Differences Between `<svg>` and `<canvas>` in HTML

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1 `<svg>` Element

1.1 Overview of SVG

SVG, or Scalable Vector Graphics, is an XML-based markup language for describing two-dimensional vector graphics.

1.2 Characteristics of SVG

- **Vector Graphics**: SVG is used for creating vector graphics. These graphics are defined using mathematical equations to draw shapes, which means they can be scaled infinitely without losing quality.
- **DOM Interaction**: SVG elements are part of the Document Object Model (DOM), allowing them to be manipulated with CSS and JavaScript.
- **Accessibility**: Text inside SVG graphics is selectable and searchable, enhancing accessibility.
- **Performance**: Best for graphics with fewer details and lower complexity.

2 `<canvas>` Element

2.1 Overview of Canvas

The `<canvas>` element in HTML is used to draw raster graphics via scripting (usually JavaScript).

2.2 Characteristics of Canvas

- **Raster Graphics**: Canvas is used to render raster graphics (pixel-based), ideal for complex scenes with frequent redrawing like games or animations.
- **Scripting Required**: Drawing on the canvas requires JavaScript, making the graphics not part of the DOM.

- **Resolution Dependency**: Quality of canvas graphics is dependent on resolution and can degrade when scaling.
- **Performance**: More suitable for rendering detailed and complex animations or interactive graphics.

3 Key Differences

1. **Type of Graphics**: SVG is for vector graphics, while canvas is for raster graphics.
2. **DOM Interaction**: SVG elements are part of the DOM and can be styled and scripted like other HTML elements. Canvas graphics are drawn with JavaScript and are not part of the DOM.
3. **Scalability**: SVG graphics can scale infinitely without loss of quality, whereas canvas graphics can become pixelated.
4. **Use Cases**: SVG is ideal for high-quality, scalable graphics like icons and logos. Canvas is better suited for complex, interactive, or frequently updating graphics.