

# BASIC WEB DEVELOPMENT

KIRELL BENZI, PH.D



@KirellBenzi

[www.kirellbenzi.com](http://www.kirellbenzi.com)

# CSS



# HTML





# HTML

Originally: “HyperText Markup Language” (27 years ago)

Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript it forms a triad of cornerstone technologies for the World Wide Web [Flanagan].

**HTML instructs web browsers how to render content to users**

## World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aimed at linking the information resources of computers

Everything there is online about W3 is linked directly or indirectly to this document, including November's [W3 news](#) , [Frequently Asked Questions](#) .

### [What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

### [Help](#)

on the browser you are using

### [Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#)

### [Technical](#)

Details of protocols, formats, program internals etc

### [Bibliography](#)

Paper documentation on W3 and references.

### [People](#)

A list of some people involved in the project.

### [History](#)

A summary of the history of the project.

### [How can I help ?](#)

If you would like to support the web..

### [Getting code](#)

Getting the code by [anonymous FTP](#) , etc.



# What Does HTML5 Do?

Key features of the next Web programming standard.



## <STORAGE>

Data can be stored on a user's computer or mobile device, so Web apps work without an Internet connection.



## <TYPE>

Web pages can have flashier type with more fonts, shadows, colors and other effects.



## <MOTION>

Objects move on Web pages and react to the movements of a cursor.



## <GAMES>

Interactive games can run with just a Web browser without installing other software or plug-ins.



## <VIDEO>

Video can be embedded in a Web page without a plug-in. Browser makers have not agreed on formats.



## <3D>

A technology called WebGL can create interactive 3-D effects using a computer's graphics processor.



## <AUDIO>

Audio is played without a plug-in. Browser makers have not agreed on formats.





```

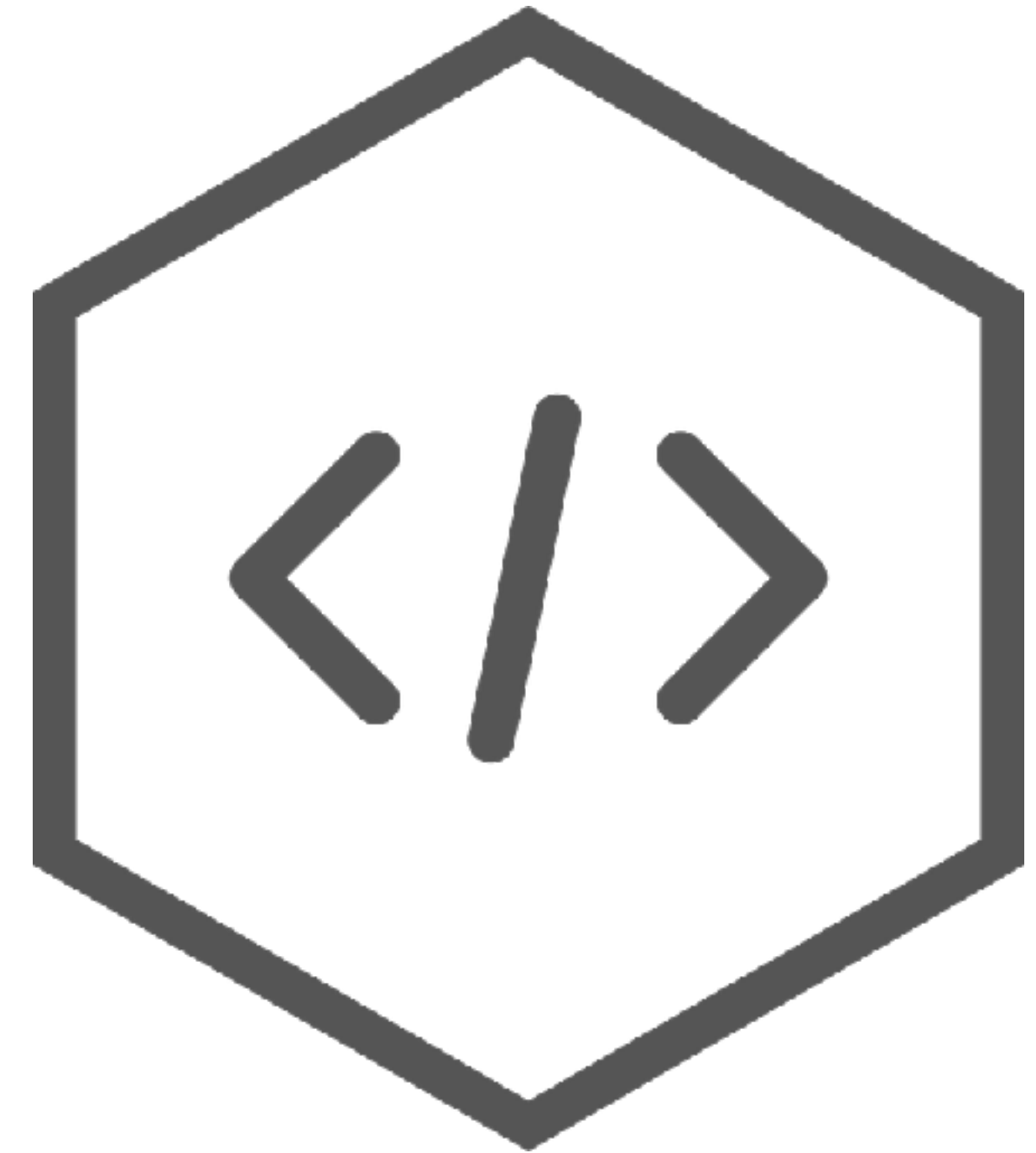
    <div id="h-js-header__drawer-backdrop" class="h-c-header__drawer-backdrop"></div>
</div>    <div class="main">
<div class="hero hero--home" >

    <div class="hero__image hero__image--mobile "
        style="background-image: url('/assets/static/images/home/hero-home-mobile.jpg')">
    </div>
<div class="hero__image hero__image--desktop "
    style="background-image: url('/assets/static/images/home/hero-home.jpg')">
</div>
<div class="hero__content">
    <div class="h-c-page">
        <div class="h-c-grid">
            <div class="h-c-grid__col h-c-grid__col-1--10 h-c-grid__col-1--offset-1">
                <div class="hero__logo"></div>
                <h1 class="hero__title h-c-headline h-c-headline--two">
                    Bringing the benefits of AI to everyone
                </h1>
            </div>
        </div>
    </div>
</div><section class="copy padding-bottom--none copy--home h-c-page">
    <div class="h-c-grid">
        <div class="copy__column h-c-grid__col h-c-grid__col--10 h-c-grid__col--offset-1
h-c-grid__col-1--7 h-c-grid__col-1--offset-2">

            <div class="copy__text "><p class="h-c-copy">
                Our mission is to organize the world's information and make it universally accessible and useful, and AI is enabling us to do that in incredible new ways -
                solving problems for our users, our customers, and the world.
            </p>

<p class="h-c-copy">
                AI makes it easier for you to do things every day, whether it's searching for photos of people you love, breaking down language barriers, or helping you get
                things done with your own personal digital assistant. But it's also providing us with new ways of looking at old problems and helping transform how we work and
                live, and we think the biggest impact will come when everyone can access it.
            </p></div>

