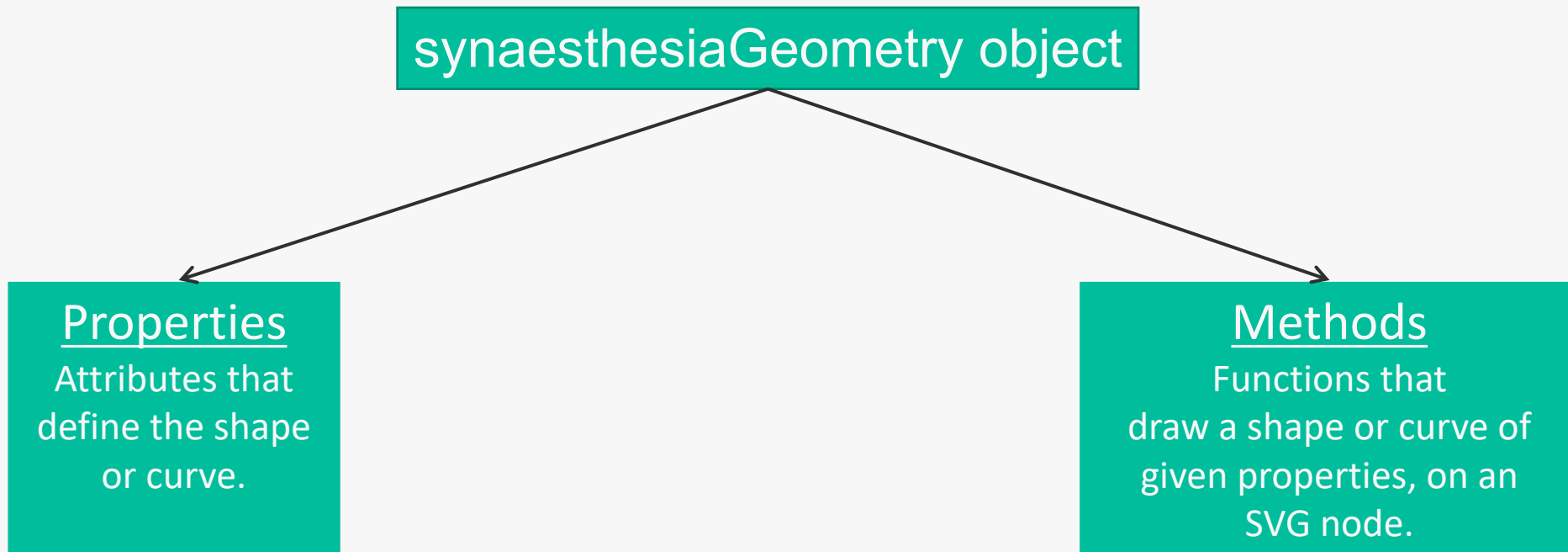


# **synaesthesiaGeometry Library**

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# synaesthesiaGeometry Library

synaesthesiaGeometry is a javascript library that was created to simplify the creation and modification of 32 well-known shapes and curves with HTML5. The shapes-curves are designed to be depicted on images in SVG format.



# synaesthesiaGeometry Library

Property	Used in Methods	Description
<code>strokeColor</code>	<i>All methods</i>	<p>The <code>strokeColor</code> property refers to the color that the drawing line will have on the SVG depiction.</p> <p><b>Value type:</b> <code>string(color)</code>  <b>Default value:</b> "White" (white color)</p>
<code>fillColor</code>	<i>All methods</i>	<p>The <code>fillColor</code> property refers to the color that the shape-curve will be filled with on the SVG depiction.</p> <p><b>Value type:</b> <code>string(color)</code>  <b>Default value:</b> "none" (no color)</p>

Table 1: 2 out of the 66 initial properties of the synaesthesiaGeometry object.

Method	Input	Output	Description
<code>.circle()</code>	The inputs of the <code>.circle()</code> method are the properties: <code>strokeColor</code> , <code>fillColor</code> , <code>strokeWidth</code> , <code>translateX</code> , <code>translateY</code> , <code>degrees</code> , <code>size</code> , <code>node</code> , <code>cx</code> , <code>cy</code> , <code>radius</code> .	Creates a new synaesthesiaGeometry object that is a <code>circleSVG</code> element.	The <code>.circle()</code> method draws a circle of the given properties on the SVG node.
<code>.line()</code>	The inputs of the <code>.line()</code> method are the properties: <code>strokeColor</code> , <code>fillColor</code> , <code>strokeWidth</code> , <code>translateX</code> , <code>translateY</code> , <code>degrees</code> , <code>size</code> , <code>node</code> , <code>lx1</code> , <code>ly1</code> , <code>lx2</code> , <code>ly2</code> .	Creates a new synaesthesiaGeometry object that is a <code>lineSVG</code> element.	The <code>.line()</code> method draws a line of the given properties on the SVG node.
<code>.ellipse()</code>	The inputs of the <code>.ellipse()</code> method are the properties: <code>strokeColor</code> , <code>fillColor</code> , <code>strokeWidth</code> , <code>translateX</code> , <code>translateY</code> , <code>degrees</code> , <code>size</code> , <code>node</code> , <code>ex</code> , <code>ey</code> , <code>rx</code> , <code>ry</code> .	Creates a new synaesthesiaGeometry object that is an <code>ellipseSVG</code> element.	The <code>.ellipse()</code> method draws an ellipse of the given properties on the SVG node.

Table 2: 3 out of the 32 initial methods of the synaesthesiaGeometry object.








