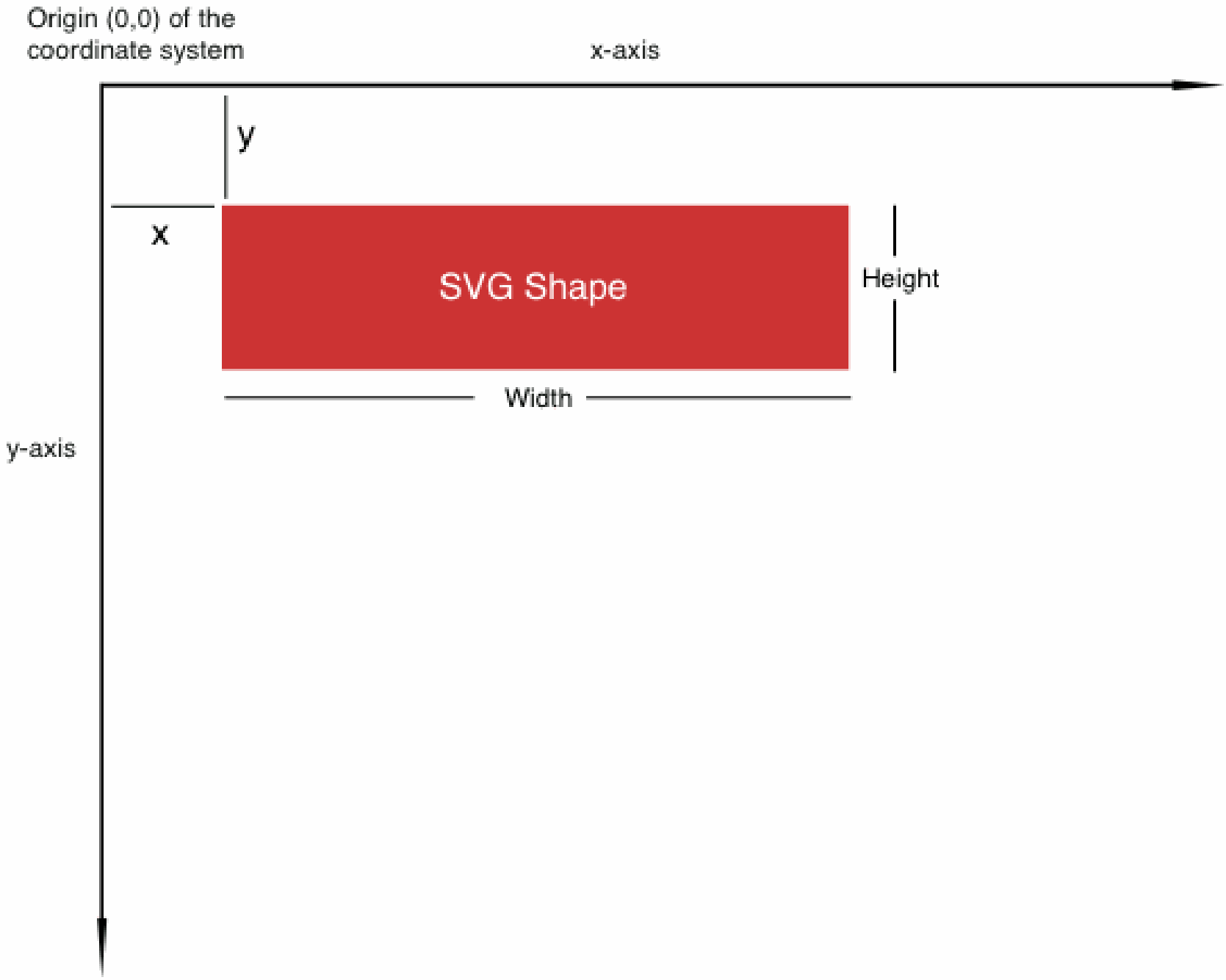
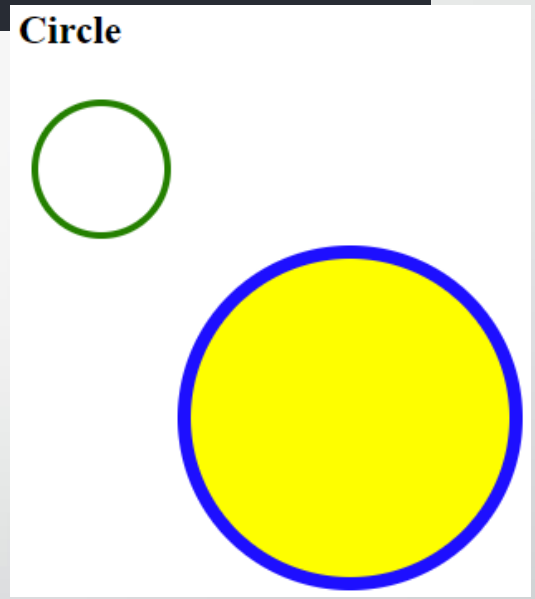
Μαθήματα SVG

SVG: Scalable Vector Graphics

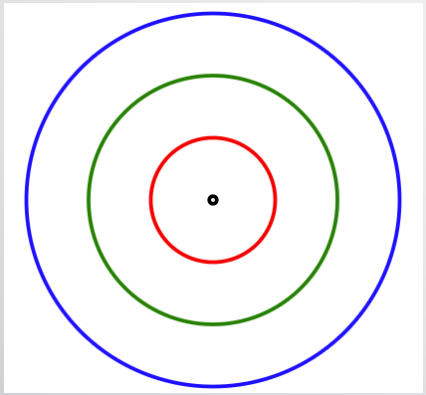

Origin (0,0) of the coordinate system
x-axis
y
x
SVG Shape
Height
Width
y-axis

```
<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

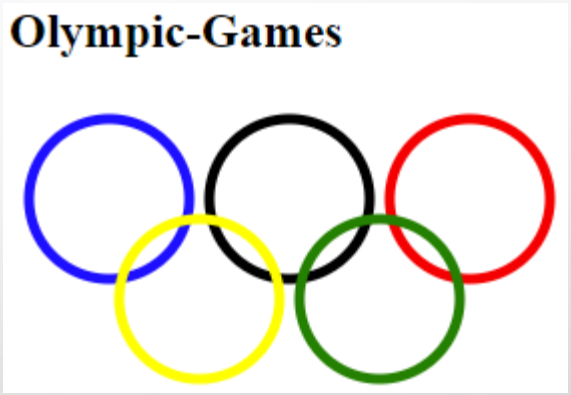
Ασκήσεις:



Circles-01.html

```
opacity="0.5"
```

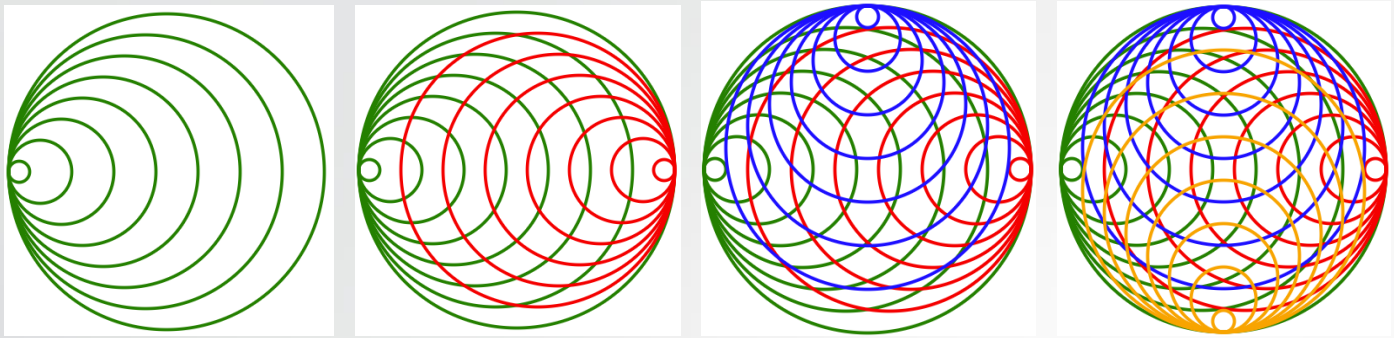
Circles-02.html



Olympic-Games.html

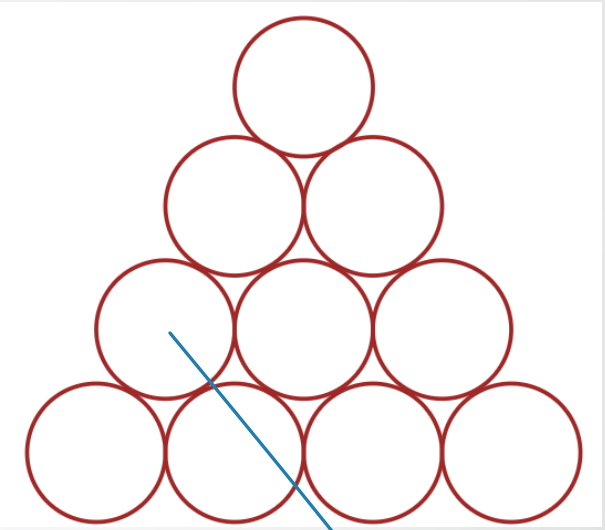
```
<svg width="100" height="100" style="background-color:gray">
```

Circle

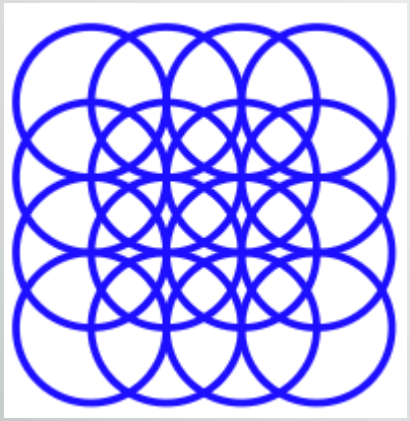


y2 = y1 + R2-R1

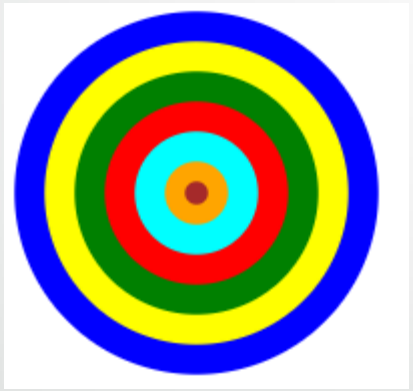
Circles-03.html



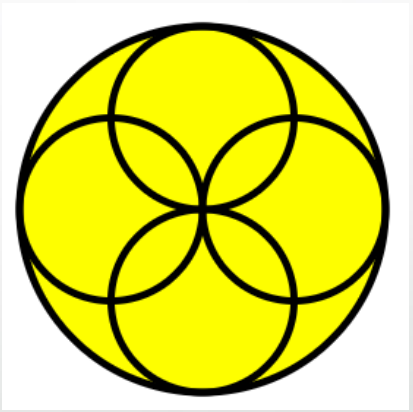
Circles-04.html

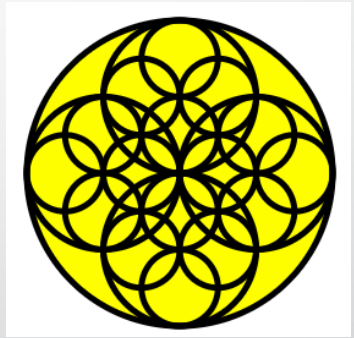


Circles-05.html

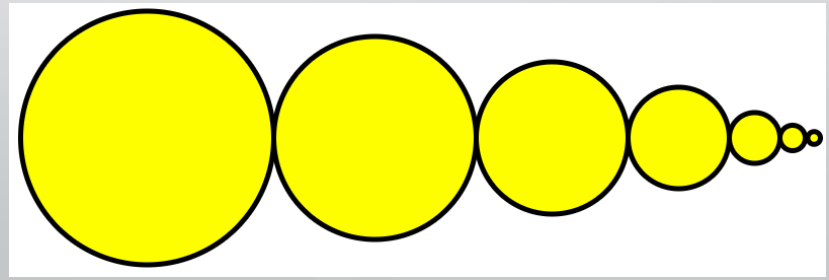


Circles-06.html

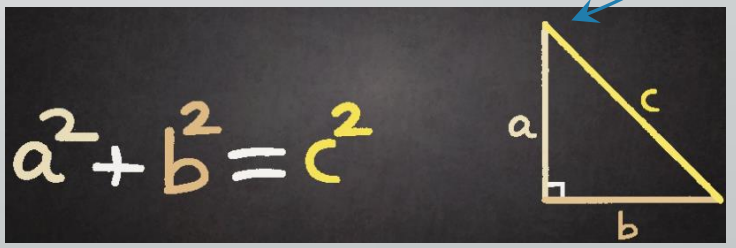




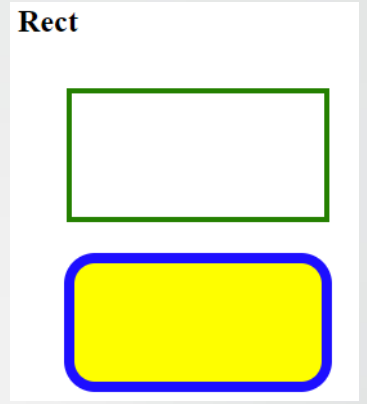
Circles-07.html

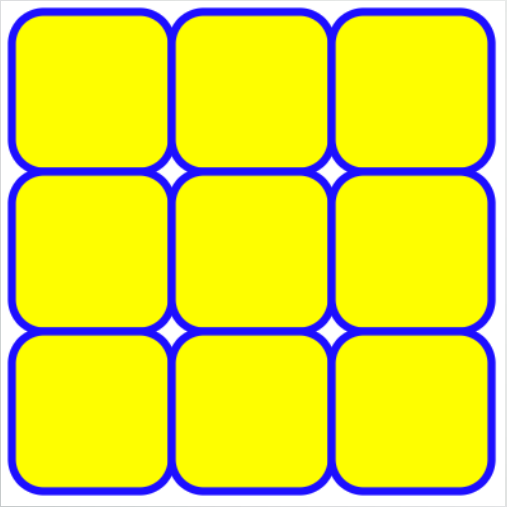


Circles-08.html

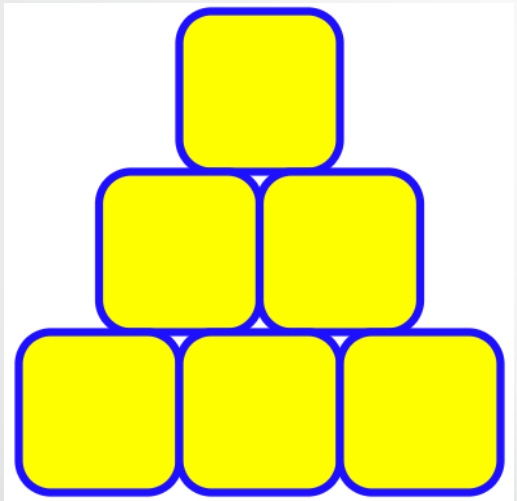


