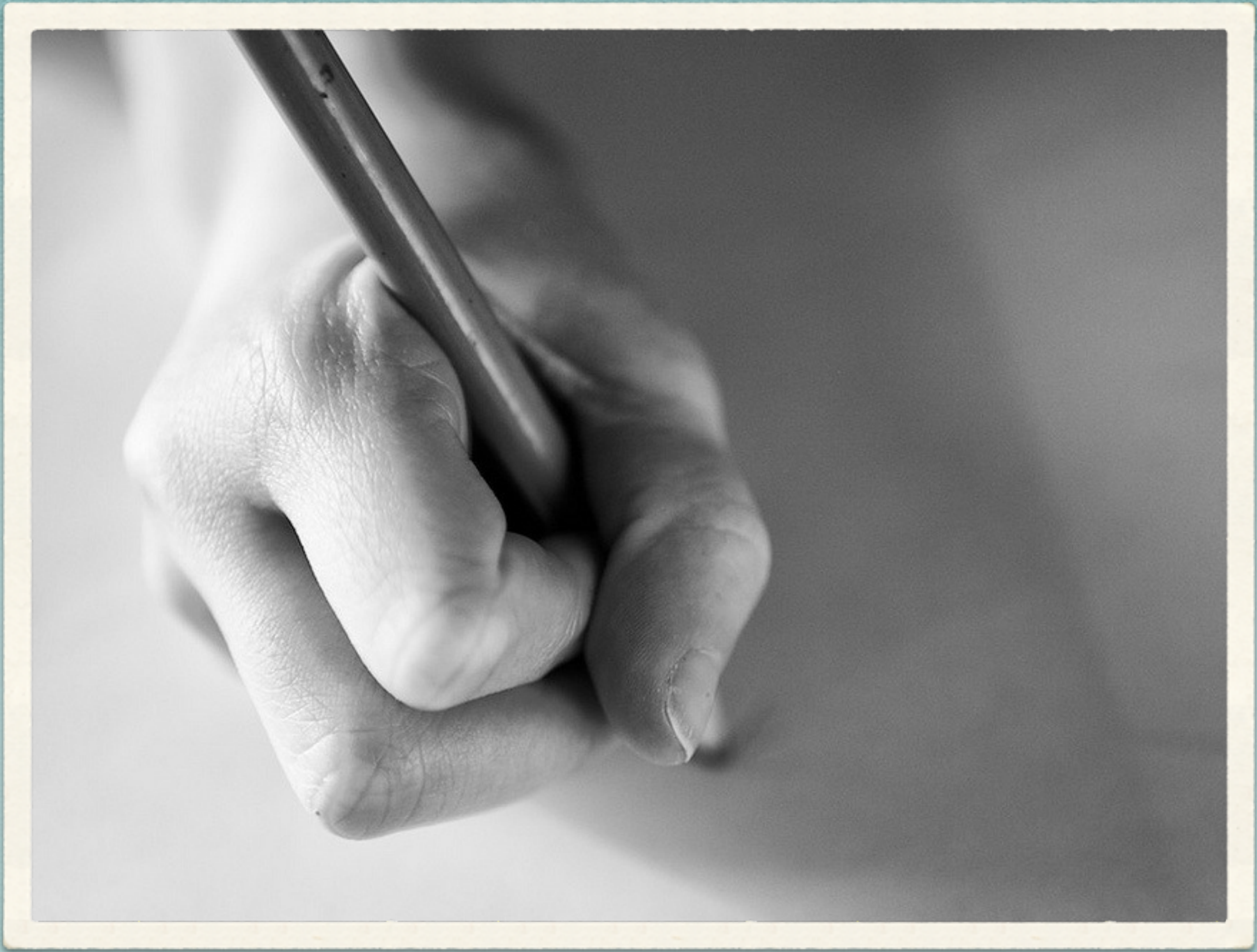

Intro to HTML5 Canvas

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Gonna Talk About These Topics You Betcha

- Canvas (Overview)
- Canvas 2D Context (The Beefcake)
- Canvas Tricks (For Fun and Profit)
- Canvas Demos (To Recap Concepts Discussed)

Canvas

Overview

http://dev.w3.org/html5/2dcontext/

Just Google it. :)

Definition

Immediate-mode API and associated utility methods
for drawing two-dimensional vector graphics
to a raster drawing area.

