Web Lab Exercise12

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Subject	Web Programming
Slot	L15+L16+L19+L20
Venue	AB3 – 202

1. Write a **JavaScript program** using the **HTML5 Canvas API** to draw a scene that consists of the following **shapes and corresponding drawings**:

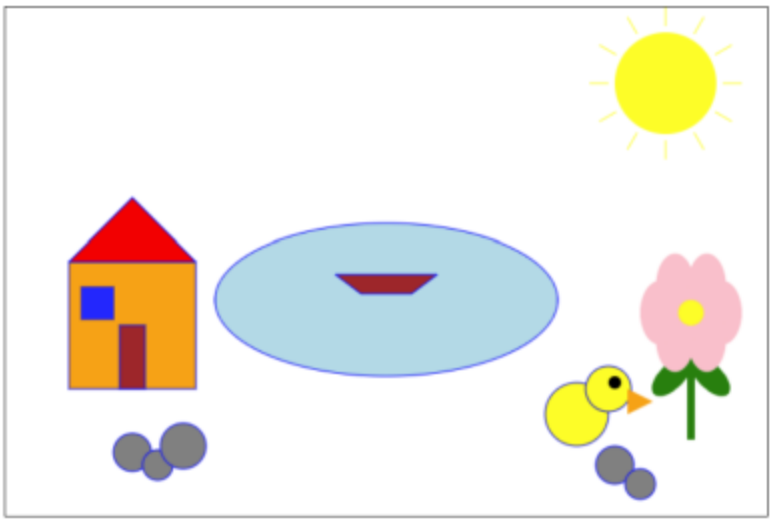
Shape	Drawing Representation
Oval	Pond
Polygon (Quadrilateral with curved edges)	Boat
Two Circles of Different Sizes	Duck (Body & Head)
A Large Circle with Multiple Straight Lines Extending Outward	Sun
A Rectangle with a Triangle on Top	House
An Ellipse with a Vertical Line and Two Curved Shapes	Flower (Stem, Leaves, and Petals)
Multiple Small Circles	Stones

Requirements:

- Use the **Canvas API** functions such as `arc()`, `ellipse()`, `fillRect()`, `lineTo()`, `moveTo()`, and `stroke()`.
- Assign **different colors** to each shape.
- Ensure the **relative positioning** of the elements remains visually structured.

Sample Scene:

Pond Scene using JavaScript Canvas



2. Apply an animation effect to the boat

CODE:

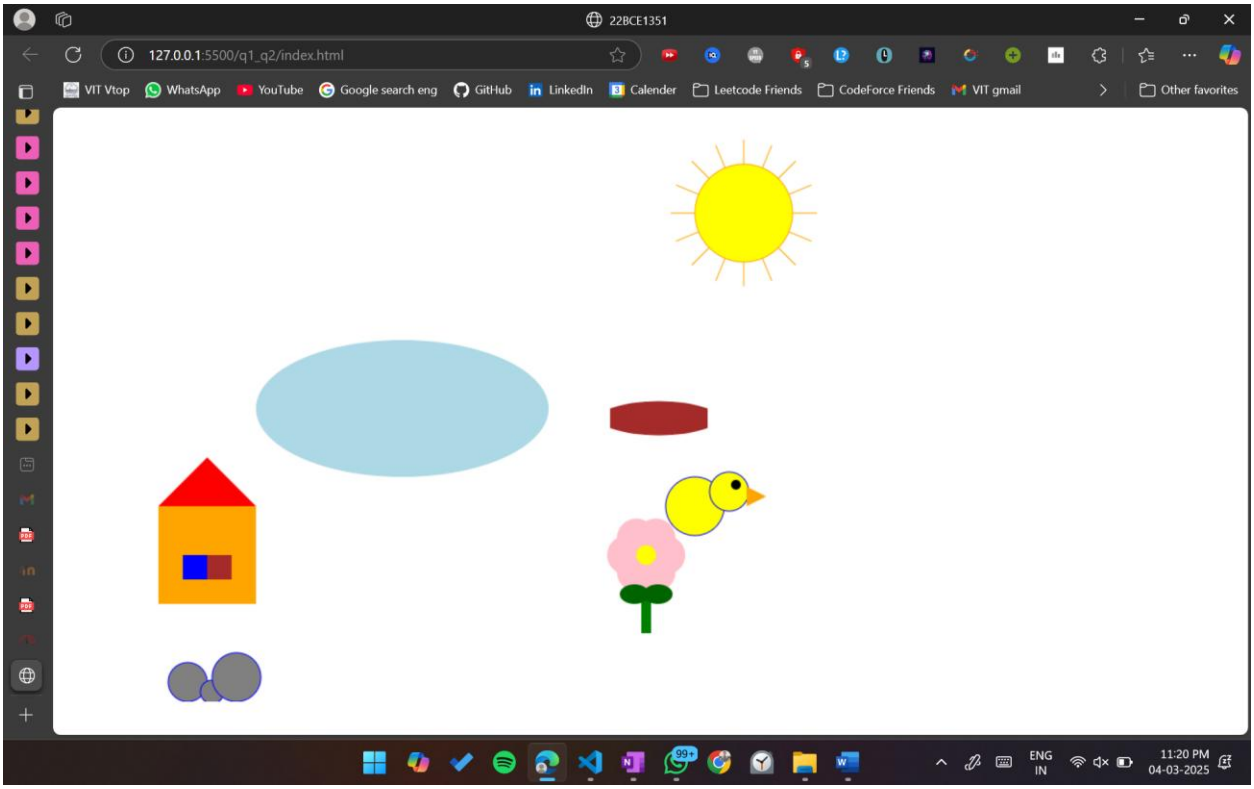
```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>22BCE1351</title>
</head>

<body>
    <canvas id="sceneCanvas" width="800" height="600"></canvas>
    <script>
        const canvas = document.getElementById("sceneCanvas");
        const ctx = canvas.getContext("2d");

        function drawPond(x, y, width, height) {
            ctx.beginPath();
            ctx.fillStyle = "lightblue";
            ctx.ellipse(x, y, width, height, 0, 0, Math.PI * 2);
            ctx.fill();
        }

        function drawBoat(x, y, width, height) {
            ctx.beginPath();
            ctx.fillStyle = "brown";
            ctx.moveTo(x, y);
            ctx.bezierCurveTo(
                x + width / 4,
                y - height / 2,
                x + (width * 3) / 4,
                y - height / 2,
                x + width,
                y
            );
            ctx.lineTo(x + width, y + height);
