

JavaScript Art

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2D Graphics (recall)

- ▶ Raster graphics
 - bit-mapped images defined by pixel grid
 - computer friendly
 - compressable
 - .gif .jpeg .png .bmp
 - Adobe Photoshop, GIMP
- ▶ Vector graphics
 - shape elements such as lines and curves defined programmatically
 - human friendly
 - scalable
 - .svg .swf
 - Adobe Illustrator

SVG: Scalable Vector Graphics

- ▶ a language for describing 2D-graphics and graphical applications in XML.
- ▶ XML: EXtensible Markup Language.
 - a markup language much like HTML designed to
 - describes data and to focus on what data is.
- ▶ HTML
 - display data and to focus on how data looks.

JavaScript Graphics Library

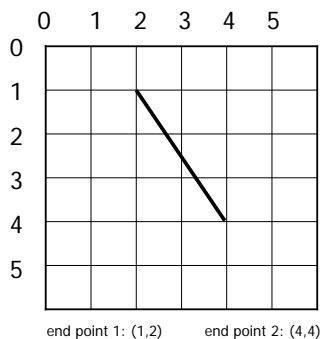
modify mydraw.js

- ▶ Create a jsGraphics Object

```
var jg_doc = new jsGraphics();
```
- ▶ Draw your stuff here...
- ▶ Paint the whole picture so it shows up on the screen. Without this, nothing shows at all!

```
jg_doc.paint();
```

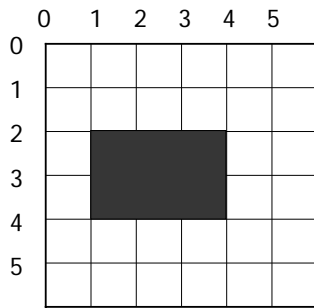
How to draw a line?



JavaScript code

```
// orange line
x1 = 500; y1 = 200;
x2 = 700; y2 = 10;
jg_doc.setColor ("orange");
jg_doc.drawLine (x1, y1, x2, y2);
```

How to draw a rectangle?

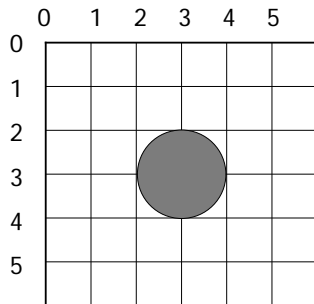


top left corner: (2,1) width 3, height 2

JavaScript code

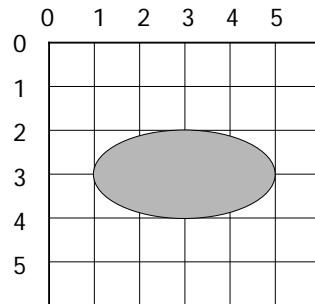
```
//red rectangle  
x = 550; y = 400;  
width = 200; height = 100;  
jg_doc.setColor ("red");  
jg_doc.fillRect (x, y, width, height);
```

How to draw a circle?



top left corner of bounding square: (2,2) width: 2

How to draw an oval?

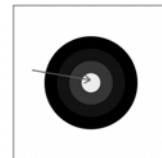


top left corner of bounding square: (2,1) width: 4 height: 2

JavaScript Code

```
//magenta oval  
jg_doc.setColor("green");  
jg_doc.drawOval (100, 100, 120, 75);
```

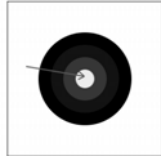
Can you draw this?



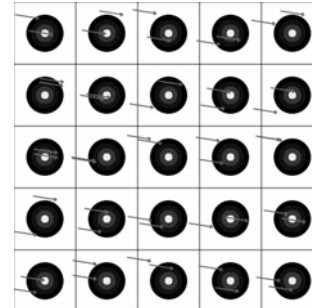
```
// Draw a rectangle as the border of our image.
jg_doc.setColor("black");
jg_doc.drawRect(50, 50, 250, 250);

// Draw four concentric circles for our bull's eye:
jg_doc.setColor("black"); jg_doc.fillEllipse(100, 100, 150, 150);
jg_doc.setColor("blue"); jg_doc.fillEllipse(120, 120, 110, 110);
jg_doc.setColor("red"); jg_doc.fillEllipse(140, 140, 70, 70);
jg_doc.setColor("yellow"); jg_doc.fillEllipse(160, 160, 30, 30);

// Draw an arrow near the center of the bull's eye.
// I just fiddled with the numbers until this looked arrow-like! :)
jg_doc.setColor("green"); jg_doc.setStroke(2);
jg_doc.drawLine(80, 155, 174, 171);
jg_doc.drawLine(174, 171, 165, 163);
jg_doc.drawLine(174, 171, 164, 176);
```



Can you draw this?



A close look at For loops

```
for(<initialization>; <continuation>; <next iteration>)
{
    <statement list>;
}

<initialization>;
if(<continuation>)
{
    <statement list>;
    <next iteration>;
}
```

Factorial

Compute $9! = 1 * 2 * 3 * 4 * 5 * 6 * 7 * 8 * 9$

```
fact=1;
for(j = 1; j <= 9; j = j + 1)
{
    fact = fact * j;
}
```

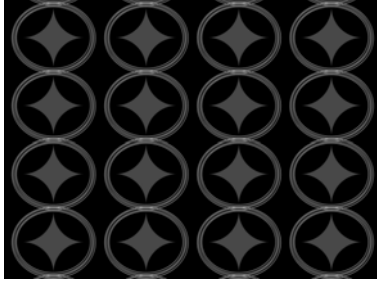
Array Manipulation

```
for(alpha=0;alpha<pn.length-1;alpha++)
{
    for(beta=alpha+1;beta<pn.length;beta++)
    {
        if(pn[alpha]>pn[beta])
        {
            swap(pn[alpha],pn[beta]);
        }
    }
}
```

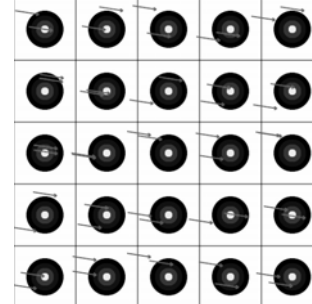
Common Bugs

- ▶ infinite loops: iteration variable
- ▶ out of bounds: index variable

Drawing with For loops



Can you draw this now?



Define a function

```
function drawBullsEye(x, y, size)
{
  jg_doc.setColor("black");
  jg_doc.fillOval(x+5*size,y+5*size, 15*size, 15*size);
  jg_doc.setColor("blue");
  jg_doc.fillOval(x+7*size,y+7*size, 11*size, 11*size);
  jg_doc.setColor("red");
  jg_doc.fillOval(x+9*size,y+9*size, 7*size, 7*size);
  jg_doc.setColor("yellow");
  jg_doc.fillOval(x+11*size, y+11*size, 3*size, 3*size);
}
```

Draw with For loops and function

```
for (var x = 0; x < 500; x = x + 100)
{
  for (var y = 0; y < 500; y = y + 100)
  {
    drawBullsEye(x, y, 4);
    var arrowX = random(-30, 30) + x;
    var arrowY = random(-30, 30) + y;
    drawArrow(arrowX, arrowY, 4);
    arrowX = random(-30, 30) + x;
    arrowY = random(-30, 30) + y;
    drawArrow(arrowX, arrowY, 4);
  }
}
```

Animation with For loops

► [textbook resource](#)

(http://wps.aw.com/aw_snyder_fluency_2/0,10715,2287950-,00.html)