Draw and forget API and utils for 2D drawing.

Markup

<canvas></canvas>

<canvas **width**="800" **height**="600"></canvas>

<canvas width="800" height="600">No canvas for you!</canvas>

Element Access

- Attributes: width, height
- Method: getContext (for drawing), toDataURL (for saving)

Show some apps and libs now.

Canvas 2D Context

The Beefcake

Get Some Context

- var canvas = document.getElementById("myCanvas");
- var ctx = canvas.getContext("2d");

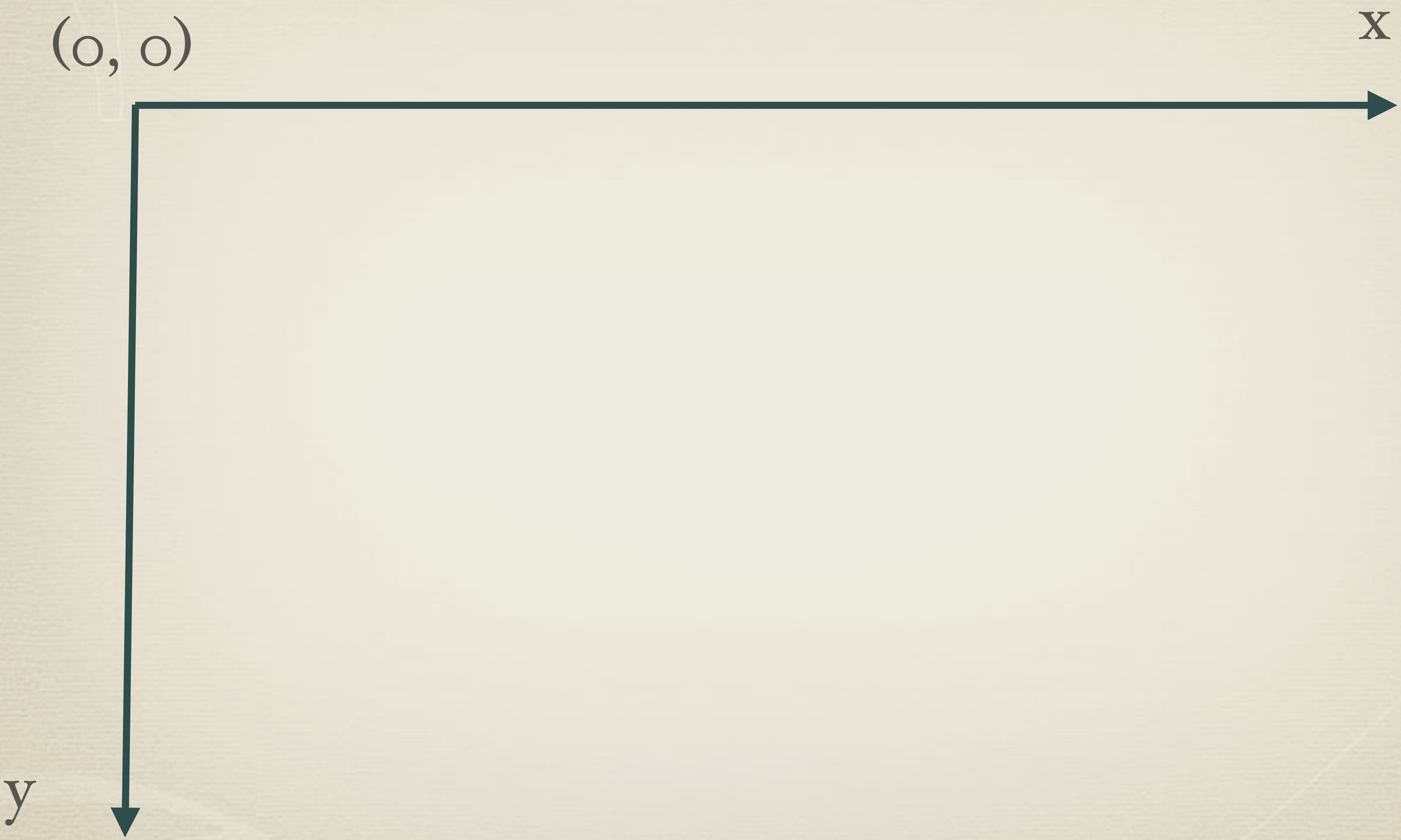
Context Functionality

- It's a state machine
- Read-only ref back to canvas (attr)
- save/restore + ops
- Ops: transformations, compositing, colors and styles, line caps/joins, shadows, rects, paths, text, drawing images, pixel manipulation + misc. crud I won't cover

