Using Canvases to Create Images

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Course Overview

SVG	Canvas
Basic shapes	Basic shapes
Paths	Paths
Text	Text
Images	Images
Gradients	Gradients
Animation	Sketching

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What is the Canvas?

JavaScript-based graphics using <canvas> element

Used to create 2D and 3D rasterized images

Good choice for animation, game graphics, and image manipulation applications

```
<body>
    <canvas id="           width="500"></canvas>
    <script                        ('canvas');
                                                   h.PI);

                                          );
                              ath.PI);
                              * Math.PI);
        ctx.
        ctx.fillSt
        ctx.fillText('Canvases are easy to use!', 250, 500);
    </script>
</body>
```

Canvases are easy to use!

First Steps with Canvases

```html
<!DOCTYPE html>

<html lang="en">

<body>

    <canvas id="canvas" height="600" width="500"></canvas>

    <script>

        const canvas = document.getElementById('canvas');

        const ctx = canvas.getContext('2d');

    </script>

</body>

</html>
```

First Steps with Canvases

Canvas is an HTML element

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Canvas is an HTML element

JavaScript is used for drawing

First Steps with Canvases

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Canvas is an HTML element

JavaScript is used for drawing

All drawing done via a context

Drawing Contexts

2d	**webgl**	**webgl2**
	bitmaprenderer	**...**

Drawing Basic Shapes

```
<body>

    <canvas id="canvas"
     height="200" width="200"></canvas>

    <script>

        const canvas =

            document.getElementById('canvas');

        const ctx = canvas.getContext('2d');

        ctx.strokeStyle = 'black';

        ctx.fillStyle = 'rgb(240, 90, 40)';

        ctx.lineWidth = 5;

        ctx.beginPath();

        ctx.rect(10, 10, 100, 100);

        ctx.stroke();

        ctx.fill();

    </script>

</body>
```

◄ Canvas HTML element
◄ Set height and width attributes

◄ Reference to <canvas> in JavaScript

◄ Retrieve drawing context
◄ Set context attributes

◄ Start a new shape
◄ Define the rectangle
◄ Draw outline of shape
◄ Fill shape
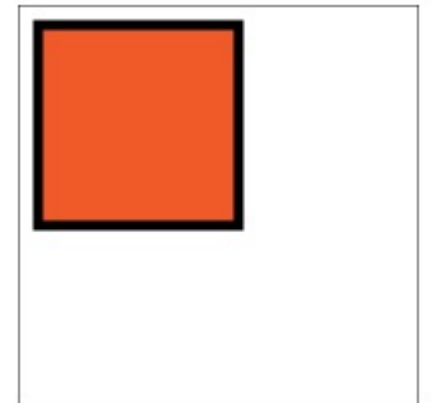
Basic Shapes

```
rect(x, y, width, height)

ellipse(x, y, rx, ry, rotation,

    startAngle, endAngle, [anticlockwise]);

arc(x, y, radius,

    startAngle, endAngle, [anticlockwise]);

arcTo(x1, y1, x2, y2, radius);


lineTo(x, y);
```
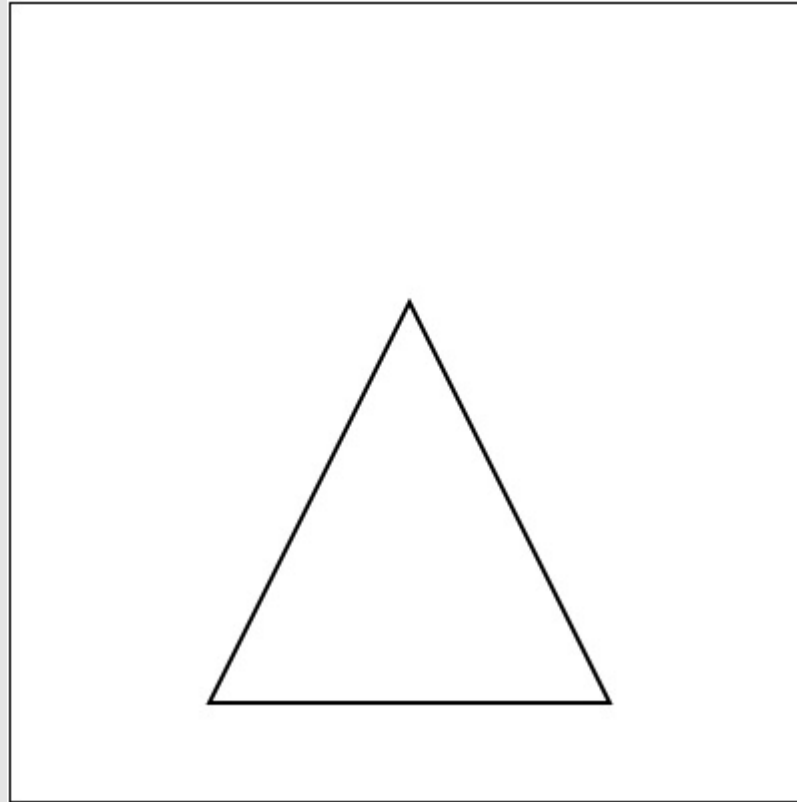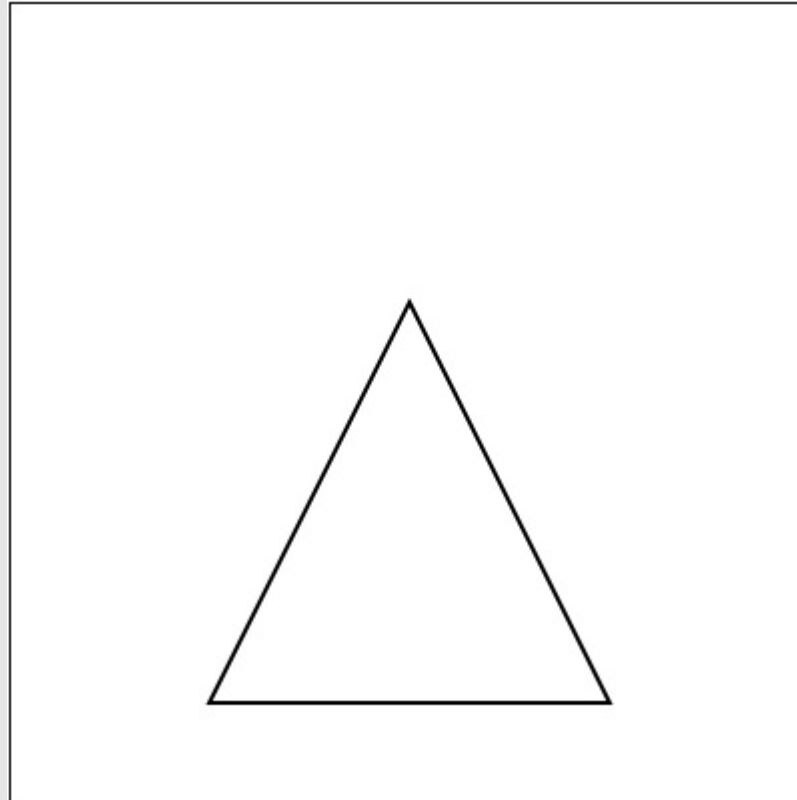
Drawing with Path Elements

```
ctx.beginPath();

ctx.moveTo(100, 75);

ctx.lineTo(150, 175);

ctx.lineTo(50, 175);

ctx.closePath();

ctx.stroke();
```
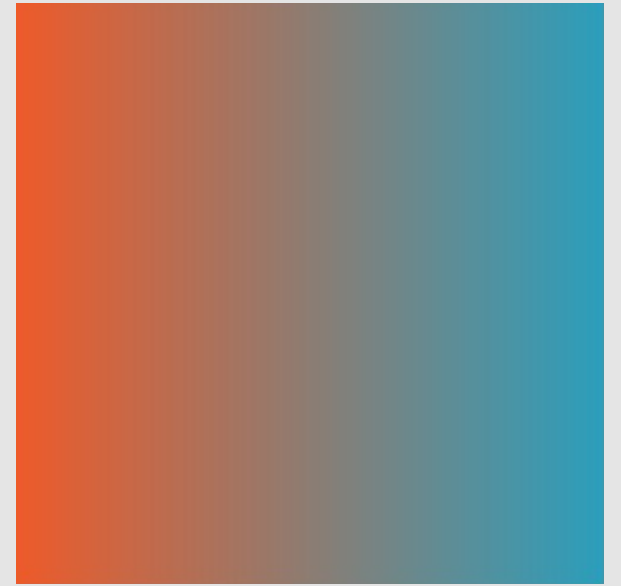
Drawing with Path Elements

```
const p = new Path2D(

    'M 100, 75

    l 50, 100

    h -100

    z');

ctx.stroke(p);
```

