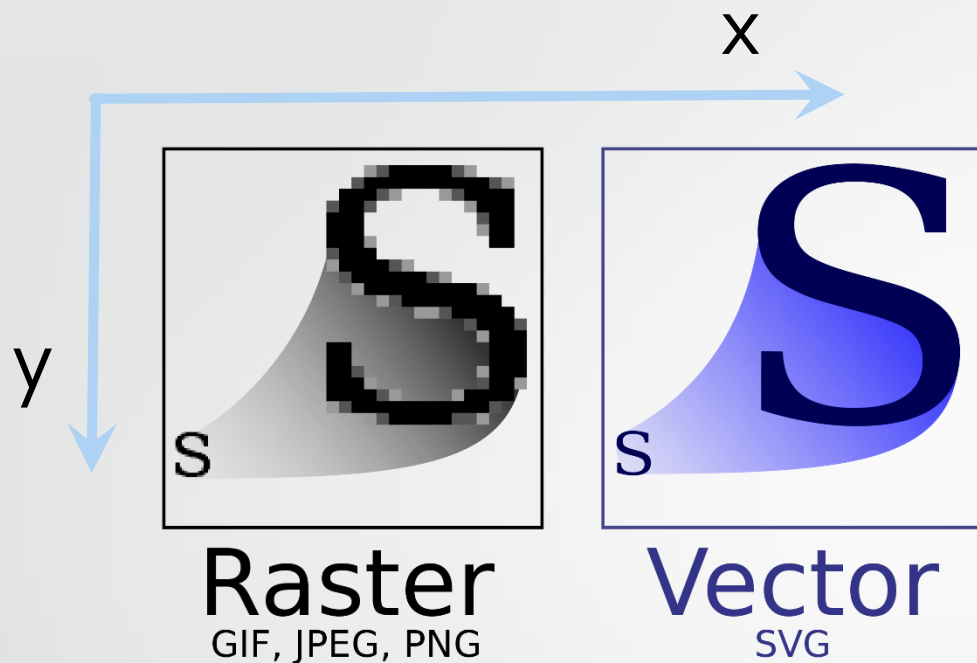




Μαθήματα SVG

SVG: Scalable Vector Graphics

Origin (0,0) of the
coordinate system

x-axis

y

x

SVG Shape

Height

Width

y-axis



```
<h2>Circle</h2>
```

```
<svg width="500" height="500">
```

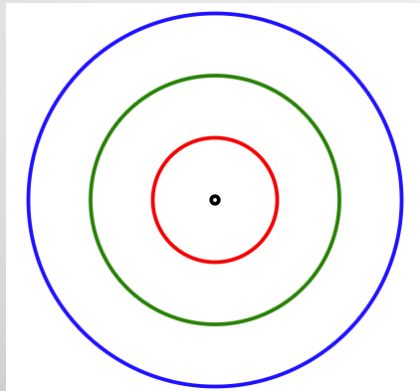
```
  <circle cx="50" cy="50" r="40" stroke="green" stroke-width="4" fill="none" />
```

```
  <circle cx="200" cy="200" r="100" stroke="blue" stroke-width="8" fill="yellow" />
```

```
</svg>
```

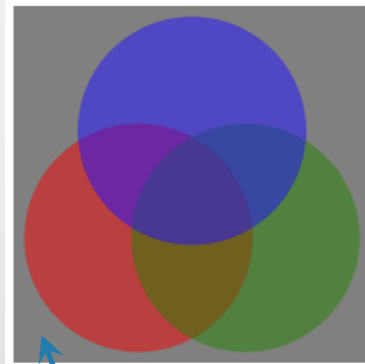
Circle

Ασκήσεις:



Circles-01.html

```
opacity="0.5"
```



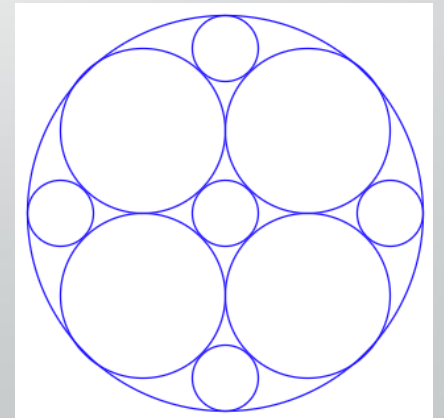
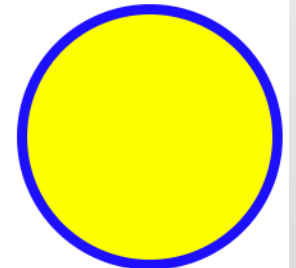
Circles-02.html

Olympic-Games



Olympic-Games.html

Circle

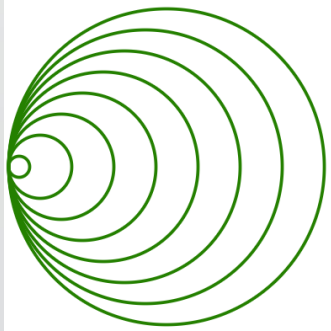


Circles-09.html

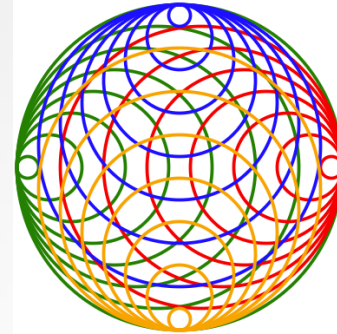
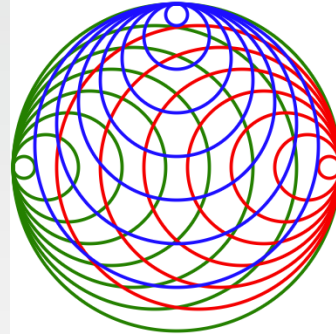
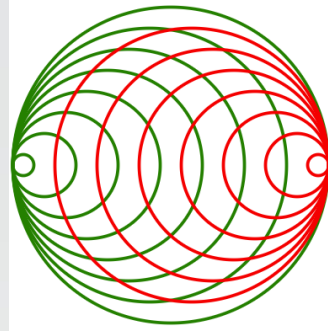
```
<svg width="100" height="100" style="background-color:gray">
```

Καραμαούνας Πολύκαρπος

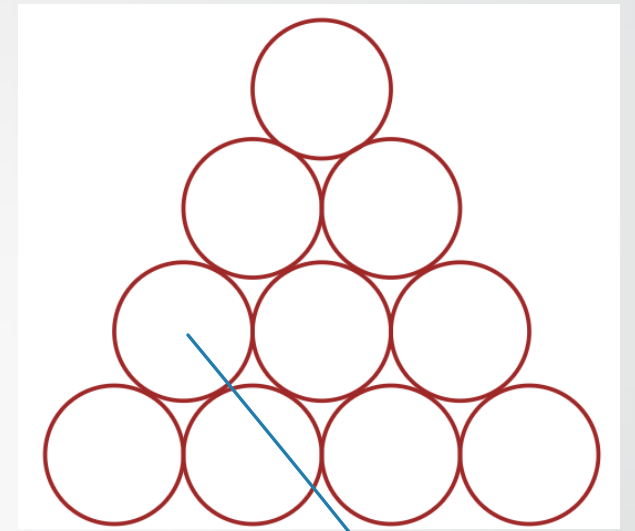
Circle



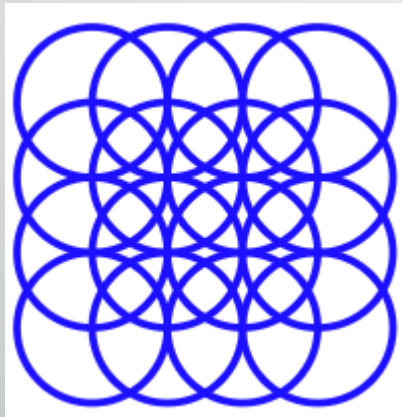
$$x_2 = x_1 + R_2 - R_1$$



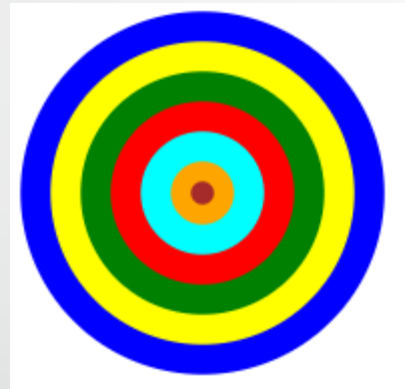
Circles-o3.html



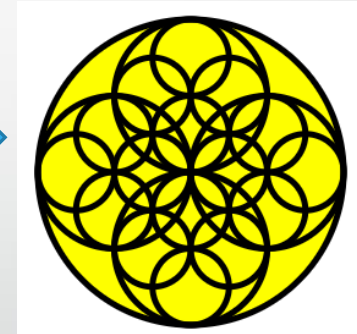
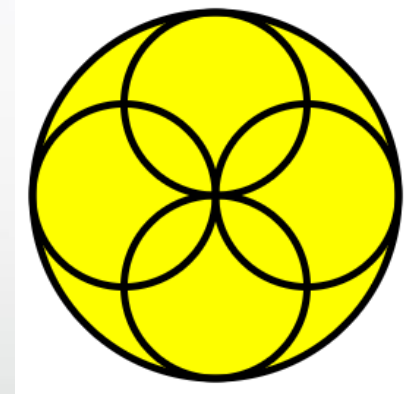
Circles-o4.html



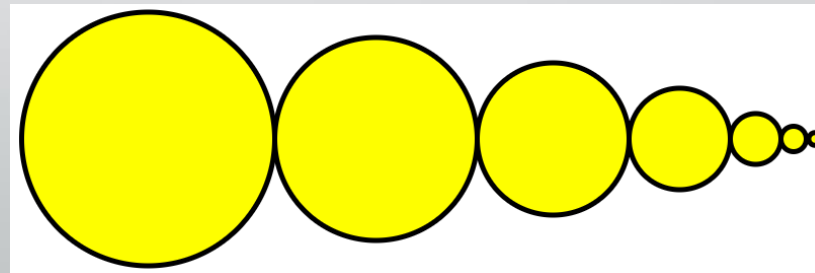
Circles-o5.html



Circles-o6.html

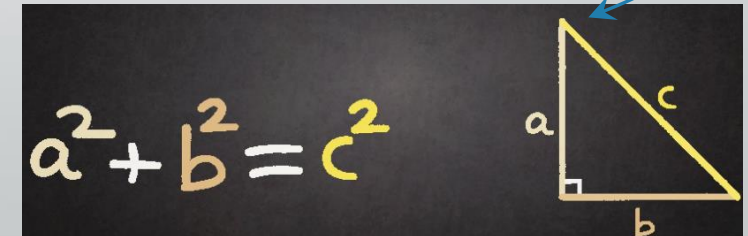


Circles-o7.html

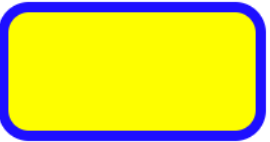


Circles-o8.html

Καραμαούνας Πολύκαρπος



Rect



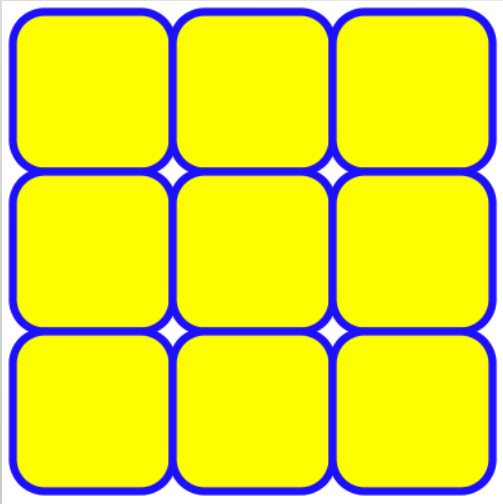
```
<h2>Rect</h2>
```

```
<svg width="500" height="500">
```

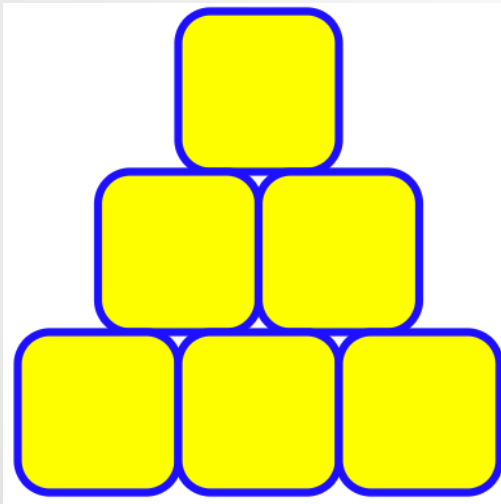
```
<rect x="40" y="20" width="200" height="100" stroke="green" fill="none" stroke-width="4"/>
```

```
<rect x="40" y="150" width="200" rx="20" height="100" stroke="blue" fill="yellow" stroke-width="8"/>
```

```
</svg>
```