            ctx.bezierCurveTo(
                x + (width * 3) / 4,
                y + (height * 3) / 2,
                x + width / 4,
                y + (height * 3) / 2,
```

```
                x,
                y + height
            );
            ctx.closePath();
            ctx.fill();
        }

        function drawDuck(x, y, bodyRadius, headRadius) {
            ctx.beginPath();
            ctx.fillStyle = "yellow";
            ctx.arc(x, y, bodyRadius, 0, Math.PI * 2);
            ctx.fill();

            ctx.beginPath();
            ctx.fillStyle = "orange";
            ctx.arc(x - bodyRadius / 2, y - bodyRadius / 2, headRadius, 0,
Math.PI * 2);
            ctx.fill();
        }

        function drawSun(x, y, radius) {
            ctx.beginPath();
            ctx.fillStyle = "yellow";
            ctx.arc(x, y, radius, 0, Math.PI * 2);
            ctx.fill();

            for (let i = 0; i < 16; i++) {
                const angle = (i / 16) * Math.PI * 2;
                const lineLength = radius * 0.5;
                ctx.moveTo(x + Math.cos(angle) * radius, y +
Math.sin(angle) * radius);
                ctx.lineTo(
                    x + Math.cos(angle) * (radius + lineLength),
                    y + Math.sin(angle) * (radius + lineLength)
                );
            }
            ctx.strokeStyle = "orange";
            ctx.stroke();
        }

        function drawHouse(x, y, width, height) {
```

```
            ctx.beginPath();
            ctx.fillStyle = "orange";
            ctx.fillRect(x, y, width, height);

            ctx.beginPath();
            ctx.fillStyle = "red";
            ctx.moveTo(x, y);
            ctx.lineTo(x + width, y);
            ctx.lineTo(x + width / 2, y - height / 2);
            ctx.closePath();
            ctx.fill();

            ctx.beginPath();
            ctx.fillStyle = "blue";
            ctx.fillRect(x + width / 4, y + height / 2, width / 4, height /
4);
            ctx.fillStyle = "brown";
            ctx.fillRect(x + width / 2, y + height / 2, width / 4, height /
