

Course website

<https://go.uic.edu/CS526>

 **CS 526 - Computer Graphics II (Spring 2026)**

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Overview

Welcome to CS 526 Computer Graphics II

This is a graduate-level course that exposes students to state-of-the-art topics in computer graphics and visualization. The focus for this Spring 2026 term will be on **human factors in visualization, visual analytics, and virtual reality (VR)**. The course will emphasize perceptual theory, human-centered design, and empirical evaluation. We will study how properties of the human visual perception and cognition shape the effectiveness of visualization techniques and immersive environments. We will also discuss perceptual and cognitive models relevant to the design of these systems. We will study how to apply experimental techniques from psychology and HCI to conduct user studies to evaluate the effectiveness of graphical encodings, or to measure the user experience.

The course will be research-oriented, with many of the topics driven by papers in the field, which we will present, discuss, and critique in class. Students will also undertake research projects to validate specific visualizations/VR techniques through user studies, develop models to predict the effectiveness of these techniques, or create new techniques that enable better perception, sensemaking, or engagement. As part of the course, students will learn how to use web-based graphics and visualization libraries (D3 and Three.js) to design prototypes and experimental apparatus for data collection.

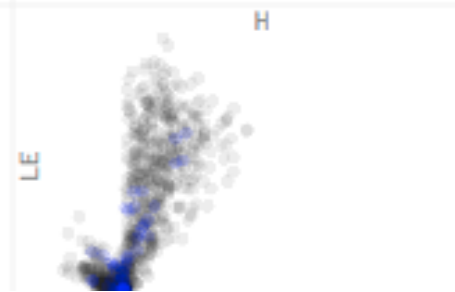
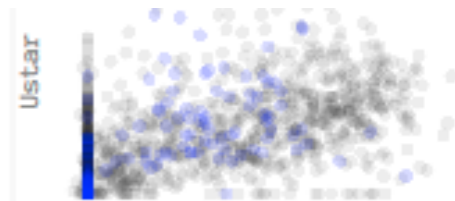
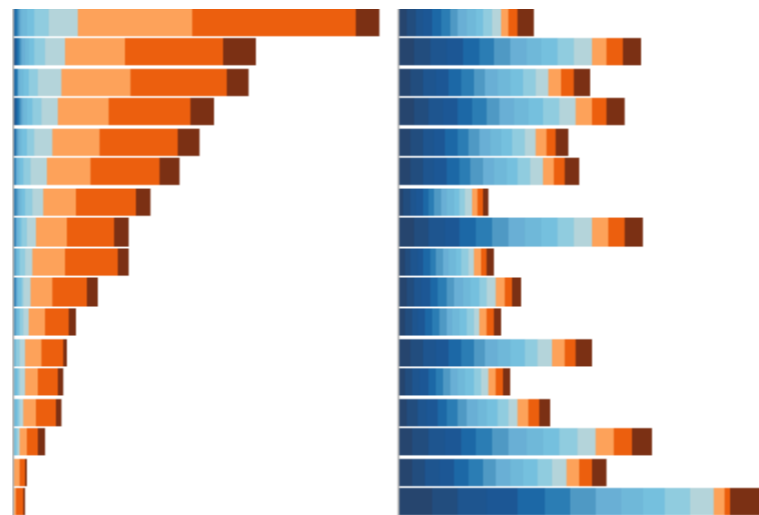
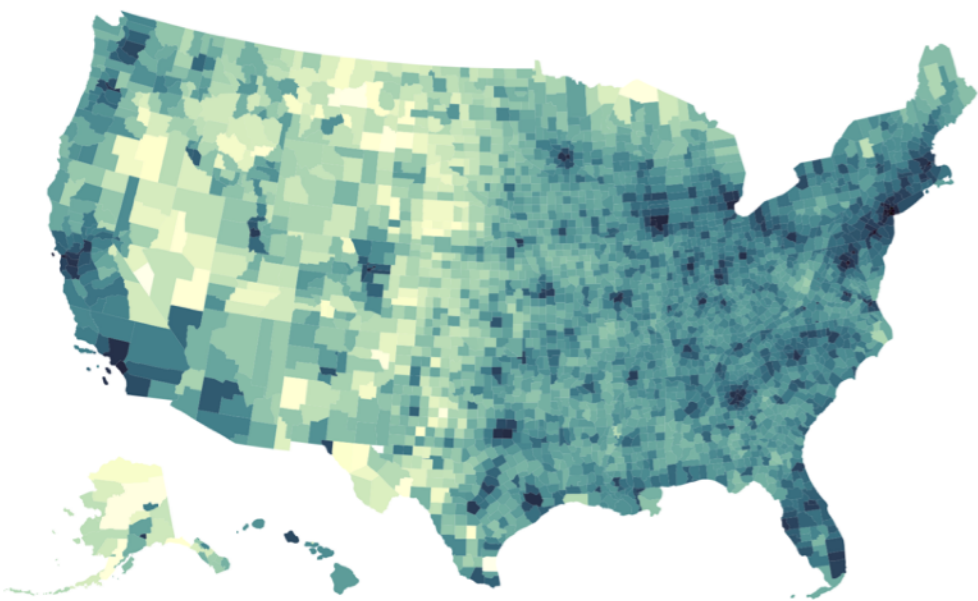
Piazza

