

*CS 641, Haik Sahakian*

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# Mobile Web Development

Mobile Graphics

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*Part 8*

# Mobile Graphics

# Types of Web Graphics



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# Types of Web Graphics

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What are the different types of web graphics?

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# Types of Web Graphics

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- ❖ Canvas
- ❖ SVG
- ❖ Canvas w / WebGL
- ❖ Styled DIVs
- ❖ Images: JPEG and PNG

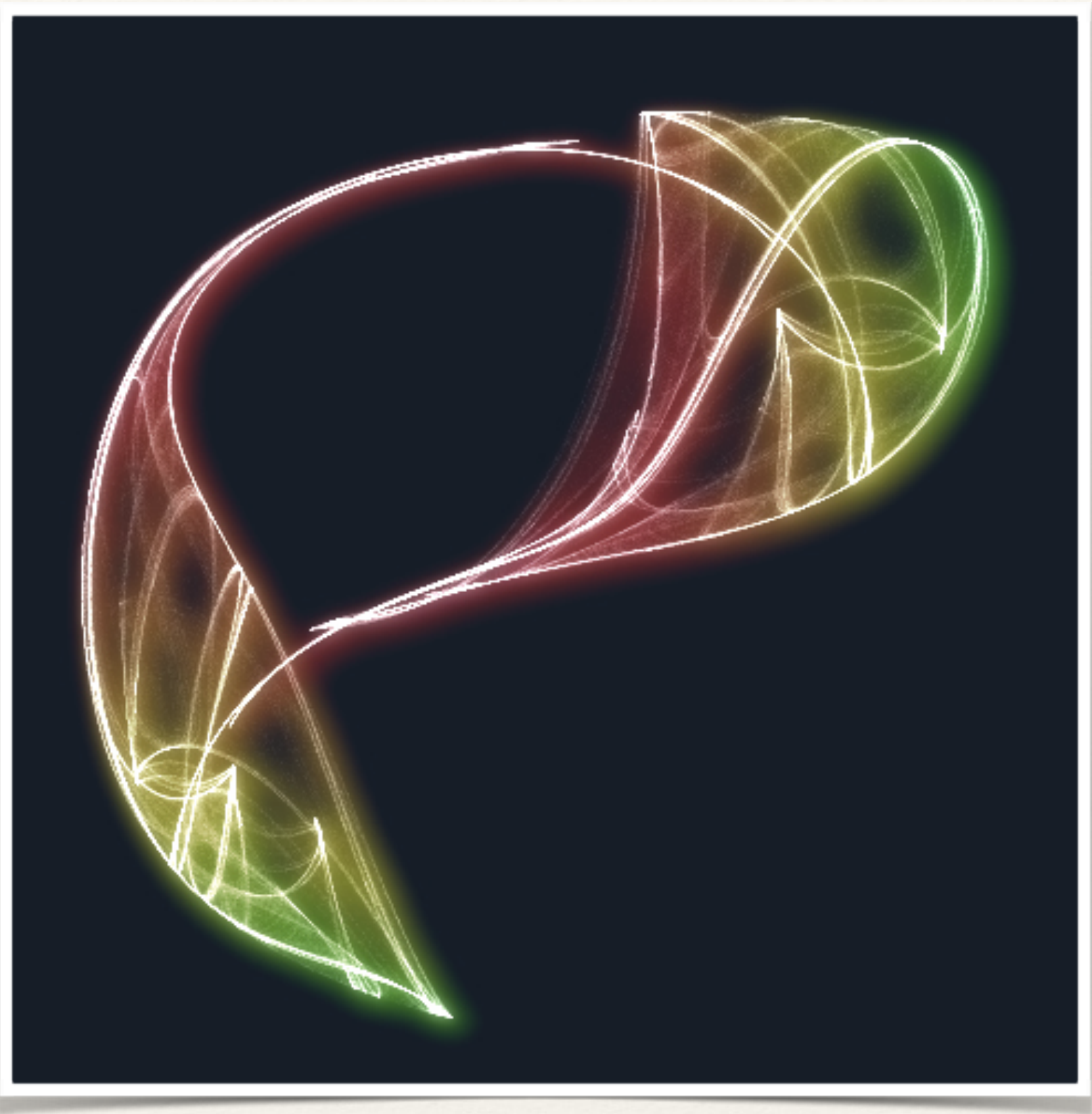
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# Canvas