# Synaesthesia Depiction Application

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# Synaesthesia Depiction Application

- Synaesthesia depiction application is an implementation of the visualization of the experience that a synaesthete has.
- The product of the application is a SVG image.
- The elements that the SVG image can contain are the shapes or curves that the synaesthesiaGeometry Library offers.
- The application is an explicit use-tester of the synaesthesiaGeometry Library.

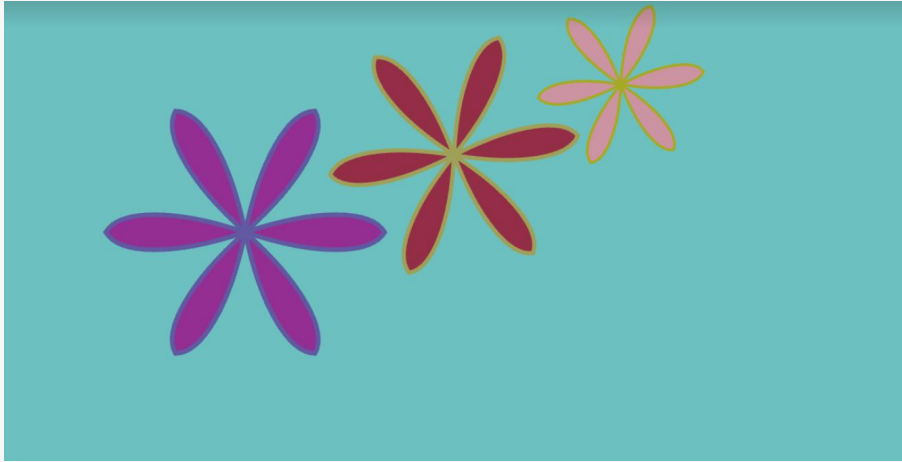
Shape Name	Shape Picture
Line	
Circle	
Ellipse	
Semi circle	
Arc	

The first 5 shapes of the synaesthesia depiction application's "table of shapes".

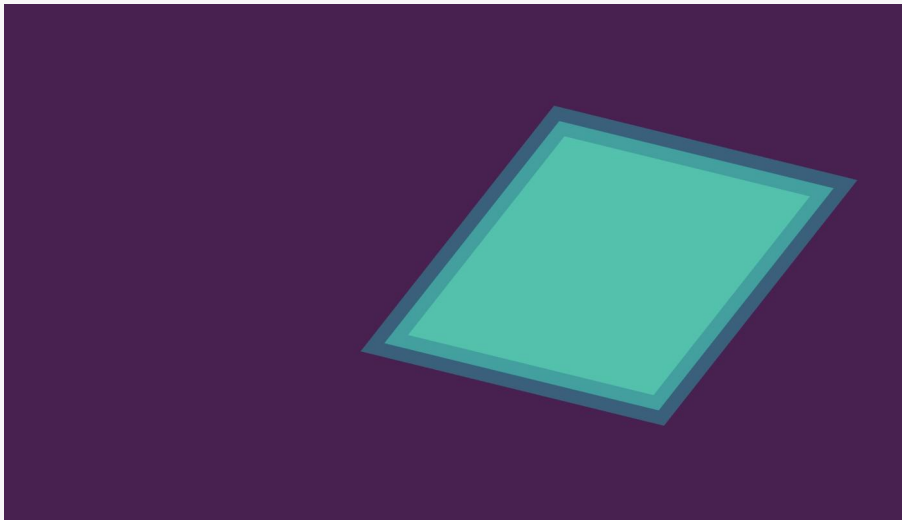
# Examples of use

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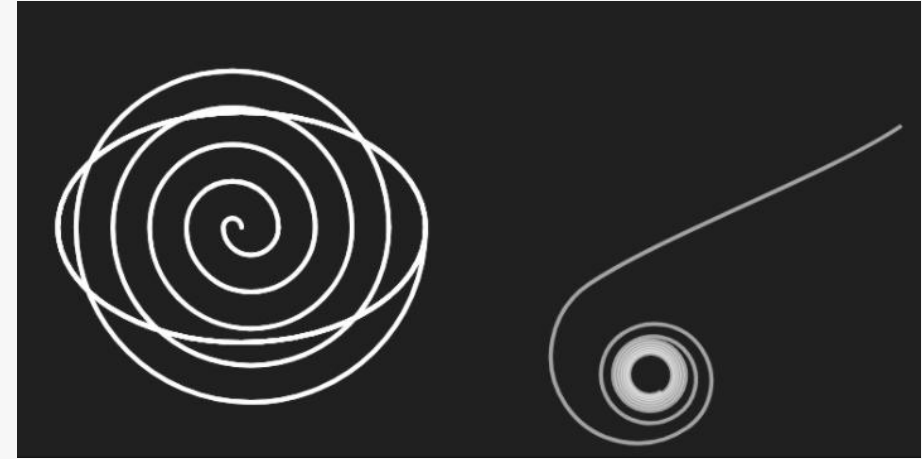
## Examples of use



Example 1: 3 Rhodonea Curves.



Example 3: A rotated rhombus



Example 2: An ellipse above an Archimedean spiral and a rotated lituus curve.

These SVG files are products of use of the synaesthesia depiction application by users that had only read the manual.

# Conclusion

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# Conclusion

- The application can be used by anyone who wants to create digital images that include shapes-curves of different colors, sizes, rotation, transformation, position, opacity.
- The synaesthesiaGeometry library can become a tool for anyone that wants to depict and handle SVG elements with javascript.

## Future work

- The library can become a groundwork for the developement of a geometry library with more shapes and curves such as general polygons or more unknown curves or it can be enriched with transformations, movement, 3D visualization, animation, color mixing.
- The application could encapsulate a canvas depiction for printing or could provide coordinate drawing as digitizers or graphic tablets do and texture options.



**Thank you for your time**

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