Rects-01.html



Rects-02.html



greek-flag.html



Rects-04.html



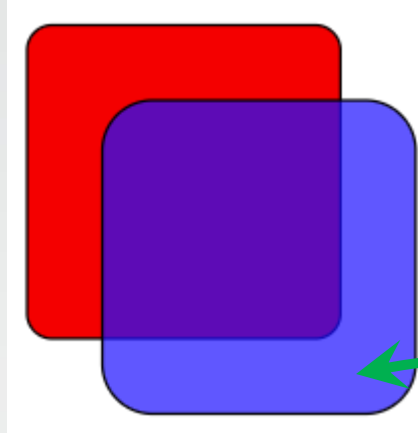
Rects-07.html

Rect

Rect

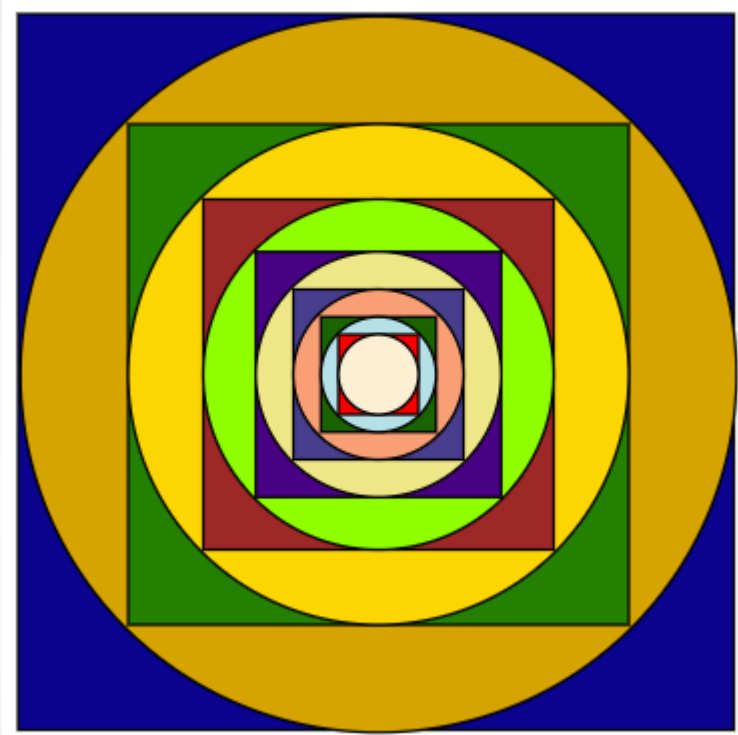


Rects-o5.html

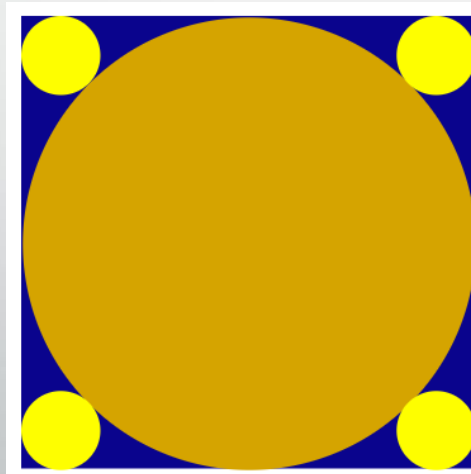


Rects-o3.html

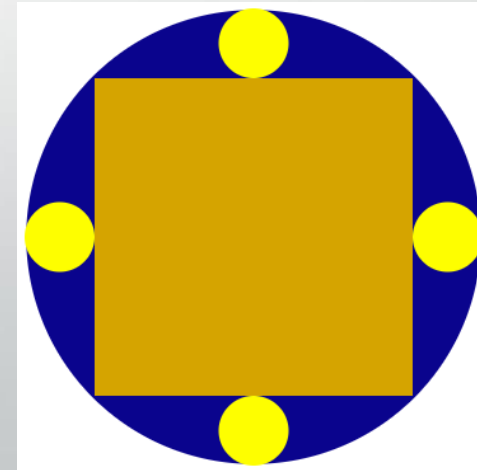
fill-opacity="0.7"



Rects-o6.html

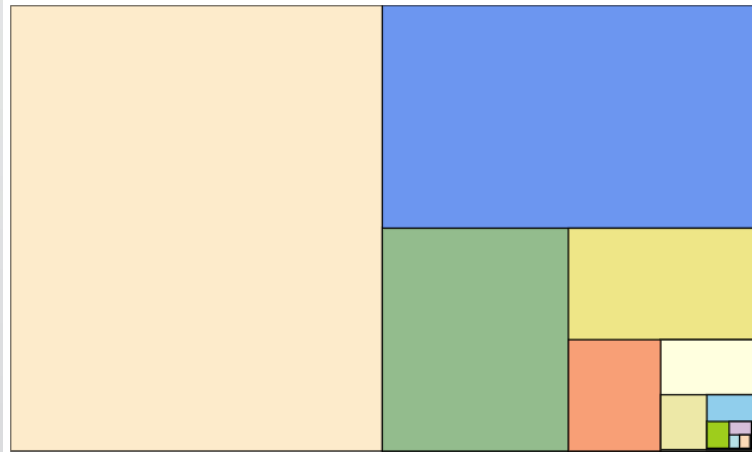


Rects-o8.html

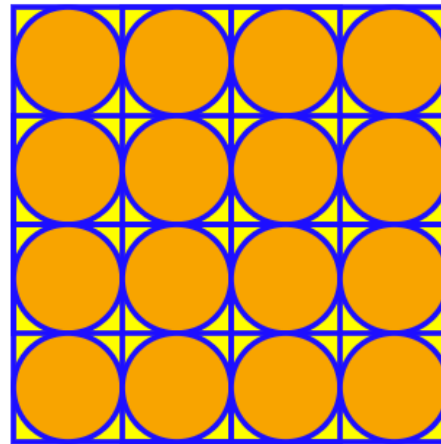


Rects-o9.html

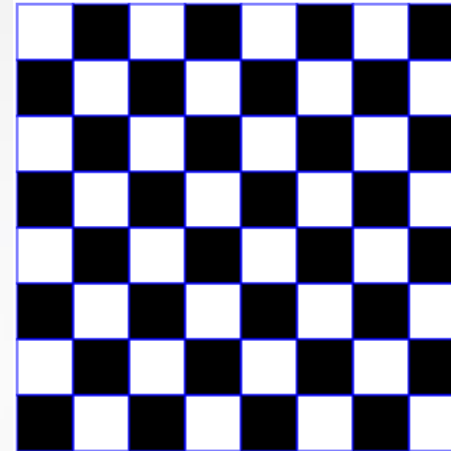
Rect



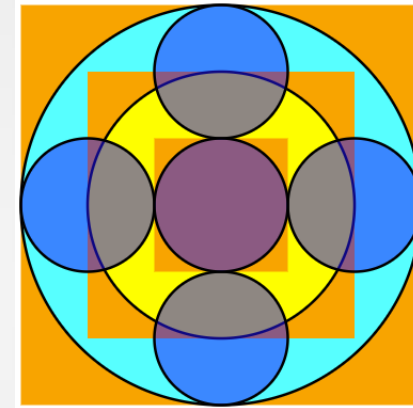
Rects-10.html



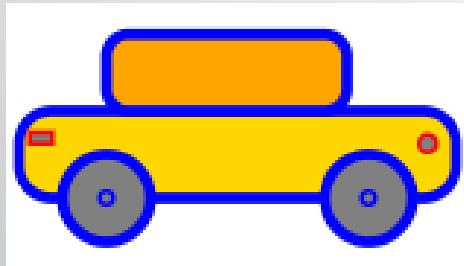
Rects-11.html



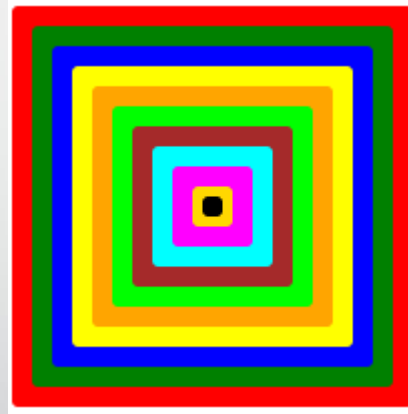
Rects-12.html



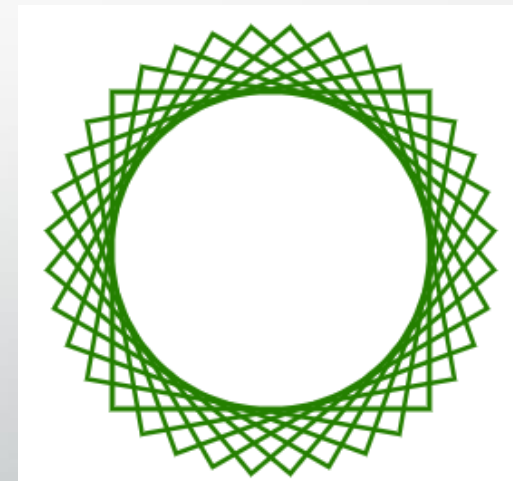
Rects-16.html



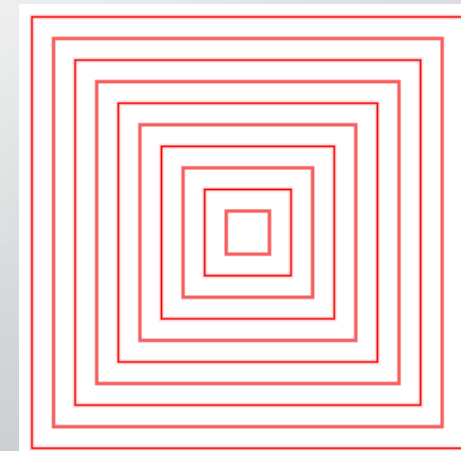
Rects-13.html



Rects-14.html



Rects-15.html



Rects-17.html

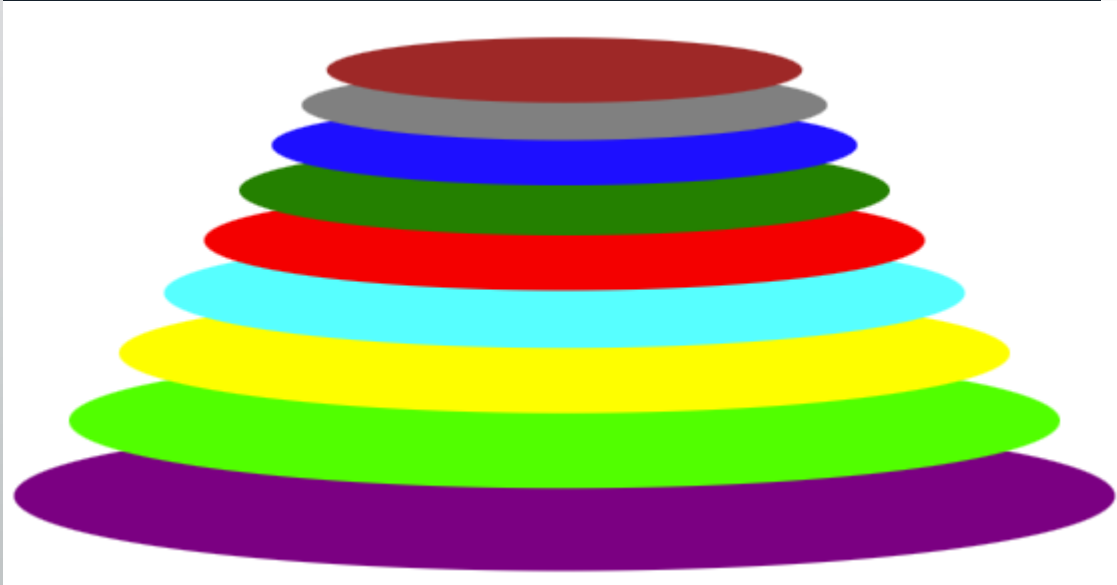
Καραμαούνας Πολύκαρπος

`<rect x="200" y="200" width="140" height="140" transform="rotate(10,270,270)"/>` (περιστροφή από 10-90 μοίρες)

```
<svg height="1000" width="1000">
  <ellipse cx="200" cy="80" rx="150" ry="70" fill="yellow" stroke="blue" stroke-width="8" />
</svg>
```

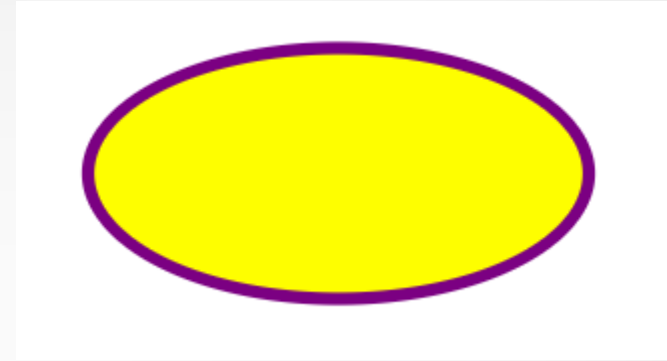
Ellipse

```
<svg height="1000" width="1000">
  <ellipse cx="200" cy="80" rx="150" ry="70"
fill="yellow" stroke="blue" stroke-width="8" />
</svg>
```

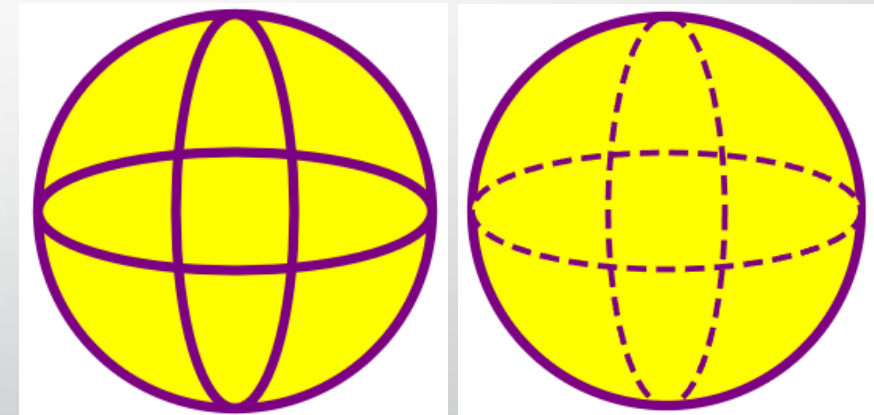


Ellipses-01.html

(με κλιμάκωση -10% των *cy*, *rx*, *ry*)