[piazza.com/uic/
spring2026/cs526](https://piazza.com/uic/spring2026/cs526)

vr dnylp l ztm

**Signup for paper
slots!**

Out soon



CS526

Computer Graphics II

Intro to HTML, JavaScript, and D3

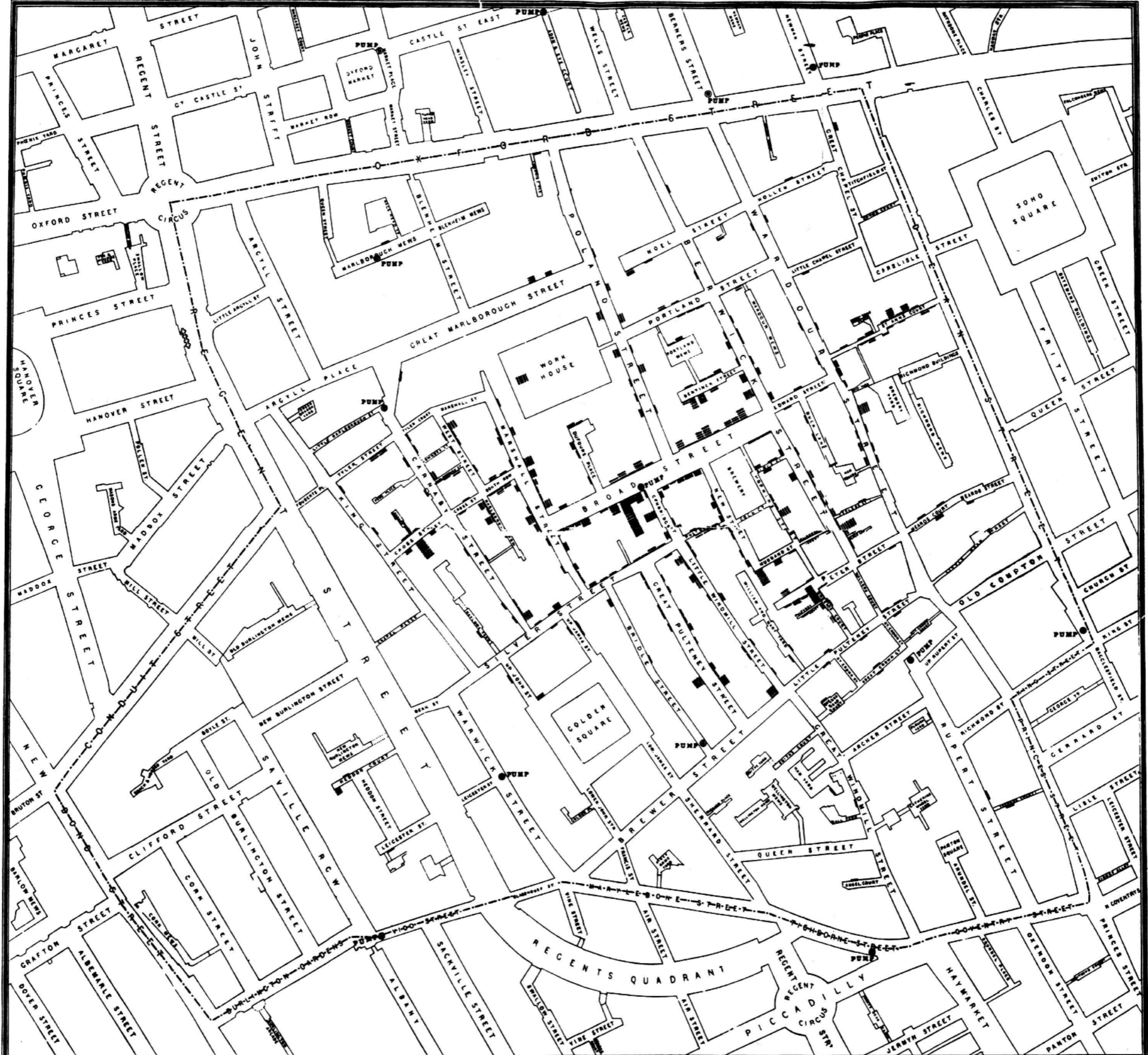
Khairi Reda | redak@uic.edu
Computer Science, UIC



Last lecture...

Why use **vision** to analyze information?

1. Vision is the highest bandwidth channel into our brain
2. Cognition is limited. Perception beats cognition
3. Working memory is limited; external representations expand our memory
4. Visuals are an integral part of our culture



Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M.M. Chiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre. Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davout qui avaient été détachés sur Minsk et Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