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- ❖ Invented by Apple in 2004
- ❖ Bitmap object with JavaScript drawing commands
- ❖ No memory of commands. Similar to Windows or Mac OS graphics programming.
- ❖ No object-level selection or interactivity
- ❖ Fast
- ❖ IE 9+





Typical use of Canvas

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# Scalable Vector Graphics

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- ❖ Invented by W3C in 1999
- ❖ First implemented by Konqueror browser in 2004
- ❖ XML-based vector drawing language
- ❖ Complete memory of commands
- ❖ Excellent compression
- ❖ Fast, but slower than canvas
- ❖ IE 9+





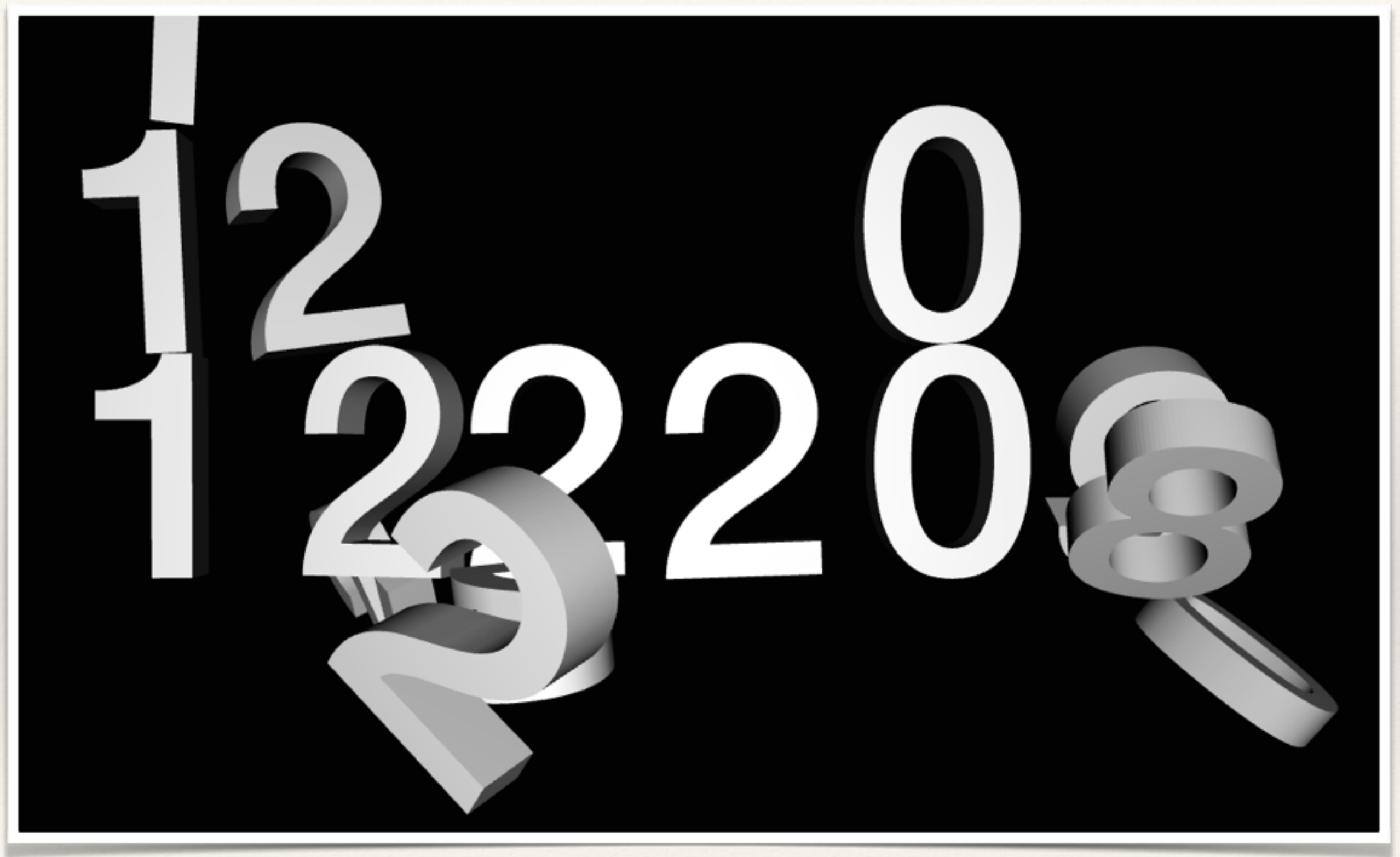
Typical use of SVG

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# Canvas with WebGL

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- ❖ Invented and shipped by Mozilla in 2007.
- ❖ Based on OpenGL-ES, a slim version of OpenGL meant for embedded systems.
- ❖ Relies on a GPU. Supported on mobile by iOS 8+ and some Android phones, such as the Samsung Galaxy S II.
- ❖ No memory of commands.
- ❖ Fast if you keep things simple. Often slow on phones.
- ❖ IE 11+