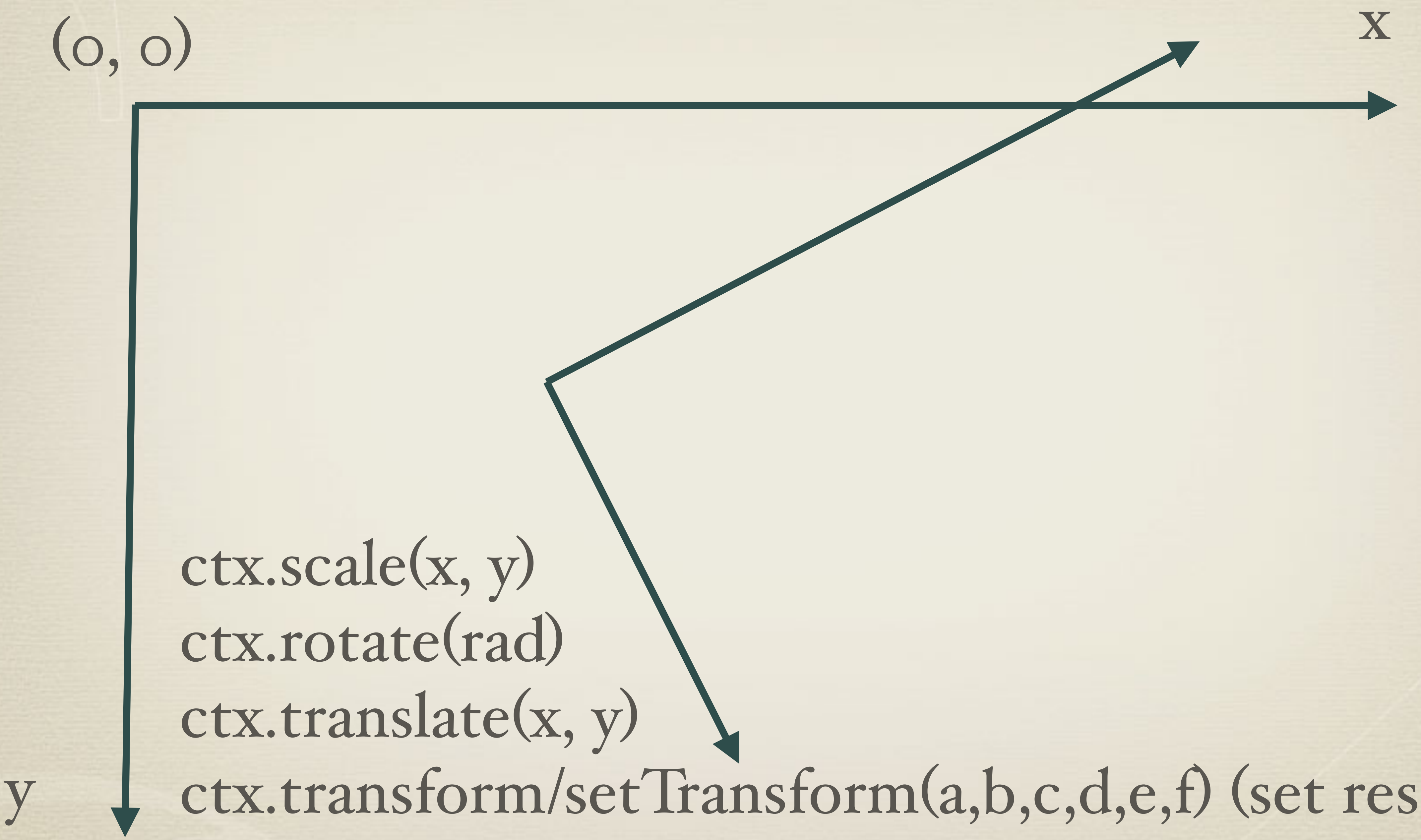
Context for Dummies

1. Set some states (transformation, color, ie.)
2. Draw (lines, whatnot)
3. ???
4. Profit

Default Context



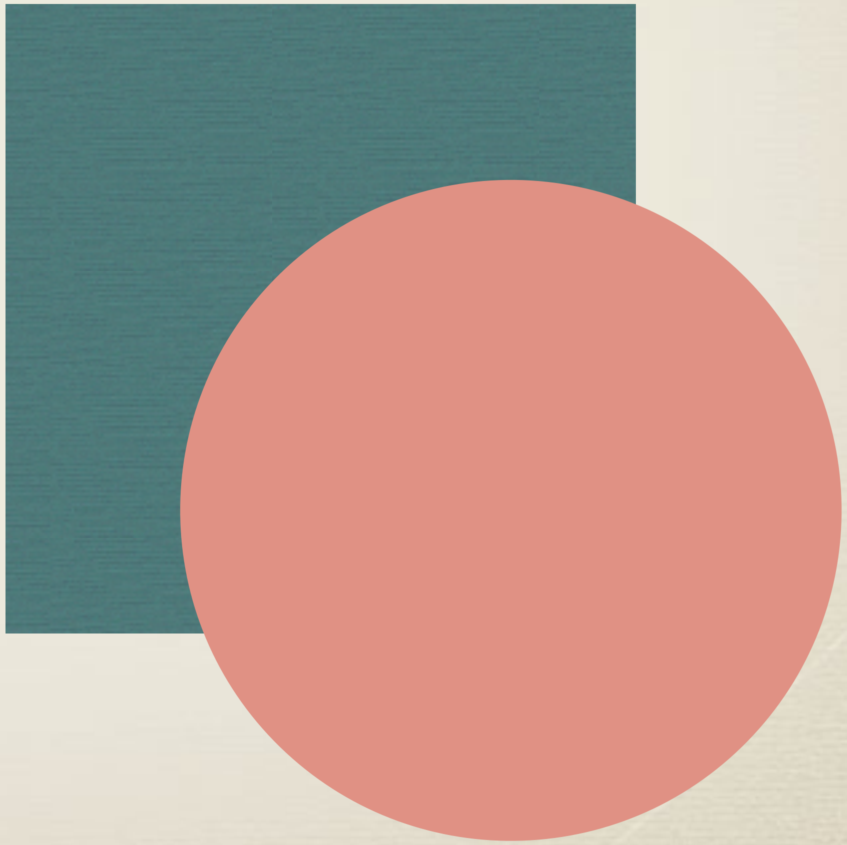
Transformed Context



```
ctx.scale(x, y)
ctx.rotate(rad)
ctx.translate(x, y)
ctx.transform/setTransform(a,b,c,d,e,f) (set resets)
```

Compositing

ctx.globalAlpha = 0.38;



ctx.globalCompositeOperation = "source-over";

