DRAWING WITH SVG

Section Outline

In this section we will cover

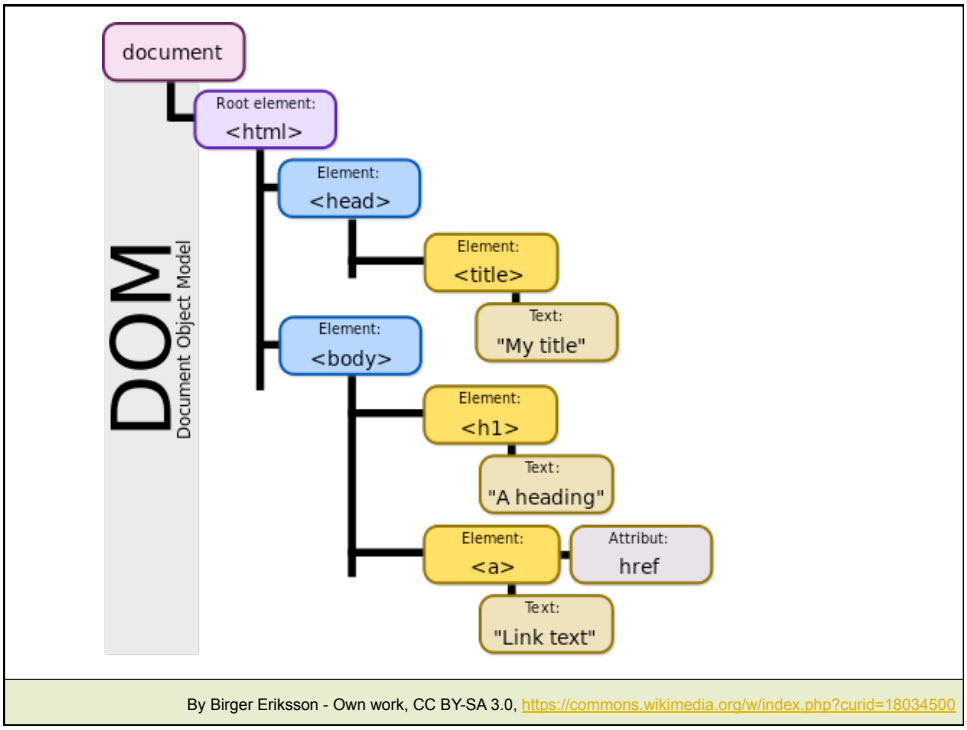
- The DOM
- Drawing SVG elements
- Styling SVG elements
- Creating SVG groups

THE DOM

The DOM

The Document Object Model (DOM) is an application programming interface that treats a HTML document as a tree structure

- Each node is an object representing a part of the document.
- The objects in the DOM can be manipulated programmatically
- Changes made to objects in the DOM are reflected in the display of the document



The DOM

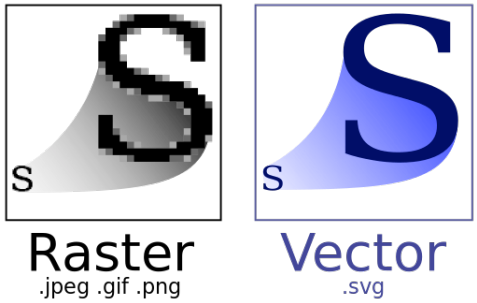
When creating D3 visualisations we interact with all elements on a page, or in a visualisation, through the DOM

DRAWING SVG ELEMENTS

What Is SVG?

Scalable Vector Graphics (SVG) is an XML-based vector image format for two-dimensional graphics

- SVG images are saved in XML files
- Compared to raster graphics SVG images scale much more effectively



What Is SVG?