Typical use of WebGL

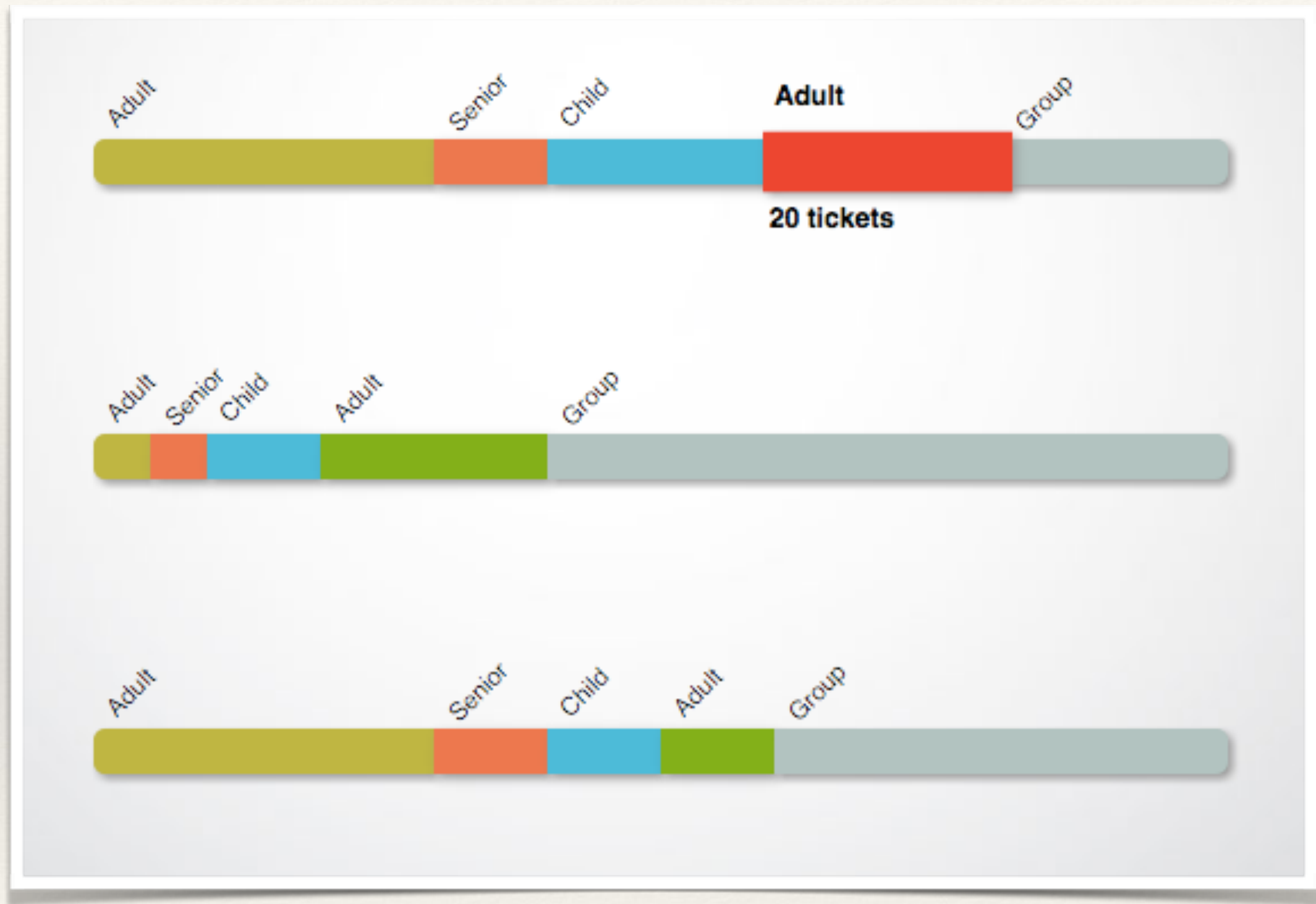


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# Styled DIVs

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- ❖ Any HTML tag can be used for graphics. DIVs are frequently used in this role because they are semantically neutral and have minimal default formatting.
- ❖ Limited to simple shapes.
- ❖ CSS-based animations and styling are extremely fast.
- ❖ No browser worries.