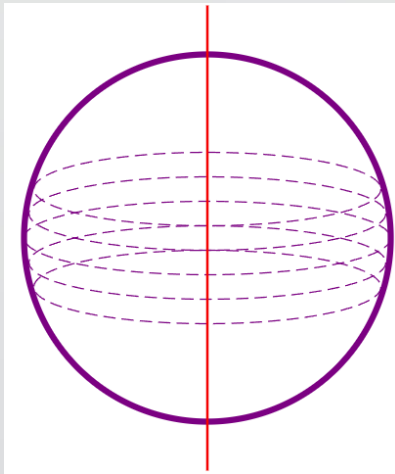


`stroke-dasharray="10,5"`

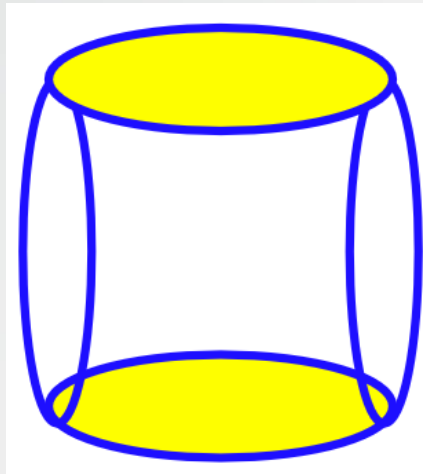


Ellipses-02.html

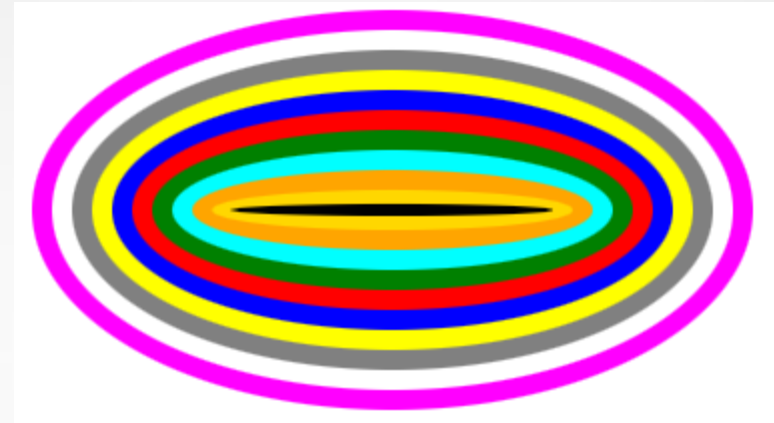
Ellipse



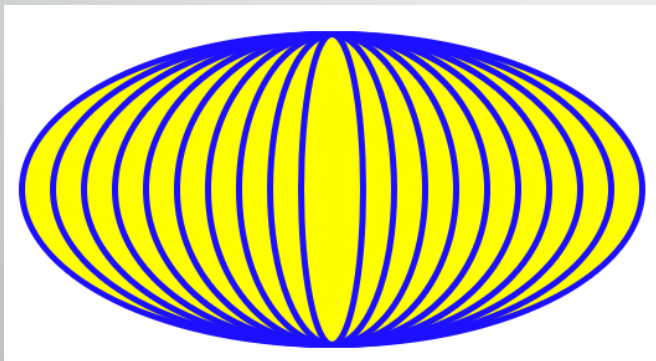
Ellipses-o3.html



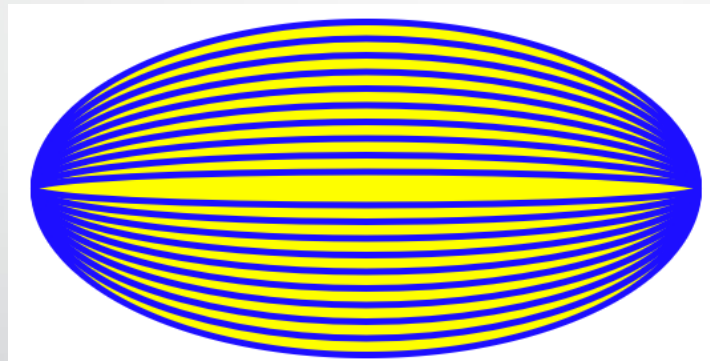
Ellipses-o4.html



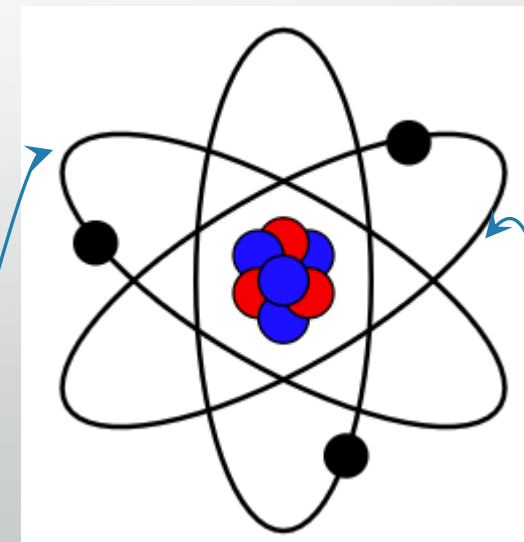
Ellipses-o5.html



Ellipses-o6.html



Ellipses-o7.html



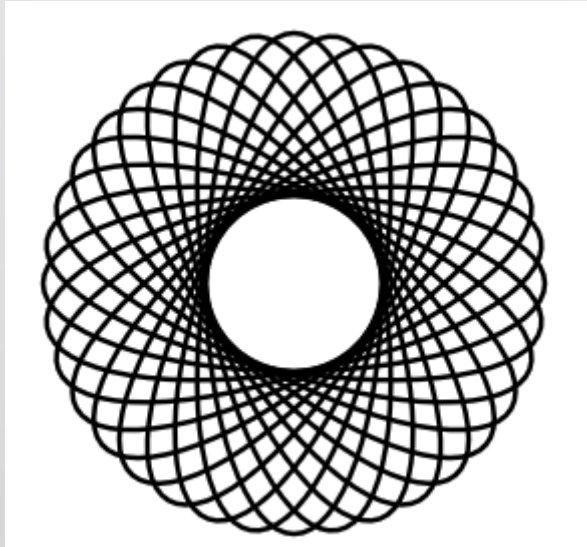
Ellipses-o8.html

Καραμαούνας Πολύκαρπος

`cx="200" cy="200"`

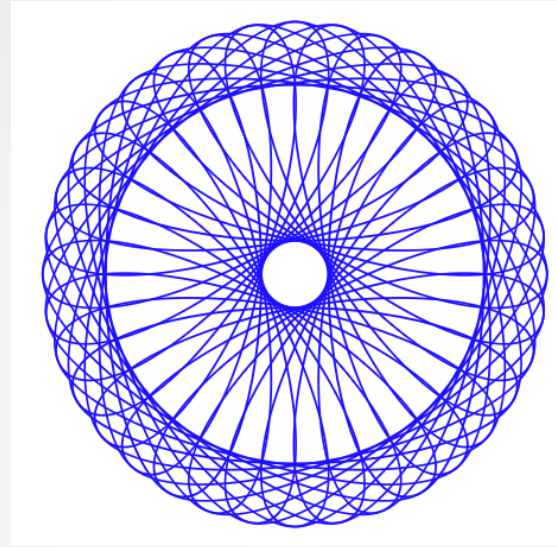
`transform="rotate(-60,200,200)"` `transform="rotate(60,200,200)"`

Ellipse



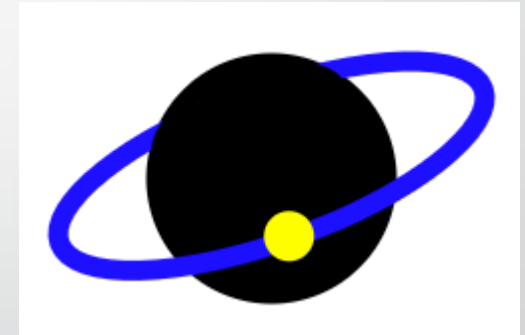
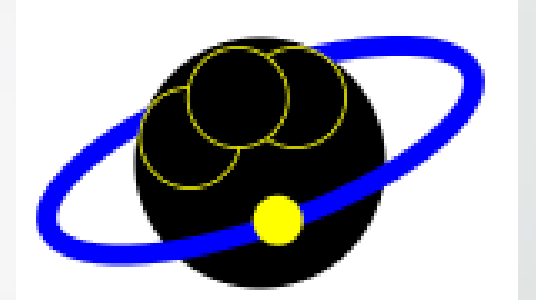
Ellipses-09.html

```
cx="200" cy="200" rx="35" ry="100"  
transform="rotate(x,200,200)"  
 $x \in [0, 360)$ 
```



Ellipses-09b.html

```
cx="200" cy="200" rx="35" ry="100"  
transform="rotate(x,150,200)"  
 $x \in [0, 360)$ 
```



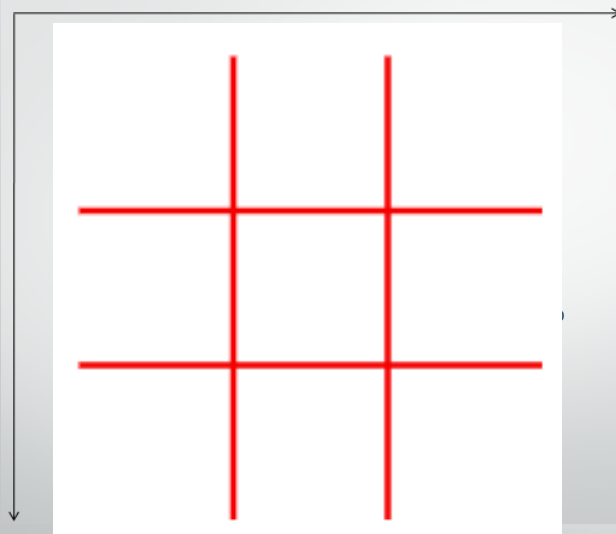
Ellipses-10.html

```
<svg height="210" width="500">  
  <line x1="20" y1="10" x2="200" y2="100" stroke="red" stroke-width="2"/>  
</svg>
```

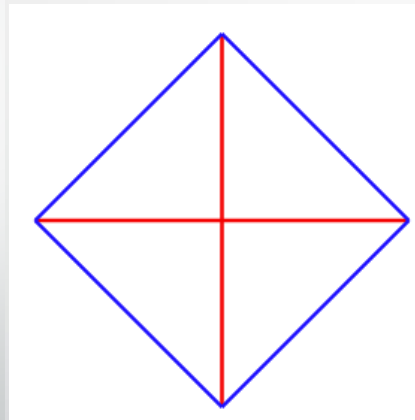


Line

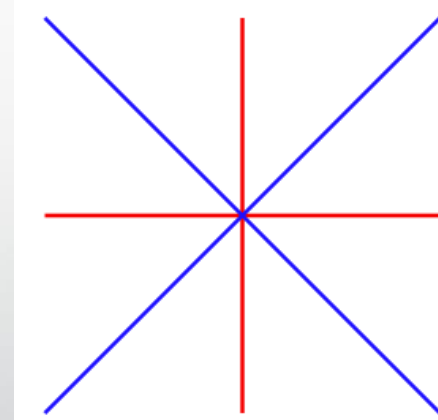
```
<svg height="210" width="500">  
  <line x1="20" y1="10" x2="200" y2="100" stroke="red" stroke-width="2"/>  
</svg>
```