```
<h2>Rect</h2>

<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

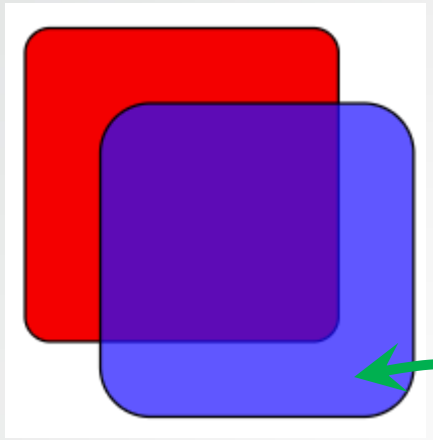
Rects-04.html

Rects-07.html

Rect

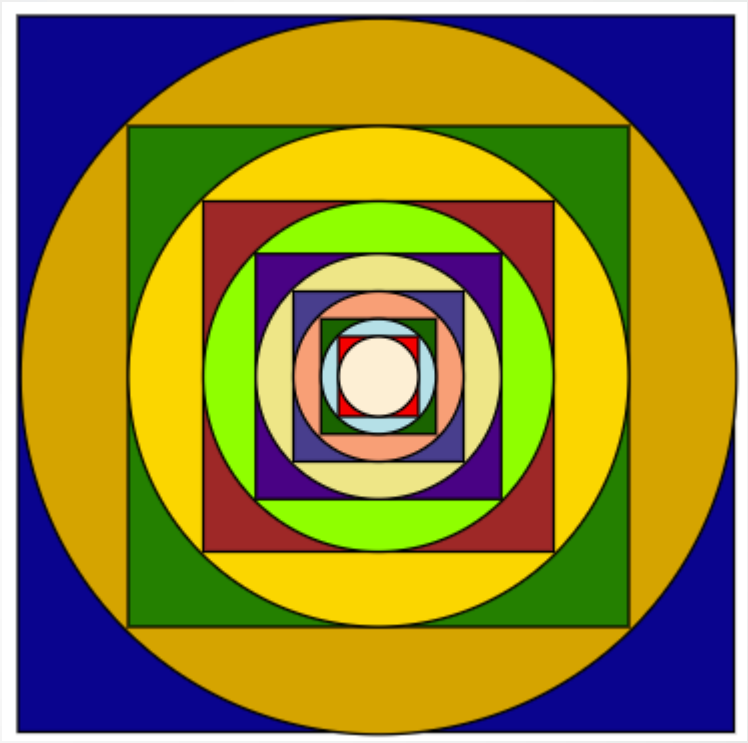
Rect

Rects-05.html

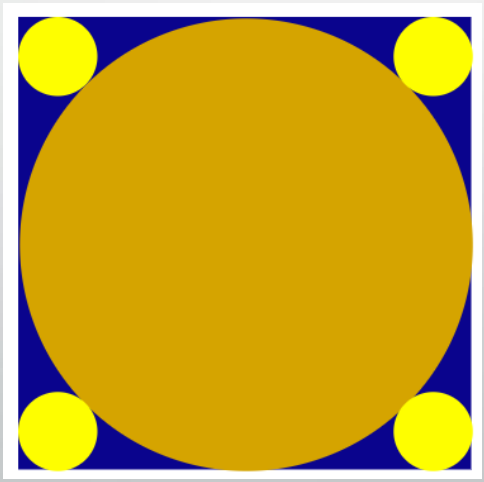


Rects-03.html

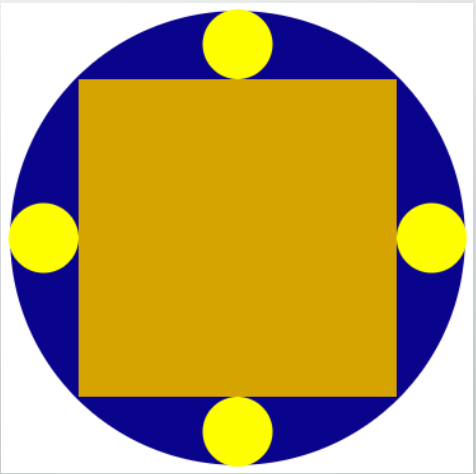
fill-opacity="0.7"



Rects-06.html

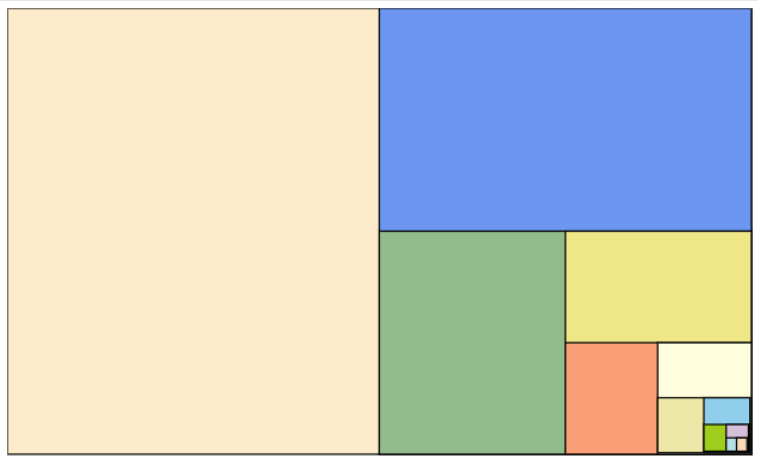


Rects-08.html

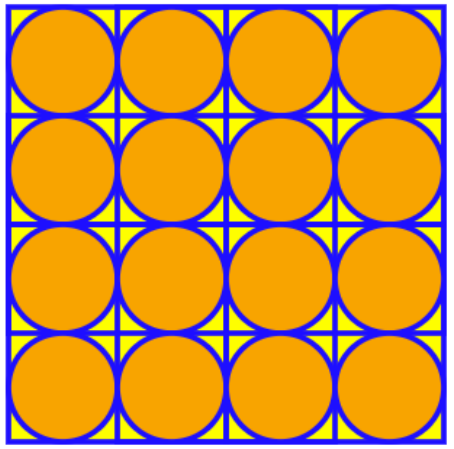


Rects-09.html

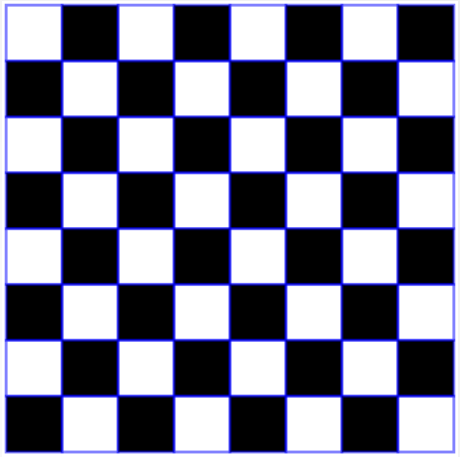
Rect



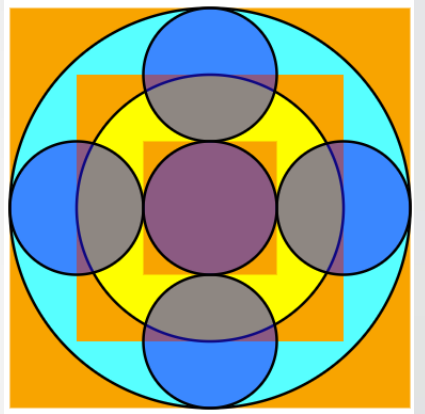
Rects-10.html



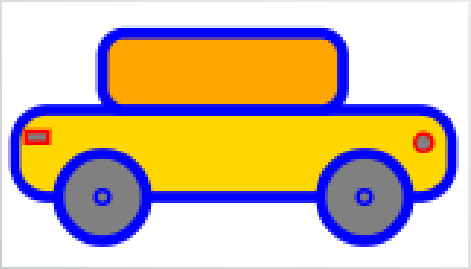
Rects-11.html



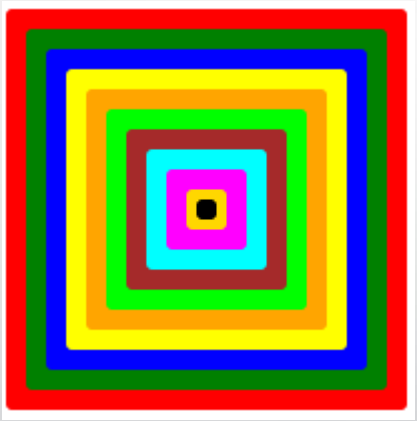
Rects-12.html



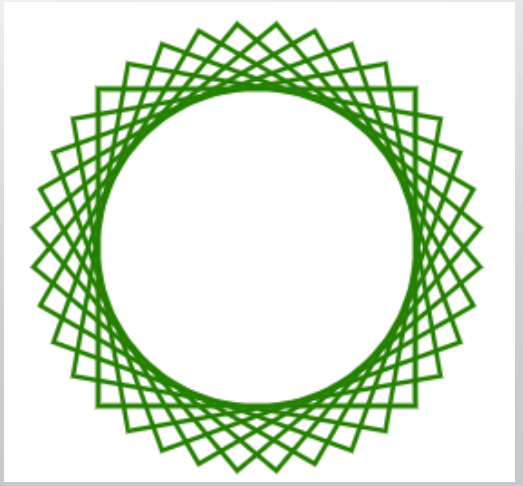
Rects-16.html



Rects-13.html



Rects-14.html



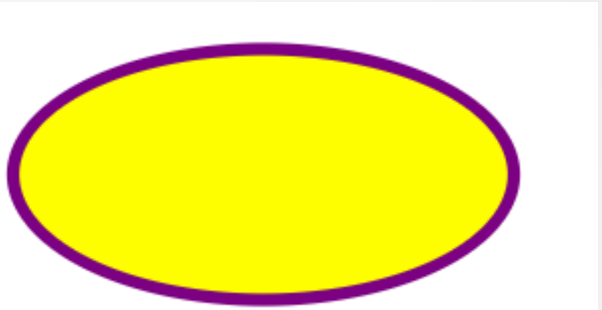
Rects-15.html

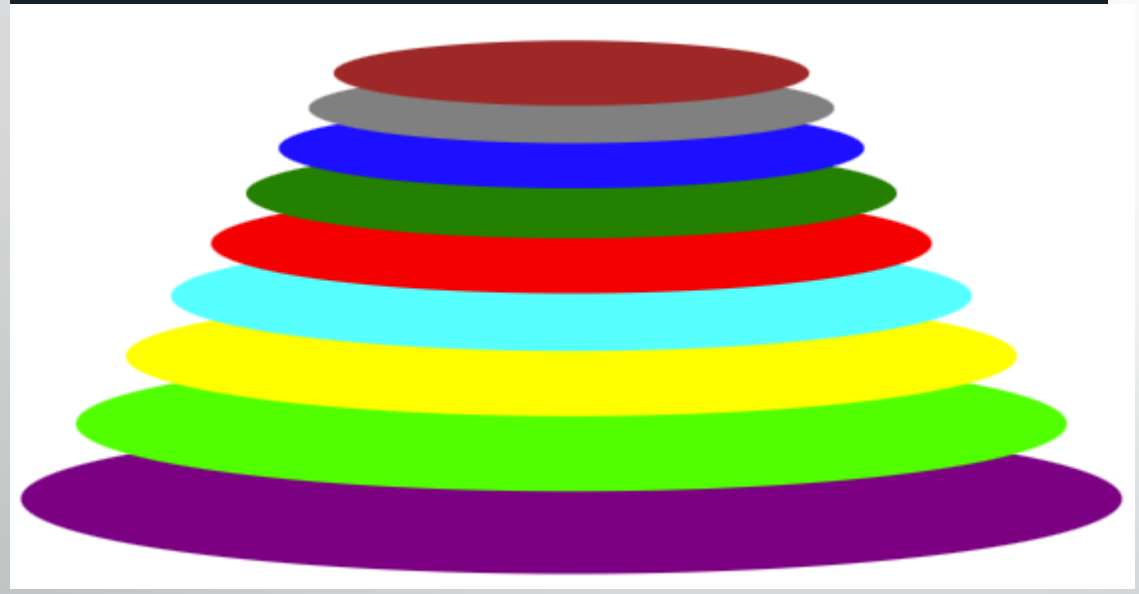
<rect x="200" y="200" width="140" height="140" transform="rotate(10,270,270)"/> *(περιστροφή από 10-90 μοίρες)*