Typical use of styled DIVs for charting

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# Images

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- ❖ Can be cached separately, and served by a different server.
- ❖ Pre-rendered: faster but large file size.
- ❖ No browser worries.

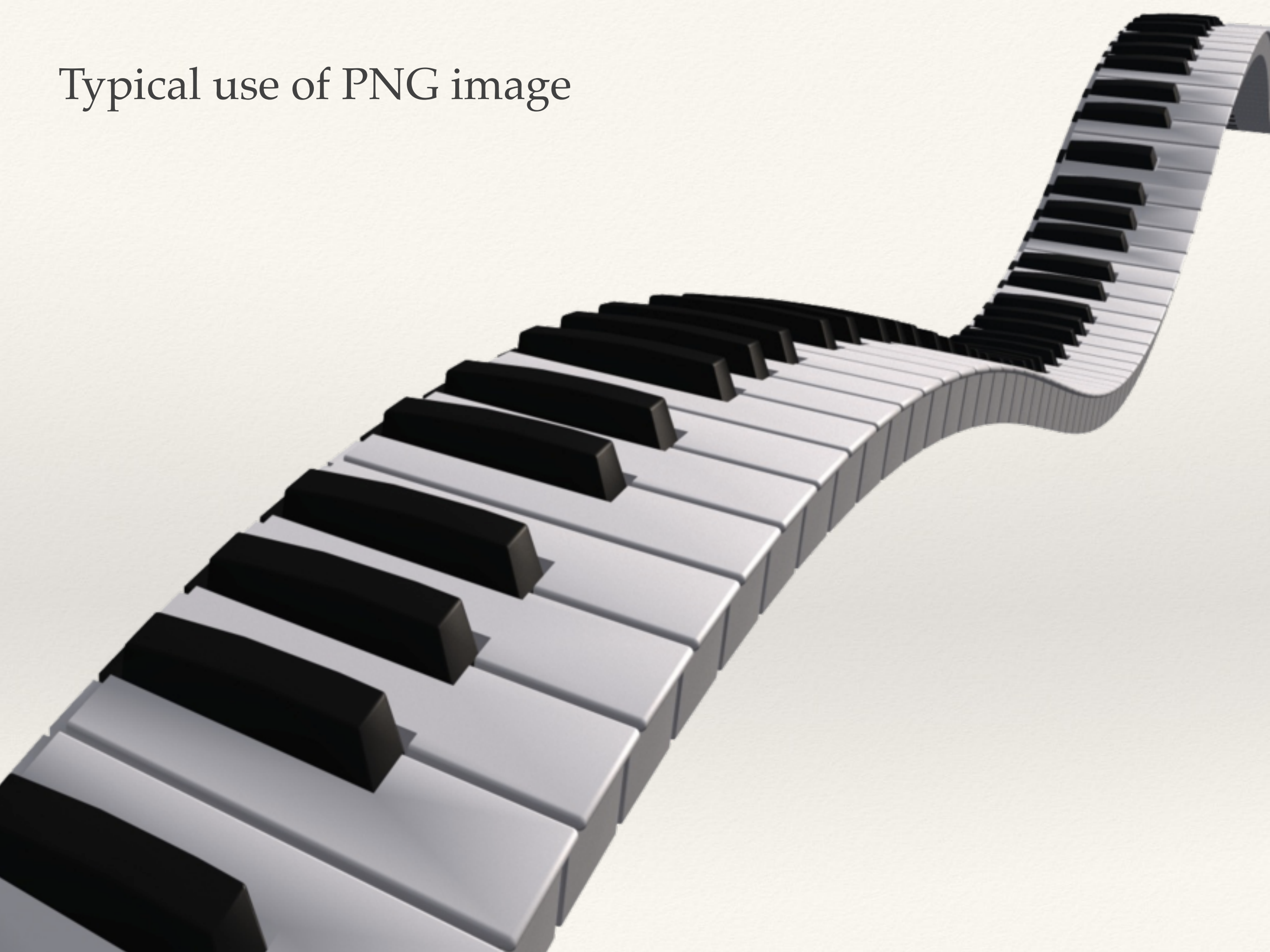




Typical use of JPEG image



Typical use of PNG image



# Graphics Libraries

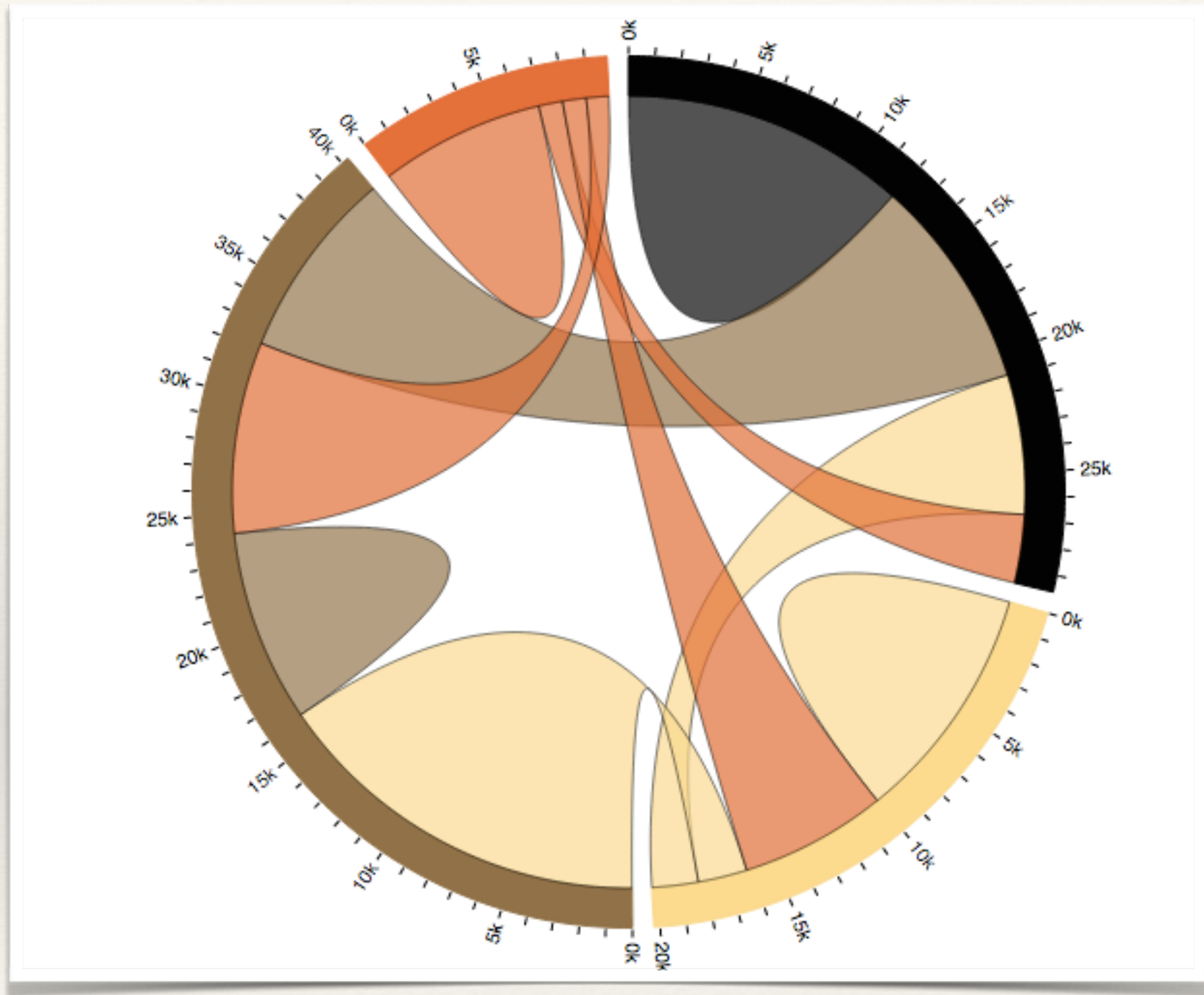


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# D3

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- ❖ By Mike Bostock. Often used on the New York Times web site.
- ❖ Binds data to html tags. As a result, it's useful for SVG and DIVs, but not Canvas or images which are not tag-based.
- ❖ Fast, even on phones.
- ❖ Popular for large-scale data visualizations, and often used in large companies.