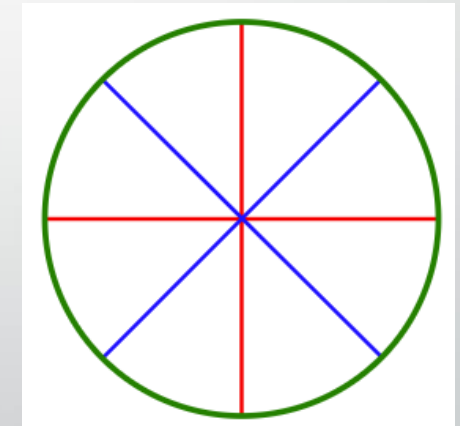
Lines-01.html



Lines-02.html

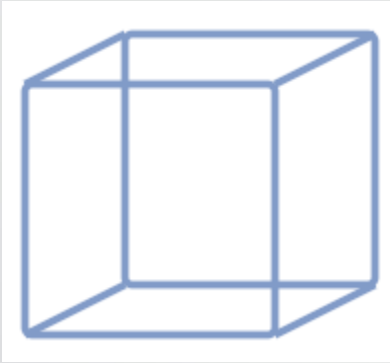


Lines-03.html

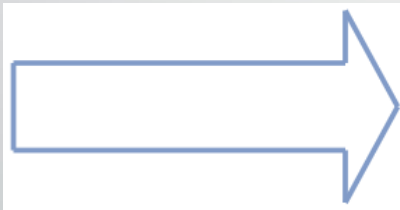


*Lines-04.html **

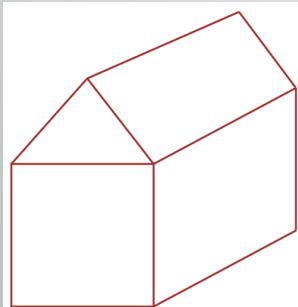
Line



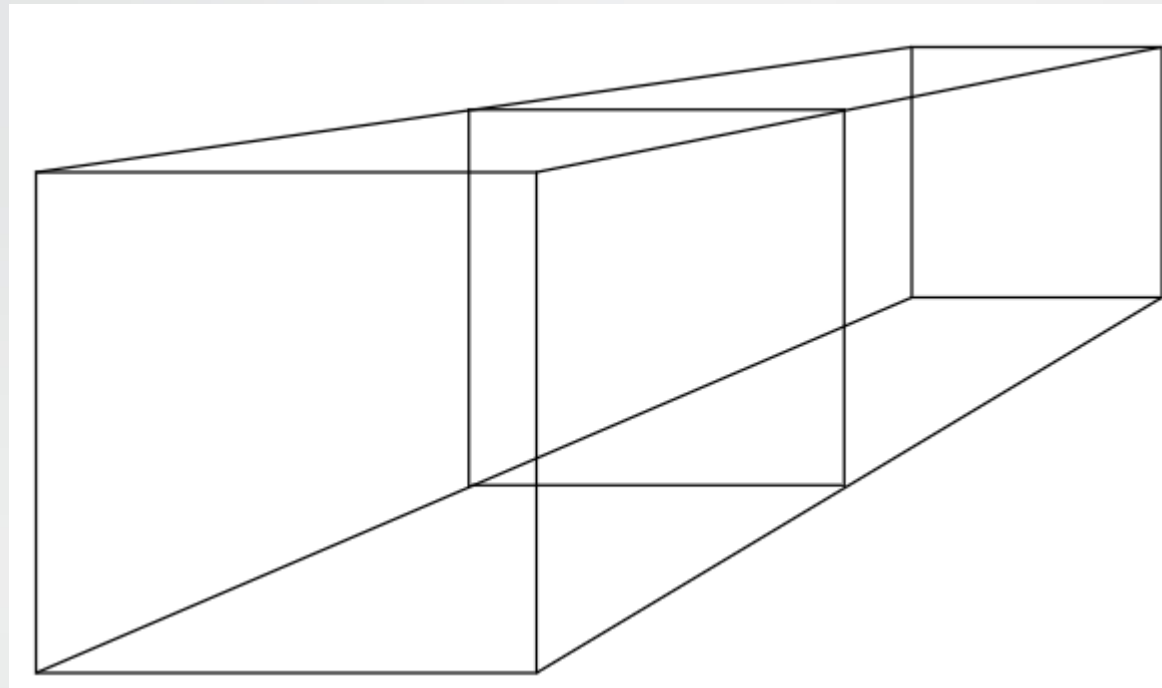
Lines-05.html



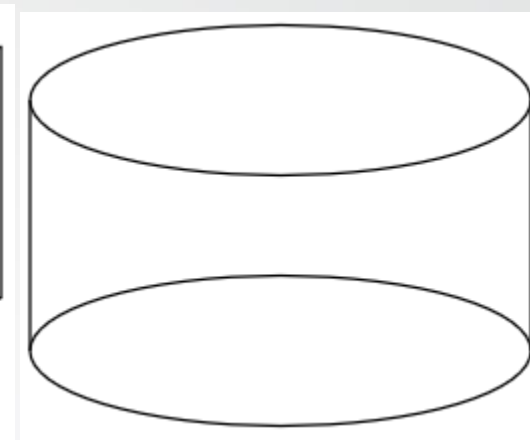
Lines-08.html



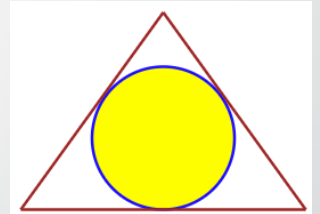
Lines-10.html



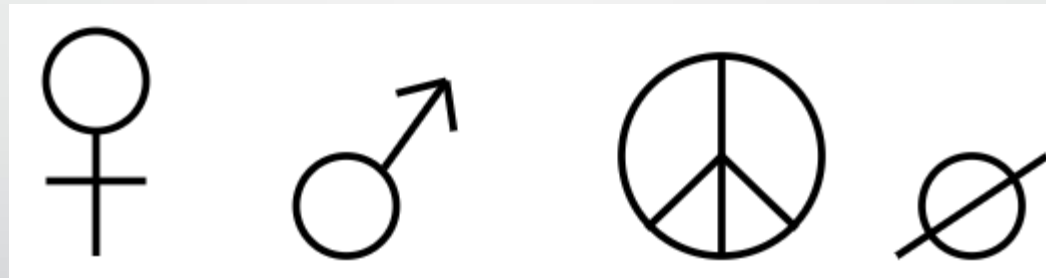
Lines-06.html



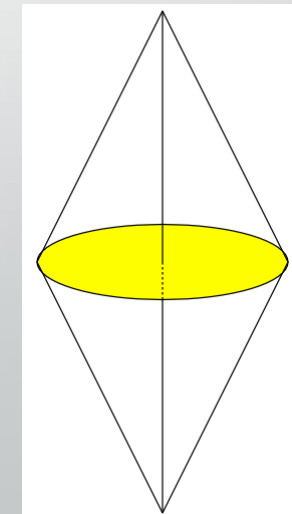
Lines-07.html



Lines-09.html



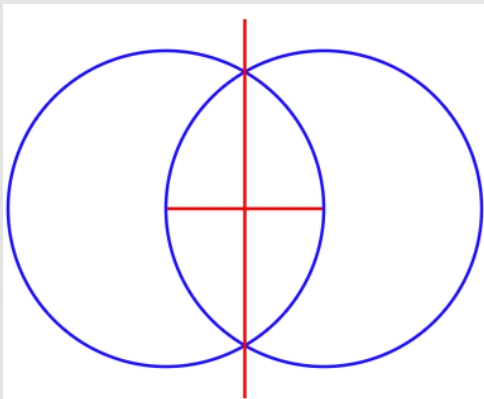
Lines-Circles-01.html



Lines-11.html

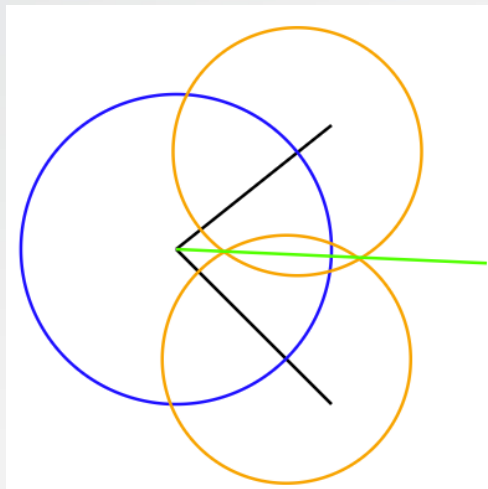
Line

Σχεδιάζουμε 2 κύκλους με κέντρα τα άκρα του ευθύγραμμου τμήματος και ακτίνες όσο το μήκος του. Τα 2 σημεία τομής τους ορίζουν τη μεσοκάθετο.



Lines-12.html

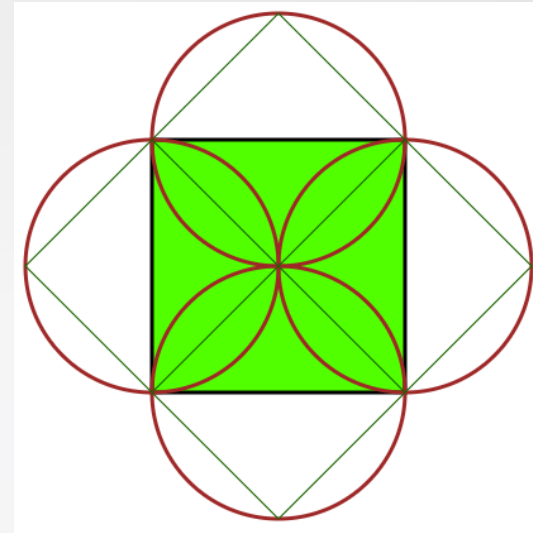
(Διχοτόμηση ευθύγραμμου τμήματος)



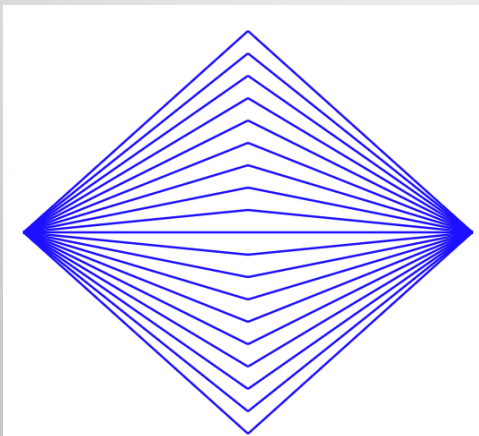
Lines-13.html

(Διχοτόμηση γωνίας)

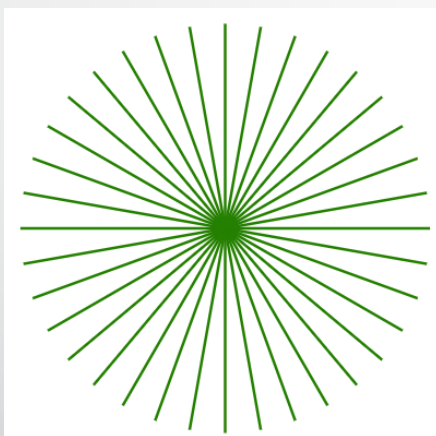
Σχεδιάζουμε έναν κύκλο με κέντρο την κορυφή της γωνίας. Σχεδιάζουμε 2 κύκλους με κέντρα τα σημεία τομής του αρχικού κύκλου με τις πλευρές της γωνίας και ακτίνες περίπου τα $\frac{2}{3}$ της ακτίνας του αρχικού κύκλου. Τα 2 σημεία τομής τους ορίζουν την διχοτόμο της γωνίας.



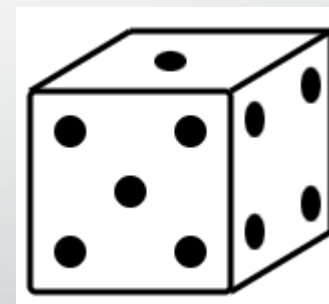
Lines-14.html



Lines-15.html



Lines-16.html



Lines-17.html

Καραμαούνας Πολύκαρπος

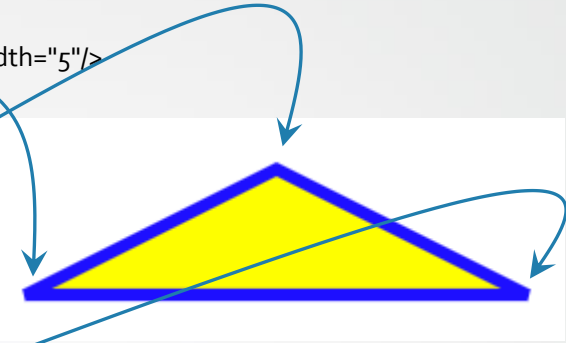
`transform="rotate(10,250,300)"`
(περιστροφή από 10-180 μοίρες)

10: γωνία περιστροφής
(250,300): το μέσο της γραμμής

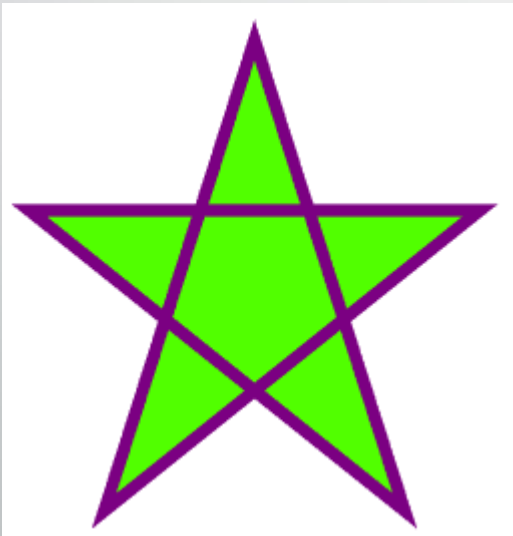
Polygon

```
<svg height="210" width="500">  
  <polygon points="100,100,200,50,300,100" fill="yellow" stroke="blue" stroke-width="5"/>  
</svg>
```

Το στοιχείο `<polygon>` χρησιμοποιείται για τη δημιουργία ενός πολυγώνου που περιέχει τουλάχιστον τρεις πλευρές. Τα πολύγωνα είναι κατασκευασμένα από ευθείες γραμμές και το σχήμα είναι "κλειστό" (όλες οι γραμμές συνδέονται).



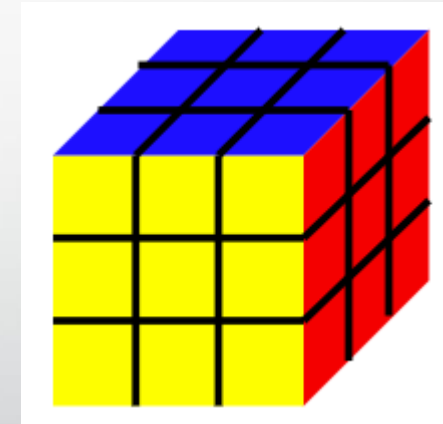
```
<svg height="210" width="500">  
  <polygon points="100,100,200,50,300,100" fill="yellow" stroke="blue" stroke-width="5"/>  
</svg>
```



Polygon-01.html



Polygon-02.html



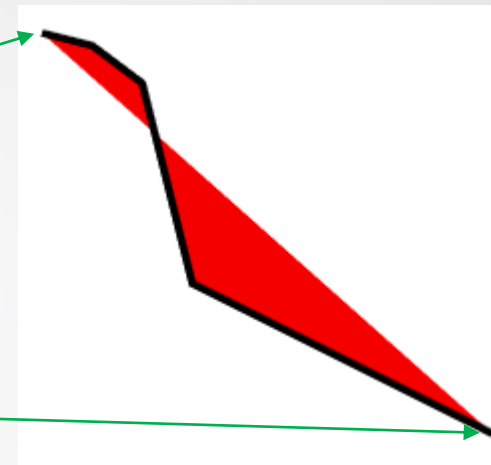
RubicCube.html

Polyline

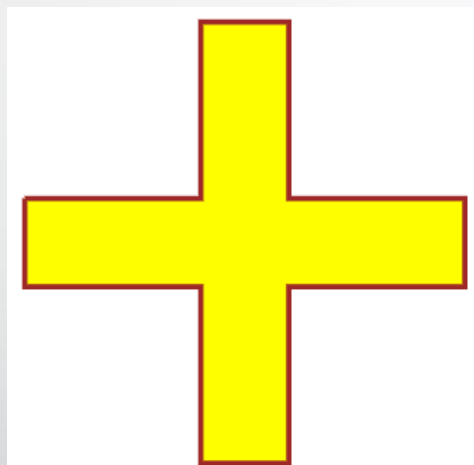
```
<svg height="210" width="500">  
  <polyline points="20, 20, 40, 25, 60, 40, 80, 120, 120, 140, 200, 180" fill="red"  
  stroke="black" stroke-width="3"/>  
</svg>
```

Το στοιχείο `<polyline>` χρησιμοποιείται για τη δημιουργία οποιουδήποτε σχήματος που αποτελείται μόνο από ευθείες γραμμές (που συνδέεται σε πολλά σημεία)

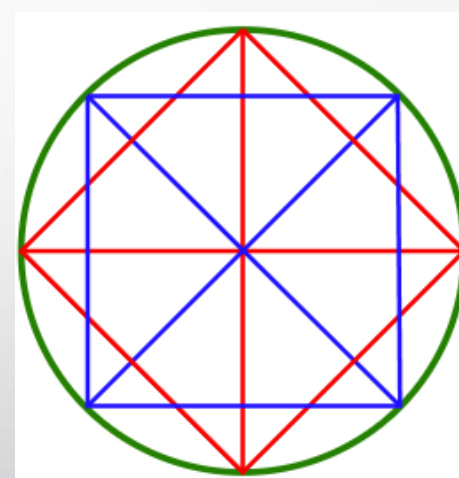
```
<svg height="210" width="500">  
  <polyline points="20, 20, 40, 25, 60, 40, 80, 120, 120, 140, 200, 180" fill="red"  
  stroke="black" stroke-width="3"/>  
</svg>
```



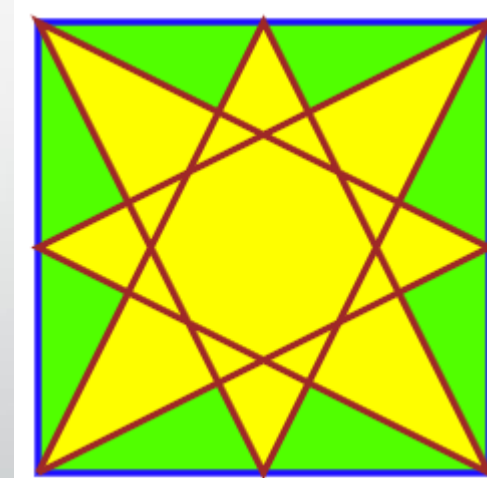
Polyline-01.html



Polyline-02.html

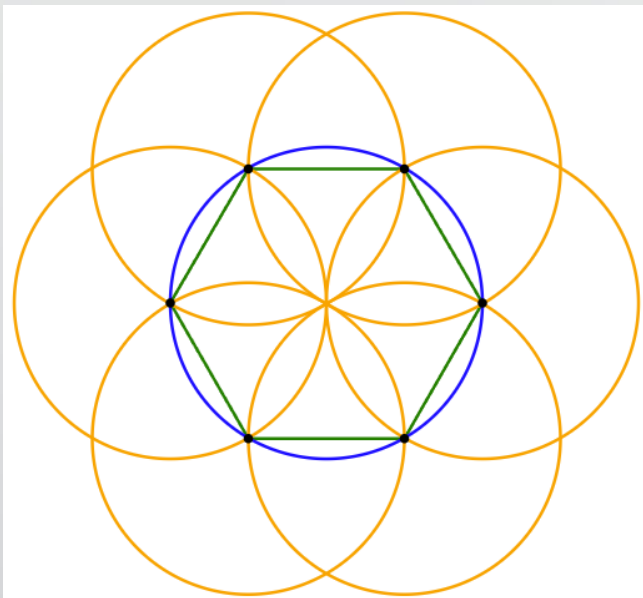


Polyline-03.html



Polyline-05.html

Polyline



Polyline-o4.html
(Κατασκευή κανονικού εξάγωνου)

Βήμα 1: σχεδιάστε τον αρχικό μπλε κύκλο

Βήμα 2: σχεδιάστε τον 1ο πορτοκαλί κύκλο με κέντρο το αριστερό σημείο του μπλε κύκλου στο ίδιο ύψος με το κέντρο του και με ίδια ακτίνα.