<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>
```

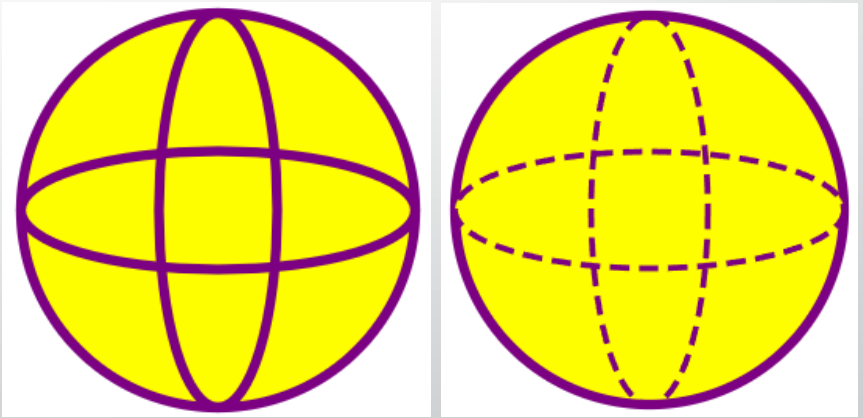




Ellipses-01.html

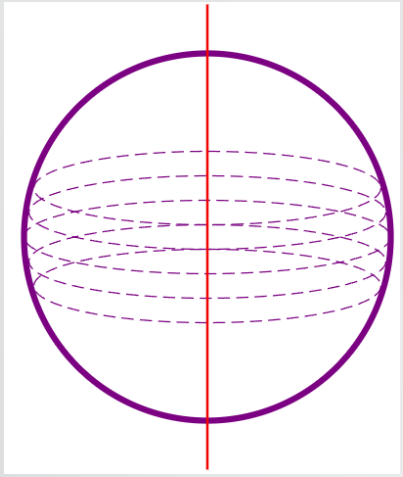
(με κλιμάκωση -10% των cy, rx, ry)

stroke-dasharray="10,5"

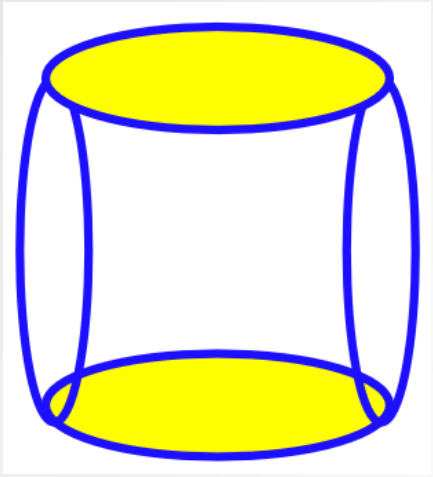


Ellipses-02.html

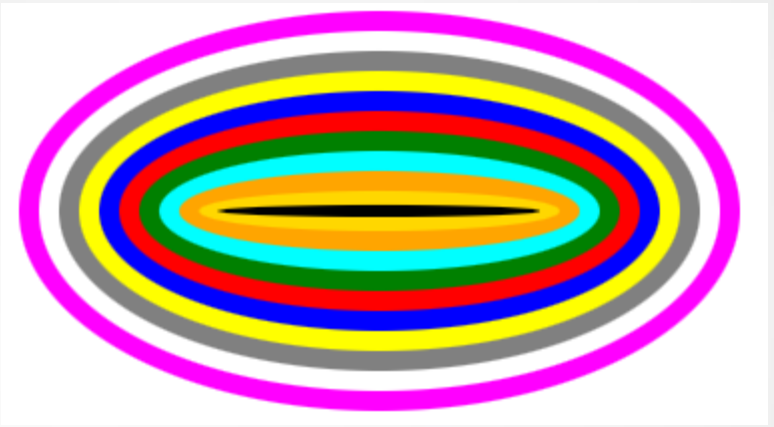
Ellipse



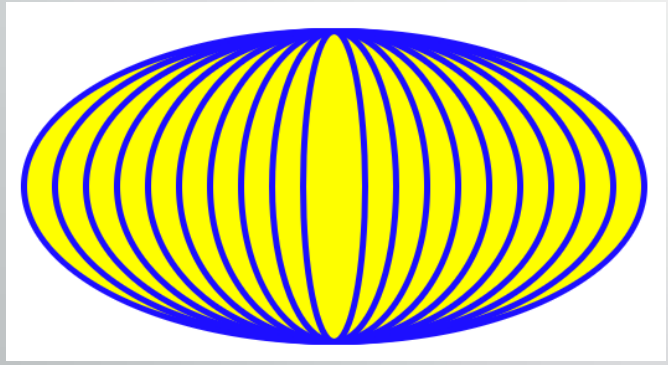
Ellipses-03.html



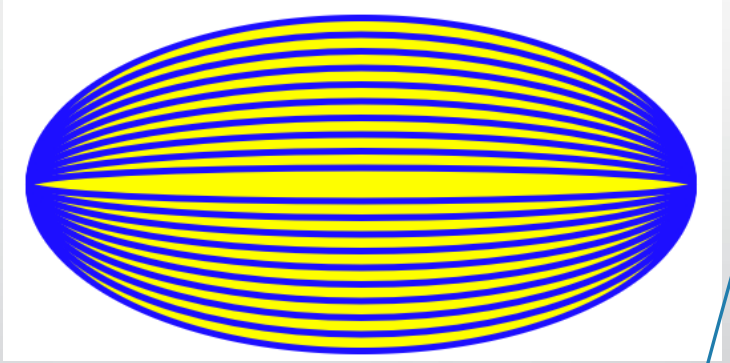
Ellipses-04.html



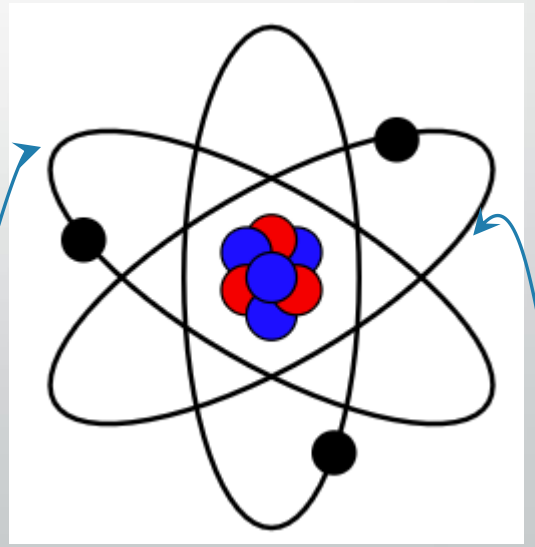
Ellipses-05.html



Ellipses-06.html



Ellipses-07.html



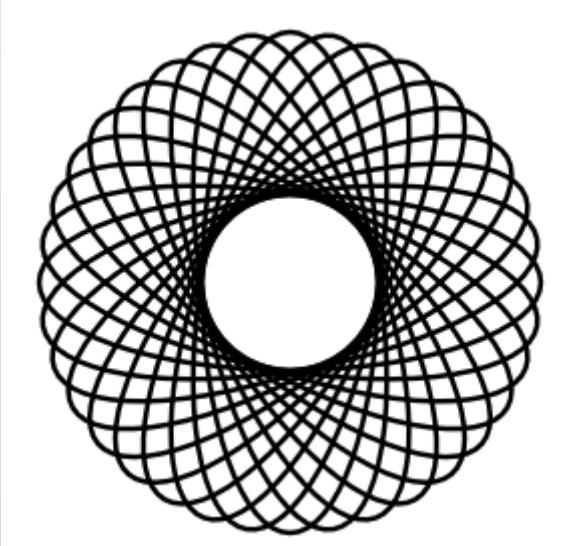
Ellipses-08.html

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

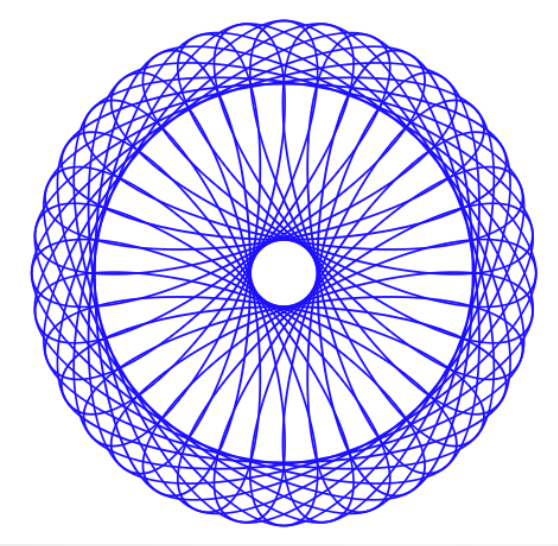
```
transform="rotate(-60,200,200)"
```

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

Ellipse



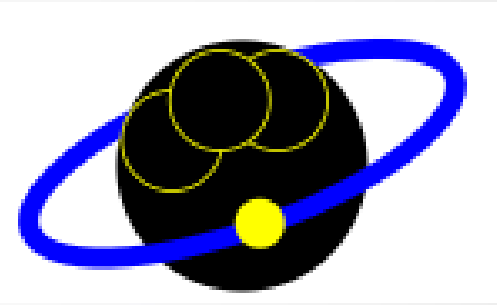
Ellipses-09.html

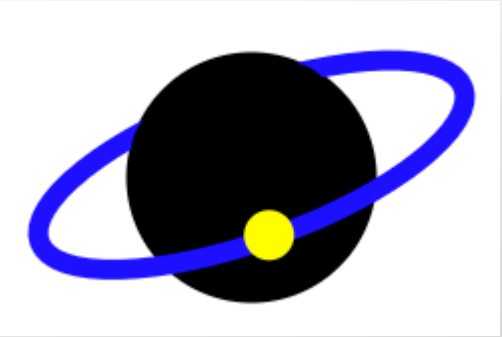


Ellipses-09b.html

cx="200" cy="200" rx="35" ry="100"
transform="rotate(x,150,200)"

$x \in [0, 360)$



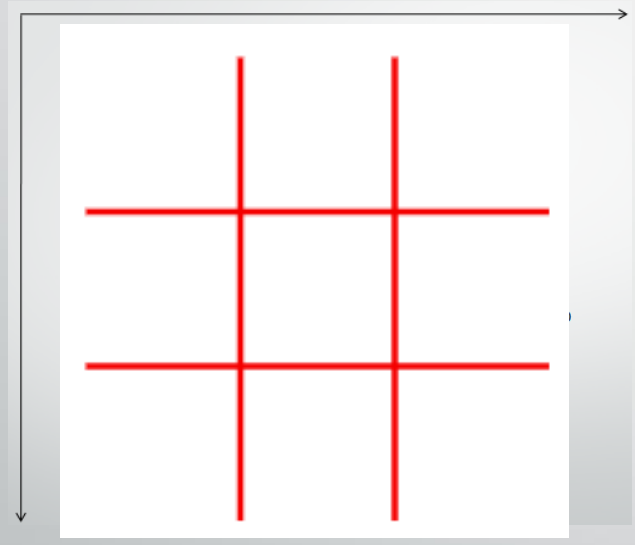


Ellipses-10.html

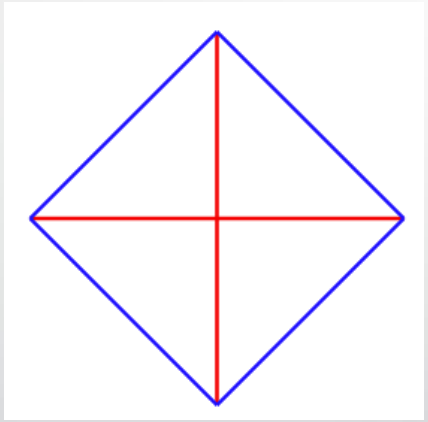
```
<svg height="210" width="500">
 <line x1="20" y1="10" x2="200" y2="100" stroke="red" stroke-width="2"/>
</svg>
```

Line

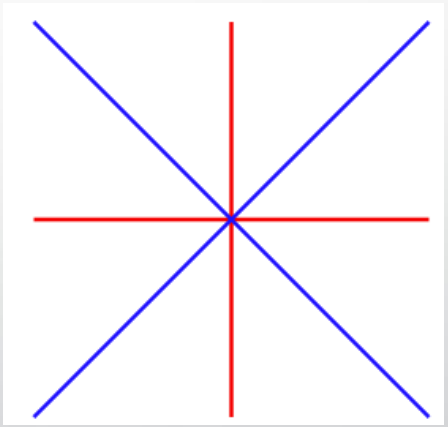
```
<svg height="210" width="500">
  <line x1="20" y1="10" x2="200" y2="100" stroke="red" stroke-width="2"/>
</svg>
```



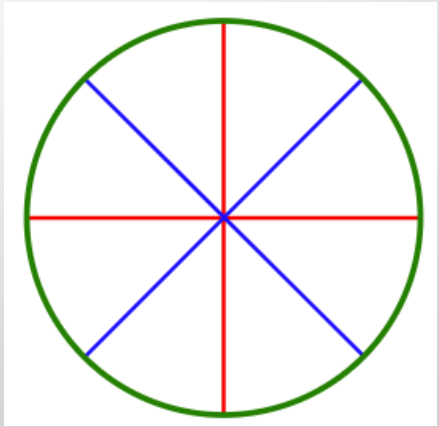
Lines-01.html



Lines-02.html

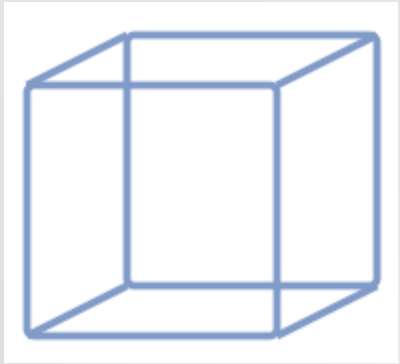


Lines-03.html

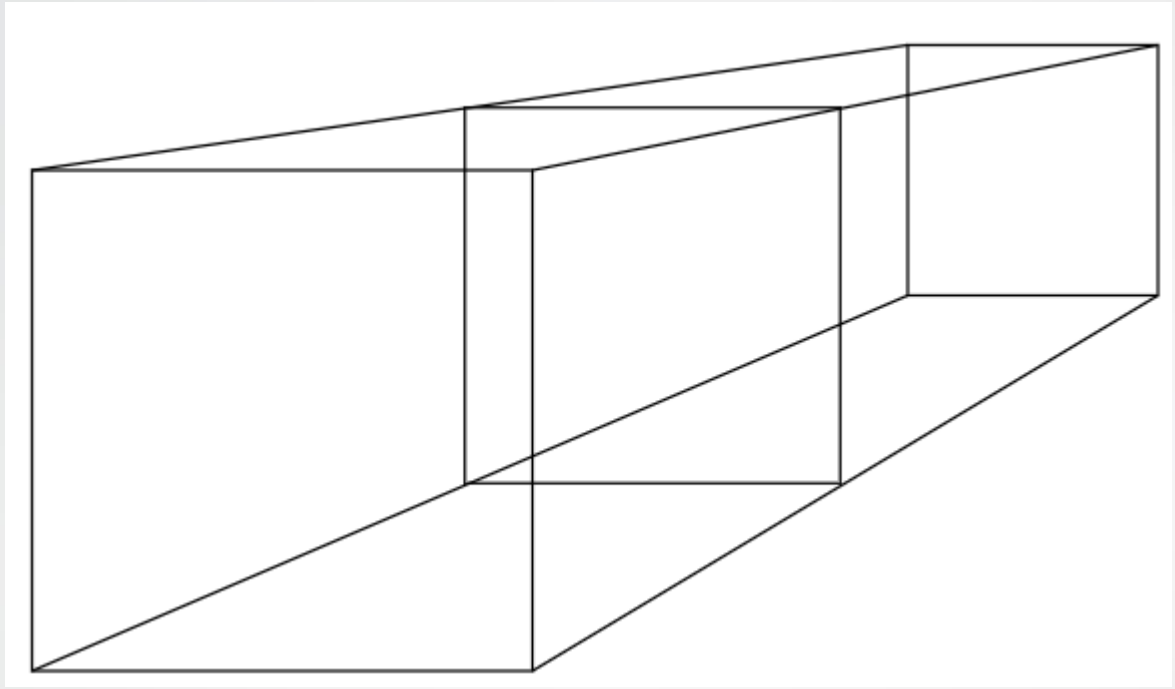


*Lines-04.html **

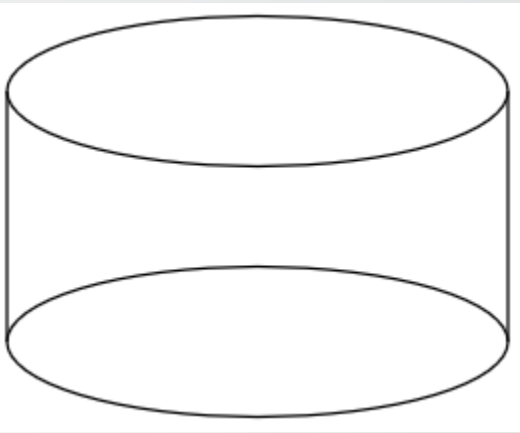
Line



Lines-05.html