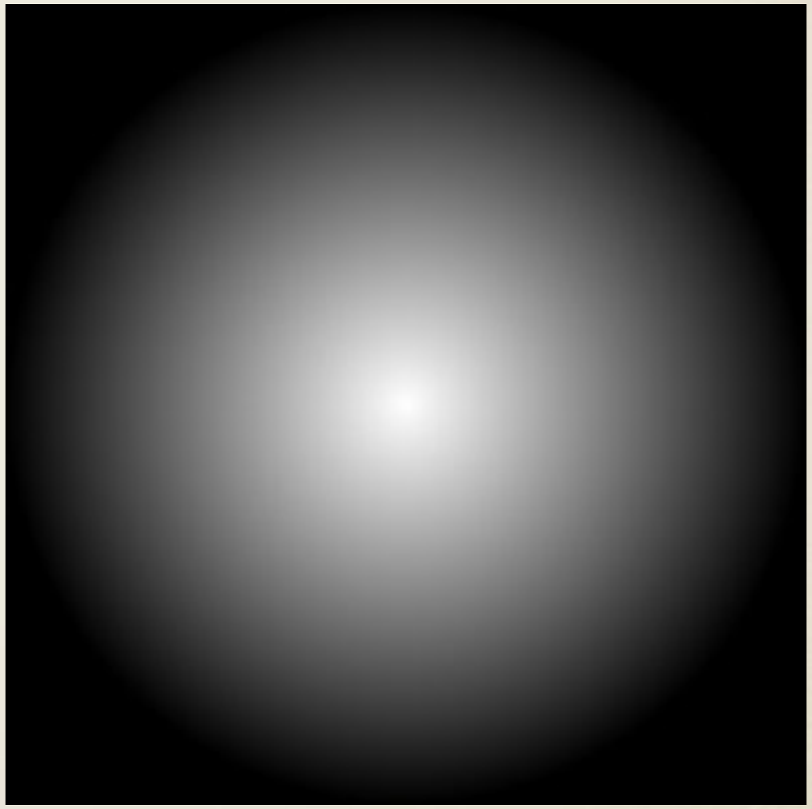
Colors and Styles - stroke/ fill

ctx.strokeStyle = "black";

ctx.fillStyle = "yellow";

Colors and Styles - Gradients

ctx.createLinearGradient(x0,y0,x1,y1)

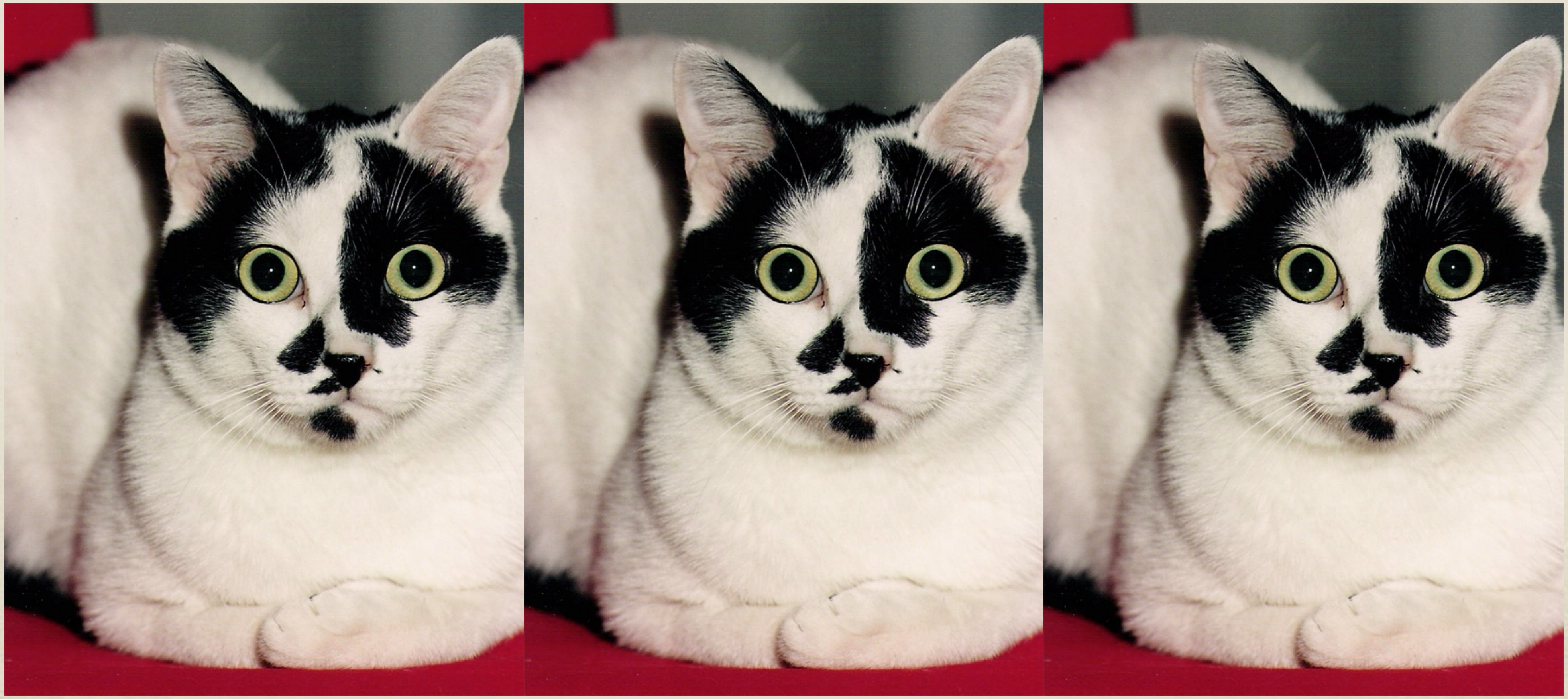


ctx.createRadialGradient(x0,y0,r0,x1,y1,r1)

ctx.addColorStop(offset, color);