Gradients

```
const ctx = canvas.getContext('2d');


const gradient =

    ctx.createLinearGradient(10, 0, 180, 0);

gradient.addColorStop(0, 'rgb(240, 90, 40)');

gradient.addColorStop(1, 'rgb(42, 159, 188)');


ctx.fillStyle = gradient;

ctx.fillRect(10, 10, 180, 180);
```

Gradients

```
const ctx = canvas.getContext('2d');


const gradient =

    ctx.createRadialGradient(100, 100, 0, 100, 100, 100);

gradient.addColorStop(0, 'rgb(240, 90, 40)');

gradient.addColorStop(1, 'rgb(42, 159, 188)');


ctx.fillStyle = gradient;

ctx.fillRect(10, 10, 180, 180);
```
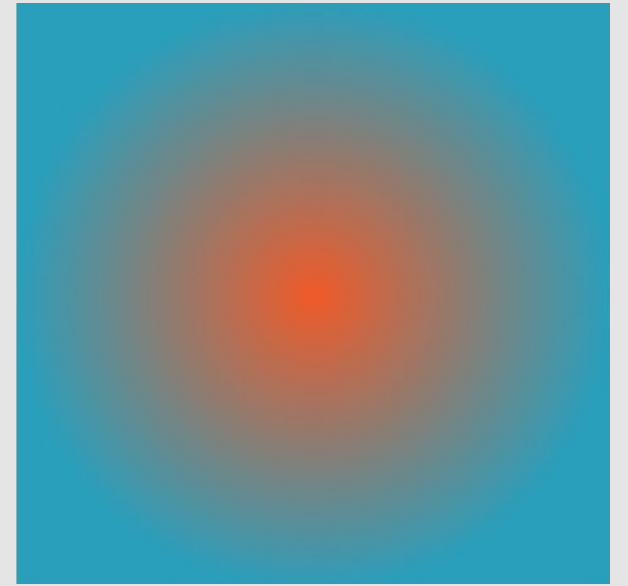
Summary

What is the Canvas?

Rendering different types of content

- Basic shapes

- Paths

- Text

- Images

Sketch tool

Course Overview

Scalable Vector Graphics (SVG)

Canvas