```



HTML documents are composed of elements represented by tags, to categorize content.

# Basic elements

```
<!DOCTYPE html>
<html>
  <head>
    <title>Hello World</title>
  </head>
  <body>
    <h1>My Header 1</h1>
    <h2>My Header 2</h2>
    <h3>My Header 3</h3>
    <p>Say hello to my little text.</p>
  </body>
</html>
```

## HTML element

```
<h3>My Header 3</h3>
```

## HTML tag

```
<h3>
```

**My Header 1**

**My Header 2**

**My Header 3**

Say hello to my little text

# HTML attributes

Opening tags can contain extra information about the element

```
<a id='myanchor' href='http://www.google.com'>A link to Google</a>
```

The most important attributes are:

- ✱ **id**: the element can be referenced directly from JS (like a global variable)
- ✱ class (next slides)
- ✱ style (next slides)

# Document metadata

**<html>** creates the entire HTML container.

**<head>** creates the header with the page's title and links to style sheets/scripts.

**<script>** links to or embeds a script.

**<style>** for embedding a style in the website.

**<link>** to reference an external document, often a css document like that: **<link rel="stylesheet" type="text/css" href="style.css">**. The rel attribute defines the relationship to the active document, the type attribute tells the browser which type of file to expect.

**<body>** marks the container of the content of the website.



# Necessary boilerplate

```
<!DOCTYPE html>  
<html lang="en">  
  <head>  
    <meta charset="UTF-8">  
    <title>A Title</title>  
  </head>  
  <body>  
    Insert stuff here  
  </body>  
</html>
```

# Live example

<https://codepen.io/kikohs/pen/qXZgag>



# Vital resources

## Mozilla developer network

### Web technology for developers

The open nature of the World Wide Web presents incredible opportunities for people who want to create websites or online applications. To take full advantage of the web's capabilities, you need to know how to use them. Explore the links below to learn more about various web technologies.

#### Web technologies

##### Basics

###### HTML

HyperText Markup Language (HTML) is used to describe and define the *content* of a webpage.

###### CSS

Cascading Style Sheets (CSS) are used to describe the *appearance or presentation* of content on a webpage.

###### HTTP

Hypertext Transfer Protocol (HTTP) is used to deliver HTML and other hypermedia documents on the web.

##### Scripting

###### JavaScript

JavaScript is the programming language that runs in your browser. You can use it to add interactivity and other dynamic features to your website or application.

#### Learning area

##### Learning web development

This set of articles provides beginners with everything they need to start coding simple websites.

#### Other topics

##### Developing web applications

This set of articles explains the techniques used in developing web apps for mobile, desktop, and Firefox OS environments.

##### Accessibility

Accessible websites enable as many people as possible to use the web, including those whose visual, auditory, or other abilities are limited in some way. This set of articles provides information about accessible web development.

##### Security

Don't let your website or app leak private data to the bad guys. Use this set of articles to make sure your projects are secure.

<https://developer.mozilla.org/en-US/docs/Web>

# Vital resources

The screenshot displays the Stack Overflow homepage. At the top, there's a navigation bar with the Stack Overflow logo, a search bar, and user statistics (4,995 reputation, 2 gold medals, 29 silver medals, 50 bronze medals). Below the navigation bar, the left sidebar contains links to Home, PUBLIC, Stack Overflow, Tags, Users, Jobs, and Teams. The main content area is titled 'Top Questions' and features a list of questions with their respective vote counts, answer counts, view counts, titles, tags, and authors. The questions listed are: 'Run database migrations on build' (1 vote, 2 answers, 26 views), 'Reactj, typescript Property 'setState' is missing in type' (6 votes, 2 answers, 6k views), 'I want to make a code using a function within an if statement in python' (0 votes, 0 answers, 10 views), 'How to check if an array of user input equals a specific object?' (0 votes, 0 answers, 18 views), and 'Compiling Dolphin emulator beta' (1 vote, 0 answers, 49 views). On the right side, there are two sections: 'FEATURED ON META' and 'HOT META POSTS'. The 'FEATURED ON META' section includes a post about VSTS being renamed to Azure DevOps. The 'HOT META POSTS' section lists three posts with their respective scores and titles. At the bottom right, there is a 'Watched Tags' section with a list of tags including babeljs, boost, cmake, d3.js, freak, graph, graph-databases, graphlab, graph-tool, homebrew, javascript, networkx, nlp, pandas, qt, qt5, and sparksee.

stackoverflow Search...

