

Learning to Code with SVG

Lesson Plan: Coding a Countdown Calendar in SVG

Objective: Hands-on learning of SVG by a simple day calendar. How to add a margin to an SVG image. How to style and position text. And, introduces how to use Google Fonts in an SVG image.
The required Javascript is copy and pasted. Students are not required to understand it for this lesson.

Lab Time: Approximately 0.5 hour, not including Lecture time. Students should copy and paste lines, and then change the attribute values to reduce typing time and typos.

Age range: 4-12th grades, or any age student unfamiliar with SVG

Requirements: Familiar with a simple text editor like Notepad on Windows, Text Wrangler on a Mac, or Text on a Chromebook
Familiar with copy and paste shortcuts (ctrl-c and ctrl-v on Windows and Chromebooks, command-c and command-v on a Mac).
Ability to save file with a .svg extension.

Resources: Free eBook for the iPad *Learn SVG Interactively*, by Jay Nick
<http://www.w3schools.com/svg/default.asp>
<https://www.w3.org/TR/SVG11/>
<https://fonts.google.com>

Lecture: Introduce the <text> element and how to use styles: font-size, font-weight, font-variant, & text-anchor
Demonstrate how to use Google Fonts, copy and pasting sample code for the selected font

Procedure: Give the students the instructions on pages 4-5.
Students create an SVG element with a viewBox="0 0 510 510" in the text editor and use the translate transform to provide a 5px margin around their 500x500 SVG image.
Save the file as CountdownCalendar.svg then open in a browser. Keep the text editor and browser windows open.
Save and refresh the browser regularly to see if errors were introduced and what effect the code had.

Take Away: Students should understand how to add a margin to an SVG image.
Students should get a feel for the <text> element and using Google fonts.
Students get a peek at some javascript making a simple change to variables.

Additional Activity Students can color and format (style) the SVG elements.
Add openclipart.org images using the SVG <image> element.

STEAMCODED.ORG

Countdown Calendar

?? DAYS UNTIL

December

25

Coding a Countdown Calendar in SVG

To get started, copy the first 3 lines and last line of code of this image into your editor: <http://steamcoded.org/lessons/grid500x500.svg.txt> and save the file as CountdownCalendar.svg. In the editor, add the SVG elements (per instructions below) and open in a browser.

- 1: Create an SVG image 500x500.
Copy the first 3 lines from <http://steamcoded.org/lessons/grid500x500.svg.txt>
- 2: Add an ending svg tag: `</svg>`
- 3: Add a rectangle starting at (0,0) with a width and height of 500 and a corner radius of 20
`<rect x="0" y="0" width="500" height="500" rx="20" style="fill:white;stroke:black;stroke-width:4px;" />`
- 4: Make a 5px margin around the rectangle by increasing the viewBox to "0 0 510 510", then add a group element around the rectangle to move it over and down 5px.
`<g transform="translate(5,5)">`

`</g>`

- 5: Move the style of the `<rect>` to the group element, remove it from the `<rect>` element
`<g transform="translate(5,5)" style="fill:white;stroke:black;stroke-width:4px;">`

Add elements inside the group the rectangle is in.

- 6: Draw a line from 0 to 500px, 130px down from top
`<path d="M0,130L500,130" />`
- 7: Select a font to use for text from <https://fonts.google.com>
 1. To select a font, click on the red plus sign, then
 2. Click on the black bar at the bottom of the screen, then
 3. Click on `@import` in the middle of the window then copy the 3 lines of text
 4. Paste the style information near the top, but inside the `<svg>` element
 5. Then, copy the font-family style and append it to the group style from step 5
 6. Append **text-anchor:middle;** to the group style as well

Note: font-sizes below are picked based on the Roboto font, adjust as needed for your font. You may need to adjust the y attribute as well

- 8: Add a text element centered at (250,185), font-size:60px
`<text id="month" x="250" y="185" style="fill:black;font-size:60px;">December</text>`
- 9: Add a text element centered at (250,470), font-size:350px
`<text id="day" x="250" y="470" style="fill:navy;font-size:350px;">25</text>`

- 10: Add a text element centered at (250,90), font-size:72px
`<text id="daysLeft" x="250" y="90" style="fill:red;stroke:black; font-size:72px;font-variant:small-caps;">?? Days until</text>`
- 11: Copy the javascript from <http://steamcoded.org/lessons/CountdownCalendar.js.txt> and paste into the SVG image near the top, either above or below the `<style>` element
- 12: You can select any date as the default by changing the variables in the code - Look for 'var month=12' and 'var day=25' in the `<script>` element and change them
- 13: You can also select any date by appending parameters to the URL, for example `CountdownCalendar.svg?month=2&day=14`
- 14: Decorate your calendar by adding images from <https://openclipart.org>
Add an `<image>` element and give it attributes x, y, width, and height (similar to the rectangle element)
Then add attribute **xlink:href=""** inserting the link to the openclipart SVG image as the value of the attribute (inside the quotation marks).

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Answer Sheet

Common mistakes: closing the opening element tag with a /, missing a closing tag, missing double quote marks around attribute values, missing space between attributes, and missing the start < and ending > symbols.

- 1:

```
<svg width="100%" height="100%" viewBox="0 0 500 500"
  xmlns="http://www.w3.org/2000/svg"
  xmlns:xlink="http://www.w3.org/1999/xlink">
```
- 2:

```
</svg>
```
- 3:

```
<rect x="0" y="0" width="500" height="500" rx="20"
  style="fill:white;stroke:black;stroke-width:4px;" />
```
- 4:

```
<svg width="100%" height="100%" viewBox="0 0 510 510"
  xmlns="http://www.w3.org/2000/svg"
  xmlns:xlink="http://www.w3.org/1999/xlink">

  <g transform="translate(5,5)">
    <rect x="0" y="0" width="500" height="500" rx="20"
      style="fill:white;stroke:black;stroke-width:4px;" />
  </g>
</svg>
```
- 5:

```
<g transform="translate(5,5)" style="fill:white;stroke:black;stroke-width:4px;">
```
- 6:

```
<g transform="translate(5,5)" style="fill:white;stroke:black;stroke-width:4px;">
  <rect x="0" y="0" width="500" height="500" rx="20" />
  <path d="M0,130L500,130" />
</g>
```
- 7:

```
<style type="text/css">
  @import 'https://fonts.googleapis.com/css?family=Roboto';
</style>

<g transform="translate(5,5)" style="fill:white;
  stroke:black;stroke-width:4px;font-family:'Roboto',sans-serif;text-anchor:middle;">
```
- 8:

```
<text id="month" x="250" y="185" style="fill:black;font-size:60px;">December</text>
```
- 9:

```
<text id="day" x="250" y="470" style="fill:navy;font-size:350px;">25</text>
```
- 10:

```
<text id="daysLeft" x="250" y="90" style="fill:red;stroke:black;
  font-size:72px;font-variant:small-caps;">?? Days until</text>
```

- 11: `<script type="application/x-javascript"><![CDATA[
 javascript is here (not shown)
]]>
</script>`
- 12: `var strEventDate;
var month = 12;
var day = 25;`
- 13: `http://steamcoded.org/lessons/CountdownCalendar.svg?month=2&day=14`
- 14: `<image x="10" y="135" width="80" height="100"
 xlink:href="https://openclipart.org/download/188775/ChristmasTree.svg" />`