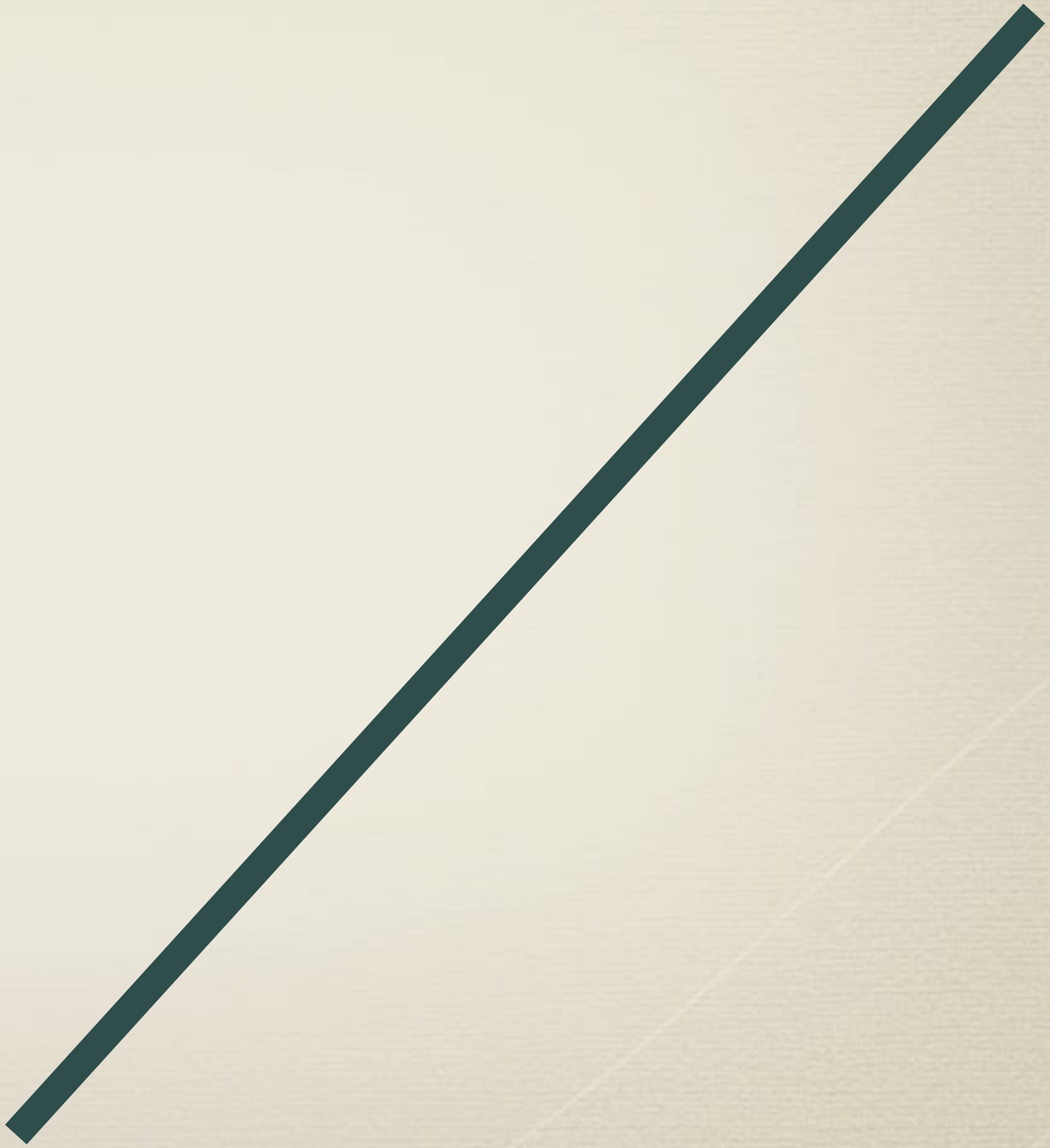
Colors and Styles - Patterns

```
ctx.createPattern(catImg, 'repeat-x');
```