4,995 2 29 50

Home

PUBLIC

Stack Overflow

Tags

Users

Jobs

Teams  
Q&A for work  
Learn More

Top Questions

Ask Question

Interesting 336 Featured Hot Week Month

1 vote 2 answers 26 views Run database migrations on build  
google-cloud-platform google-cloud-sql google-cloud-build  
modified 1 min ago Konstantin Tarkus 29.4k

6 votes 2 answers 6k views Reactj, typescript Property 'setState' is missing in type  
reactjs typescript  
answered 1 min ago Telmo Trooper 410

0 votes 0 answers 10 views I want to make a code using a function within an if statement in python  
python function if-statement  
asked 2 mins ago Max Wood 1

0 votes 0 answers 18 views How to check if an array of user input equals a specific object?  
javascript  
modified 2 mins ago Yagya Petersen 1

1 vote 0 answers 49 views +50 Compiling Dolphin emulator beta  
qt cmake compiler-errors compilation qt5  
modified 3 mins ago Fabian Röling 122

Natural sort a data frame column in pandas

FEATURED ON META

VSTS has been renamed to Azure DevOps - let's talk about some tags

HOT META POSTS

54 Regain daily number of close votes from approved question closures

14 Does reputation have influence over how many views your post gets?

3 The triage review bar with the action buttons is clipped

Watched Tags edit

babeljs boost cmake d3.js freak

graph graph-databases graphlab

graph-tool homebrew javascript

networkx nlp pandas qt qt5

sparksee

<https://stackoverflow.com/>

Stack Overflow

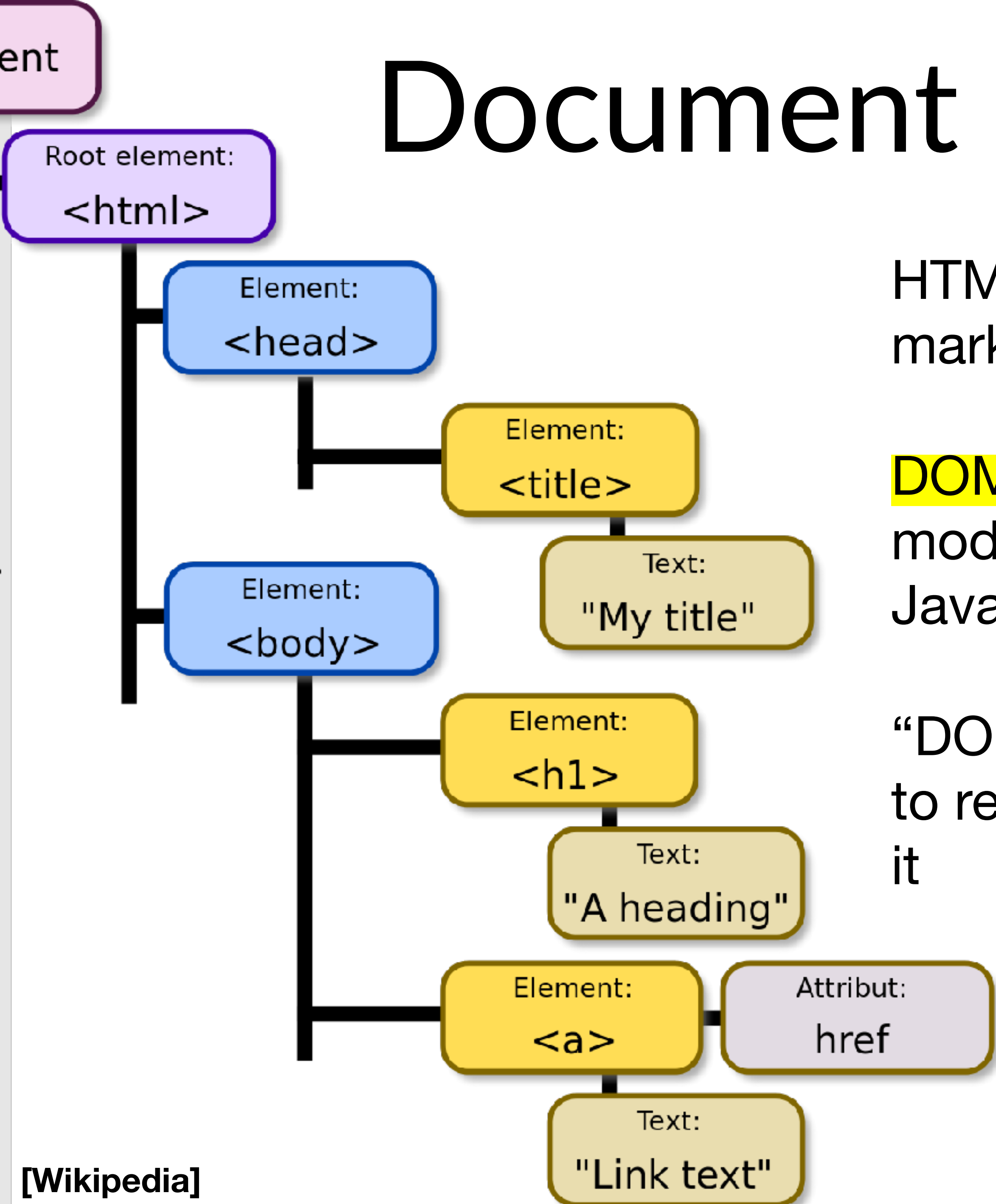


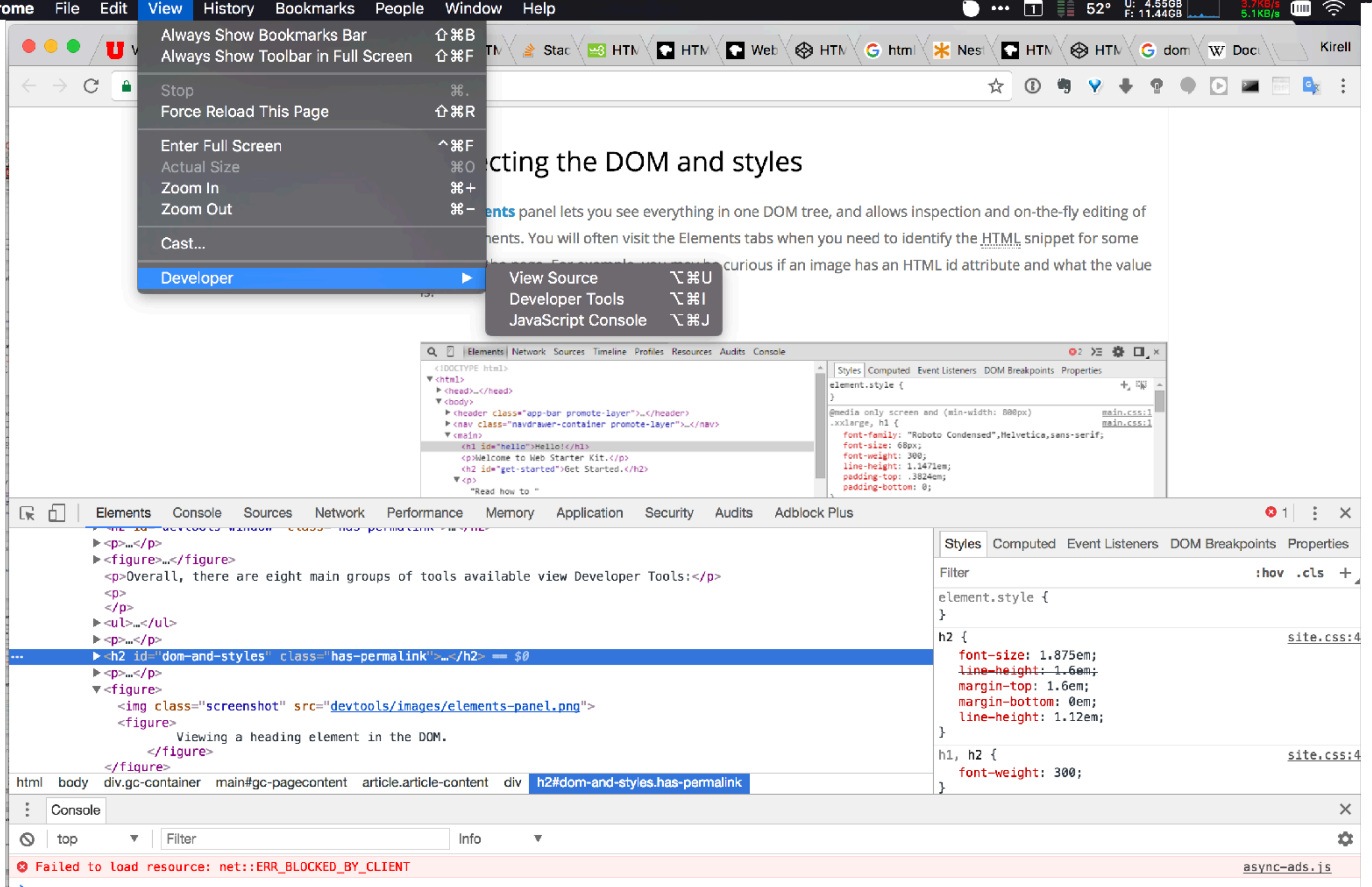
# Document Object Model

HTML is a textual representation of a markup document.

DOM is a programming interface for modifying a HTML document from Javascript.

“DOM” ≈ tree created by the web browsers to represent the document + API to access it