Typical use of D3

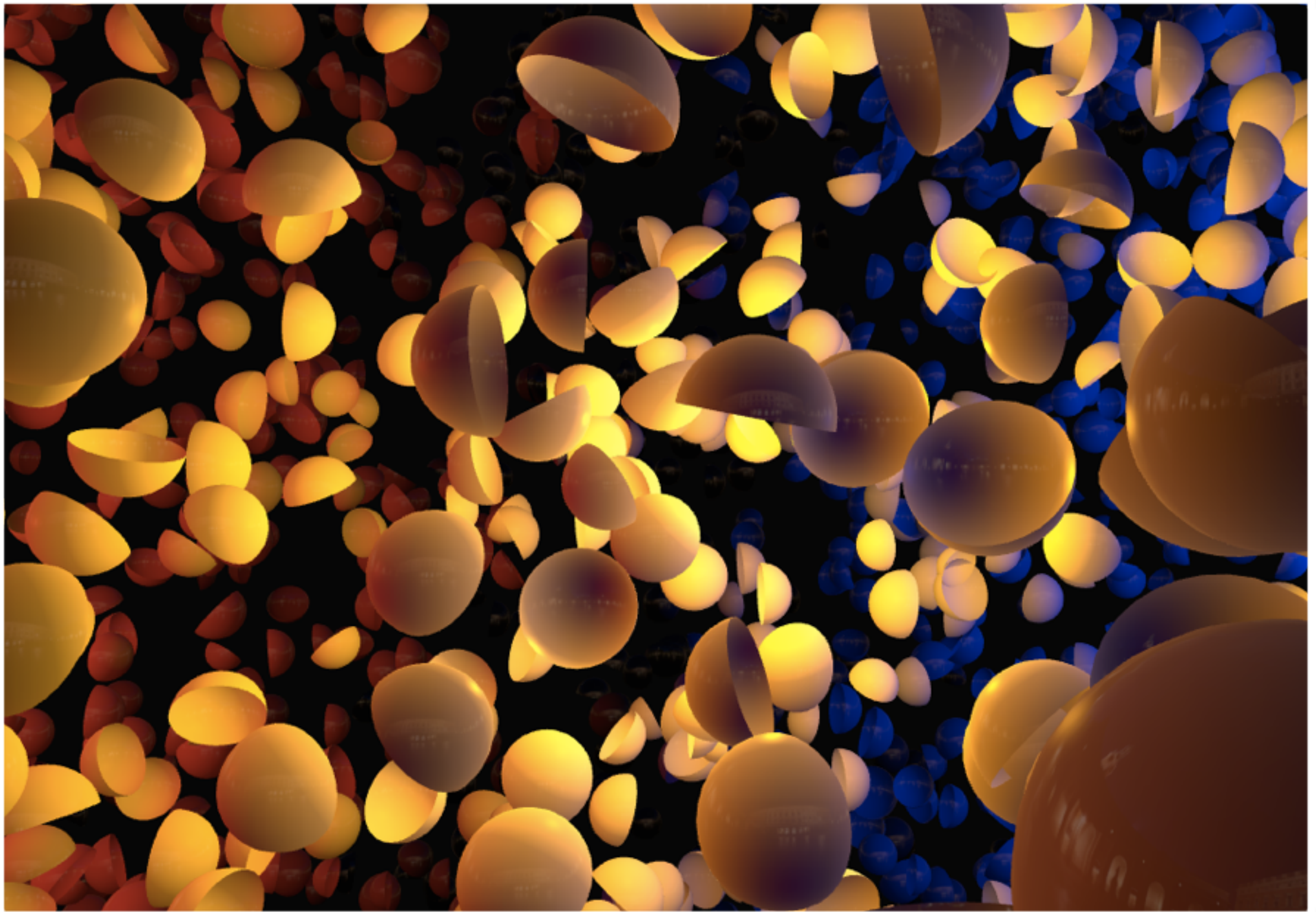
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# three.js

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- ❖ By Ricardo Cabello, and many subsequent committers.
- ❖ Provides its own high level language for 3D graphics programming.
- ❖ Offers a choice of renderers: WebGL (3D Canvas), 2D Canvas, and SVG. WebGL is the most popular.
- ❖ WebGL is a very verbose language, and well suited to being generated by a higher-level language such as three.js.





Typical use of three.js

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# Other Libraries

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There are many other graphics libraries available for the web. I've chosen to focus on D3 and three.js because they are very useful and popular.

It's worth quickly mentioning the HighCharts library as well. HighCharts is an easy to use and popular charting library, designed to only render about twenty predefined chart types, such as pie or bar charts. Within this limitation, it offers an easy to use API and excellent documentation.



## USD to EUR exchange rate from 2006 through 2008

Click and drag in the plot area to zoom in



Typical use of HighCharts



Questions?

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