Βήμα 3: σχεδιάστε τον 2ο πορτοκαλί κύκλο με κέντρο το σημείο τομής του 1ου πορτοκαλί κύκλου με τον μπλε και με ίδια ακτίνα.

Βήμα 4: επαναλάβετε το βήμα 3 παρομοίως για τους υπόλοιπους 4 κύκλους

Βήμα 5: ενώστε με polygon/polyline τα κέντρα των 6 πορτοκαλί κύκλων

Text

Το στοιχείο `<text>` χρησιμοποιείται για τον ορισμό ενός κειμένου.

```
<svg height="1000" width="1000">  
  <text x="100" y="100">SVG(100, 100)</text>  
  <text x="300" y="100">SVG(300, 100)</text>  
  <text x="200" y="200">SVG(200, 200)</text>  
</svg>
```

SVG(100, 100)

SVG(300, 100)

SVG(200, 200)

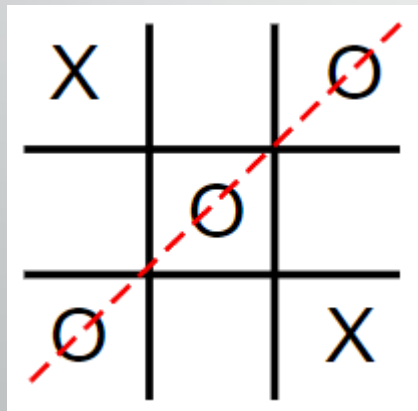


Text-o4.html

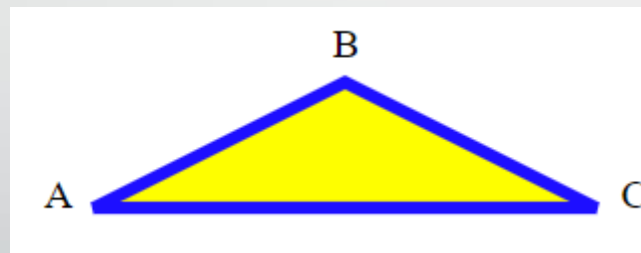
- font-size="40"
- font-weight="bold"
- fill="white"
- font-family="Comic Sans MS"



Text-o2.html



triliza.html



Text-o1.html

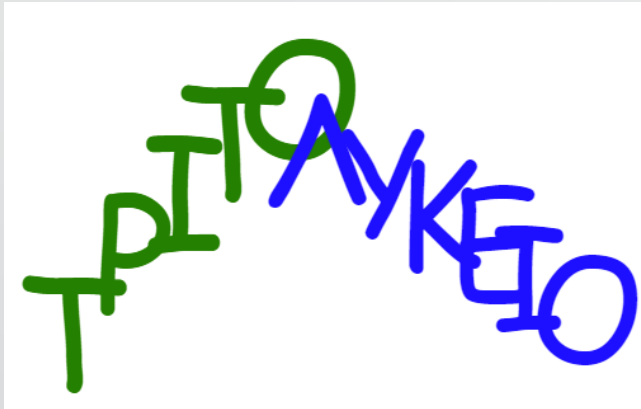


Text-17.html

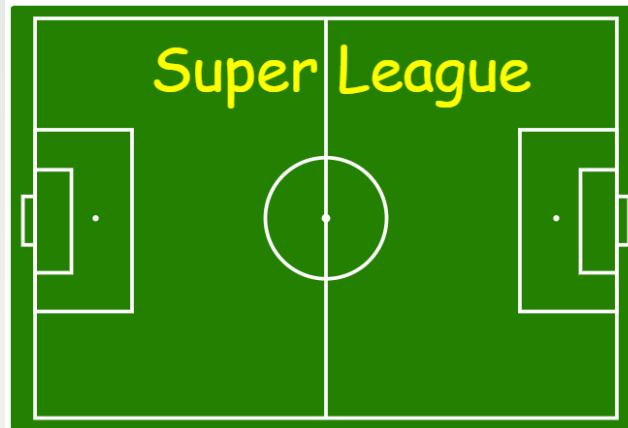


Text-o8.html

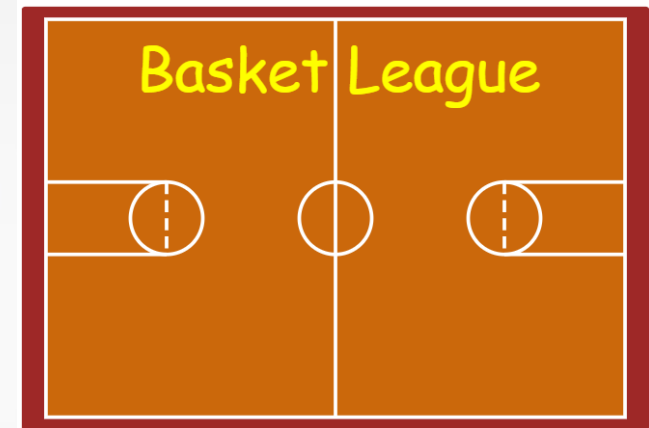
Text



Text-03.html



SuperLeague.html



BasketLeague.html



Text-05.html



Text-06.html

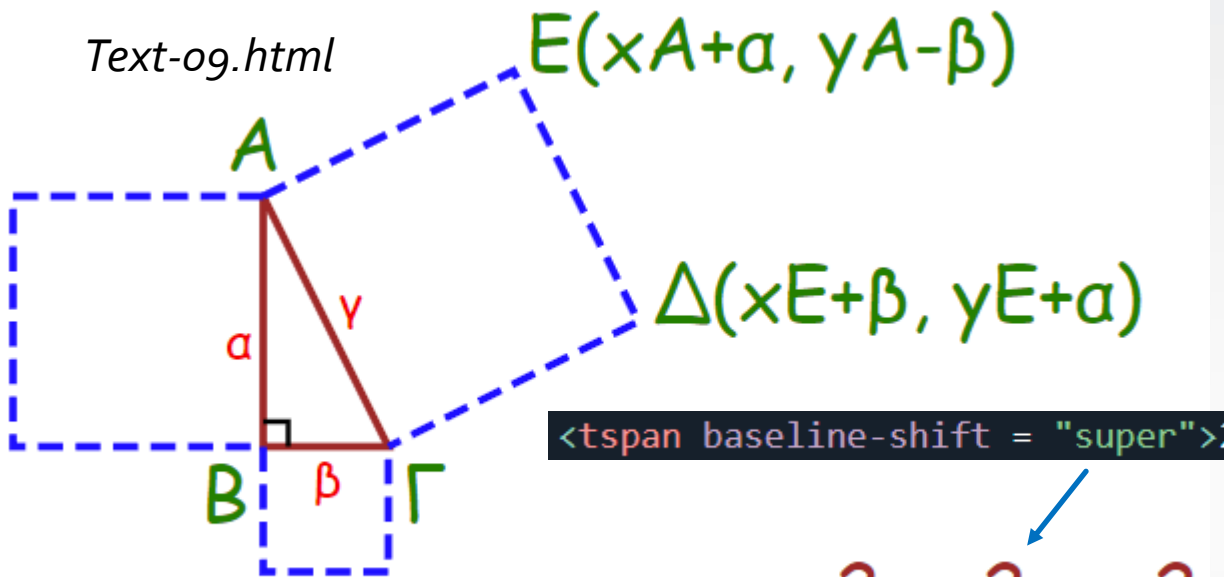
(αεροπλάνο: ✈
σύννεφο: ☁
σκάφος: ⛵)