4);
        }

        function drawFlower(ctx, x, y) {
            ctx.fillStyle = "pink";
            let petalRadius = 20;
            for (let i = 0; i < 6; i++) {
                let angle = (Math.PI / 3) * i;
                let petalX = x + Math.cos(angle) * petalRadius;
                let petalY = y + Math.sin(angle) * petalRadius;
                ctx.beginPath();
                ctx.arc(petalX, petalY, petalRadius, 0, Math.PI * 2);
                ctx.fill();
            }

            ctx.fillStyle = "yellow";
            ctx.beginPath();
            ctx.arc(x, y, 10, 0, Math.PI * 2);
            ctx.fill();

            ctx.fillStyle = "green";
            ctx.fillRect(x - 5, y + 40, 10, 40);
```

```
            ctx.fillStyle = "darkgreen";
            function drawLeaf(leafX, leafY, scaleX, scaleY) {
                ctx.beginPath();
                ctx.ellipse(leafX, leafY, 15 * scaleX, 10 * scaleY, 0, 0,
Math.PI * 2);
                ctx.fill();
            }
            drawLeaf(x - 12, y + 40, 1, 1);
            drawLeaf(x + 12, y + 40, 1, 1);
        }
        function drawStones(x, y) {
            const stones = [
                { x: x, y: y, radius: 20 },
                { x: x + 25, y: y + 10, radius: 12 },
                { x: x + 50, y: y - 5, radius: 25 },
            ];

            stones.forEach((stone) => {
                ctx.beginPath();
                ctx.fillStyle = "gray";
                ctx.strokeStyle = "blue";
                ctx.arc(stone.x, stone.y, stone.radius, 0, Math.PI * 2);
                ctx.fill();
                ctx.stroke();
            });
        }
        function animateBoat() {
            let boatX = 300;
            function moveBoat() {
                ctx.clearRect(0, 0, canvas.width, canvas.height);
                drawScene(boatX);
                boatX += 1;
                if (boatX > canvas.width) boatX = 300;
                requestAnimationFrame(moveBoat);
            }
            moveBoat();
