

An abstract graphic on the left side of the slide, consisting of a dark grey vertical band. Overlaid on this band is a complex pattern of thin, light green lines that resemble a circuit board or a neural network. These lines connect various small, light green circles of different sizes, some of which are also connected to the lines themselves, creating a web-like structure.

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HTML CANVAS

OUTLINE

- Overview of HTML Canvas
- Using the Canvas
- Examples

HTML CANVAS

- An HTML element used to draw graphics in real-time
- HTML Canvas is the place where graphics can be drawn
- Graphics are drawn with JavaScript
- Supported in all major browsers



APPLICATIONS

- Graphics
 - Animations
 - Data Visualizations
 - Games
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SETTING UP THE CANVAS

- Use the `<canvas>` html tag
- Set properties:
 - id, width, height
 - Optionally, use style/css to add a border

```
<canvas id="myCanvas" width="300"  
height="300" style="border:1px solid  
#000000"></canvas>
```

CONFIGURING JAVASCRIPT

- JavaScript is used to draw on the Canvas
- Extract the graphics context from the Canvas
- All drawing commands go through the context

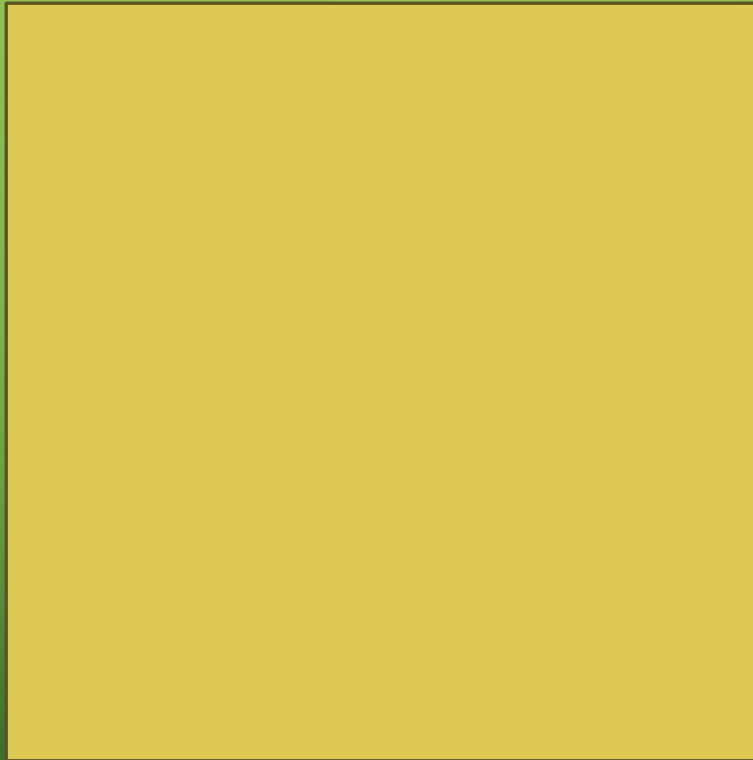
```
const canvas = document.getElementById("myCanvas");  
const ctx = canvas.getContext("2d");
```

COORDINATES

0,0

X

Y



DRAWING RECTANGLES

```
ctx.fillRect(50, 50, 150, 100);  
ctx.strokeRect(250, 50, 150, 100);  
ctx.clearRect(100, 75, 50, 50);
```


DRAWING PATHS

```
ctx.beginPath();  
ctx.moveTo(50, 200);  
ctx.lineTo(200, 200);  
ctx.lineTo(125, 300);  
ctx.closePath();  
ctx.stroke();
```

DRAWING CIRCLES/ARCS

```
ctx.beginPath();  
ctx.arc(300, 250, 50, 0, Math.PI * 2, false);  
ctx.fill();  
ctx.stroke();
```

COLOUR AND STYLE

```
ctx.fillStyle = 'purple';  
ctx.strokeStyle = 'orange';  
ctx.lineWidth = 5;
```

GRADIENTS

```
const gradient = ctx.createLinearGradient(0, 0, 200, 0);  
gradient.addColorStop(0, 'red');  
gradient.addColorStop(1, 'yellow');  
ctx.fillStyle = gradient;  
ctx.fillRect(0,0, 100, 200);  
ctx.fillRect(300, 350, 150, 75);
```

TEXT

```
ctx.font = '30px Arial';  
ctx.fillStyle = 'black';  
ctx.fillText('Hello, Canvas!', 50, 400);  
ctx.strokeStyle = 'blue';  
ctx.strokeText('Hello, Canvas', 50, 450);
```

IMAGES AND VIDEOS

```
const img = new Image();  
img.src = 'circle.png';  
img.onload = function() {  
    ctx.drawImage(img, 300, 300, 150, 150);  
};
```

TRANSFORMATIONS

```
ctx.translate(300, 200);  
ctx.rotate(Math.PI / 4);  
ctx.fillStyle = 'red';  
ctx.fillRect(0, 0, 100, 100);  
ctx.resetTransform();
```

ANIMATIONS

```
let x = 0;
function animate() {
  ctx.clearRect(0, 0, canvas.width, canvas.height);
  ctx.fillStyle = 'blue';
  ctx.fillRect(x, 50, 50, 50, 50);
  x += 2;
  if(x > canvas.width)
    x = 0;
  requestAnimationFrame(animate);
}
animate();
```


An abstract graphic on the left side of the slide, consisting of a network of thin, light green lines and small circles, resembling a circuit board or a neural network, set against a dark green background.

NEXT CLASS

ADVANCED JAVASCRIPT