JavaScript
TUTORIAL

JavaScript fillRect

Summary: in this tutorial, you'll learn how to use the JavaScript `fillRect()` method to draw rectangles with a specified width and height on a canvas.

Introduction to the JavaScript fillRect() method

The `fillRect()` is a method of the 2d drawing context object. The `fillRect()` method allows you to draw a filled rectangle at `(x,y)` position with a specified with and height on a canvas.

The following shows the syntax of the `fillRect()` method:

```
ctx.fillRect(x,y,width,height);
```

In this syntax:

- `x` is the x-axis coordinate of the starting point of the rectangle.
- `y` is the y-axis coordinate of the starting point of the rectangle.
- `width` is the rectangles' width. It can be positive or negative. The positive values are to the right while the negative values are to the left.
- `height` is the rectangle's height. It can be also positive or negative. The positive values are down while the negative values are up.

The `fillStyle` attribute of the 2d drawing context will determine the fill style of the rectangle.

JavaScript fillRect() example

The following shows the `index.html` file that has a canvas element:

```
<!DOCTYPE html>
<html lang="en">
```

```
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>JavaScript Canvas fillRect</title>
    <link rel="stylesheet" href="css/style.css">
</head>

<body>

    <h1>JavaScript Canvas fillRect</h1>

    <canvas id="canvas" height="400" width="500">
    </canvas>

    <script src="js/index.js"></script>

</body>

</html>
```

The following `drawRectangles()` function in the `app.js` file will draw two rectangles:

```
function drawRectangles() {
    const canvas = document.querySelector('#canvas');

    if (!canvas.getContext) {
        return;
    }

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

    ctx.fillStyle = '#F9DC5C';
    ctx.fillRect(100, 100, 150, 100);

    ctx.fillStyle = 'rgba(0,0,255,0.5)';
    ctx.fillRect(200, 150, -150, -100);
}
```

```
drawRectangles();
```

How it works.

First, select the canvas element using the `document.querySelector()` method:

```
const canvas = document.querySelector('#canvas');
```

Second, check if the browser supports the canvas API:

```
if (!canvas.getContext) {
    return;
}
```

Third, get the 2d drawing context object:

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

Fourth, set the fill style to the `#F9DC5C` color and draw the first rectangle using the `fillRect()` method:

```
ctx.fillStyle = '#F9DC5C';
ctx.fillRect(100, 100, 150, 100);
```

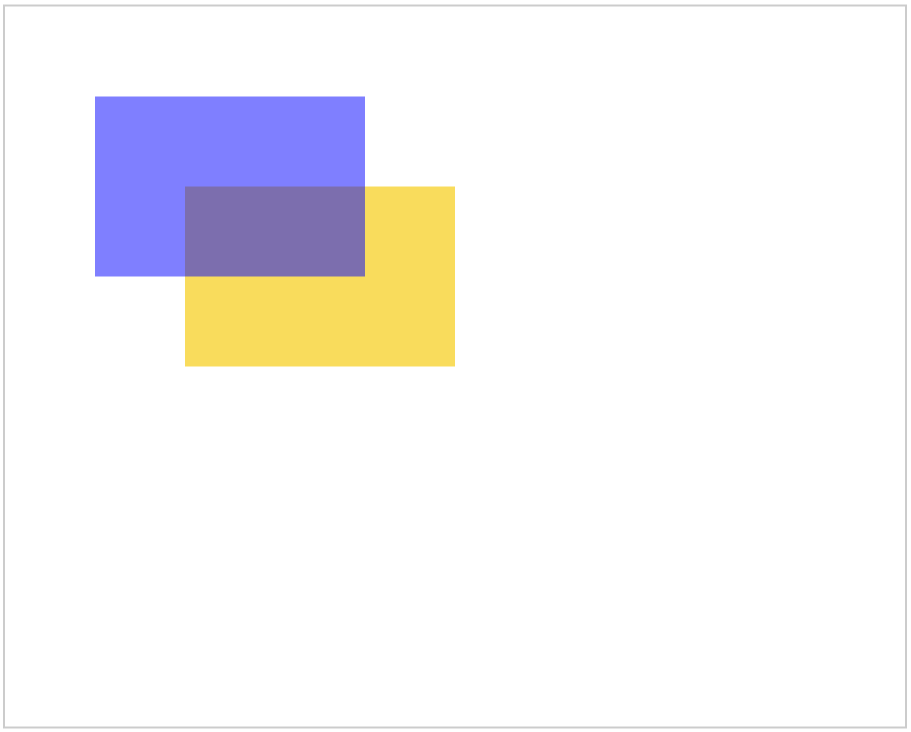
The first rectangle starts at `(100,100)` and has the width of `150` pixels and the `height` of `100` pixels.

Finally, set the fill style to blue with the alpha 0.5, which creates a transparent effect. And use the `fillRect()` method to draw the second rectangle:

```
ctx.fillStyle = 'rgba(0,0,255,0.5)';
ctx.fillRect(200, 150, -150, -100);
```

The second rectangle starts at `(200,150)`. Since we passed the negative width and height to the `fillRect()` method, the width is to the left and the height is to up.

The following picture shows the output:



Here is the link to the demo.

Using the JavaScript fillRect() to draw a brick wall

In this example, you'll learn how to use the `fillRect()` method to draw a brick wall.