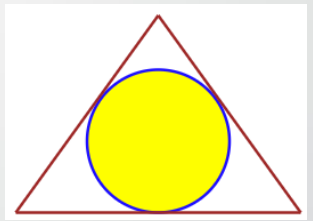


Lines-06.html

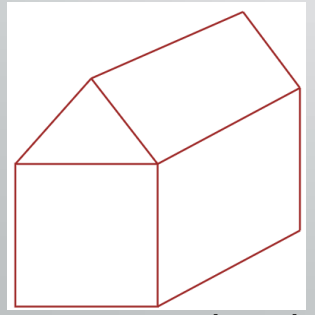


Lines-07.html

Lines-08.html

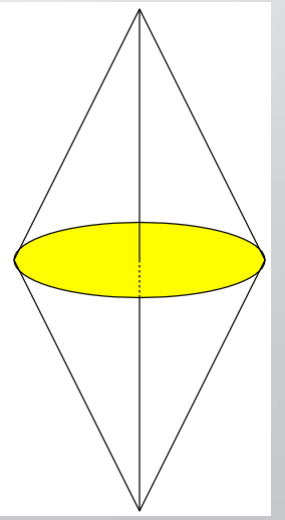


Lines-09.html



Lines-10.html

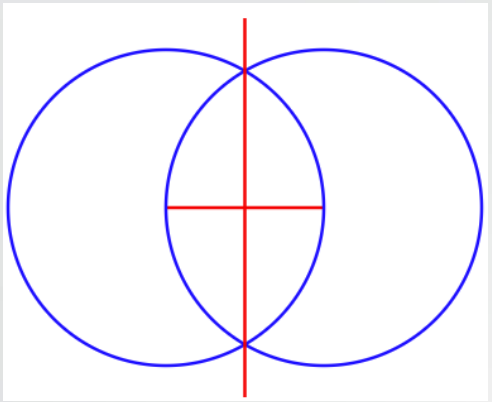
Lines-Circles-01.html



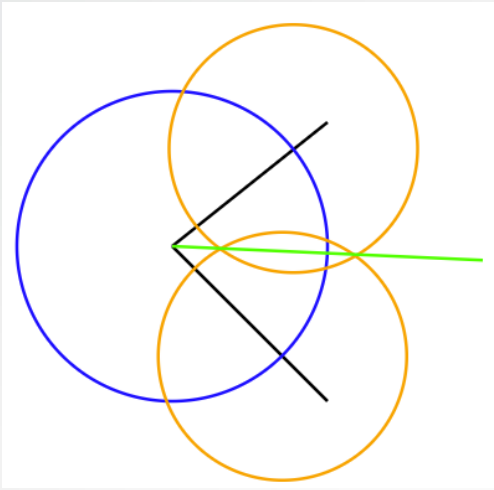
Lines-11.html

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.

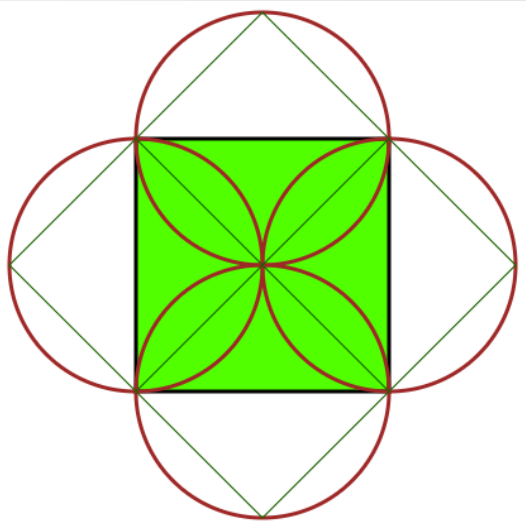


Lines-12.html
(Διχοτόμηση ευθύγραμμου τμήματος)

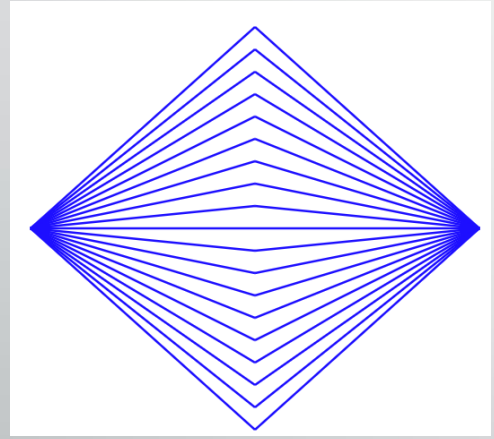


Lines-13.html
(Διχοτόμηση γωνίας)

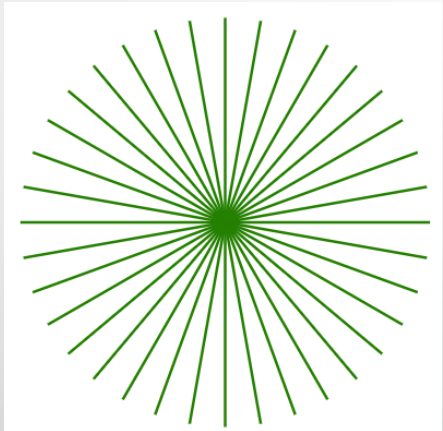
Σχεδιάζουμε έναν κύκλο με κέντρο την κορυφή της γωνίας. Σχεδιάζουμε 2 κύκλους με κέντρα τα σημεία τομής του αρχικού κύκλου με τις πλευρές της γωνίας και ακτίνες περίπου τα 2/3 της ακτίνας του αρχικού κύκλου. Τα 2 σημεία τομής τους ορίζουν την διχοτόμο της γωνίας.



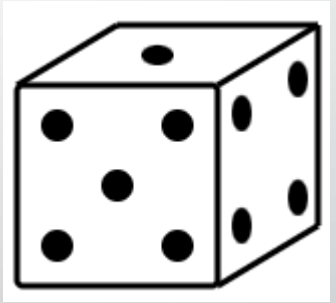
Lines-14.html



Lines-15.html



Lines-16.html



Lines-17.html

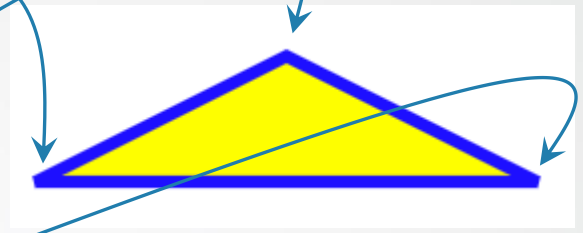
```
transform="rotate(10,250,300)"/>
```
(περιστροφή από 10-180 μοίρες)

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

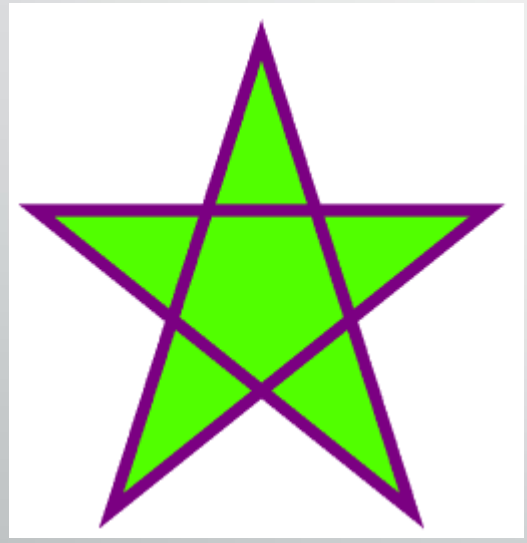
Polygon

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

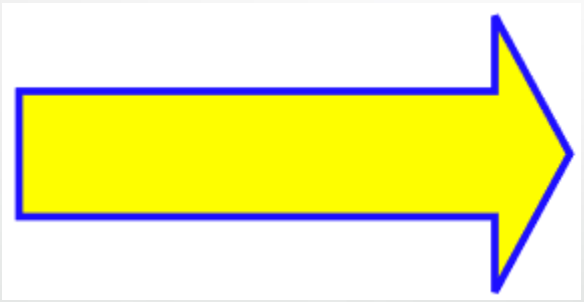
Το στοιχείο <polygon> χρησιμοποιείται για τη δημιουργία ενός πολυγώνου που περιέχει τουλάχιστον τρεις πλευρές. Τα πολύγωνα είναι κατασκευασμένα από ευθείες γραμμές και το σχήμα είναι "κλειστό" (όλες οι γραμμές συνδέονται).



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



Polygon-01.html



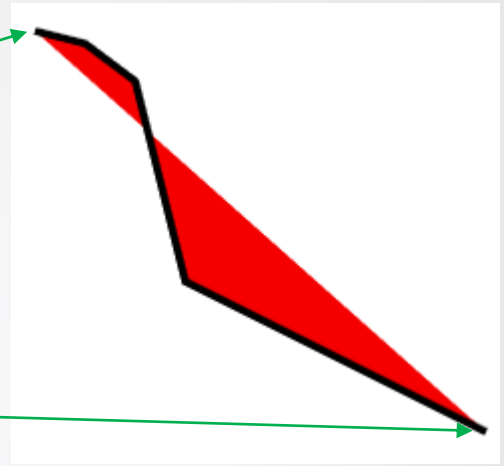
Polygon-02.html

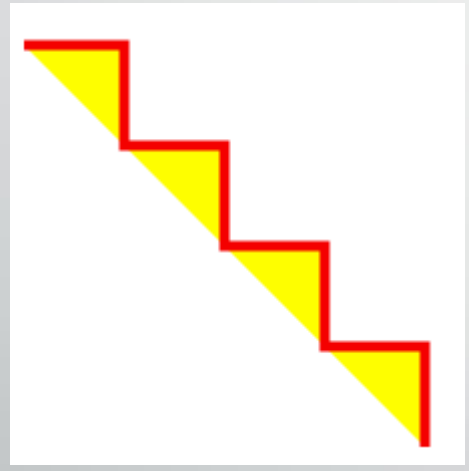