Line Caps/Joins

```
ctx.lineWidth = 12;
ctx.lineCap = "square";
ctx.lineJoin = "miter";
ctx.miterLimit = 10;
```

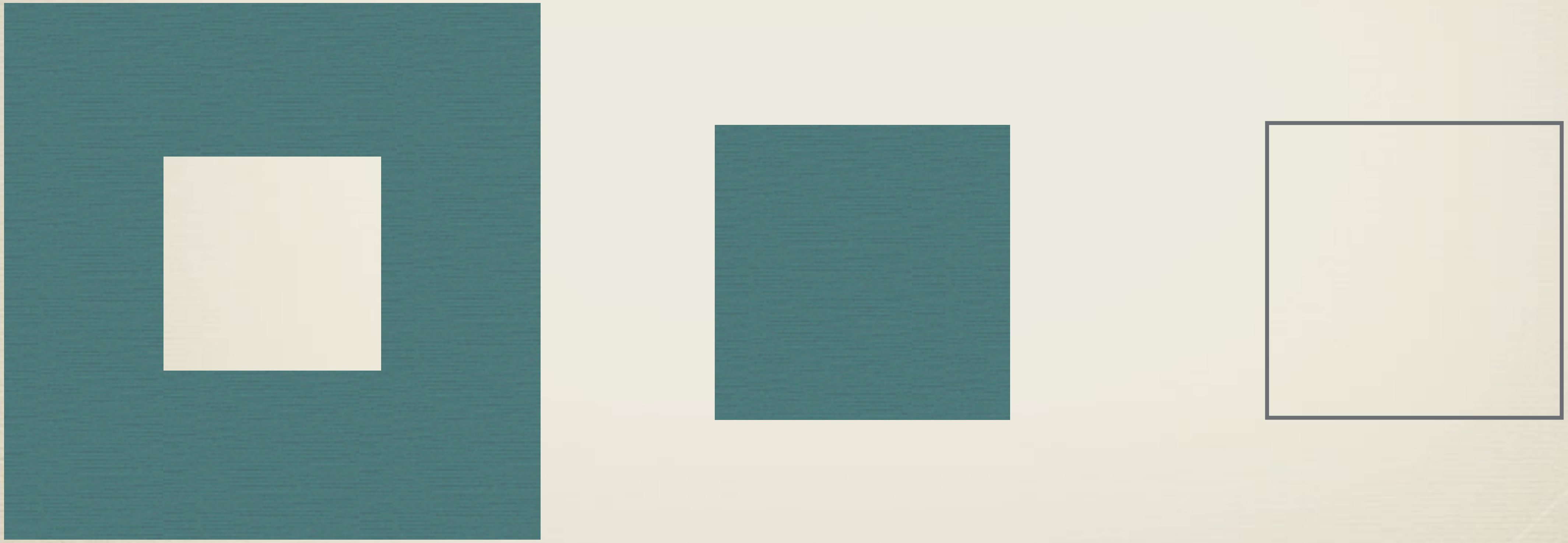


Shadows

```
ctx.shadowOffsetX = 5;
ctx.shadowOffsetY = 5;
ctx.shadowBlur = 3;
ctx.shadowColor = 'grey';
```

Rectangles

ctx.clearRect/fillRect/strokeRect(x,y,w,h)



Paths

```
ctx.beginPath();

ctx.moveTo(x, y); // initial pos

// define curve
ctx.lineTo/quadraticCurveTo/bezierCurveTo/
   arcTo/arc/rect
...

ctx.closePath();

ctx.fill/stroke/clip();
```