        }
        function drawBird(ctx, x, y) {
            ctx.beginPath();
            ctx.fillStyle = "yellow";
            ctx.strokeStyle = "blue";
```

```
            ctx.arc(x, y, 30, 0, Math.PI * 2);
            ctx.fill();
            ctx.stroke();

            ctx.beginPath();
            ctx.arc(x + 35, y - 15, 20, 0, Math.PI * 2);
            ctx.fill();
            ctx.stroke();

            ctx.beginPath();
            ctx.fillStyle = "black";
            ctx.arc(x + 42, y - 22, 5, 0, Math.PI * 2);
            ctx.fill();
            ctx.save();
            ctx.translate(x + 73, y - 10);
            ctx.rotate(Math.PI);

            ctx.beginPath();
            ctx.fillStyle = "orange";
            ctx.moveTo(0, 0);
            ctx.lineTo(20, 10);
            ctx.lineTo(20, -10);
            ctx.closePath();
            ctx.fill();

            ctx.restore();
        }
        function drawScene(boatX = 300) {
            drawPond(350, 300, 150, 70);
            drawBoat(boatX, 300, 100, 20);
            drawSun(700, 100, 50);
            drawHouse(100, 400, 100, 100);
            drawFlower(ctx, 600, 450);
            drawStones(130, 580);
            drawBird(ctx, 650, 400);
        }
        drawScene();
        animateBoat();

    </script>
</body></html>
```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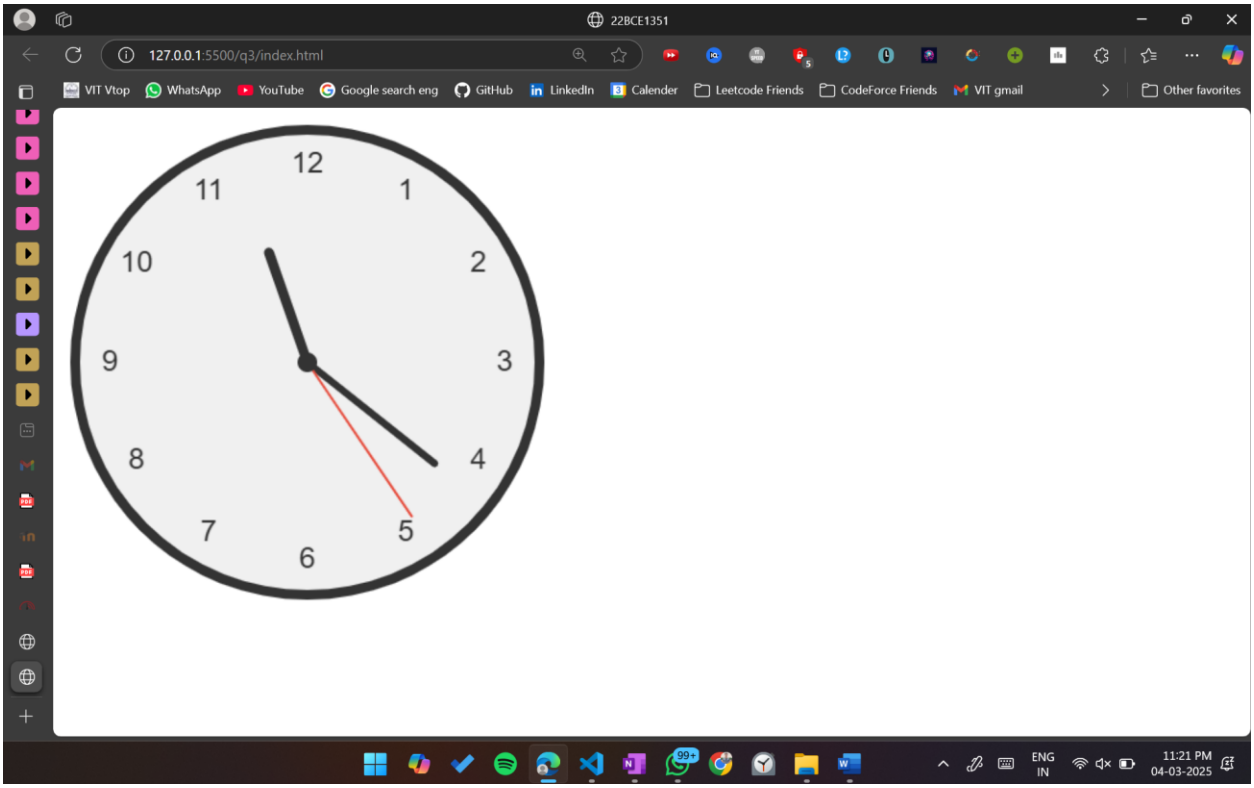
3. Write a JavaScript program that creates a working analog clock using the HTML5 Canvas API.
The clock should display the current time dynamically and accurately, updating every second.
Requirements:
i) Use the Canvas API to draw the clock face, hands, and markings.
ii) The clock must include the following elements:
a. A circular clock face with a border and a filled background color.
b. Hour, minute, and second hands that update dynamically based on the current time.
c. Numerical or tick markings for hours (1 to 12).
d. A center pivot point for the hands.
iii) Ensure the hands move smoothly and update every second.