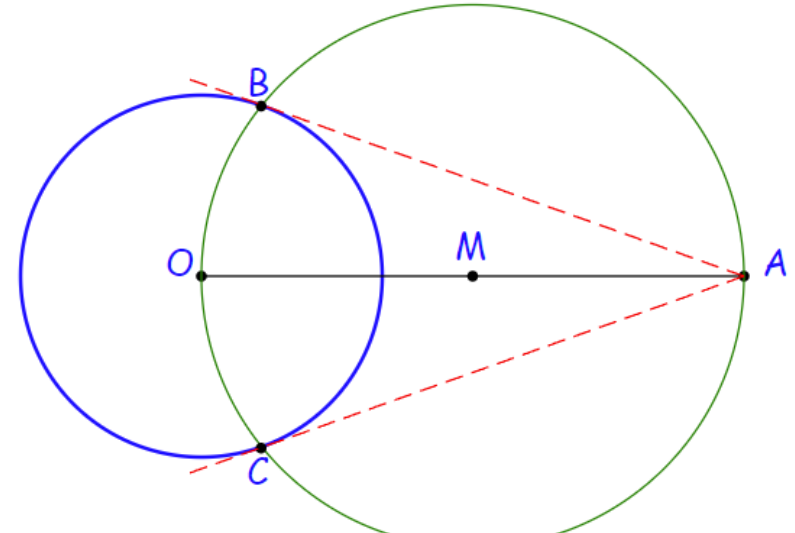
Text-07.html

`<polygon ... stroke-linejoin="round"/>`

Text-09.html

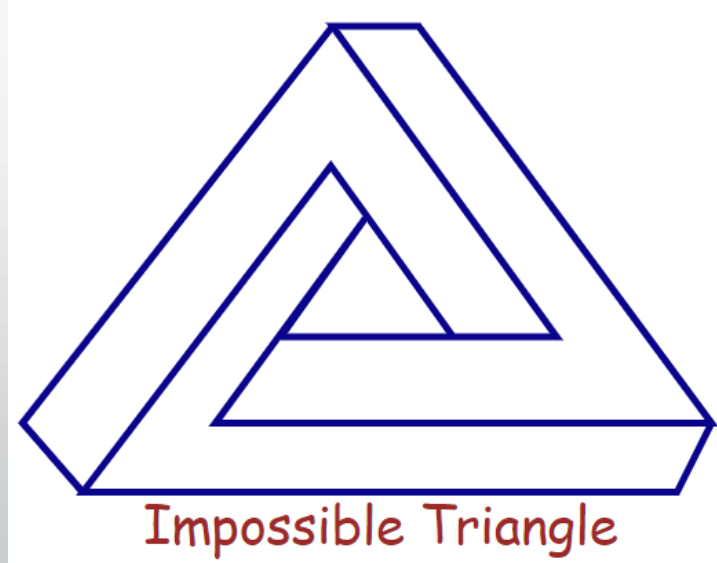


Πυθαγόρειο Θεώρημα: $\gamma^2 = \alpha^2 + \beta^2$

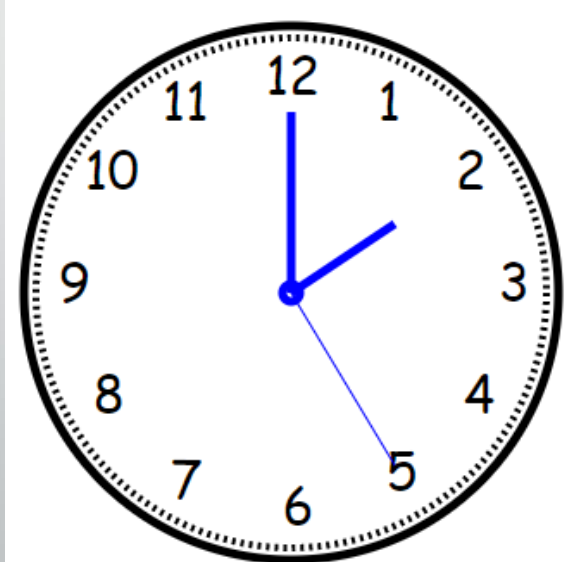


Κατασκευή εφαπτομένης ευθείας σε κύκλο που περνά από σημείο A

Text-10.html



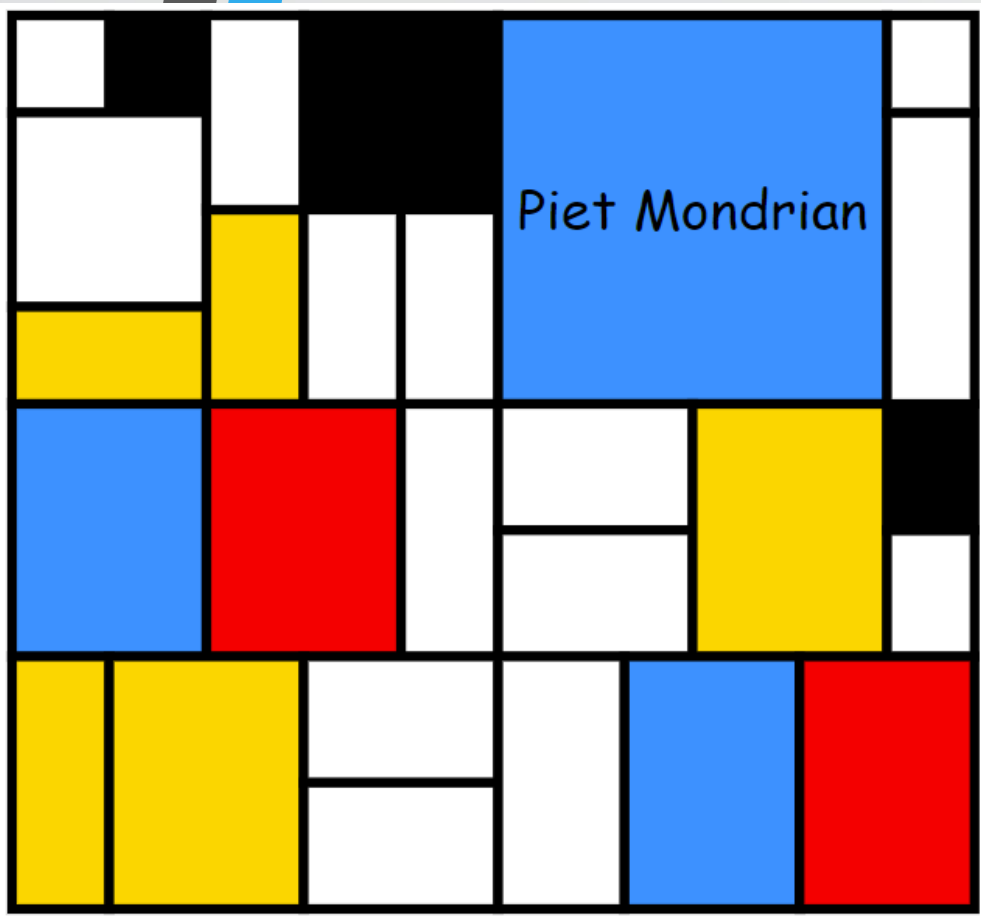
Text-11.html



Text-15.html

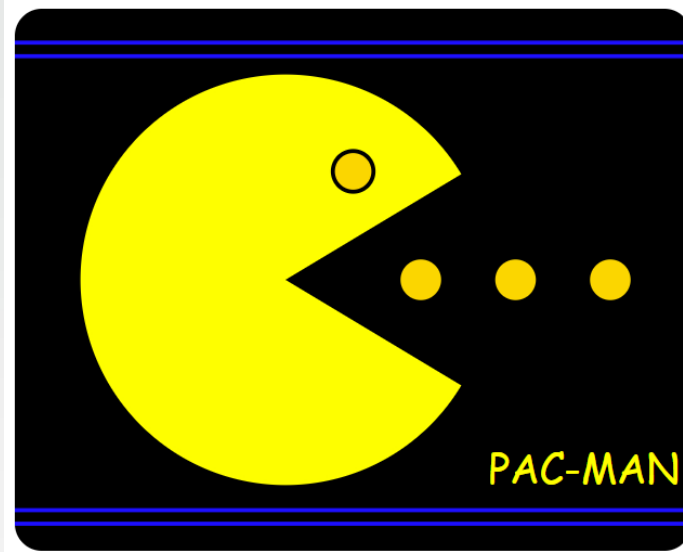
SVG Clock

Text

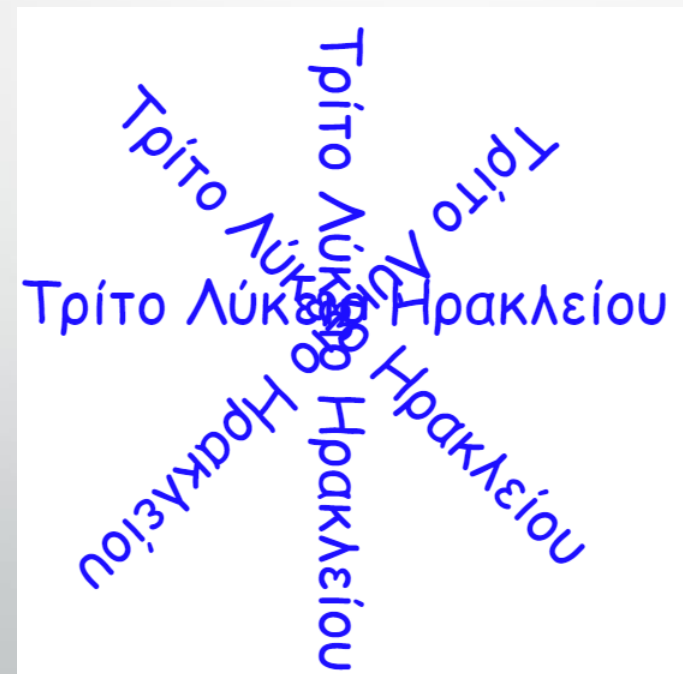


Text-12.html

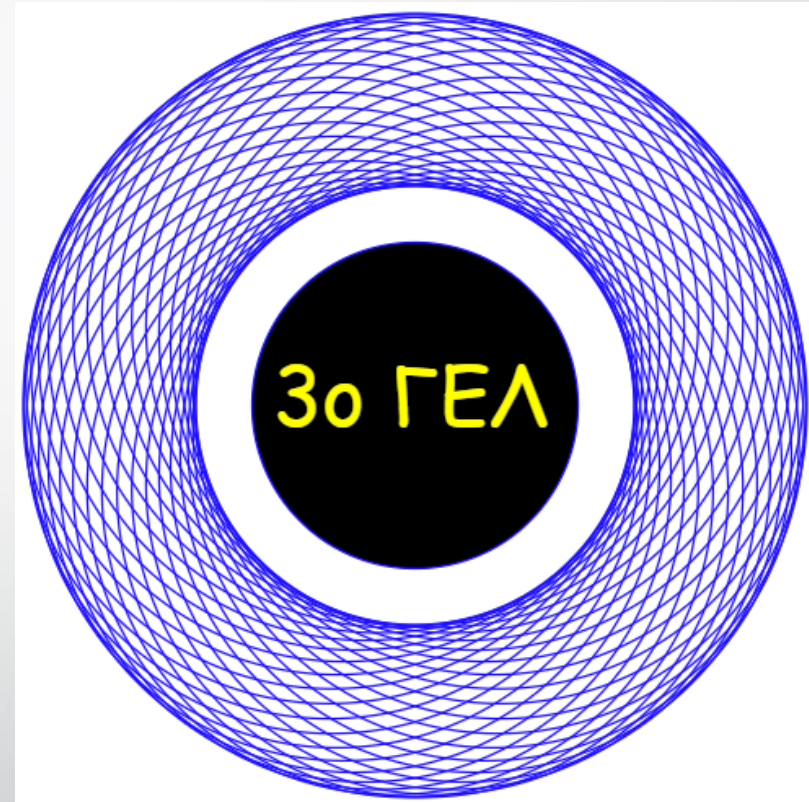
Καραμαούνας Πολύκαρπος



Text-13.html



Text-14.html



Text-16.html

Image

```
<svg width="1000" height="1000">
```

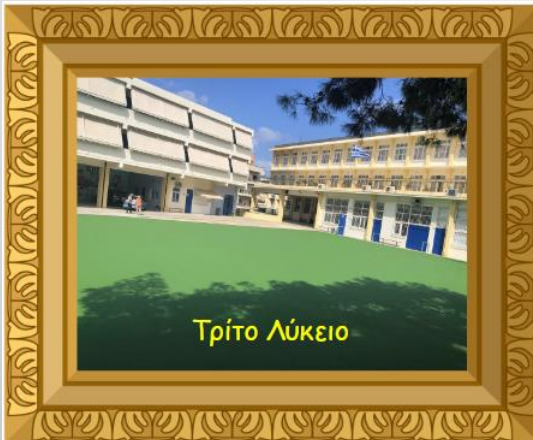
```
<image
```

```
href="https://blogs.sch.gr/3lykirak/files/2022/08/305803636_4232002560256883_7
```

```
636_4232002560256883_7752023217791185421_n.jpg" width="300" x="55" y="55"/>
```

```
width="300" x="55" y="55"/>
```

```
</svg>
```

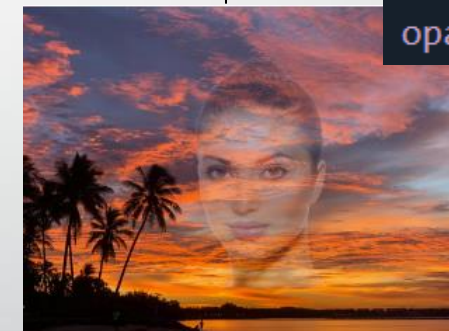


Images-01.html

```
<svg width="1000" height="1000">  
<image  
href="https://blogs.sch.gr/3lykirak/files/2022/08/305803636_4232002560256883_7  
752023217791185421_n.jpg" width="300" x="20" y="50"/>  
</svg>
```



Images-02.html



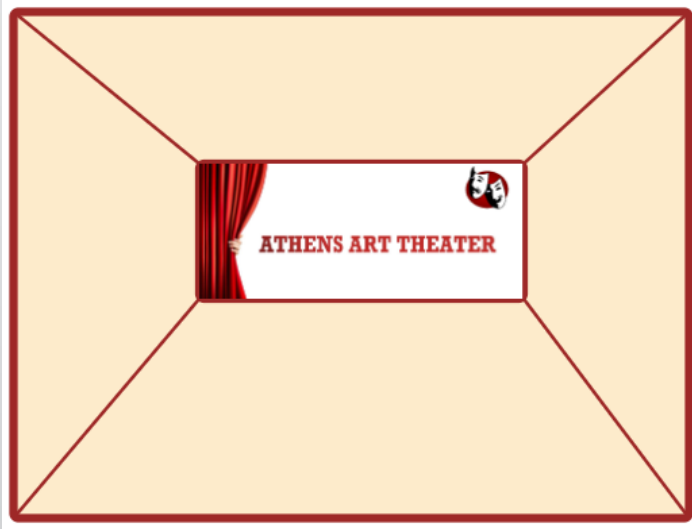
`opacity="0.35"`

Images-03.html

Image

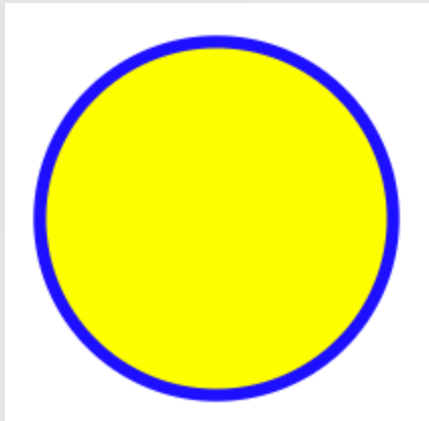


Images-o4.html



Images-o5.html

Animation



```
1 <svg width="1000" height="1000">
2   <circle cx="150" cy="150" r="50" fill="yellow" stroke="blue" stroke-width="5">
3     <animate
4       attributeName="r"
5       values="0;100;0"
6       dur="6s"
7       repeatCount="indefinite" />
8   </circle>
9 </svg>
```

Circles-Animated-01.html

Για "πάγωμα" στο τελευταίο καρέ:

```
repeatCount="1" fill="freeze"
```



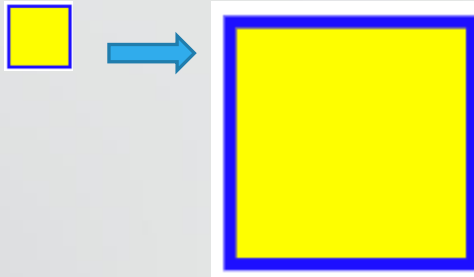
Circles-Animated-02.html

Πειραματιστείτε επιπλέον με τα εξής:

```
<animate
  attributeName="stroke-width"
  values="0;50;0"
  dur="6s"
  repeatCount="indefinite" />
```

```
<animate attributeName="cx" values="0;200;0" dur="6s" repeatCount="indefinite"/>
<animate attributeName="cy" values="0;200;0" dur="6s" repeatCount="indefinite"/>
```

Animation



Πειραματιστείτε επιπλέον με τα εξής:

```
<animate attributeName="rx" values="0;100;0" dur="2s" repeatCount="indefinite" />
```

```
<animate attributeName="x" values="0;200;0" dur="2s" repeatCount="indefinite"/>  
<animate attributeName="y" values="0;200;0" dur="2s" repeatCount="indefinite"/>
```

```
<animate attributeName="stroke-width" values="0;50;0" dur="2s" repeatCount="indefinite"/>
```

```
1 <svg width="1000" height="1000">  
2   <rect x="50" y="30" width="200" height="200" fill="yellow" stroke="blue" stroke-width="5">  
3     <animate  
4       attributeName="width"  
5       values="0;100;0"  
6       dur="2s"  
7       repeatCount="indefinite" />  
8     <animate  
9       attributeName="height"  
10      values="0;100;0"  
11      dur="2s"  
12      repeatCount="indefinite" />  
13   </rect>  
14 </svg>
```

Rects-Animated-01.html

```
<animate attributeName="fill" values="red;green;blue;yellow" dur="2s" repeatCount="indefinite"/>
```

Animation

3ο ΓΕΛ → 3ο ΓΕΛ

```
1 <svg width="1000" height="1000">
2
3 <text x="10" y="100" font-size="40" fill="blue" font-family="Comic Sans MS">3ο ΓΕΛ
4
5 <animate attributeName="font-size" values="0;100;0" dur="4s" repeatCount="indefinite"/>
6
7 </text>
8
9 </svg>
```

Text-Animated-01.html

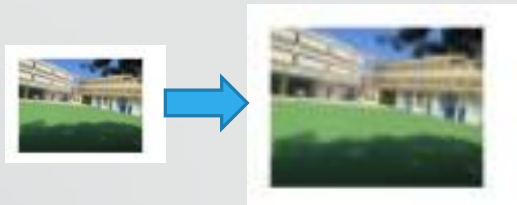
Πειραματιστείτε επιπλέον με τα εξής:

```
<animate attributeName="x" values="0;300;0" dur="4s" repeatCount="indefinite"/>
<animate attributeName="y" values="0;300;0" dur="4s" repeatCount="indefinite"/>
```

```
<animate attributeName="fill" values="red;green;blue;yellow" dur="2s" repeatCount="indefinite"/>
```

```
<animate attributeName="font-family" values="Comic Sans MS;Arial;Times New Roman" dur="4s" repeatCount="indefinite"/>
```

Animation



Πειραματιστείτε επιπλέον με τα εξής:

```
<animate attributeName="x" values="0;300;0" dur="4s" repeatCount="indefinite"/>  
<animate attributeName="y" values="0;300;0" dur="4s" repeatCount="indefinite"/>
```

```
1 <svg width="1000" height="1000">  
2  
3 <image href="https://blogs.sch.gr/3lykirak/files/2022/08/305803636_4232002560256883_7752023217791185421_n.jpg" width="300" x="55" y="55">  
4  
5 <animate attributeName="width" values="0;300;0" dur="3s" repeatCount="indefinite"/>  
6  
7 </image>  
8  
9 </svg>
```

Images-Animated-01.html

Καραμαούνας Πολύκαρπος

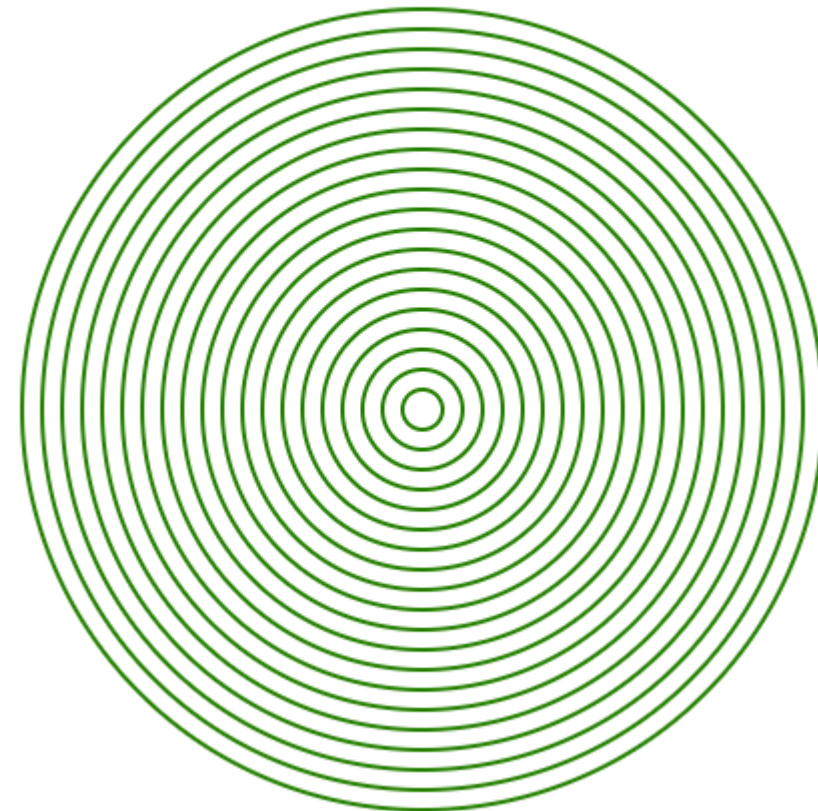


Images-Animated-02.html

```
<h2>Concentric-Circles</h2>

<body onload="drawCircles()">
<script>
  function drawCircles() {
    text = "<svg width=\"500\" height=\"500\">";
    for (i = 1; i <= 20; i++) {
      r = 10 * i;
      text += "<circle cx=\"250\" cy=\"250\" r=\"";
      text += r;
      text += "\" stroke=\"green\" stroke-width=\"2\" fill=\"none\" />";
    }
    text += "</svg>";
    document.body.innerHTML += text;
  }
</script>
</body>
```