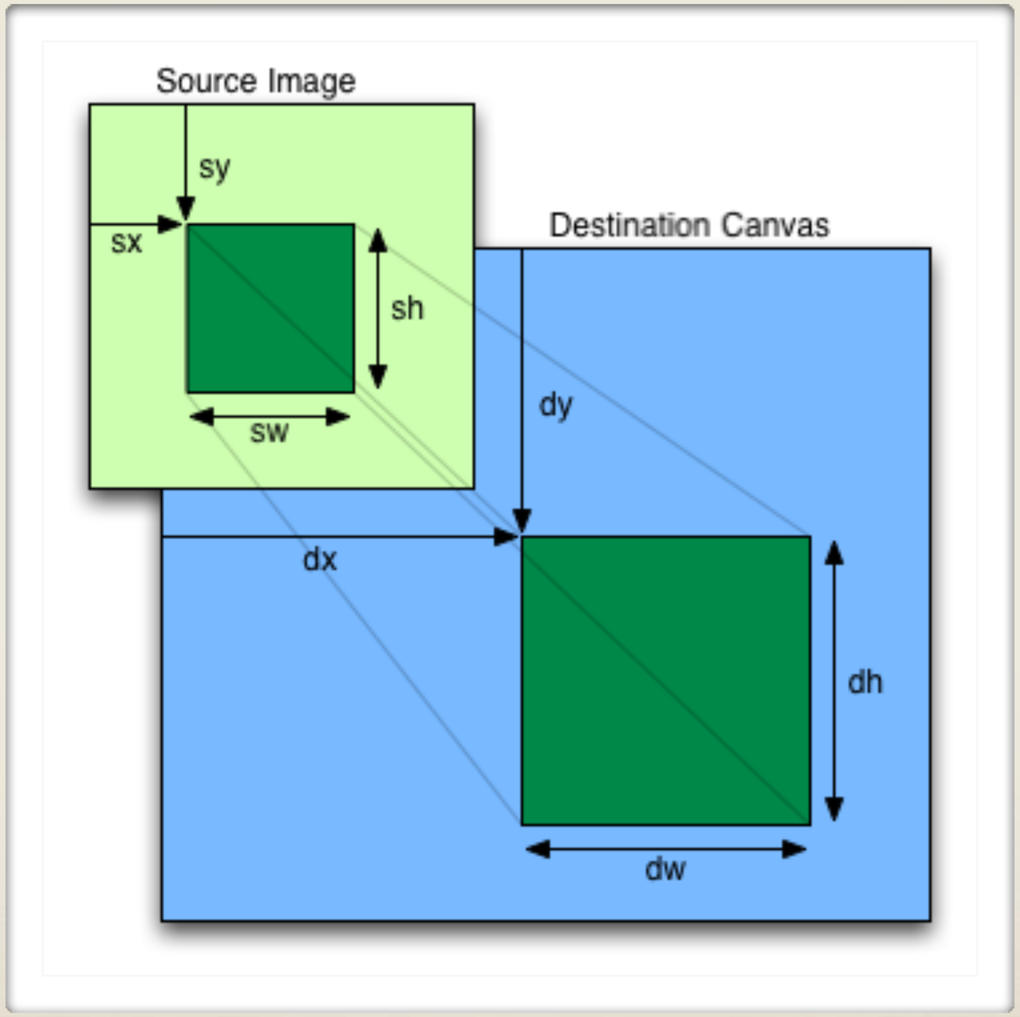
Text

```
ctx.font = "24px sans-serif";
ctx.textAlign = "center";

ctx.fillText/strokeText(text,x,y,maxWidth);
```

Drawing Images

ctx.drawImage(img/canvas/video, lots of alternatives);



Supports compositing! Use this to your advantage.

Pixel Manipulation

ctx.createImageData/getImageData/putImageData

```
var data = ctx.getImageData(0, 0, w, h);

var realData = data.data;
for(var y = 0, pos = 0; y < h; y++) {
    for(var x = 0; x < w; x++, pos+=4) {
        realData[pos + 2] *= 0.5; // modify Blue channel
    }
}
data.data = realData;
```

Friggin' slow! Avoid if possible. Optimize usage.

Canvas Tricks

For Fun and Profit

Blurred Lines

Basic idea: Use line shadow, offset actual line so that it isn't visible.

Multiple Layers

Basic idea: CSS z-index + absolute positioning.

Erasing

Basic idea: Use destination-out compositing op.

CSS Fun

Basic idea: Play around with CSS opacity and transformations (incurs perf penalty).

Canvas Demos

To recap concepts discussed

Demo time.