RubicCube.html

Polyline

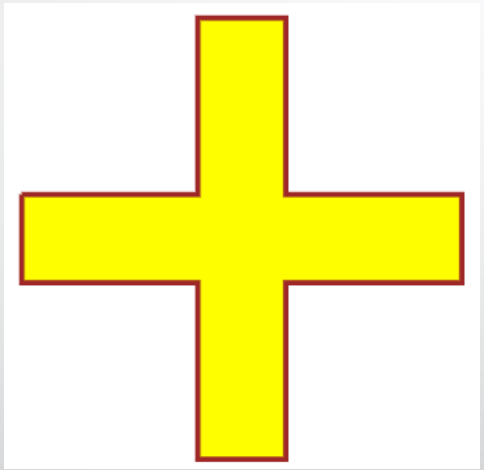
```
<svg height="210" width="500">
  <polyline points="20, 20, 40, 25, 60, 40, 80, 120, 120, 140, 200, 180" fill="red"
stroke="black" stroke-width="3"/>
</svg>
```

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

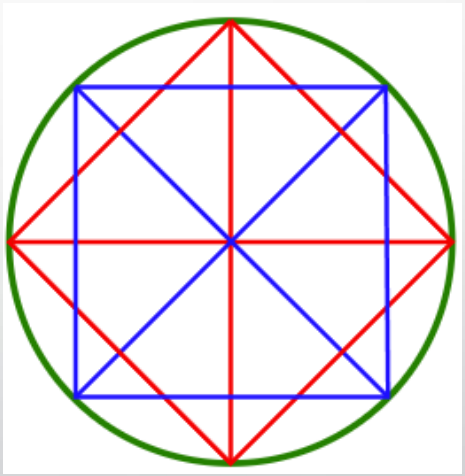




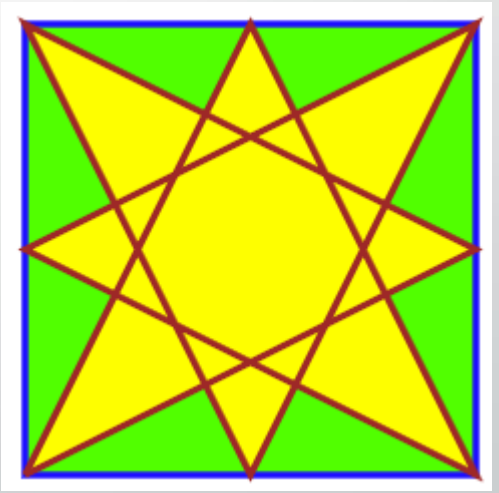
Polyline-01.html



Polyline-02.html

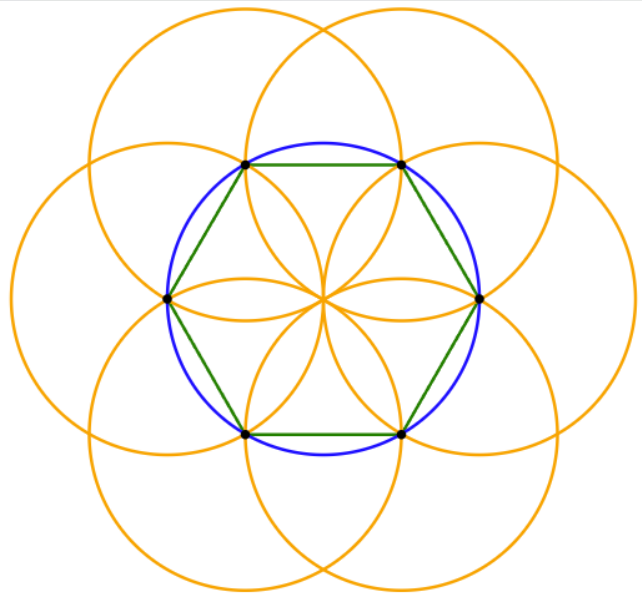


Polyline-03.html



Polyline-05.html

Polyline



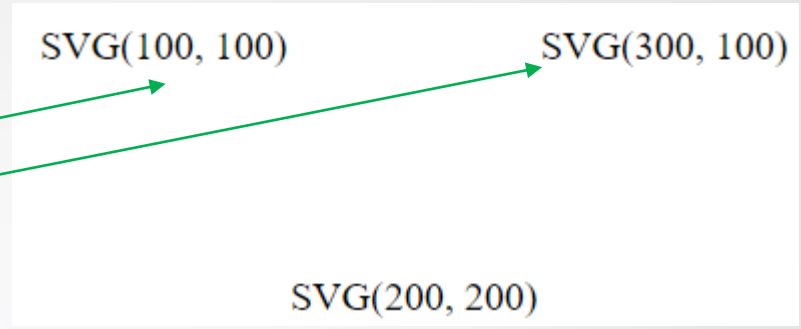
Polyline-04.html
(Κατασκευή κανονικού εξάγωνου)

Βήμα 1: σχεδιάστε τον αρχικό μπλε κύκλο
Βήμα 2: σχεδιάστε τον 10 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 20 πορτοκαλί κύκλο με κέντρο το σημείο τομής του 10ου 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.

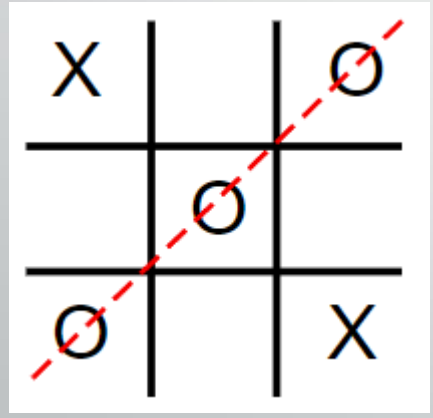
```
<svg height="1000" width="1000">
  <text x="100" y="100">SVG(100, 100)</text>
  <text x="300" y="100">SVG(300, 100)</text>
  <text x="200" y="200">SVG(200, 200)</text>
</svg>
```



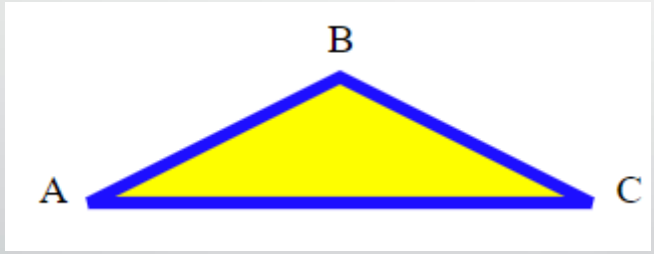
Text-04.html

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

Text-02.html



triliza.html

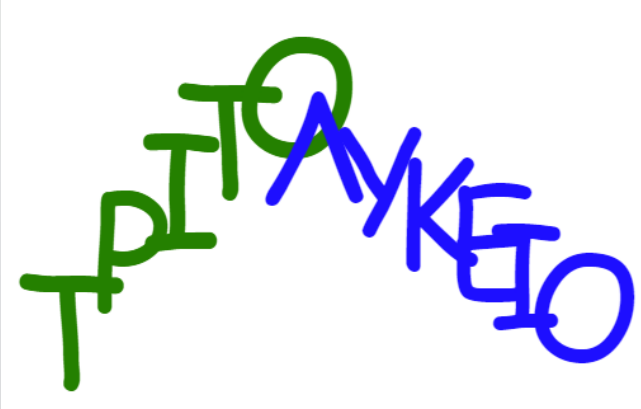


Text-01.html

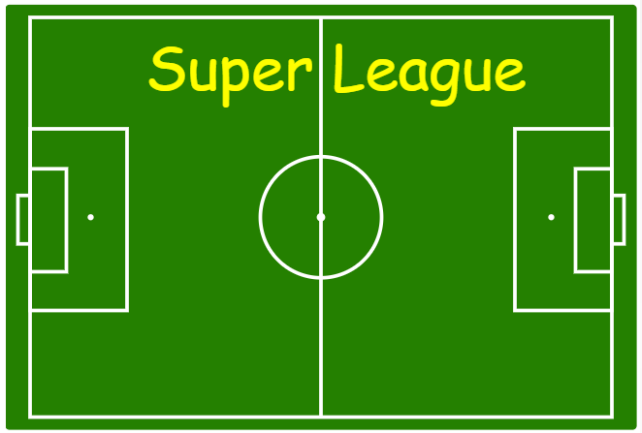
Text-17.html

Text-08.html

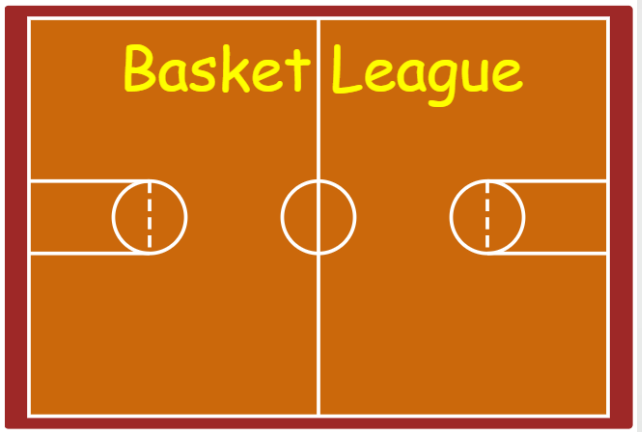
Text



Text-03.html

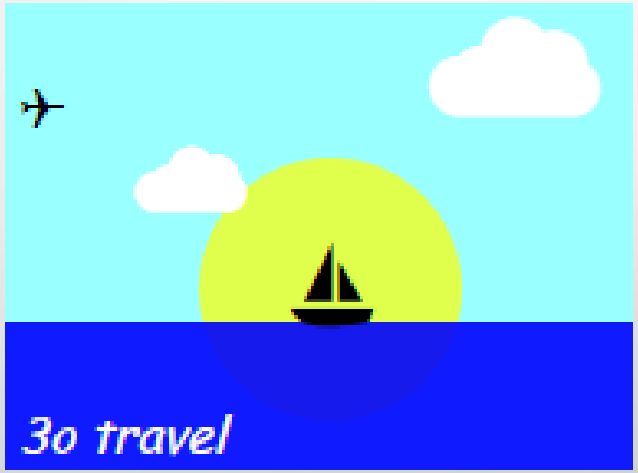


SuperLeague.html



BasketLeague.html

Text-05.html



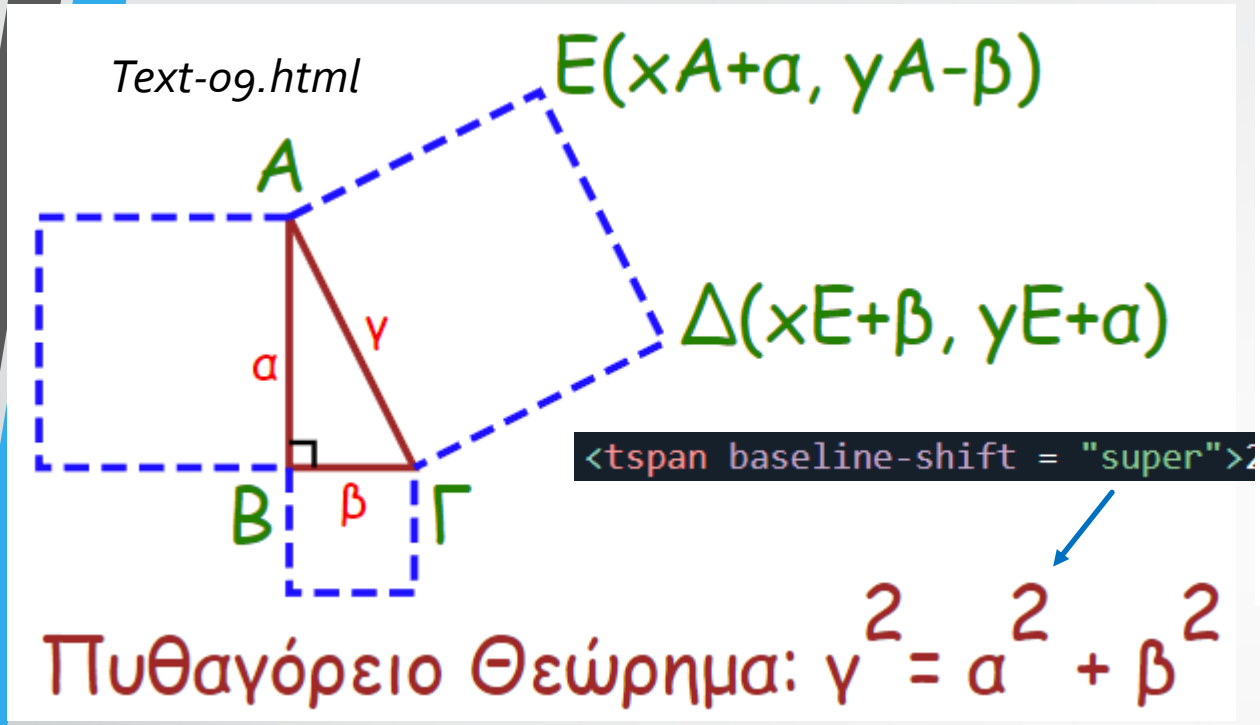
Text-06.html
(αεροπλάνο: ✈
σύννεφο: ☁
σκάφος: ⛵)

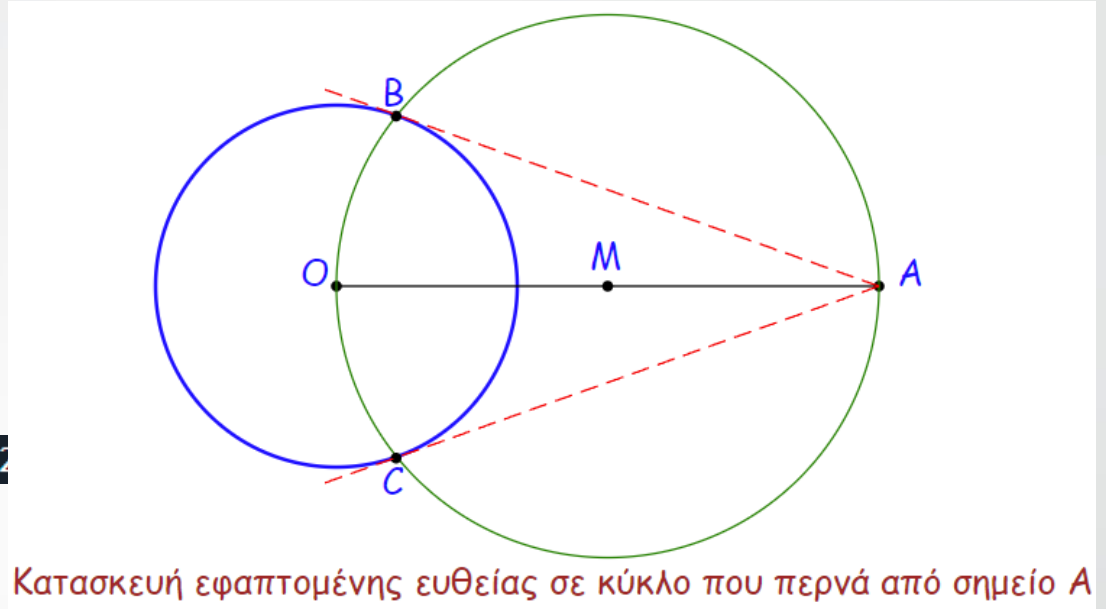
Text-07.html

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