Concentric-Circles



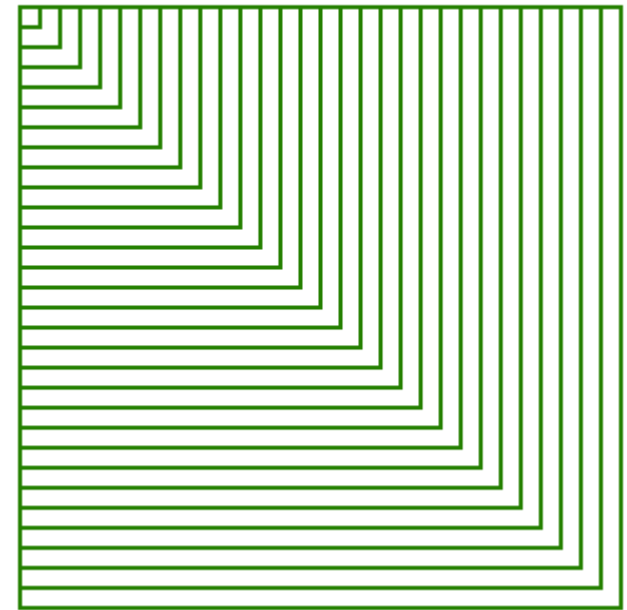
```

<h2>Nested-Rects</h2>

<body onload="drawRects()">
<script>
  function drawRects() {
    text = "<svg width=\"500\" height=\"500\">";
    for (i = 1; i <= 30; i++) {
      d = 10 * i;
      text += "<rect x=\"10\" y=\"10\" width=\"";
      text += d;
      text += "\" height=\"";
      text += d;
      text += "\" stroke=\"green\" stroke-width=\"2\" fill=\"none\" />";
    }
    text += "</svg>";
    document.body.innerHTML += text;
  }
</script>
</body>

```

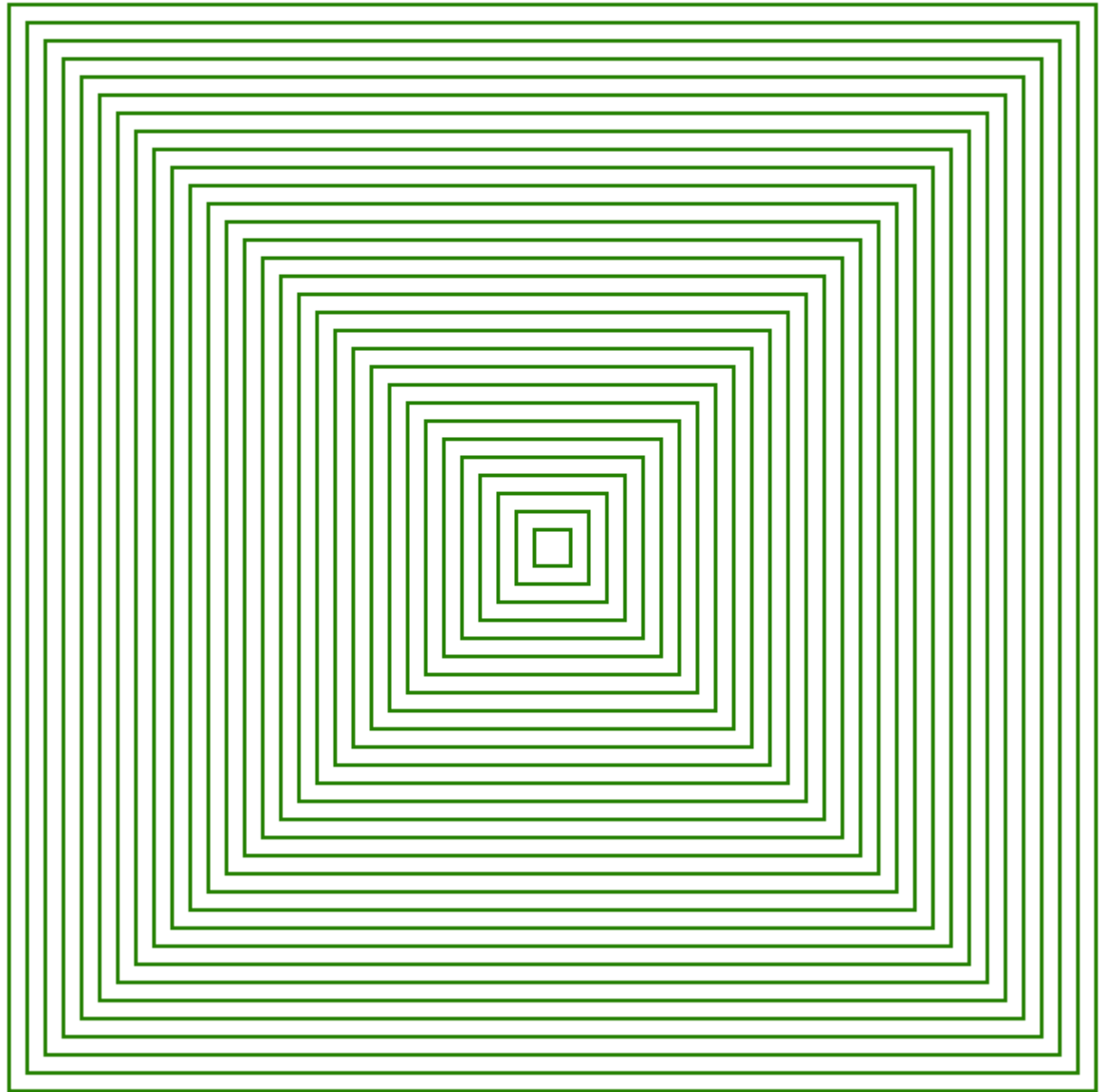
Nested-Rects



Concentric-Rects

Άσκηση:

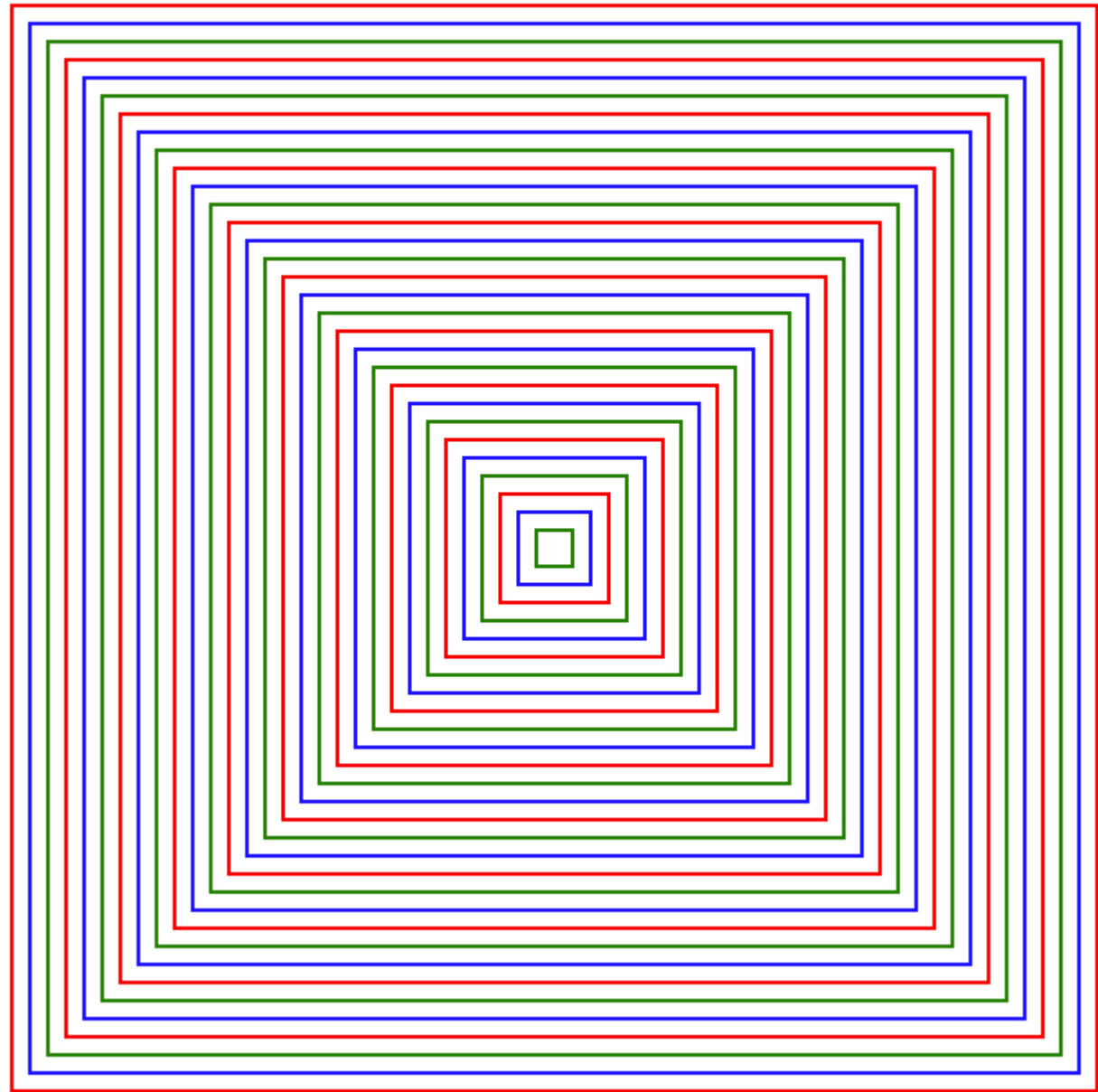
Καραμαούνας Πολύκαρπος



Concentric-Rects-2

Άσκηση:

Καραμαούνας Πολύκαρπος

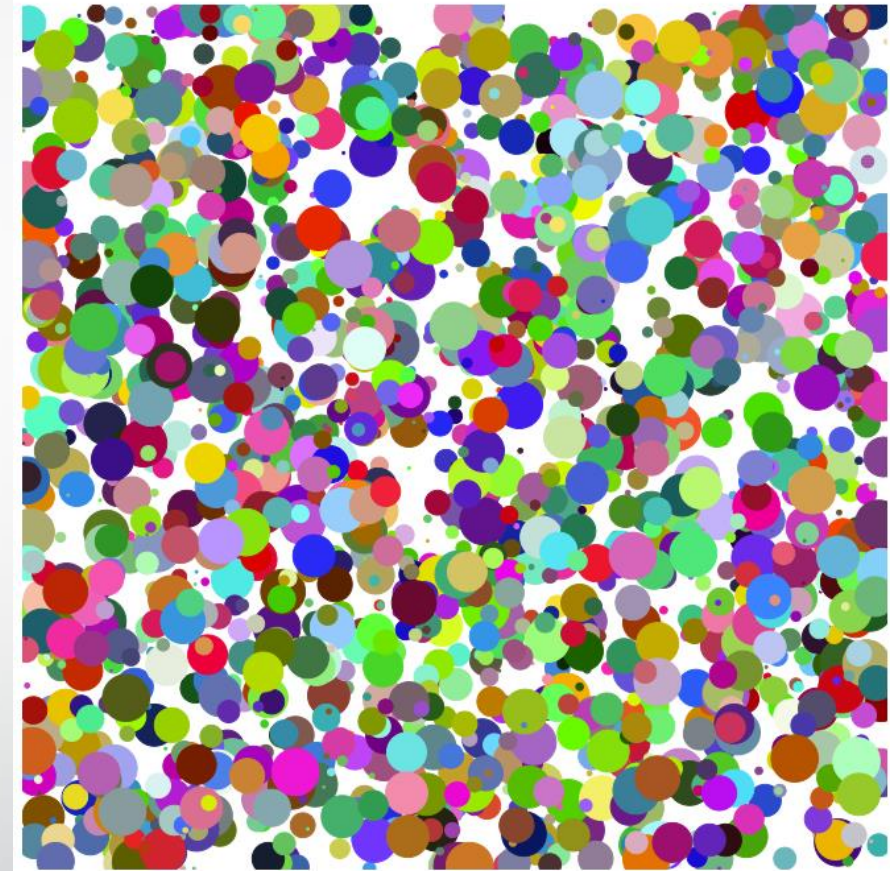


```

<h2>Bubbles</h2>
<body onload="drawBubbles()">
<script>
  function drawBubbles() {
    text = "<svg width='700' height='700'>";
    N=2000;
    for (i = 1; i <= N; i++) {
      var red = Math.floor(Math.random() * 256);
      var green = Math.floor(Math.random() * 256);
      var blue = Math.floor(Math.random() * 256);
      var RandomColor = "rgb(" + red + "," + green + "," + blue + ")";
      var x = Math.floor(Math.random() * 700);
      var y = Math.floor(Math.random() * 700);
      var R = Math.floor(Math.random() * 20);
      text += "<circle stroke-width='1'";
      text += " cx='" + x + "'";
      text += " cy='" + y + "'";
      text += " r='" + R + "'";
      text += " stroke='" + RandomColor + "'";
      text += " fill='" + RandomColor + "'";
      text += ">";
    }
    text += "</svg>";
    document.body.innerHTML += text;
  }
</script>
</body>