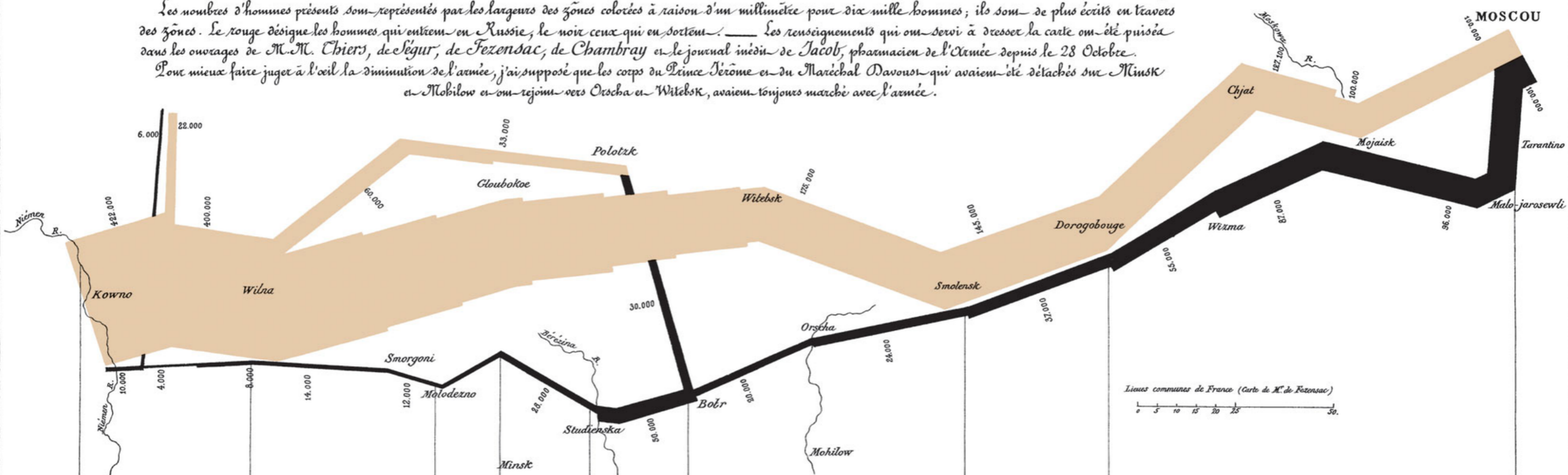
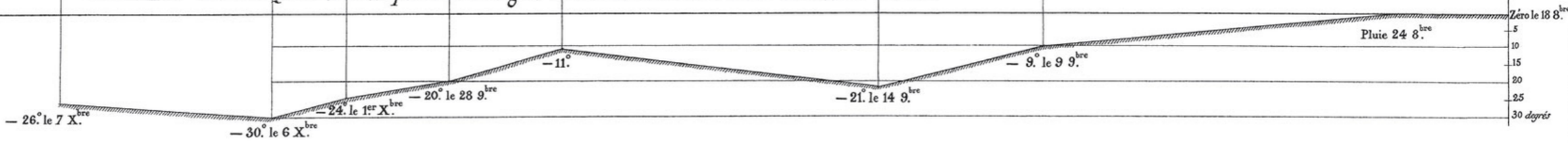