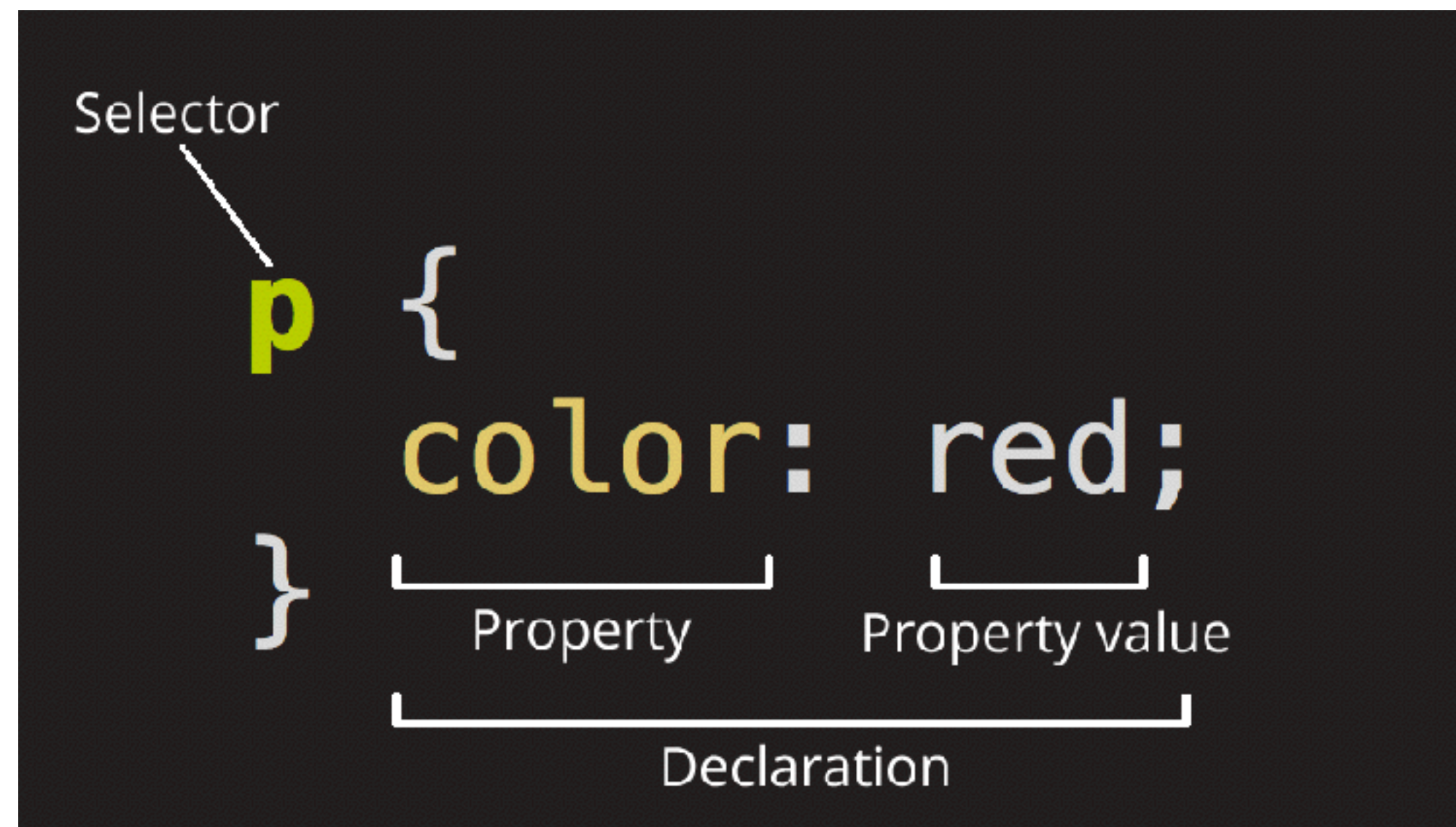


<https://developer.chrome.com/devtools>



# Cascading Style Sheets and Selectors

**CSS** control the way elements are rendered by a web browser



```
<!DOCTYPE html>
<html lang="en">
  <head>
    <style>
      p {
        color: red;
      }
    </style>
  </head>
  <body>
    <p>My paragraph!</p>
  </body>
</html>
```

My paragraph!

# Inline CSS

```
<p style="color: red">My paragraph!</p>
```

Very specific, not reusable

Don't use it!



# Embedded CSS

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <style>
      p {
        color: red;
      }
    </style>
  </head>
  <body>
    <p>My paragraph!</p>
  </body>
</html>
```

Style is put in the  
<head><style> tag

Good enough for a  
single page but **cannot  
be shared across** all  
pages

# Linked CSS

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <link rel="stylesheet" type="text/css" href="style.css">
  </head>
  <body>
    <p>My paragraph!</p>
  </body>
</html>
```

Styles are in their own dedicated file with **'.css'** extension.

A **<link>** tag in the **<head>** links to the location of the file

Style is **coherent across website**, easy to change the layout of the whole site

# More on CSS selectors

**id** are used once a page and are specific to a single element

**class** are reusable across elements

CSS

```
p {  
  font-family: verdana;  
}
```

```
#par1 {  
  color: blue;  
}
```

```
.important {  
  font-weight: bold;  
}
```

```
<p id="par1" class="important">My paragraph!</p>
```

**My paragraph**

HTML



# Live example

<https://codepen.io/kikohs/pen/vJGPjJ>

# Scalable Vector Graphics (SVG)

Scalable Vector Graphics (SVG) is an markup language for describing two-dimensional vector graphics.

**SVG is essentially to graphics what HTML is to text.**

# Simple example

```
<svg width="300" height="200">  
  <rect width="100%" height="100%" fill="red" />  
  <circle cx="150" cy="100" r="80" fill="green" />  
  <text x="150" y="125" font-size="60" text-anchor="middle"  
fill="white">SVG</text>  
</svg>
```



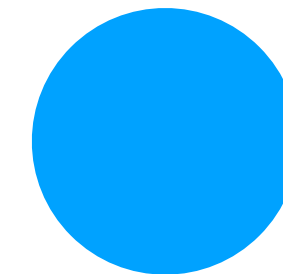


# Basic shapes

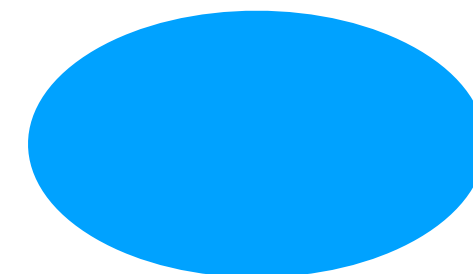
Rectangle



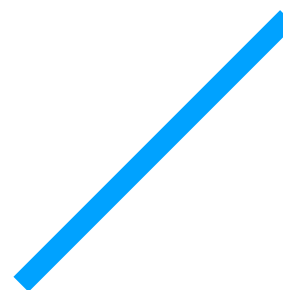
Circle



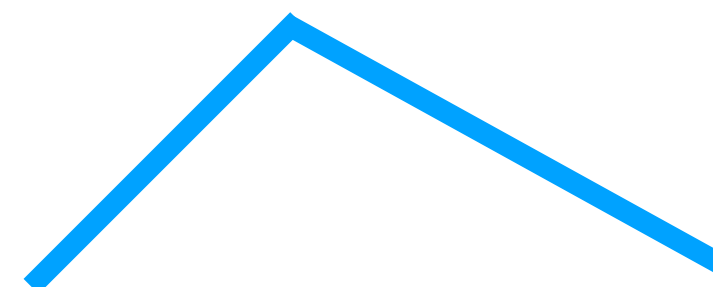
Ellipse



Line



Polyline (group of connected straight lines)



Polygon (closed shape)



Path?