```

Bubbles



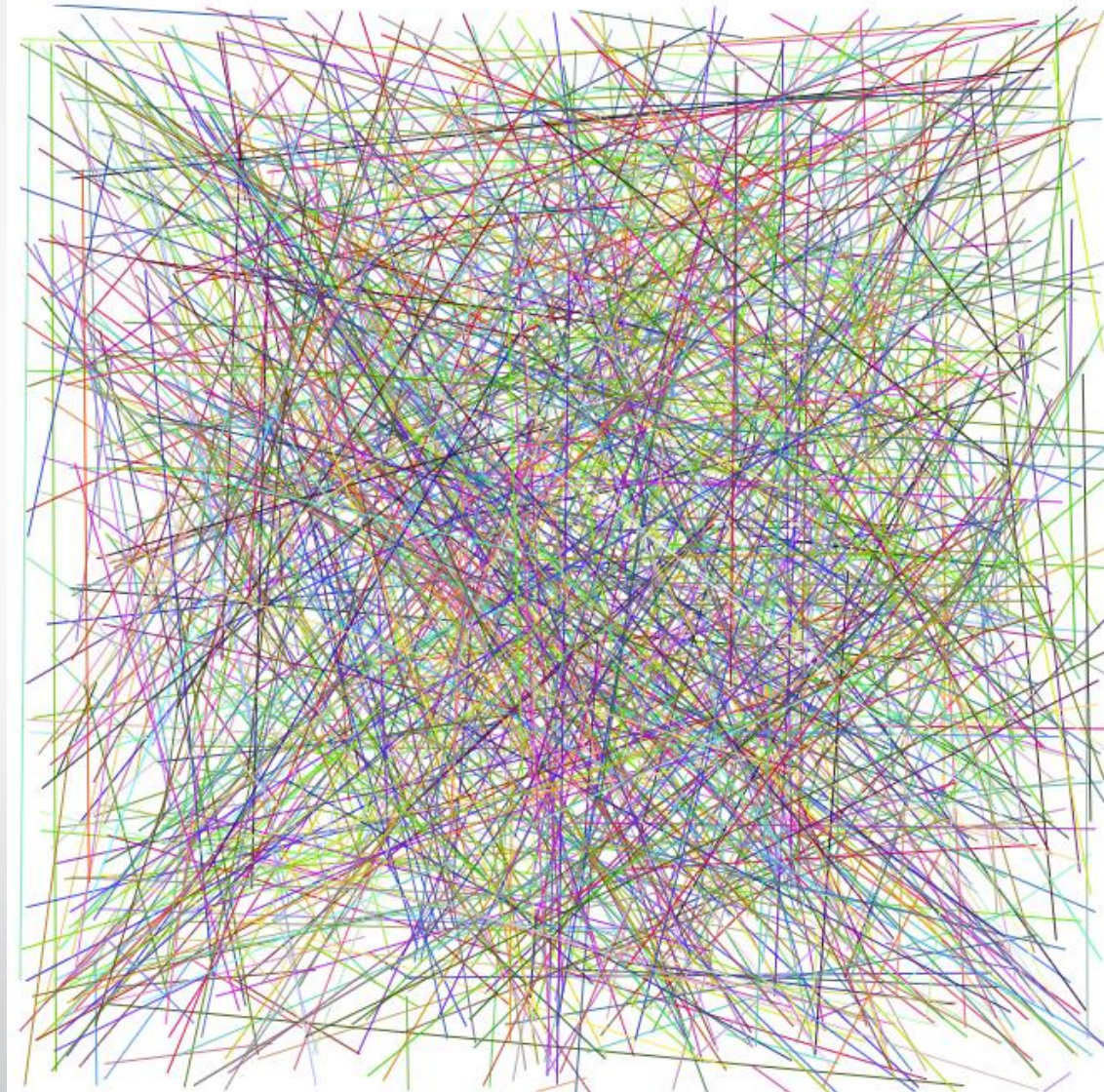
```

<h2>Lines</h2>
<body onload="drawBubbles()">
<script>
  function drawBubbles() {
    text = "<svg width=\"700\" height=\"700\">";
    N=1000;
    for (i = 1; i <= N; i++) {
      var red = Math.floor(Math.random() * 256);
      var green = Math.floor(Math.random() * 256);
      var blue = Math.floor(Math.random() * 256);
      var RandomColor = "rgb(" + red + "," + green + "," + blue + ")";
      var x1 = Math.floor(Math.random() * 700);
      var y1 = Math.floor(Math.random() * 700);
      var x2 = Math.floor(Math.random() * 700);
      var y2 = Math.floor(Math.random() * 700);

      text += "<line stroke-width='1'";
      text += " x1='" + x1 + "'";
      text += " y1='" + y1 + "'";
      text += " x2='" + x2 + "'";
      text += " y2='" + y2 + "'";
      text += " stroke='" + RandomColor + "'";
      text += "/>";
    }
    text += "</svg>";
    document.body.innerHTML += text;
  }
</script>
</body>

```

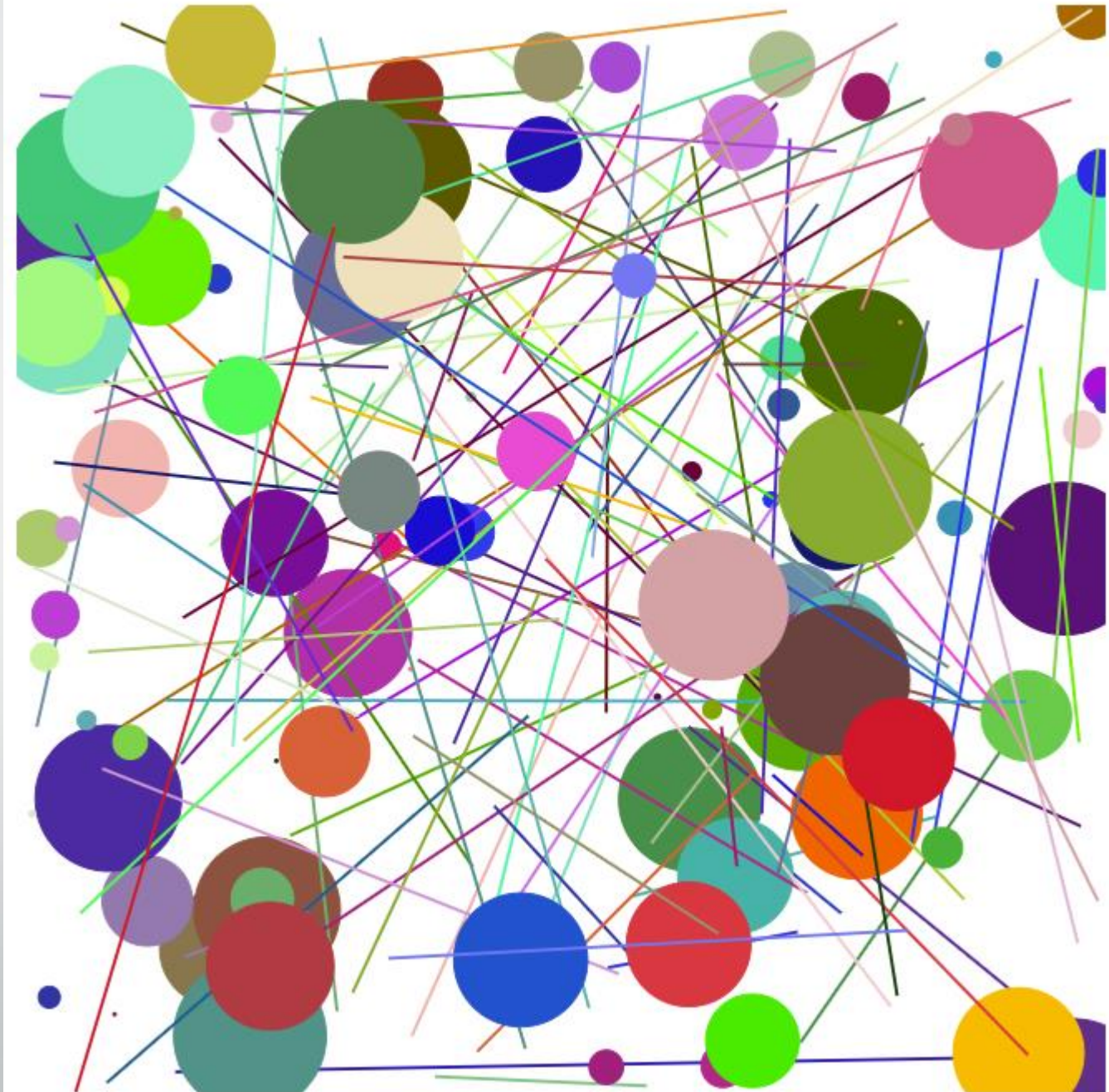
Lines



Abstract Art

Άσκηση:

Καραμαούνας Πολύκαρπος



```

<h2>Texts</h2>
<body onload="drawBubbles()">
<script>
function drawBubbles() {
  text = "<svg width=\"700\" height=\"700\">";
  N=300;
  for (i = 1; i <= N; i++) {
    var red = Math.floor(Math.random() * 256);
    var green = Math.floor(Math.random() * 256);
    var blue = Math.floor(Math.random() * 256);
    var RandomColor = "rgb(" + red + "," + green + "," + blue + ")";
    var x = Math.floor(Math.random() * 700);
    var y = Math.floor(Math.random() * 700);
    var size = Math.floor(Math.random() * 100);
    text += "<text font-family='Comic Sans MS' ";
    text += " x='" + x + "'";
    text += " y='" + y + "'";
    text += " fill='" + RandomColor + "'";
    text += " font-size='" + size + "'";
    text += ">3ο ΓΕΛ</text>";
  }
  text += "</svg>";
  document.body.innerHTML += text;
}
</script>
</body>

```



```
<h2>Mosaic</h2>
```

```
<body>
```

```
<body onload="drawRects()"
```

```
<script>
```

```
function drawRects() {
```

```
    text = "<svg width=\"800\" height=\"800\">";
```

```
    for (i = 1; i <= 40; i++) {
```

```
        for (j = 1; j <= 40; j++) {
```

```
            var red = Math.floor(Math.random() * 256);
```

```
            var green = Math.floor(Math.random() * 256);
```

```
            var blue = Math.floor(Math.random() * 256);
```

```
            var RandomColor = "rgb(" + red + "," + green + "," + blue + ")";
```

```
            var x = 20*i;
```

```
            var y = 20*j;
```

```
            text += "<rect width=\"20\" height=\"20\" x=\"";
```

```
            text += x;
```

```
            text += "\" y=\"";
```

```
            text += y;
```

```
            text += "\" fill=\"";
```

```
            text += RandomColor;
```

```
            text += "\"/>";
```

```
        }
```

```
    }
```

```
    text += "</svg>";
```

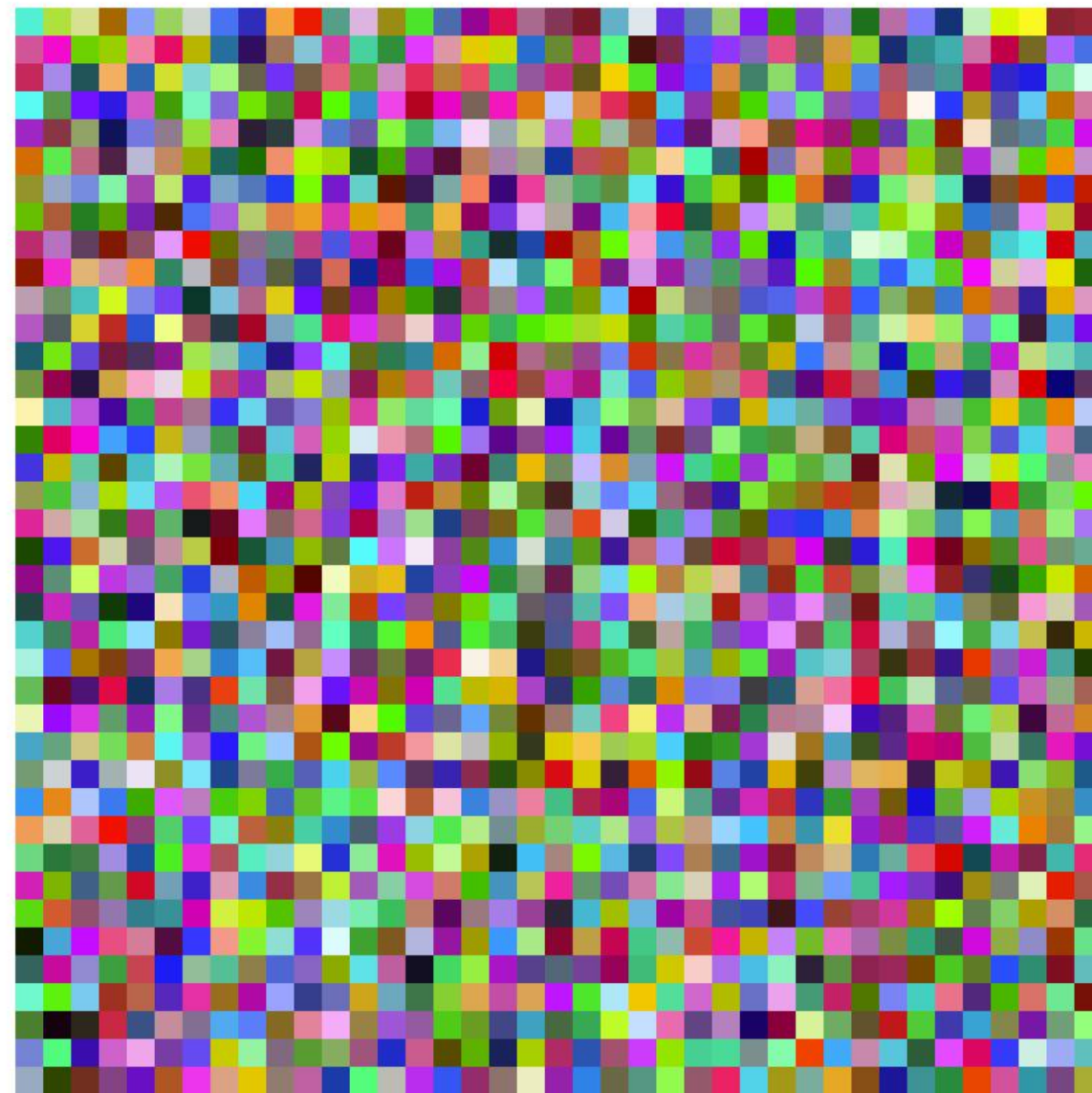
```
    document.body.innerHTML += text;
```

```
}
```

```
</script>
```

```
</body>
```

Mosaic



Πηγές

- <https://en.wikipedia.org/wiki/SVG>
- https://www.eef.edu.gr/media/2313/e_g00060.pdf
- https://www.w3schools.com/graphics/svg_intro.asp
- https://commons.wikimedia.org/wiki/SVG_examples
- <https://dev.w3.org/SVG/tools/svgweb/samples/svg-files>
- http://ebooks.edu.gr/ebooks/v/html/8547/2752/Grammiko-Schedio_G-Lykeiou-Epilogis_html-apli/index.html