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

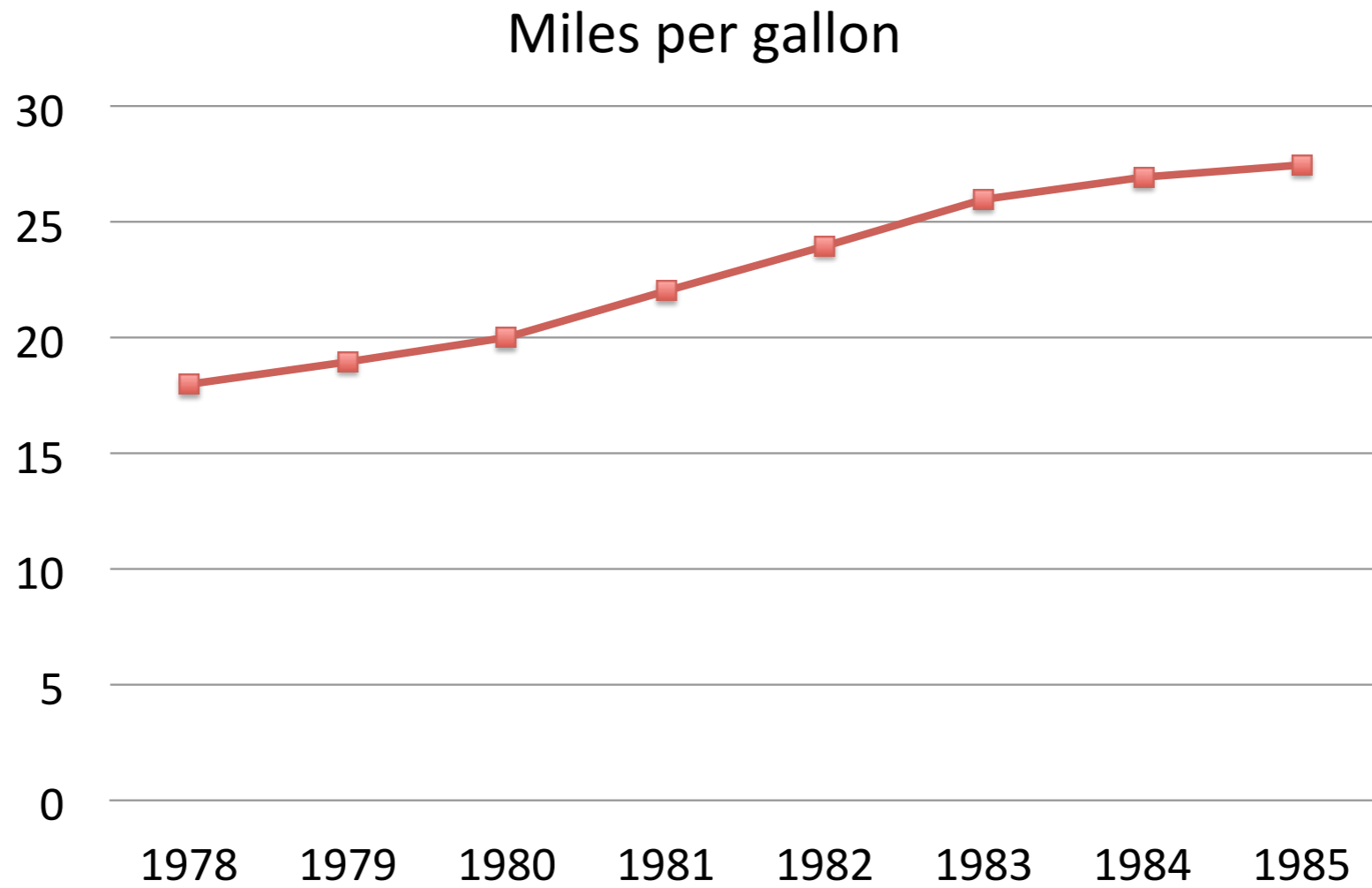
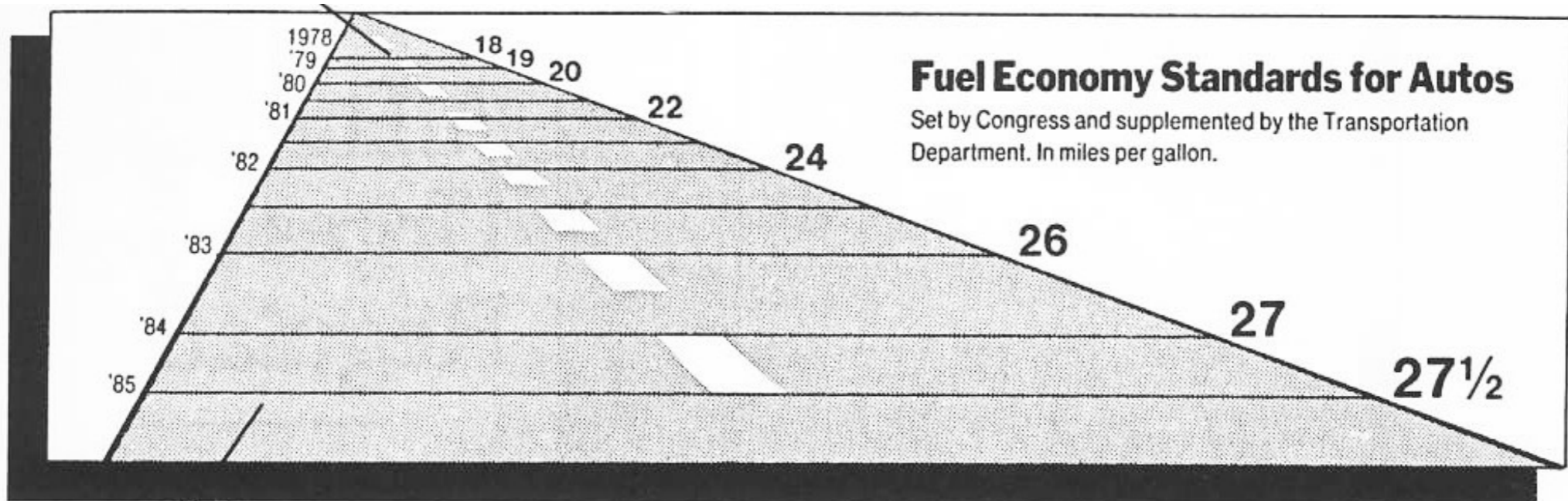


Les Cosaques passent au galop le Niemen gelé.

Autog. par Regnier, 8. Pas. S^{te} Marie S^{te} O^{me} à Paris.