CODE:

```
<!DOCTYPE html>
<html>
<head>
   <title>22BCE1351</title>
</head>
<body>
   <canvas id="clock" width="400" height="400"></canvas>

   <script>
       window.onload = function() {
           const canvas = document.getElementById('clock');
           const ctx = canvas.getContext('2d');
           const radius = canvas.height / 2 - 10;
           const centerX = canvas.width / 2;
           const centerY = canvas.height / 2;

           function drawClock() {

               ctx.clearRect(0, 0, canvas.width, canvas.height);
               ctx.beginPath();
               ctx.arc(centerX, centerY, radius, 0, 2 * Math.PI);
               ctx.fillStyle = '#f0f0f0';
               ctx.fill();
               ctx.strokeStyle = '#333';
               ctx.lineWidth = 8;
               ctx.stroke();
```

```
            ctx.font = '24px Arial';
            ctx.textAlign = 'center';
            ctx.textBaseline = 'middle';
            ctx.fillStyle = '#333';

            for (let i = 1; i <= 12; i++) {
                const angle = (i * Math.PI / 6) - Math.PI / 2;
                const x = centerX + Math.cos(angle) * (radius * 0.85);
                const y = centerY + Math.sin(angle) * (radius * 0.85);
                ctx.fillText(i, x, y);
            }


            const now = new Date();
            const hours = now.getHours();
            const minutes = now.getMinutes();
            const seconds = now.getSeconds();
            const millis = now.getMilliseconds();
            const hourAngle = (hours % 12 + minutes/60 + seconds/3600 +
millis/3600000) * Math.PI/6 - Math.PI/2;
            const minuteAngle = (minutes + seconds/60 + millis/60000) *
Math.PI/30 - Math.PI/2;
            const secondAngle = (seconds + millis/1000) * Math.PI/30 -
Math.PI/2;


            ctx.beginPath();
            ctx.moveTo(centerX, centerY);
            ctx.lineTo(
                centerX + Math.cos(hourAngle) * (radius * 0.5),
                centerY + Math.sin(hourAngle) * (radius * 0.5)
            );
            ctx.strokeStyle = '#333';
            ctx.lineWidth = 8;
            ctx.lineCap = 'round';
            ctx.stroke();

            ctx.beginPath();
            ctx.moveTo(centerX, centerY);
```

```
            ctx.lineTo(
                centerX + Math.cos(minuteAngle) * (radius * 0.7),
                centerY + Math.sin(minuteAngle) * (radius * 0.7)
            );
            ctx.strokeStyle = '#333';
            ctx.lineWidth = 6;
            ctx.lineCap = 'round';
            ctx.stroke();

            ctx.beginPath();
            ctx.moveTo(centerX, centerY);
            ctx.lineTo(
                centerX + Math.cos(secondAngle) * (radius * 0.8),
                centerY + Math.sin(secondAngle) * (radius * 0.8)
            );
            ctx.strokeStyle = '#e74c3c';
            ctx.lineWidth = 2;
            ctx.lineCap = 'round';
            ctx.stroke();

            ctx.beginPath();
            ctx.arc(centerX, centerY, 8, 0, 2 * Math.PI);
            ctx.fillStyle = '#333';
            ctx.fill();
            requestAnimationFrame(drawClock);
        }

        drawClock();
    };
  </script>
</body>
</html>
```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YouTube
Google search eng
GitHub
LinkedIn
Calender
Leetcode Friends
CodeForce Friends
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4. Write a JavaScript program that dynamically generates the charts (bar chart, line chart, pie chart and a donut chart) using Plotly.js.
Each chart must include:
a. Labeled X and Y axes (for bar and line charts).
b. Title for each chart.
c. Different colors for data points.
d. Legend (for the pie chart and donut) showing categories.
ii) The chart should be scaled properly to fit within the display area.