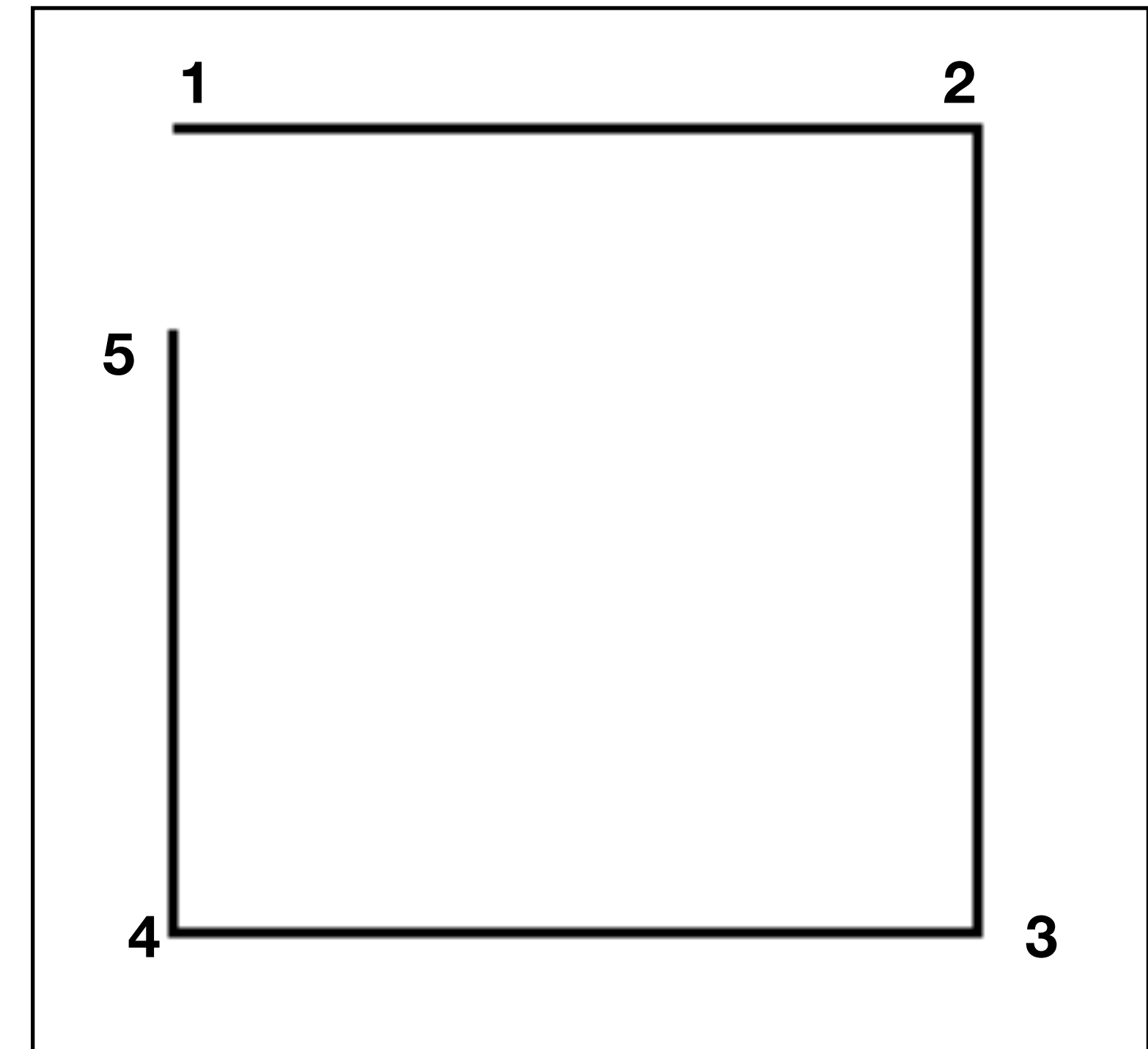
# SVG Path

Most powerful element in SVG

Can draw any shape by a mixture of letters and coordinates

Basic commands such as MoveTo, LineTo, Horizontal lineto, Vertical lineto, etc.

**Capital letter**: absolute pos; **lower case** is relative to the last point



```
<path d="M10 10 H 90 V 90 h -80 l 0 -60" />
```

# Live example

<https://codepen.io/kikohs/pen/RZazGp>



# Group and transform

<g> allows to group several svg elements (similar to div in HTML)

```
<g fill="red">  
  <rect x="0" y="0" width="10" height="10" />  
  <rect x="20" y="0" width="10" height="10" />  
</g>
```



The transform attribute allows to apply any transformations to your shapes

```
<rect x="0" y="0" width="10" height="10" transform="translate(30,40)" />
```