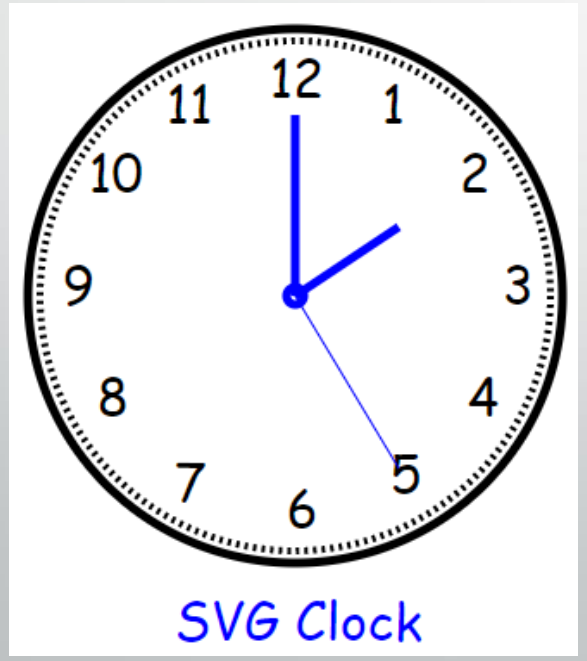
Text

Text-09.html

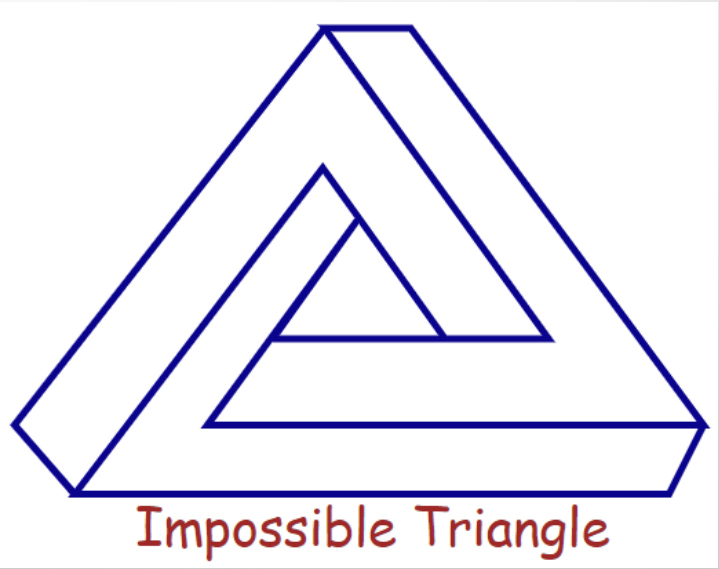




Text-10.html

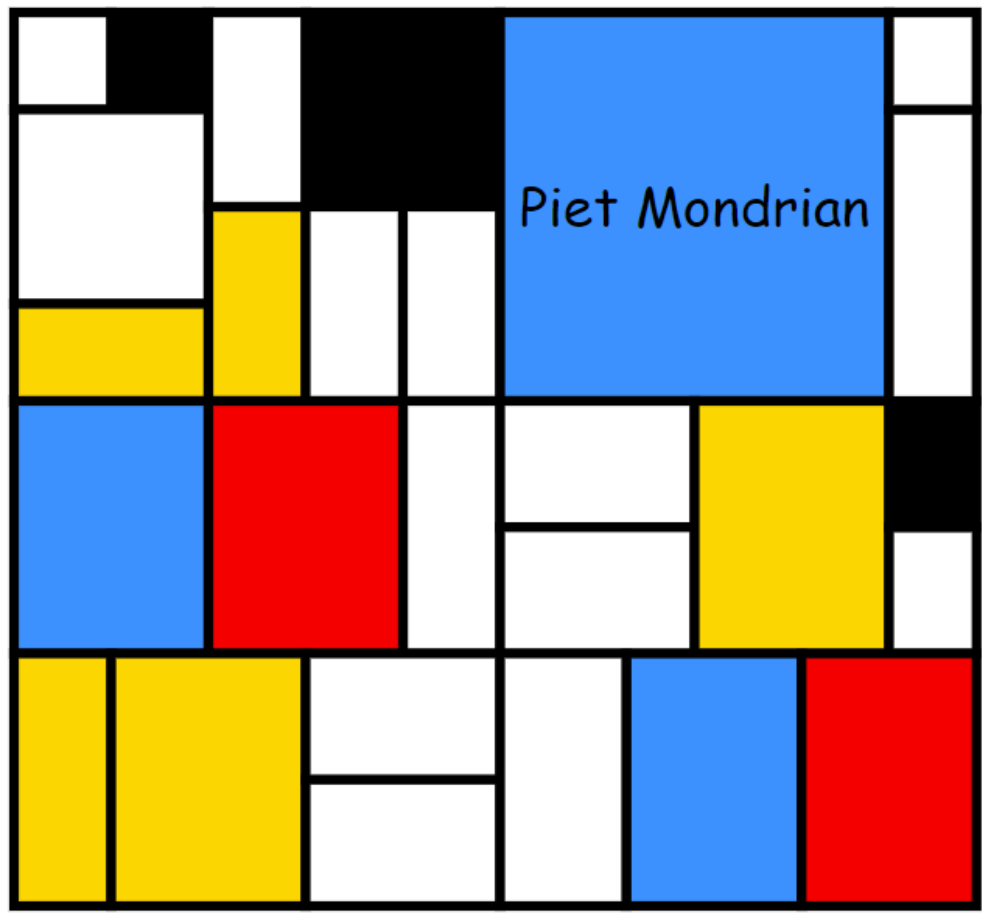


Text-15.html

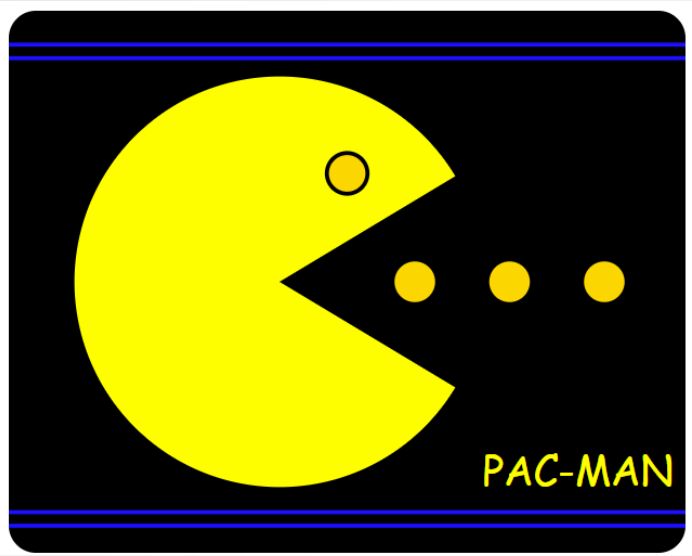


Text-11.html

Text

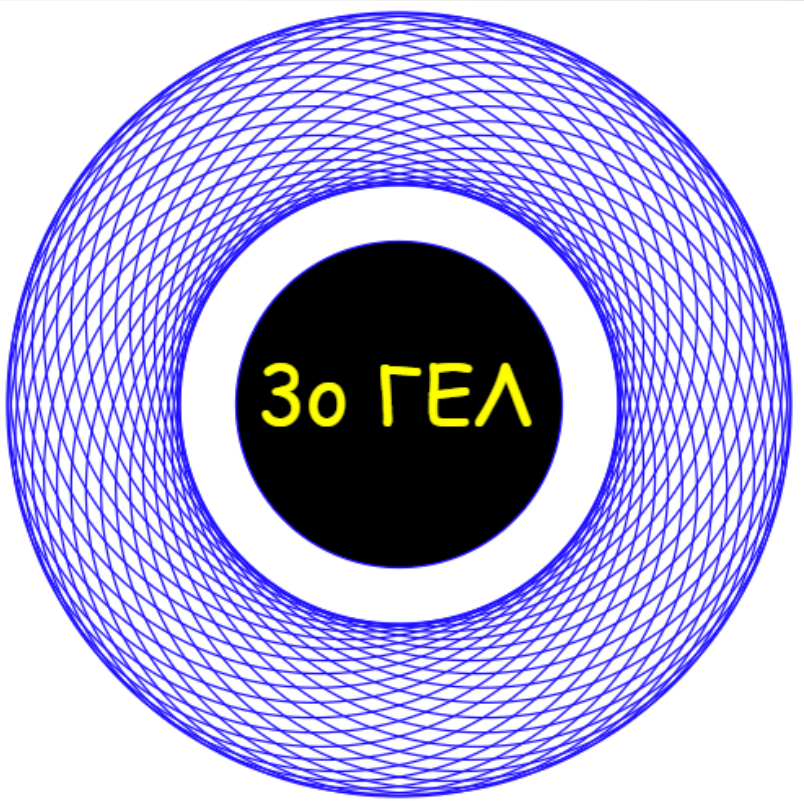


Text-12.html



Text-13.html

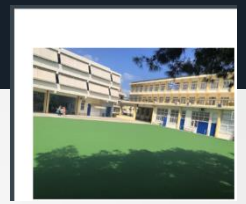
Text-14.html



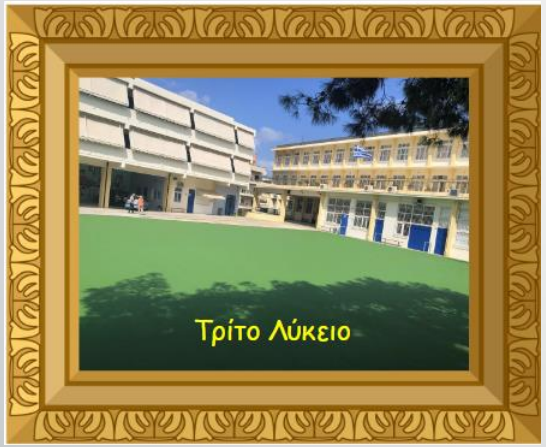
Text-16.html

Image

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

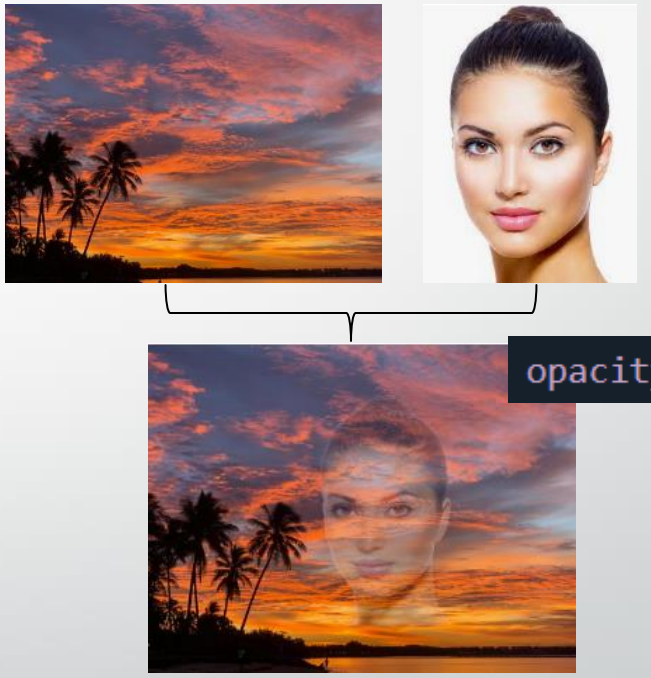


<svg width="1000" height="1000">
<image
href="https://blogs.sch.gr/3lykirak/files/2022/08/305803636_4232002560256883_77520232177911854 21_n.jpg"
width="300" x="55" y="55"/>
</svg>



Images-01.html

Images-02.html

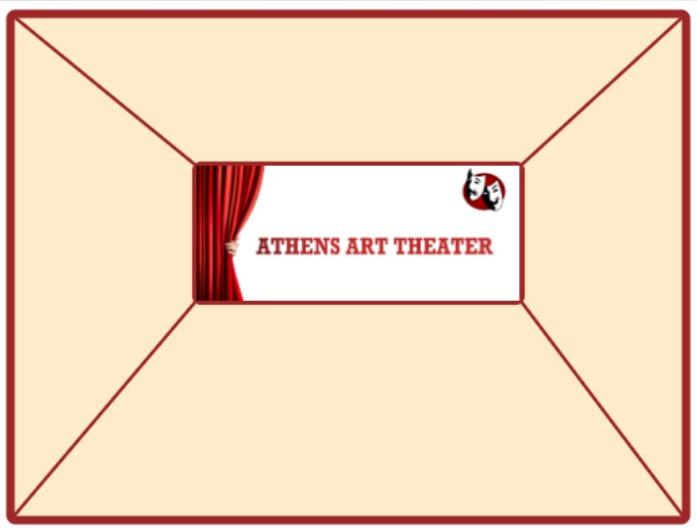


Images-03.html

https://purepng.com/public/uploads/large/purepng.com-women-facesfaceshumansfrontalhuman-identitywomen-1421526884813fq4na.png

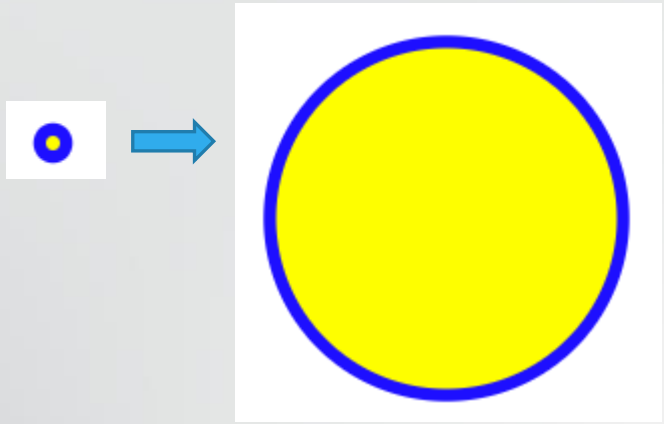
Image

Images-04.html



Images-05.html

Animation



Για "πάγωμα" στο τελευταίο καρέ:

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

Circles-Animated-02.html

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

Πειραματιστείτε επιπλεόν με τα εξής:

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

Circles-Animated-01.html

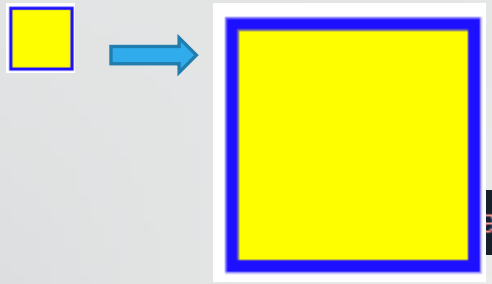
```
<animate attributeName="cx" values="0;200;0" dur="6s" repeatCount="indefinite"/>
<animate attributeName="cy" values="0;200;0" dur="6s" repeatCount="indefinite"/>
```

Συνδυασμοί animations: Animations_mixed.html

Animation

Πειραματιστείτε επιπλεόν 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"/>
```