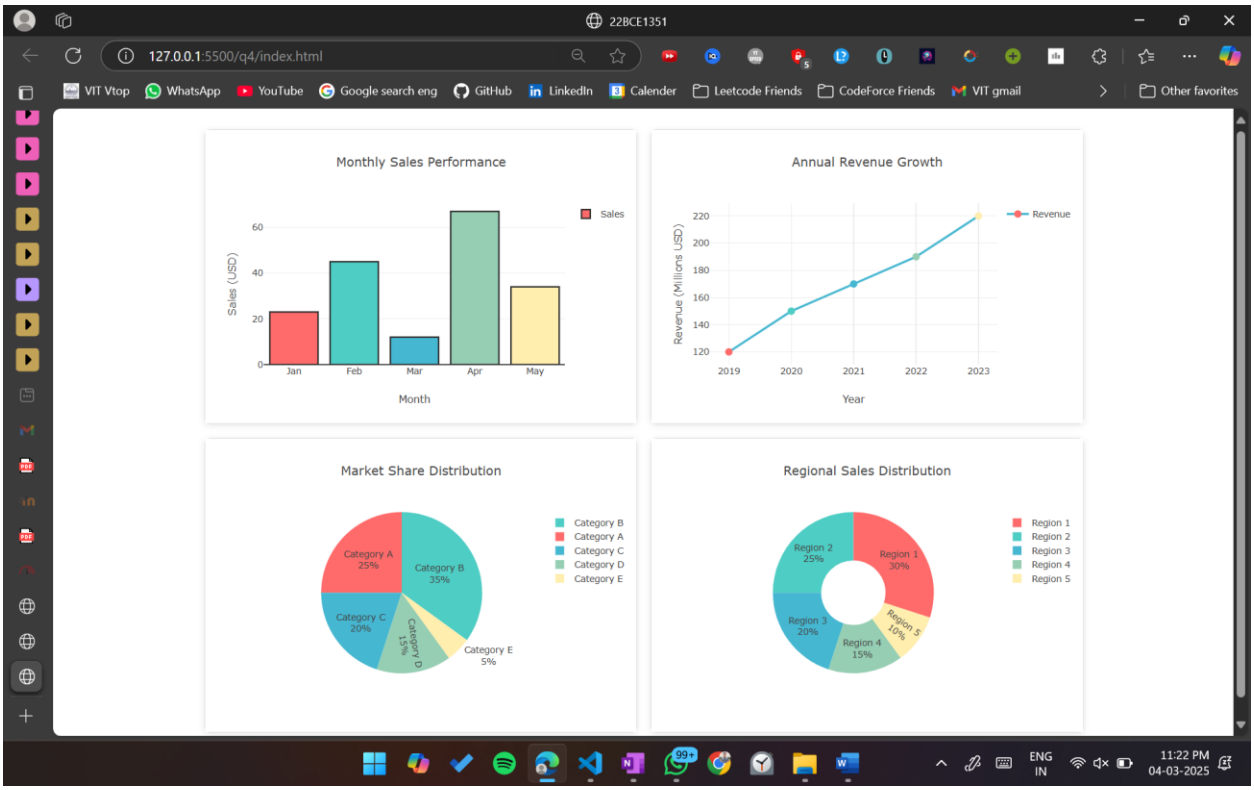
CODE:

```
<!DOCTYPE html>
<html>
<head>
   <title>22BCE1351</title>
   <script src="https://cdn.plot.ly/plotly-latest.min.js"></script>
   <style>
       .chart-container {
           display: grid;
           grid-template-columns: repeat(2, 1fr);
           gap: 20px;
           padding: 20px;
           max-width: 1200px;
           margin: 0 auto;
       }
       .chart {
           width: 100%;
           height: 400px;
           border: 1px solid #ddd;
           border-radius: 8px;
           box-shadow: 0 2px 8px rgba(0,0,0,0.1);
       }
   </style>
</head>
<body>
   <div class="chart-container">
       <div id="bar-chart" class="chart"></div>
       <div id="line-chart" class="chart"></div>
       <div id="pie-chart" class="chart"></div>
       <div id="donut-chart" class="chart"></div>
   </div>
```

```
    <script>
        document.addEventListener('DOMContentLoaded', () => {
            // Bar Chart
            const barData = [{
                x: ['Jan', 'Feb', 'Mar', 'Apr', 'May'],
                y: [23, 45, 12, 67, 34],
                type: 'bar',
                marker: {
                    color: ['#FF6B6B', '#4ECDC4', '#45B7D1', '#96CEB4',
'#FFEEAD'],
                    line: { width: 2, color: '#2A2A2A' }
                },
                name: 'Sales'
            }];

            const barLayout = {
                title: 'Monthly Sales Performance',
                xaxis: { title: 'Month' },
                yaxis: { title: 'Sales (USD)' },
                showlegend: true
            };

            Plotly.newPlot('bar-chart', barData, barLayout);

            // Line Chart
            const lineData = [{
                x: [2019, 2020, 2021, 2022, 2023],
                y: [120, 150, 170, 190, 220],
                mode: 'lines+markers',
                line: { color: '#45B7D1', width: 3 },
                marker: {