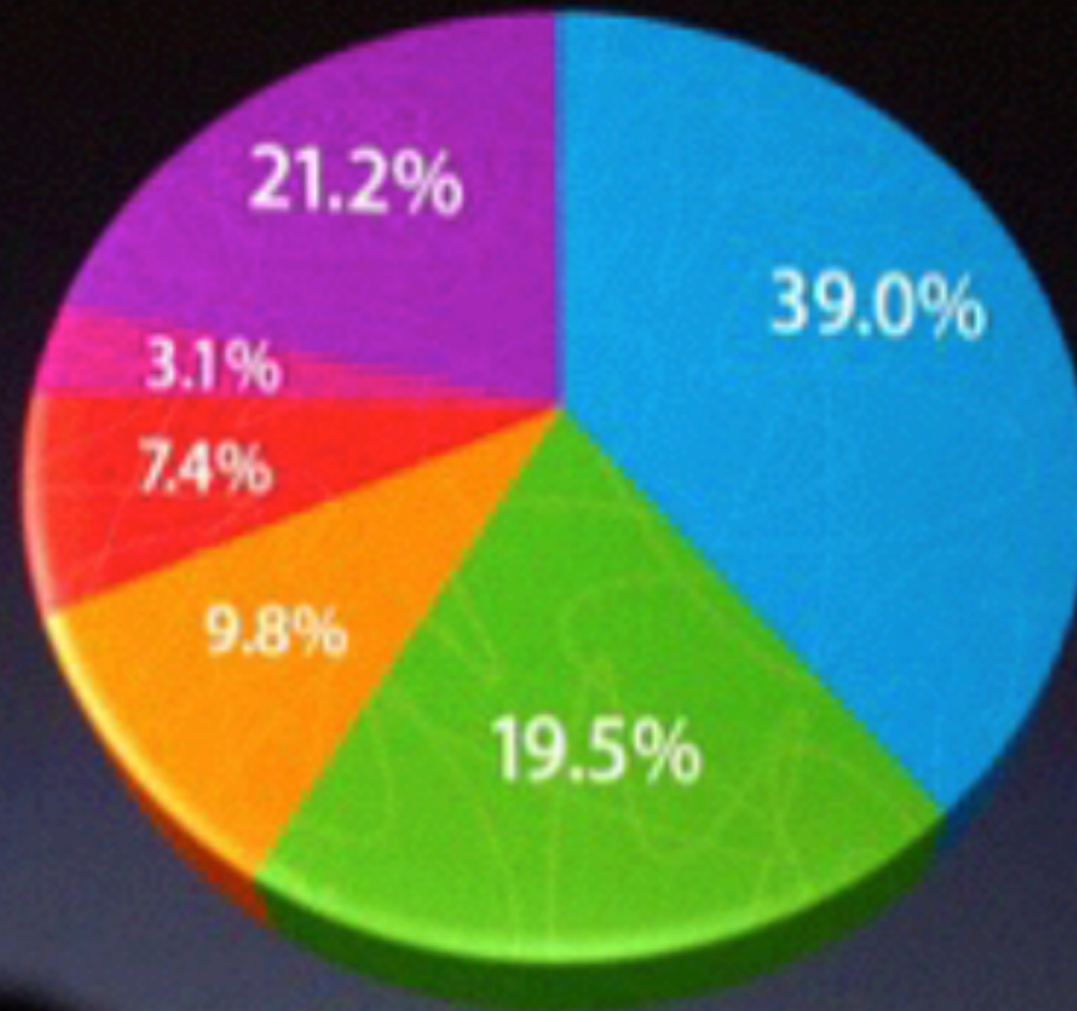
Imp. Lith. Regnier et Doucet.