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

```
<svg width="1000" height="1000">
  <rect x="50" y="30" width="200" height="200" fill="yellow" stroke="blue" stroke-width="5">
    <animate
      attributeName="width"
      values="0;100;0"
      dur="2s"
      repeatCount="indefinite" />
    <animate
      attributeName="height"
      values="0;100;0"
      dur="2s"
      repeatCount="indefinite" />
  </rect>
</svg>
```

Rects-Animated-01.html

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


Rects-Animated-01.html

Animation

3ο ΓΕΛ → 3ο ΓΕΛ

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

<text x="10" y="100" font-size="40" fill="blue" font-family="Comic Sans MS">3ο ΓΕΛ

<animate attributeName="font-size" values="0;100;0" dur="4s" repeatCount="indefinite"/>

</text>

</svg>
```

Text-Animated-01.html

Πειραματιστείτε επιπλεόν 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 επιπλεόν με τα εξής:

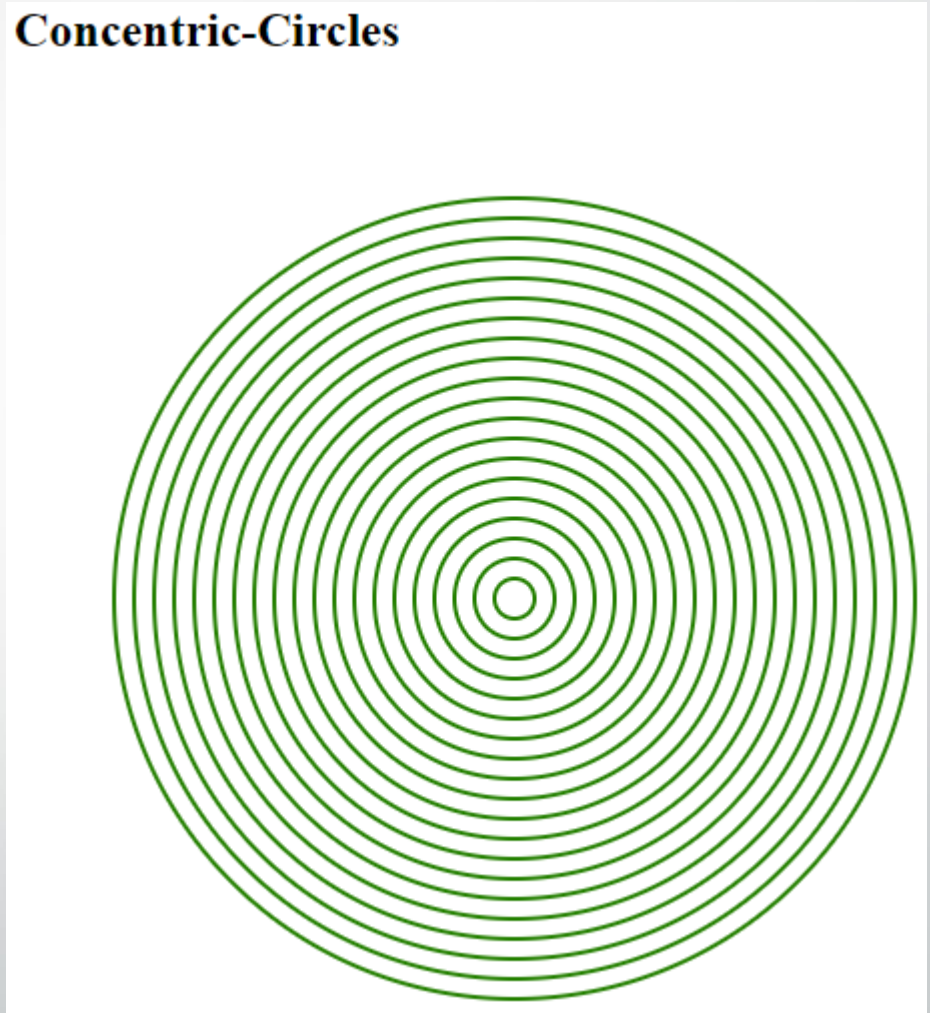
```
<animate attributeName="x" values="0;300;0" dur="4s" repeatCount="indefinite"/>
<animate attributeName="y" values="0;300;0" dur="4s" repeatCount="indefinite"/>
```

```
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>
```

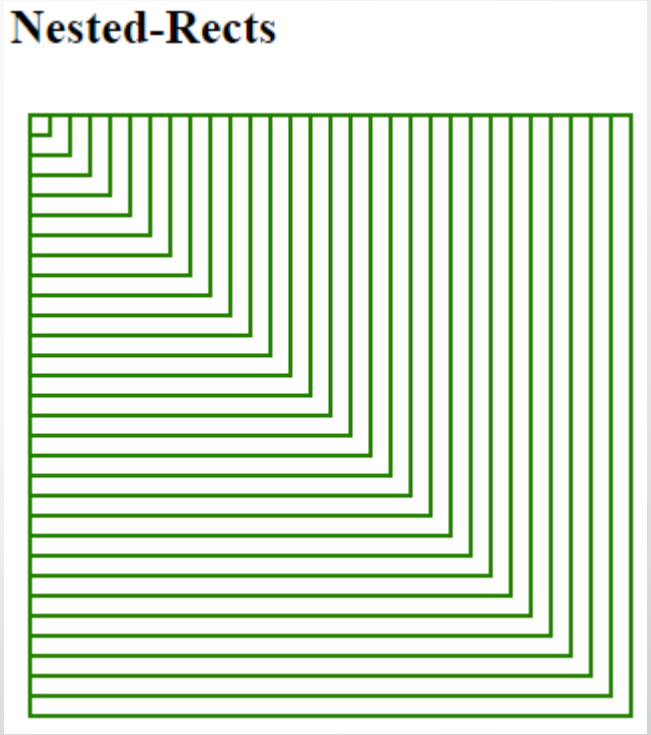
Images-Animated-01.html

Images-Animated-02.html

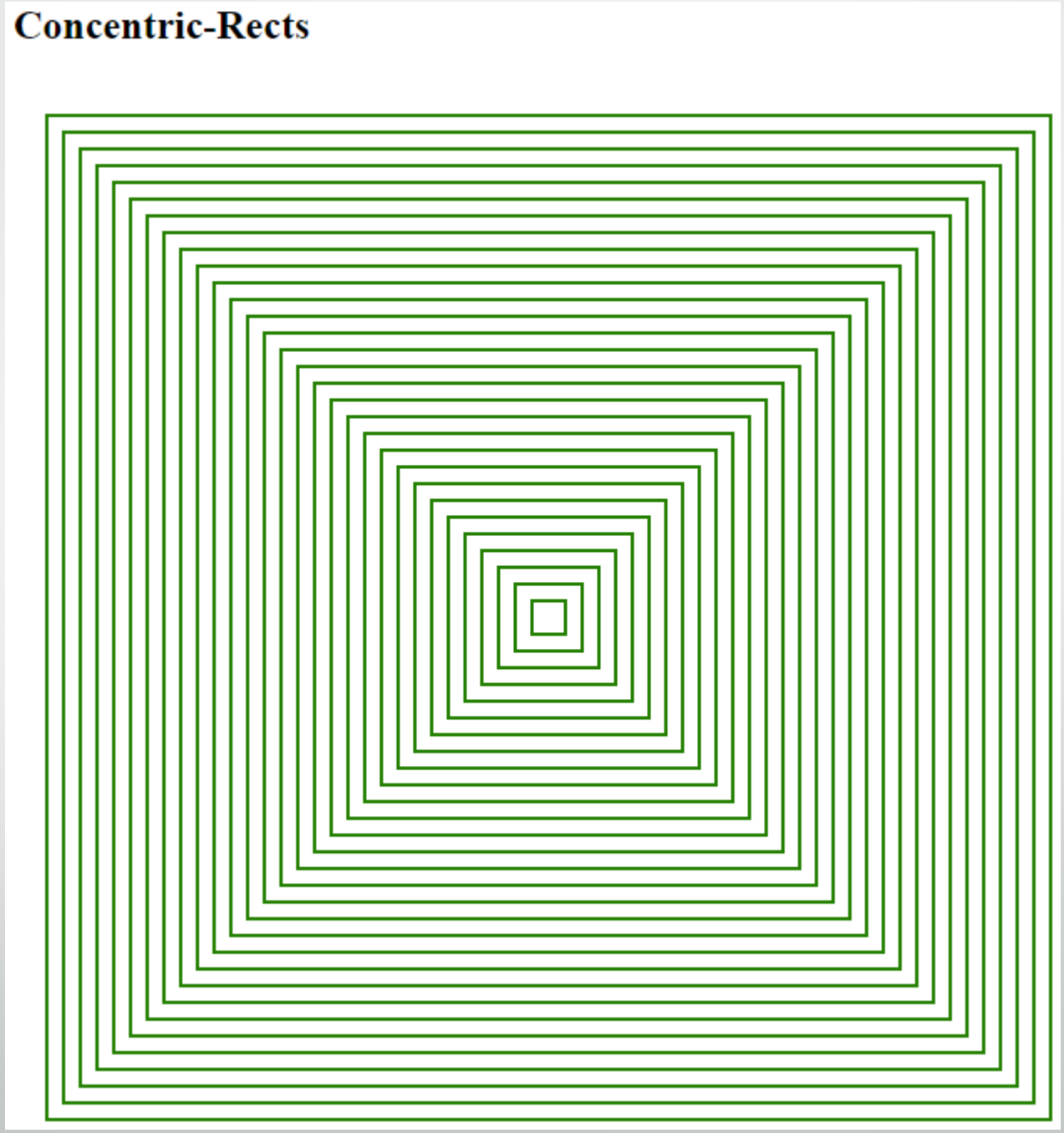
```
<h2>Concentric-Circles</h2>

<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>
```



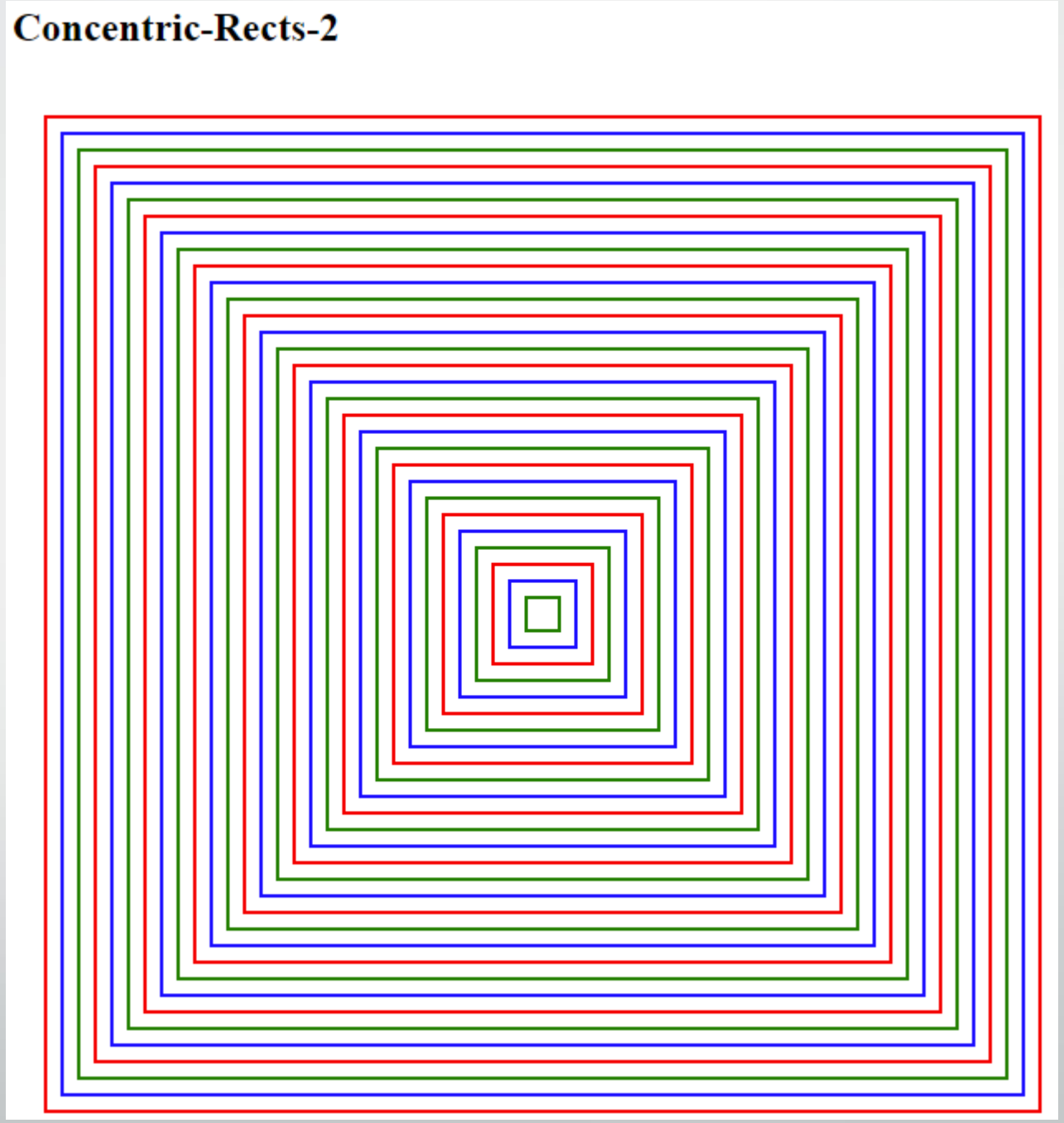
```
<h2>Nested-Rects</h2>