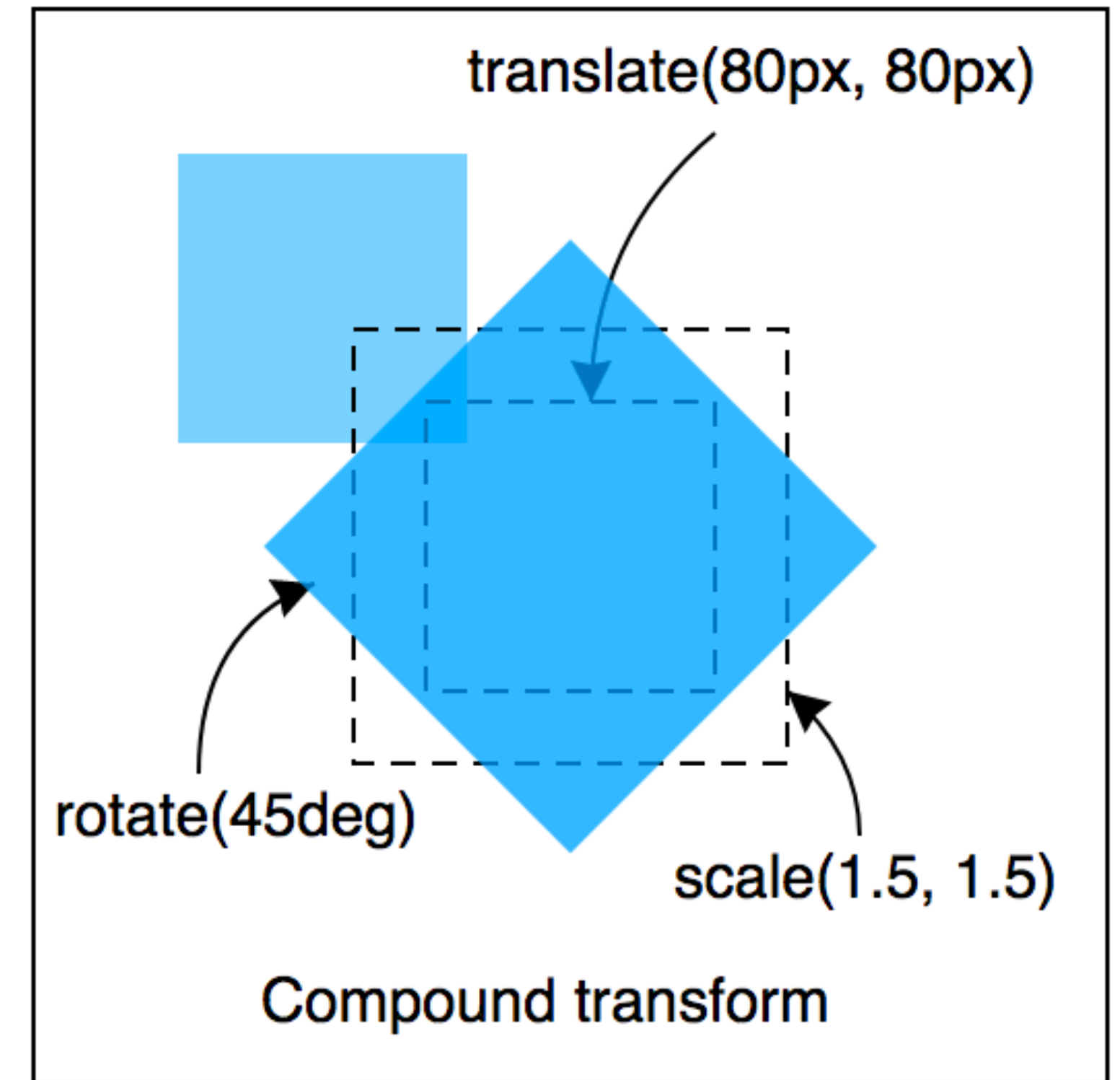
# List of transformations

Translation

Rotation

Skewing (alter in particular direction)

Scaling

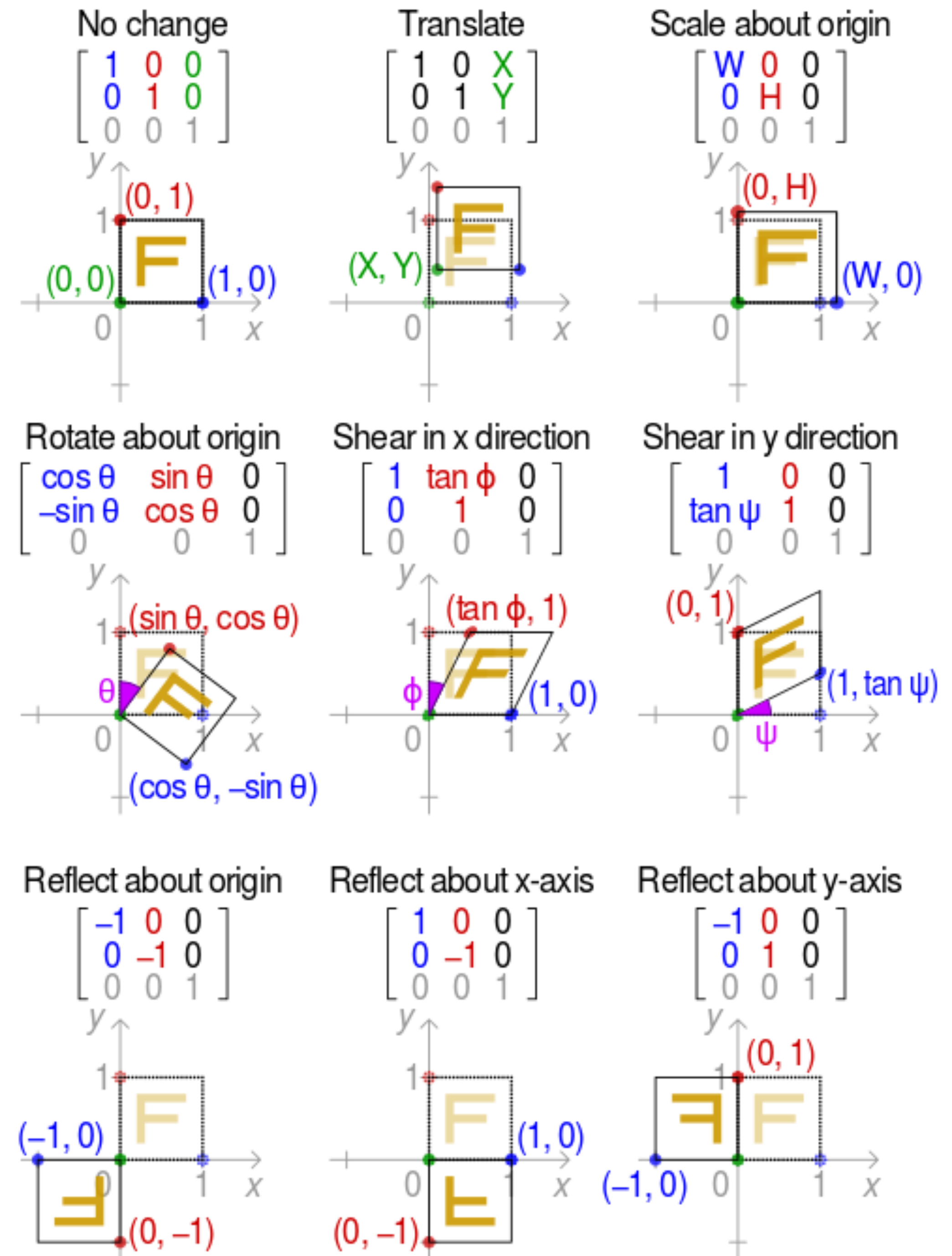


[www.w3.org](http://www.w3.org)