Charles Menard. Napoleon's 1812 campaign to Moscow



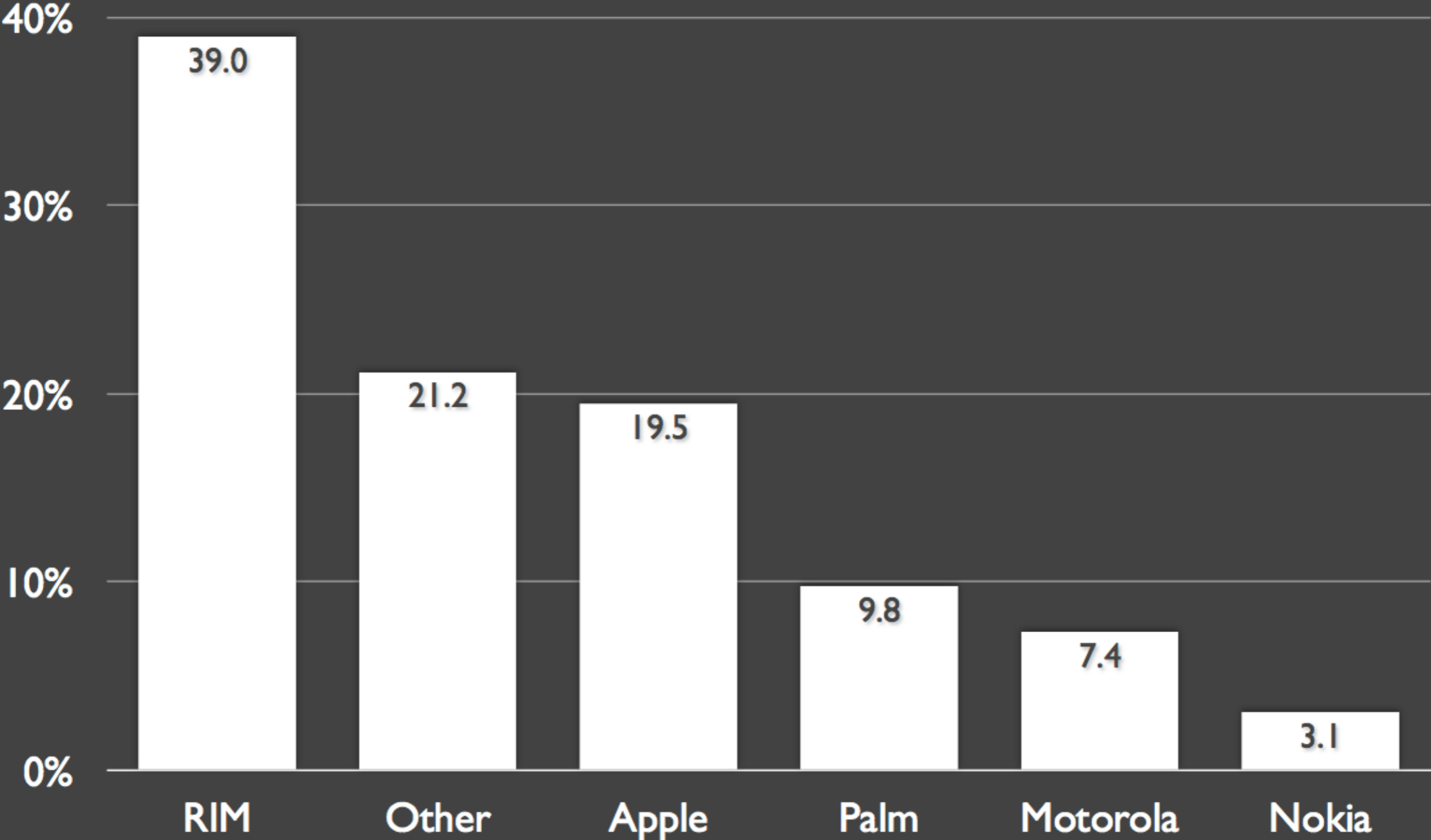
U.S. SmartPhone Marketshare

- RIM
- Apple
- Palm
- Motorola
- Nokia
- Other



Based on reporting by the Guardian
(<https://www.theguardian.com/technology/blog/2008/jan/21/liesdamnliesandstevejobs>)
Via Miriah Meyer