                    color: ['#FF6B6B', '#4ECDC4', '#45B7D1', '#96CEB4',
'#FFEEAD'],
                    size: 10
                },
                name: 'Revenue'
            }];

            const lineLayout = {
                title: 'Annual Revenue Growth',
```

```
            xaxis: { title: 'Year' },
            yaxis: { title: 'Revenue (Millions USD)' },
            showlegend: true
        };

        Plotly.newPlot('line-chart', lineData, lineLayout);

        // Pie Chart
        const pieData = [{
            values: [25, 35, 20, 15, 5],
            labels: ['Category A', 'Category B', 'Category C',
'Category D', 'Category E'],
            type: 'pie',
            marker: {
                colors: ['#FF6B6B', '#4ECDC4', '#45B7D1', '#96CEB4',
'#FFEEAD']
            },
            textinfo: 'label+percent',
            hoverinfo: 'label+value'
        }];

        const pieLayout = {
            title: 'Market Share Distribution',
            showlegend: true
        };

        Plotly.newPlot('pie-chart', pieData, pieLayout);

        const donutData = [{
            values: [30, 25, 20, 15, 10],
            labels: ['Region 1', 'Region 2', 'Region 3', 'Region 4',
'Region 5'],
            type: 'pie',
            hole: 0.4,
            marker: {
                colors: ['#FF6B6B', '#4ECDC4', '#45B7D1', '#96CEB4',
'#FFEEAD']
            },
            textinfo: 'label+percent',
            hoverinfo: 'label+value'
        }];
```

```
            const donutLayout = {
                title: 'Regional Sales Distribution',
                showlegend: true
            };

            Plotly.newPlot('donut-chart', donutData, donutLayout);
        });
    </script>
</body>
</html>
```



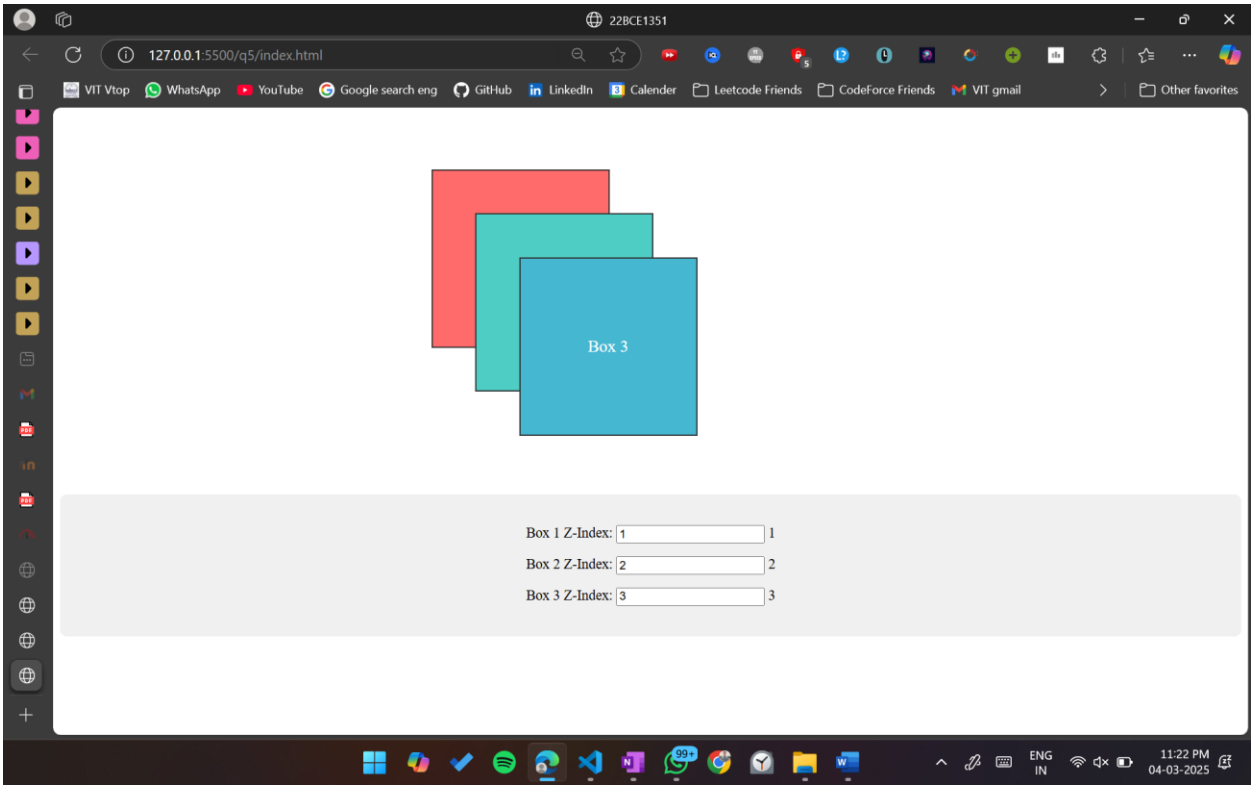
5. Write a JavaScript program that dynamically creates and manipulates overlapping elements
using CSS z-index. The program should allow the user to change the stacking order of elements by adjusting their z-index values.