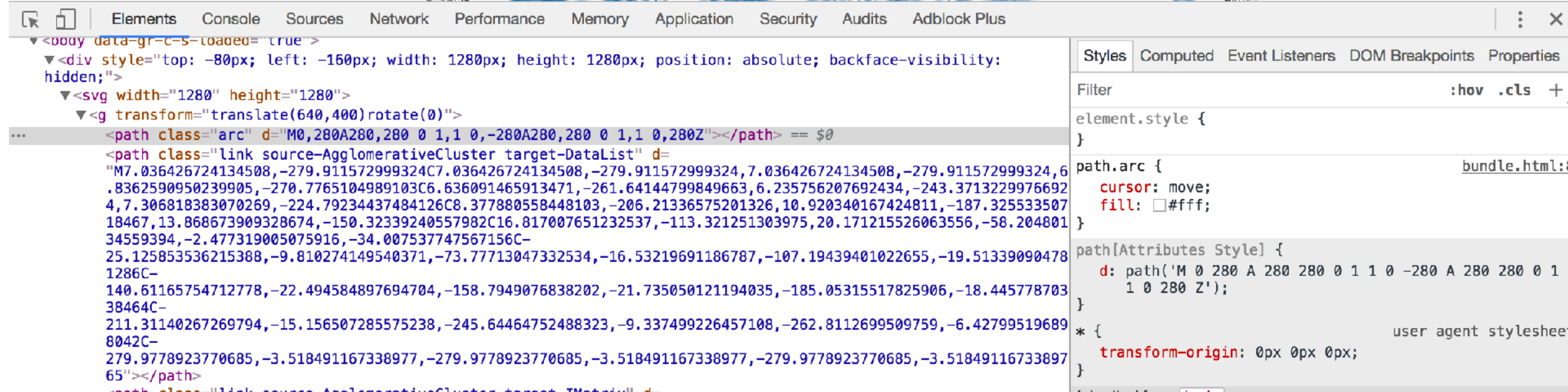
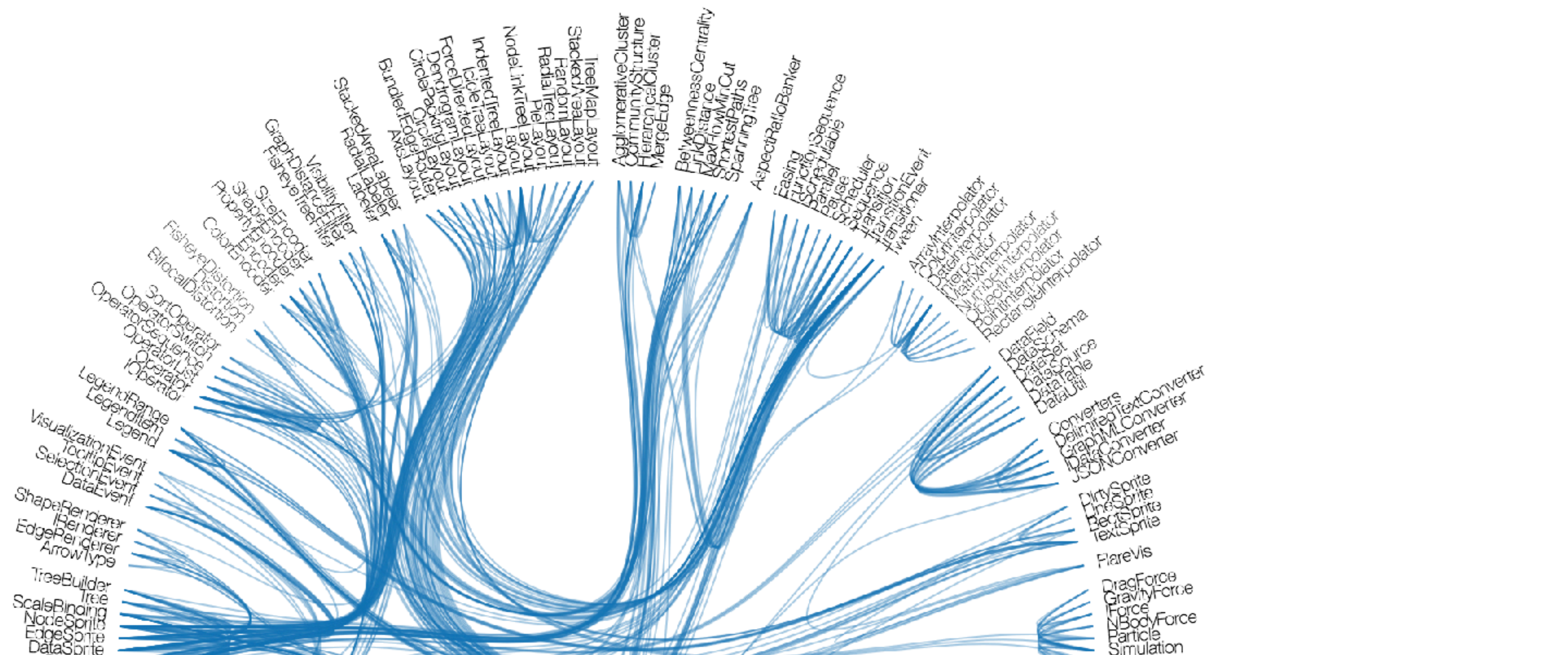
Add a third dimension point (x,y) to account for translation

$$\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & t_x \\ 0 & 1 & t_y \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}.$$

Complex transformations with matrix()









# Wrapping-up

HTML structures the content of a webpage and instruct the browser on how to display it

CSS styles the elements

SVG is a markup language to describe graphics

JS and d3.js will help us deal with complex SVG to create stunning charts



# Homework

**Finish MDN tutorials on HTML, CSS and SVG**

[https://developer.mozilla.org/en-US/docs/Learn/HTML/Introduction to HTML/Getting started](https://developer.mozilla.org/en-US/docs/Learn/HTML/Introduction_to_HTML/Getting_started)

[https://developer.mozilla.org/en-US/docs/Learn/CSS/Introduction to CSS/How CSS works](https://developer.mozilla.org/en-US/docs/Learn/CSS/Introduction_to_CSS/How_CSS_works)

<https://developer.mozilla.org/en-US/docs/Web/SVG/Tutorial>

**Read 3 first chapters**

<http://chimera.labs.oreilly.com/books/12300000000345>