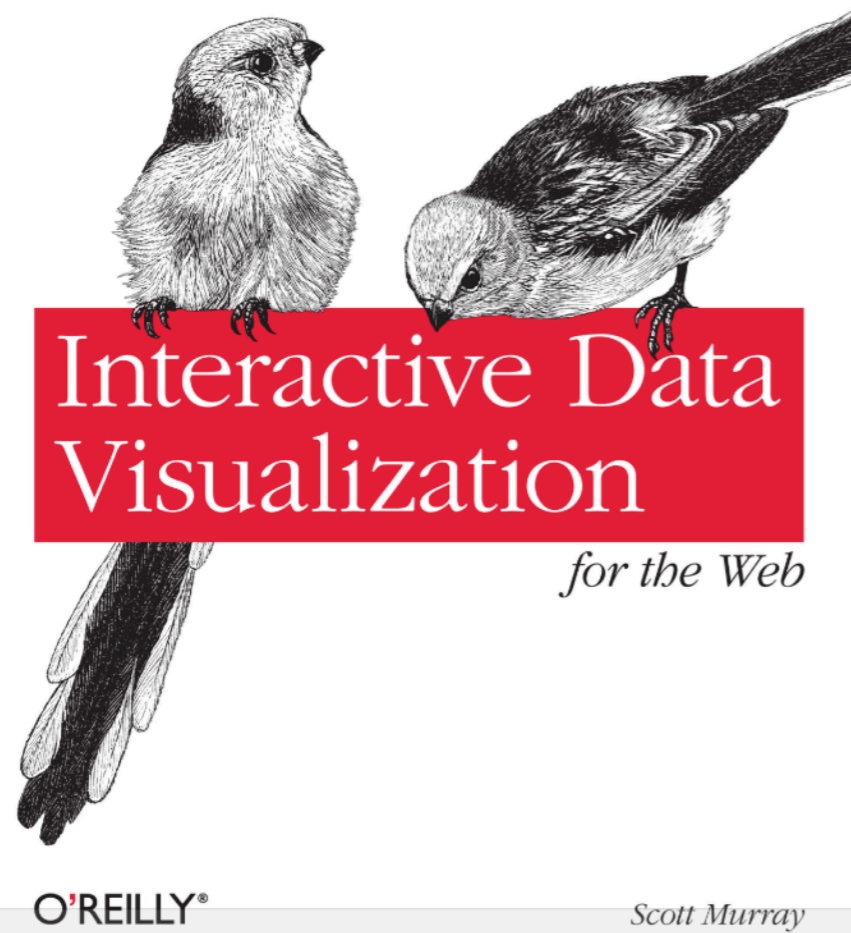
US smart phone marketshare



Today

Intro to HTML, JavaScript, and D3

An Introduction to Designing With D3



Chapters 1-6

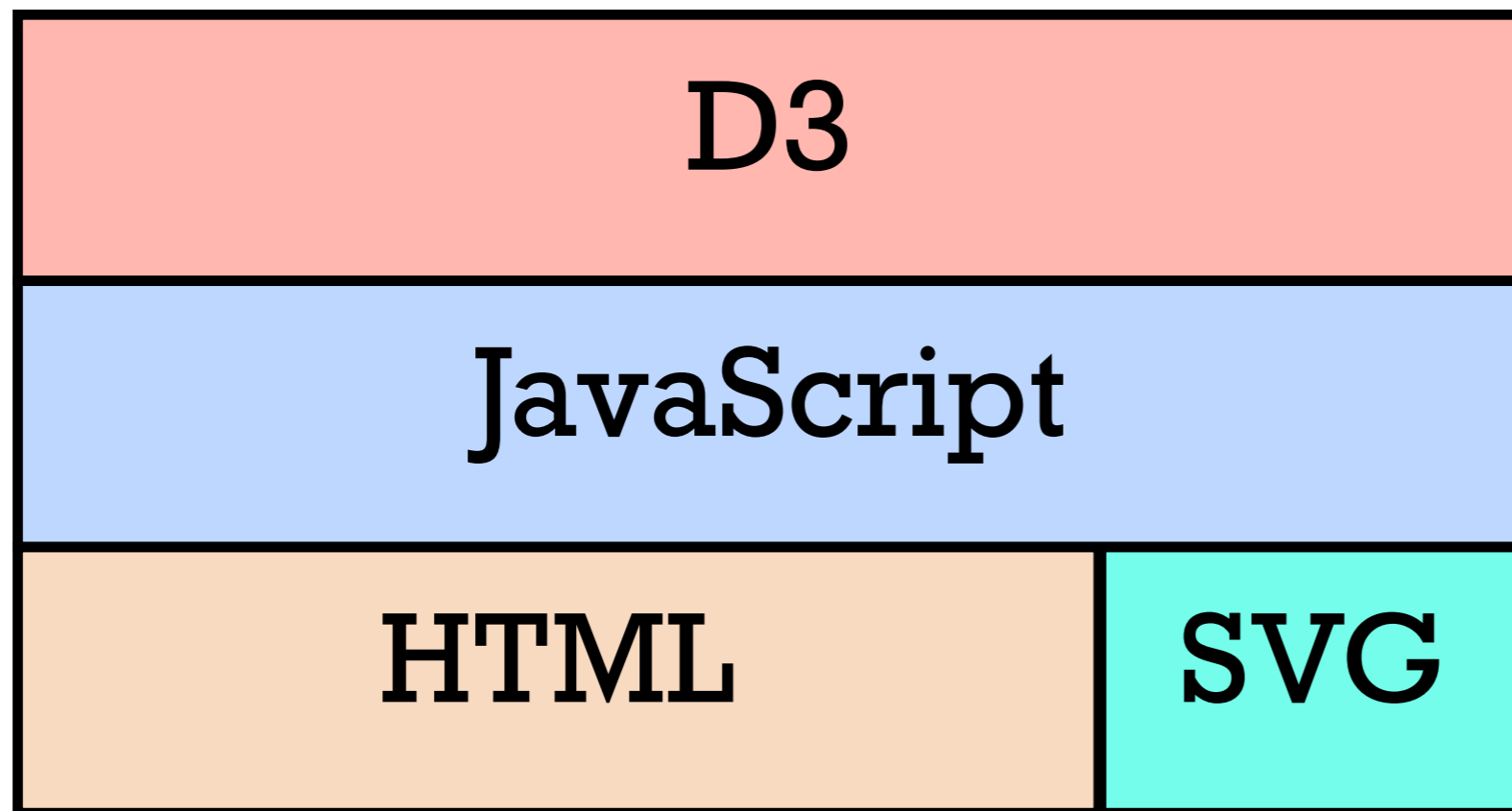
Next week: Chapters 7-10

Homework 0

Extension:

Wednesday Sep 8 5:59pm

The D3 stack



Hypertext markup language

**Scalable
Vector graphics**



D3

**Note: for compatibility with the book, we will use
D3 version 3**

HTML example

```
1 <html>
2   <head>
3     <title>Test</title>
4   </head>
5
6   <body>
7     <p>This is a paragraph!</p>
8
9     <p>We can break a line in a paragraph with a self-closing <br /> br tag. </p>
10
11    <br>
12      Include an image. The src attribute defines a link to the image/
13  </body>
14 </html>
```

This is a paragraph!

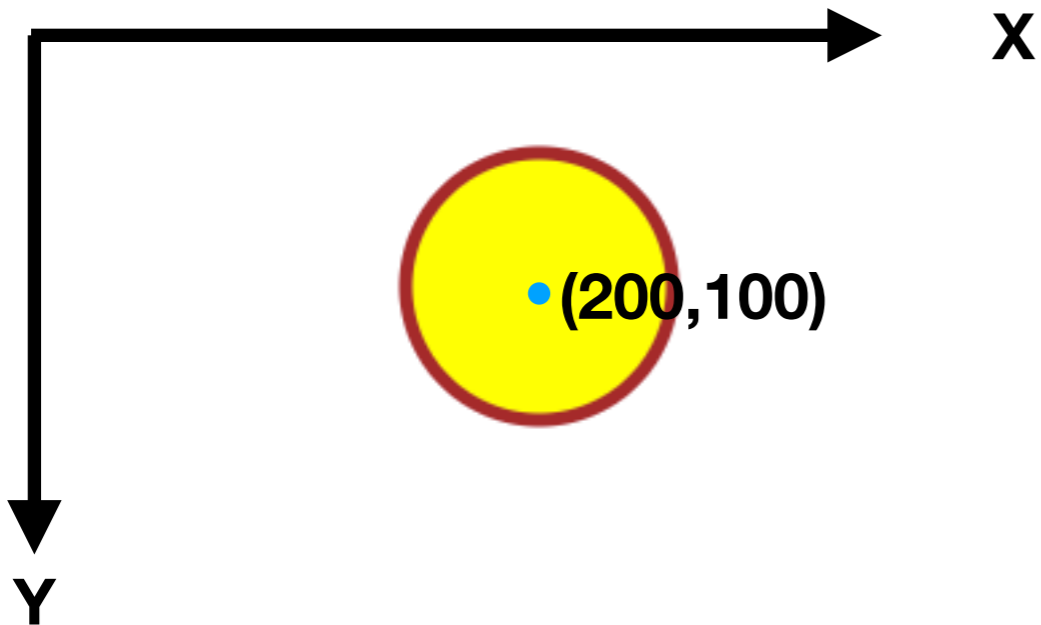
We can break a line in a paragraph with a self-closing
br tag.



Include an image. The src attribute defines a link to the image.