<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>
```



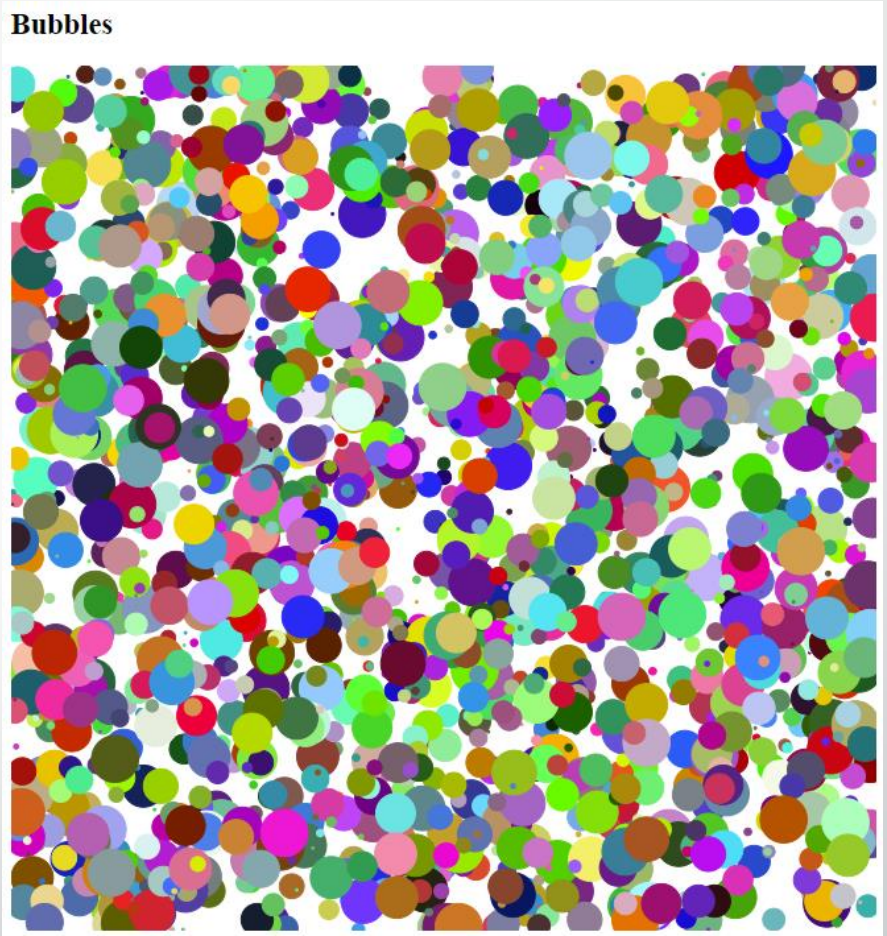
Άσκηση:



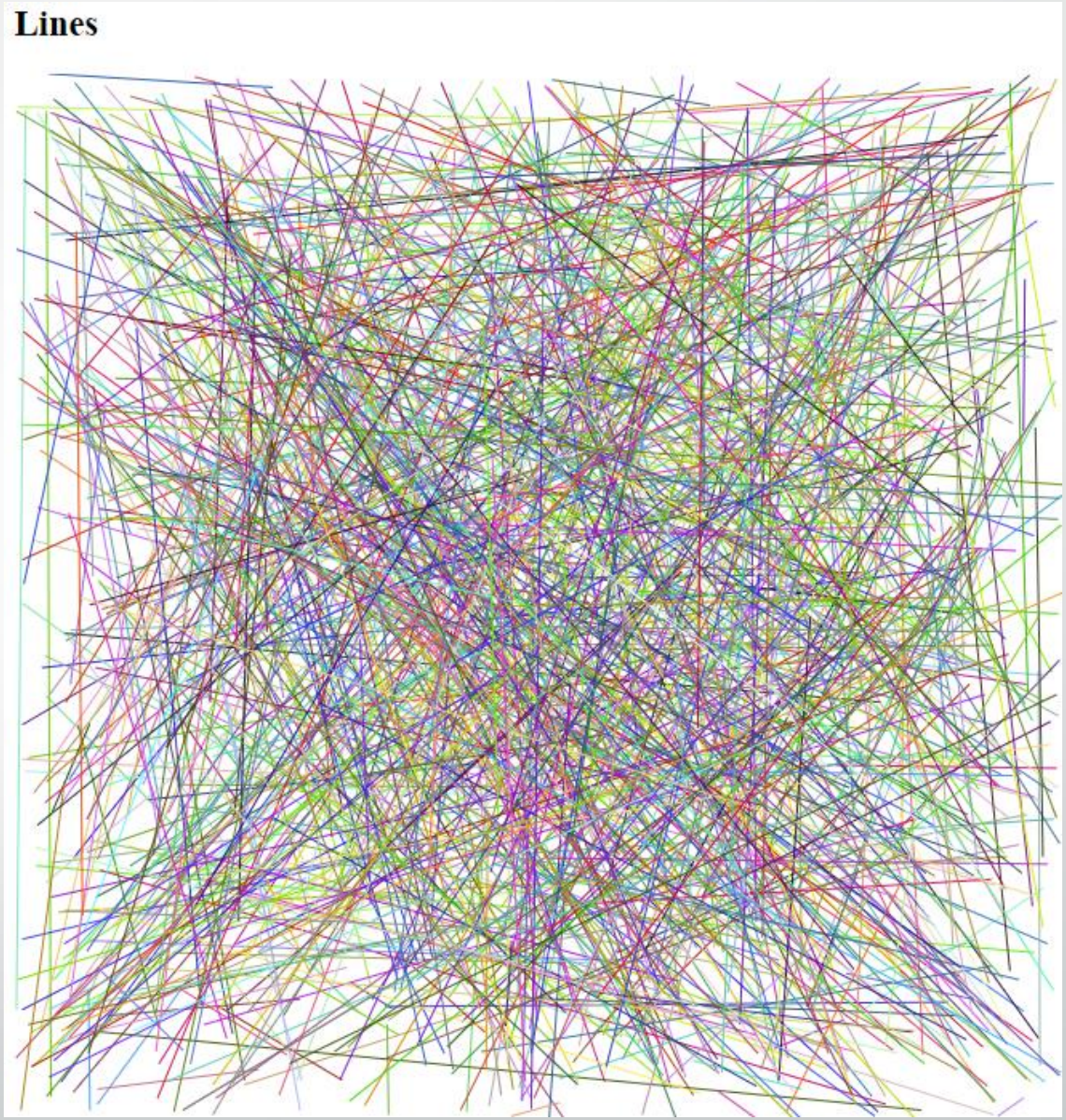
Άσκηση:



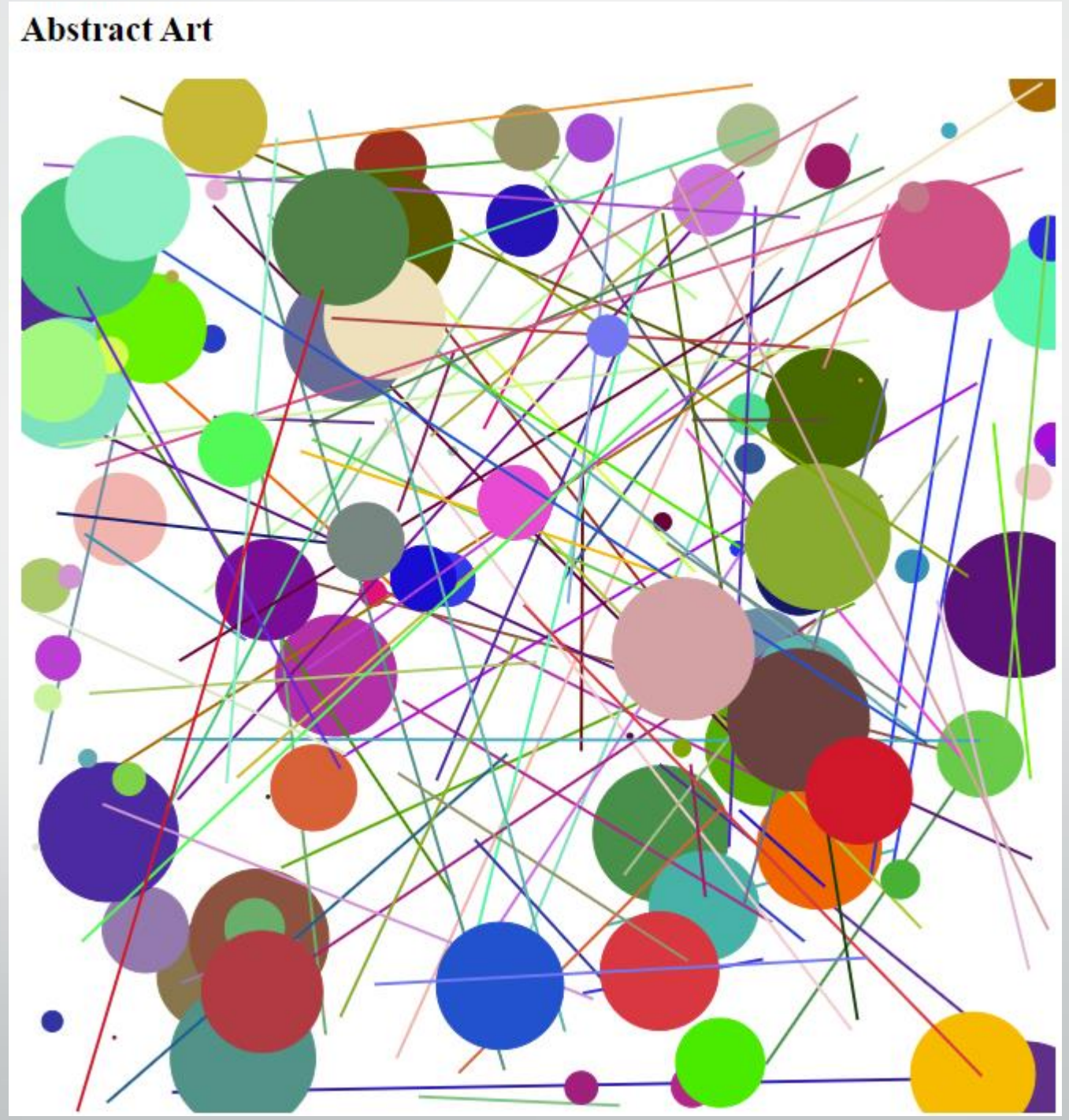
```
<h2>Bubbles</h2>
<body onload="drawBubbles()">
<script>
    function drawBubbles() {
        text = "<svg width=\"700\" height=\"700\">";
        N=2000;
        for (i = 1; i <= N; i++) {
           var red = Math.floor(Math.random() * 256);
           var green = Math.floor(Math.random() * 256);
           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>
```



```
<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>
```



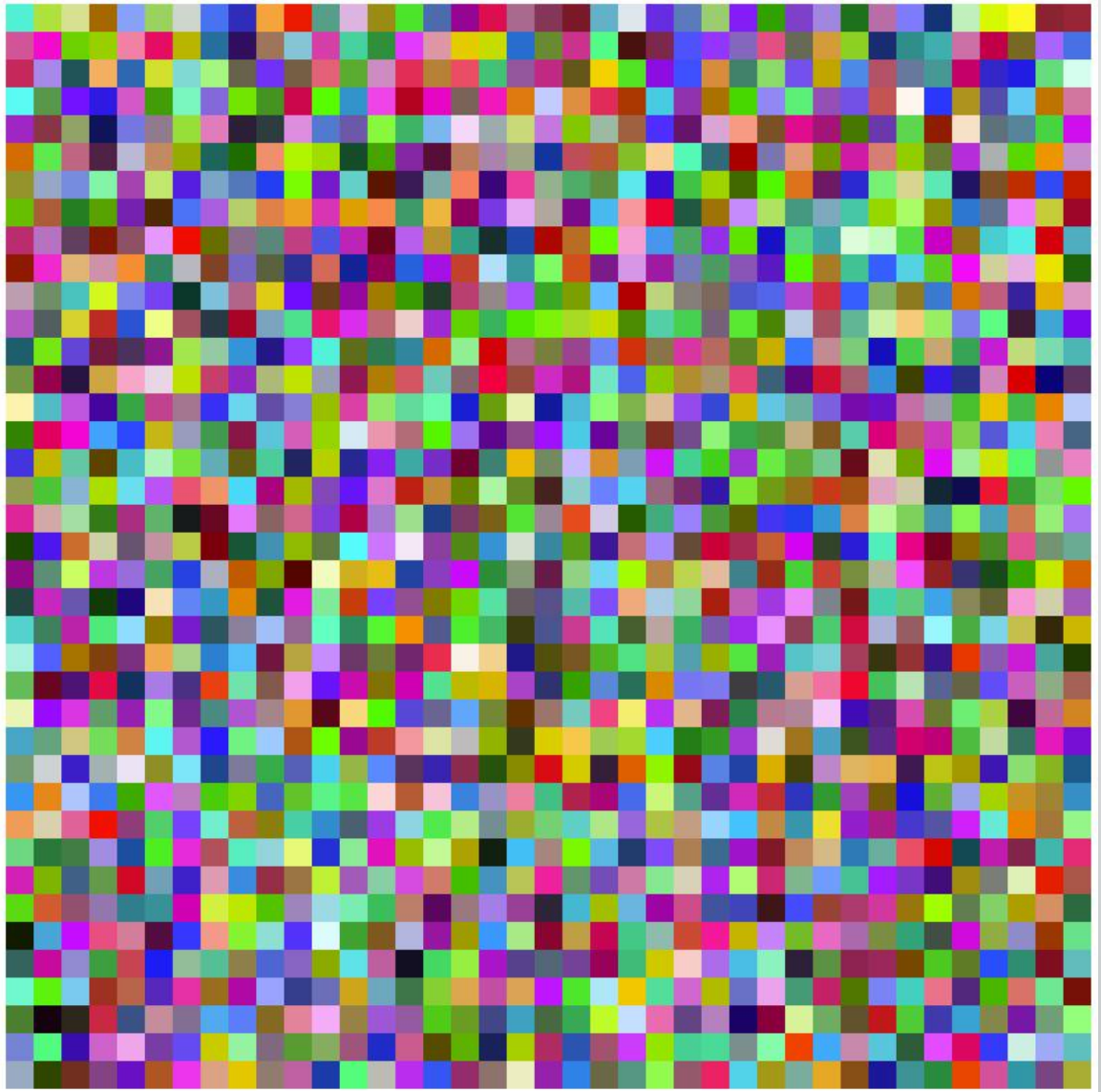
Άσκηση:



```
<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_gooo6o.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