The following illustates the `index.html` file that has a canvas element:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>JavaScript Canvas fillRect</title>
    <link rel="stylesheet" href="css/style.css">
</head>

<body>
```

```html
    <h1>JavaScript fillRect() - Draw a Brick Wall</h1>

    <canvas id="canvas" height="400" width="500">
    </canvas>


  <script src="js/app.js"></script>

</body>

</html>
```

In this example, the canvas will have the following style specified in the `style.css` file:

```css
canvas {
    border: solid 1px #ccc;
    background-color: #000;
}
```

In the `app.js` file, define a function called drawWall() that draws a brick wall on a canvas:

```javascript
function drawWall(ctx, canvasWidth, canvasHeight) {
    // define brick height and width, and spaces between them
    const bh = 20,
        bw = 50,
        space = 5;

    // calculate the rows and columns of the wall
    const rows = Math.ceil(canvasHeight / (bh + space));
    const columns = Math.ceil(canvasWidth / (bw + space));

    // draw columns
    for (let r = 0; r < rows; r++) {
        // draw rows
        for (let c = 0; c < columns; c++) {
            if (r % 2) {
                c == 0 ? ctx.fillRect(c * (bw + space), r * (bh + space), bw / 2, bh) :
                    ctx.fillRect(c * (bw + space) - bw / 2, r * (bh + space), bw, bh);
            } else {
                ctx.fillRect(c * (bw + space), r * (bh + space), bw, bh);
            }
        }
    }
}
```

The `drawWall()` function accepts a 2d drawing context and the height and width of the wall.

First, define the height (bh) and width (bw) of each brick and the space between two bricks:

```
const bh = 20,
      bw = 50,
      space = 5;
```

Second, calculate the number of rows and columns of bricks based on the dimension of the brick and the wall's width and height:

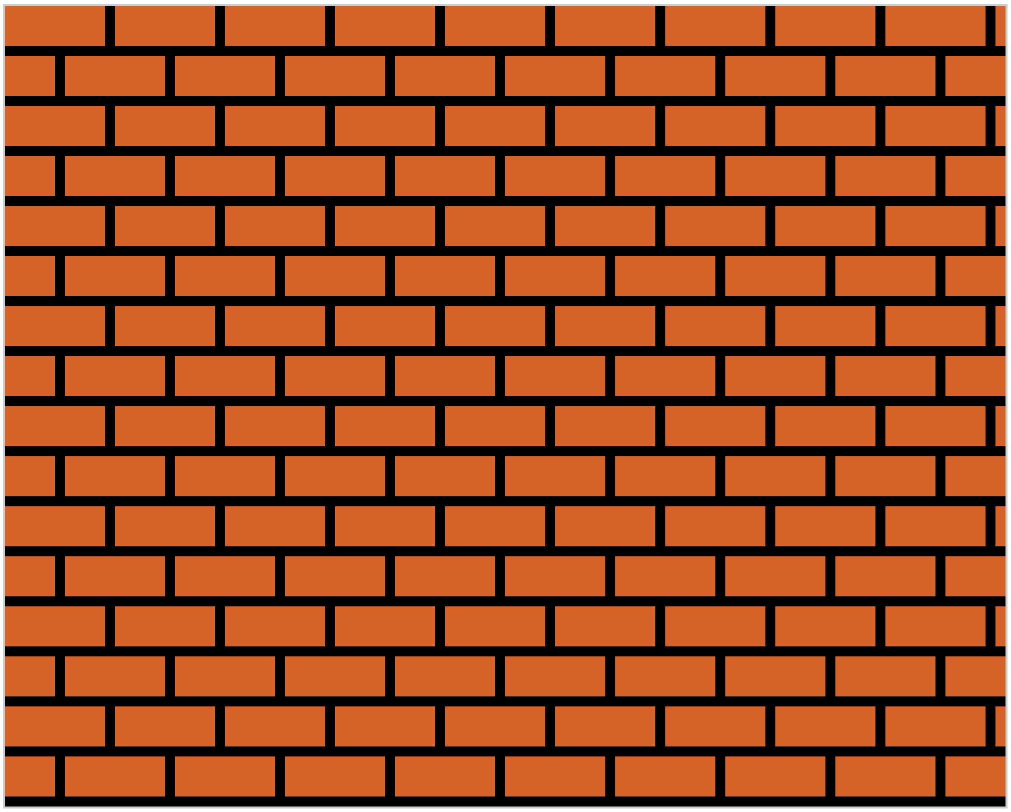
```
// calculate the rows and columns of the wall
const rows = Math.ceil(height / (bh + space));
const columns = Math.ceil(width / (bw + space));
```

Third, draw bricks by using the `fillRect()` method. Use two for loops to draw bricks row by row.

```
// draw rows
for (let r = 0; r < rows; r++) {
    // draw columns
    for (let c = 0; c < columns; c++) {
        if (r % 2) {
            c == 0 ? ctx.fillRect(c * (bw + space), r * (bh + space), bw / 2, bh) :
                ctx.fillRect(c * (bw + space) - bw / 2, r * (bh + space), bw, bh);
        } else {
            ctx.fillRect(c * (bw + space), r * (bh + space), bw, bh);
        }
    }
}
```

Note that the first brick of the even row will have a width that equals to a half of the normal brick's width.

The following picture shows the output:



And here is the link shows the demo.

Summary

- Use the JavaScript `fillRect()` to draw a filled rectangle that starts at `(x,y)` and has a specified width and height.
- Use the `fillStyle` property to set the fill style of the rectangle.