SVG

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title></title>
6 </head>
7 <body>
8 <svg width="400" height="200">
9   <circle cx="200" cy="100" r="50"
10     style="fill:yellow; stroke:brown; stroke-width:5px"/>
11 </svg>
12 </body>|
13 </html>
```



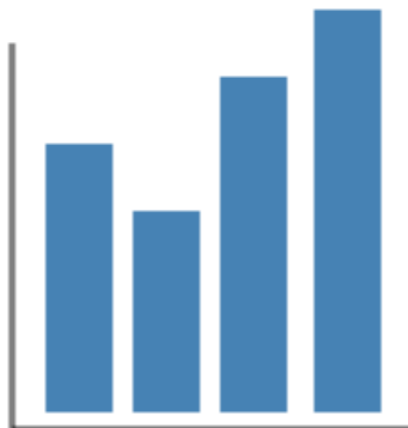
SVG

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title></title>
6 </head>
7 <body>
8 <svg width="200" height="200">
9   <circle cx="50" cy="50" r="10" />
10  <circle cx="80" cy="80" r="10" />
11  <circle cx="110" cy="50" r="10" />
12  <circle cx="140" cy="90" r="10" />
13 </svg>
14 </body>
15 </html>
```



SVG: a bar chart

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title></title>
6   <style>
7     rect {
8       fill: steelblue
9     }
10  </style>
11 </head>
12 <body>
13 <svg width="200" height="200">
14   <rect x="50" y="50" width="20" height="80" />
15   <rect x="76" y="70" width="20" height="60" />
16   <rect x="102" y="30" width="20" height="100" />
17   <rect x="130" y="10" width="20" height="120" />
18   <line x1="40" x2="160" y1="135" y2="135" stroke="black" />
19   <line x1="40" x2="40" y1="20" y2="135" stroke="black" />
20
21
22 </svg>
23 </body>
24 </html>
```



Exercise:

Create a bar chart in SVG to visualize the following dataset:

Pets animals from a neighborhood survey:

cats	45
dogs	21
iguanas	102

Use the following SVG elements:

```
<rect x="" y="" width="" height="" />
```

```
<line x1="" x2="" y1="" y2="" />
```

```
<text x="" y="">Label here</text>
```

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title></title>
6   <style>
7     rect {
8       fill: steelblue
9     }
10  </style>
11 </head>
12 <body>
13 <svg width="200" height="200">
14   <rect x="50" y="50" width="20" height="80" />
15   <rect x="76" y="70" width="20" height="60" />
16   <rect x="102" y="30" width="20" height="100" />
17   <rect x="130" y="10" width="20" height="120" />
18   <line x1="40" x2="160" y1="135" y2="135" stroke="black" />
19   <line x1="40" x2="40" y1="20" y2="135" stroke="black" />
20
21
22 </svg>
23 </body>
24 </html>
```

Exercise 2:

Repeat the previous exercise. Instead of “hardcoding” the attributes of SVG elements, adjust them programmatically using JavaScript

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title></title>
6 </head>
7 <body>
8 <svg width="400" height="200">
9
10  <rect id="bar1" x="50" y="50" width="30" height="100" style="fill: steelblue"/>
11  <rect id="bar2" x="92" y="50" width="30" height="100" style="fill: steelblue"/>
12  <rect id="bar3" x="134" y="50" width="30" height="100" style="fill: steelblue"/>
13
14  <line x1="40" x2="220" y1="150" y2="150" stroke="black"/>
15  <line x1="40" x2="40" y1="0" y2="150" stroke="black"/>
16
17 </svg>
18
19 <script type="text/javascript">
20
21   var CHART_HEIGHT = 130;
22
23   var pets = [45, 21, 102];
24
25   for (var i=0; i<pets.length; i++) {
26
27     var bar = document.getElementById("bar" + (i+1));
28
29     bar.setAttribute('height', (pets[i] / 102) * CHART_HEIGHT);
30   }
31 </script>
32
33 </body>
34 </html>
```

Pets dataset
as an array

For loop to iterate
through dataset

Get a reference to a
“rect” element

Adjust “height”
attribute

Exercise 3:

Repeat the previous exercise. Instead of using pure JavaScript, use D3 selections

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <script src="https://d3js.org/d3.v3.min.js"></script>
6   <title></title>
7 </head>
8 <body>
9 <svg width="400" height="200">
10
11   <rect id="bar1" x="50" y="50" width="30" height="100" style="fill: steelblue"/>
12   <rect id="bar2" x="92" y="50" width="30" height="100" style="fill: steelblue"/>
13   <rect id="bar3" x="134" y="50" width="30" height="100" style="fill: steelblue"/>
14
15   <line x1="40" x2="220" y1="150" y2="150" stroke="black"/>
16   <line x1="40" x2="40" y1="0" y2="150" stroke="black"/>
17
18 </svg>
19
20 <script type="text/javascript">
21
22   var CHART_HEIGHT = 130;
23
24   var pets = [45, 21, 102];
25
26   var selection = d3.select('svg').selectAll('rect').data(pets)
27   selection.attr('height', function(d) { return (d/102) * CHART_HEIGHT; });
28 </script>
29
30 </body>
31 </html>
```

selection and
data binding

selection and
data binding

Client and server run on the same computer

Installing Python web-server: go.uic.edu/webserver

```
[ redak khairis-mbp Desktop ] cd webserver  
[ redak khairis-mbp webserver ] ls  
cat.jpg  
[ redak khairis-mbp webserver ] python3 -m http.server
```

Exercise 4:

Loading a CSV file and visualizing the data

<http://khreda.com/teaching/cs526/d3-exercises/>