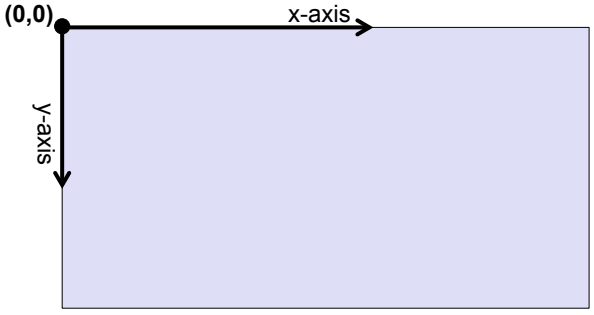
All major modern web browsers—including Mozilla Firefox, Internet Explorer, Google Chrome, Opera, and Safari—have at least some degree of SVG rendering support

In HTML the<svg> tag allows us to create an SVG canvas on which SVG elements can be rendered

SVG Canvas Element

<svg>

- width the width in pixels of the SVG canvas
- height the height in pixels of the SVG canvas



SVG Shape Elements

<rect>

- x of — horizontal coordinate of top left corner rectangle
- y — vertical coordinate of top left corner of rectangle
- width — the width in pixels of the rectangle
- height — the height in pixels of the rectangle
- rx corner — the horizontal radius of the rounded of the rectangle
- ry of — the vertical radius of the rounded corner the rectangle

SVG Shape Elements

<circle>

- cx — horizontal coordinate of circle centre
- cy — vertical coordinate of circle centre
- r — circle radius

SVG Shape Elements

<ellipse>

- cx horizontal coordinate of circle centre
- cy vertical coordinate of circle centre
- rx ellipse radius along horizontal axis
- ry ellipse radius along vertical axis

SVG Shape Elements

<line>

- x1 horizontal coordinate of line start
- y1 vertical coordinate of line start
- x2 horizontal coordinate of line end
- y2 vertical coordinate of line end

SVG Shape Elements

<polyline>

- points a series of x and y coordinates defining the polylines' corners, given as "x1,y1, x2,y2, x3,y3, …, xn,yn"

SVG Shape Elements

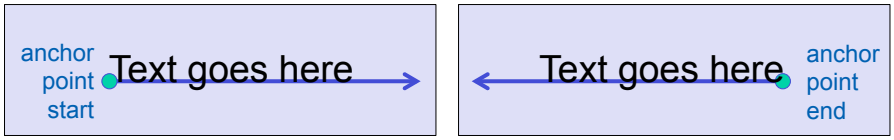
<polygon>

- points a series of x and y coordinates defining the polygon's corners, given as "x1,y1, x2,y2, x3,y3, …, xn,yn"

SVG Shape Elements

<text>

- x anchor — horizontal coordinate of text point
- y — vertical coordinate of text anchor point
- text-anchor of — position of text anchor point, one *start*, *middle*, or *end*



SVG Shape Elements

<path>

- d — a series of instructions defining an arbitrary path using a set of coordinates and joined as specified in a set of commands including
  - M move to
  - L line to
  - C curve to
  - S continuous curve to
  - Z close path

Nice paths tutorial: https://developer.mozilla.org/en/docs/Web/SVG/Tutorial/Paths

STYLING SVG ELEMENTS

SVG Styles

SVG shapes can be styled using style properties including

- fill — the fill colour of a shape, specified using RGB colours given as hex code, an RGB triple, or a named colour
- fill-opacity — the opacity of the fill colour
- opacity — sets opacity for both fill and stroke

SVG Styles

- stroke — the outline colour of a shape, specified using RGB colours given as hex code or an RGB triple, or a named colour
- stroke-width — sets stroke thickness
- stroke-opacity — sets stroke opacity
- stroke-linecap — sets the shape of line end-points, one of *butt*, *round* or *square*
- stroke-dasharray — a dash pattern for the stroke

SVG Styles

- font-size — point size for text
- font-family — specifies the font, e.g. Arial, "Times New Roman", Impact, "Courier New", serif, sans-serif, ...
- transform — transform the position of the text (useful for rotations)

CREATING SVG GROUPS

SVG Groups

SVG elements can be combined into groups

- Surround with <g> ... </g> elements to define a group
- Common styling can be applied across a group
- Groups can be transformed together