-Create at least three overlapping elements (e.g., div boxes or images).
- Use CSS z-index to control the layering order of these elements.
-Provide buttons or user input to dynamically adjust the z-index values using JavaScript.
-Display the current z-index value of each element.

CODE:

```
<!DOCTYPE html><html>
<head>
   <title>22BCE1351</title>
   <style>
       .container {
           position: relative;
           width: 600px;
           height: 400px;
           margin: 20px auto;
       }
       .box {
           position: absolute;
           width: 200px;
           height: 200px;
           border: 2px solid #333;
           justify-content: center;
           font-size: 1.2em;
           color: white;
       }
       #box1 {
           background-color: #FF6B6B;
           top: 50px;
           left: 50px;
           z-index: 1;
       }
       #box2 {
           background-color: #4ECDC4;
           top: 100px;
           left: 100px;
           z-index: 2;
       }
```

```
        #box3 {
            background-color: #45B7D1;
            top: 150px;
            left: 150px;
            z-index: 3;
        }

        .controls {
            margin-top: 20px;
            padding: 20px;
            background-color: #f0f0f0;
            border-radius: 8px;
            text-align: center;
        }

        .control-group {
            margin: 15px 0;
        }
    </style>
</head>
<body>
    <div class="container">
        <div class="box" id="box1">Box 1</div>
        <div class="box" id="box2">Box 2</div>
        <div class="box" id="box3">Box 3</div>
    </div>

    <div class="controls">
        <div class="control-group">
            <label>Box 1 Z-Index: </label>
            <input type="number" id="input1" value="1"
                   oninput="updateZIndex('box1', this.value)">
            <span id="z1">1</span>
        </div>

        <div class="control-group">
            <label>Box 2 Z-Index: </label>
            <input type="number" id="input2" value="2"
                   oninput="updateZIndex('box2', this.value)">
            <span id="z2">2</span>
        </div>
```

```
        <div class="control-group">
            <label>Box 3 Z-Index: </label>
            <input type="number" id="input3" value="3"
                   oninput="updateZIndex('box3', this.value)">
            <span id="z3">3</span>
        </div>
    </div>

    <script>
        function updateZIndex(elementId, value) {
            const element = document.getElementById(elementId);
            const display =
document.querySelector(`span#${elementId.replace('box', 'z')}`);

            if (element && display) {
                element.style.zIndex = value;
                display.textContent = value;
            }
        }

        document.getElementById('z1').textContent = 1;
        document.getElementById('z2').textContent = 2;
        document.getElementById('z3').textContent = 3;
    </script>
</body>
</html>
```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127.0.0.1:5500/q5/index.html
VIT Vtop
WhatsApp
YouTube
Google search eng
GitHub
LinkedIn
Calender
Leetcode Friends
CodeForce Friends
VIT gmail
Other favorites
Box 3
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Box 2 Z-Index: 2 2
Box 3 Z-Index: 3 3
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