CS50 Beyond

Course Overview

Topics

- HTML5, CSS3
- Git
- JavaScript, Functional Programming
- Python, Flask
- Database Design, SQL, ORM, APIs
- React
- Scalability, Security

Schedule

- 7 days, Saturday January 19 — Friday January 25
- 10am-5pm
  - 10am-12:30pm : Morning Session
  - 12:30pm-2pm: Lunch
  - 2pm-5pm: Afternoon Session

Staff

Instructor

- Brian Yu

Teaching Fellows

- Athena Braun
- Josh Sacher
- Krishna Suraj
- Julia Pearl

Website

- cs50.harvard.edu/beyond

Agenda

- HTML
  - HTML5 Features
  - Regular Expressions
- CSS
  - Selectors, Combinators, Specificity
  - Box Model
  - Responsive Design

HTML

```
<!DOCTYPE html>
<html>
    <head>
        <title>Hello!</title>
    </head>
    <body>
        Hello, world!
    </body>
</html>
```

Common HTML Elements

- `<h1>, <h2>, ..., <h6>`
- `<ol>, <ul>`
- `<img>`
- `<a>`
- `<table>`
- `<form>`

Links

- Linking to local page
- Linking to external page
- Linking to same page

Page Organization

HTML4

- `<div class="header">`
- `<div class="nav">`
- `<div class="section">`
- `<div class="footer">`

HTML5

- `<header>`
- `<nav>`
- `<section>`
- `<footer>`

New HTML5 Features

- contenteditable
- datalist
- pattern
- audio
- video
- ...

Regular Expressions

- Define a "regular language"
- Used in string searching algorithms
- Basic Operations
  - Concatenation
  - Alternation
  - Kleene Star

Regular Expressions

Expression:

```
hi
```

Matches:

hi

Regular Expressions

Expression:

```
hi|hello
```

Matches:

```
hi
hello
```

Regular Expressions

Expression:

```
hi?
```

Matches:

```
h
hi
```

Regular Expressions

Expression:

```
hi*
```

Matches:

```
h
hi
hii
hiii
hiiii
...
```

Regular Expressions

Expression:

```
hi+
```

Matches:

```
hi
hii
hiii
hiiii
...
```

Regular Expressions

Expression:

```
hi{3}
```

Matches:

```
hiii
```

Regular Expressions

Expression:

.

Matches:

a
A
2
8
!
. . .

Regular Expressions

Expression:

\.

Matches:

.

Regular Expressions

Expression:

```
[a-z]
```

Matches:

```
a
b
c
...
z
```

Regular Expressions

Expression:

```
[A-Z]
```

Matches:

A
B
C
...
Z

Regular Expressions

Expression:

```
[0-9]
```

Matches:

```
0
1
2
...
9
```

Regular Expressions

Expression:

```
[0-9]{3}-[0-9]{3}-[0-9]{4}
```

Matches:

```
123-456-7890
617-495-1000
555-555-5555
...
```

Regular Expressions

Expression:

```
.+@.+\..+
```

Matches:

```
name@example.com
person@gmail.com
foo@bar.net
...
```

Regular Expressions

Expression:

```
0|-?[1-9][0-9]*
```

Matches:

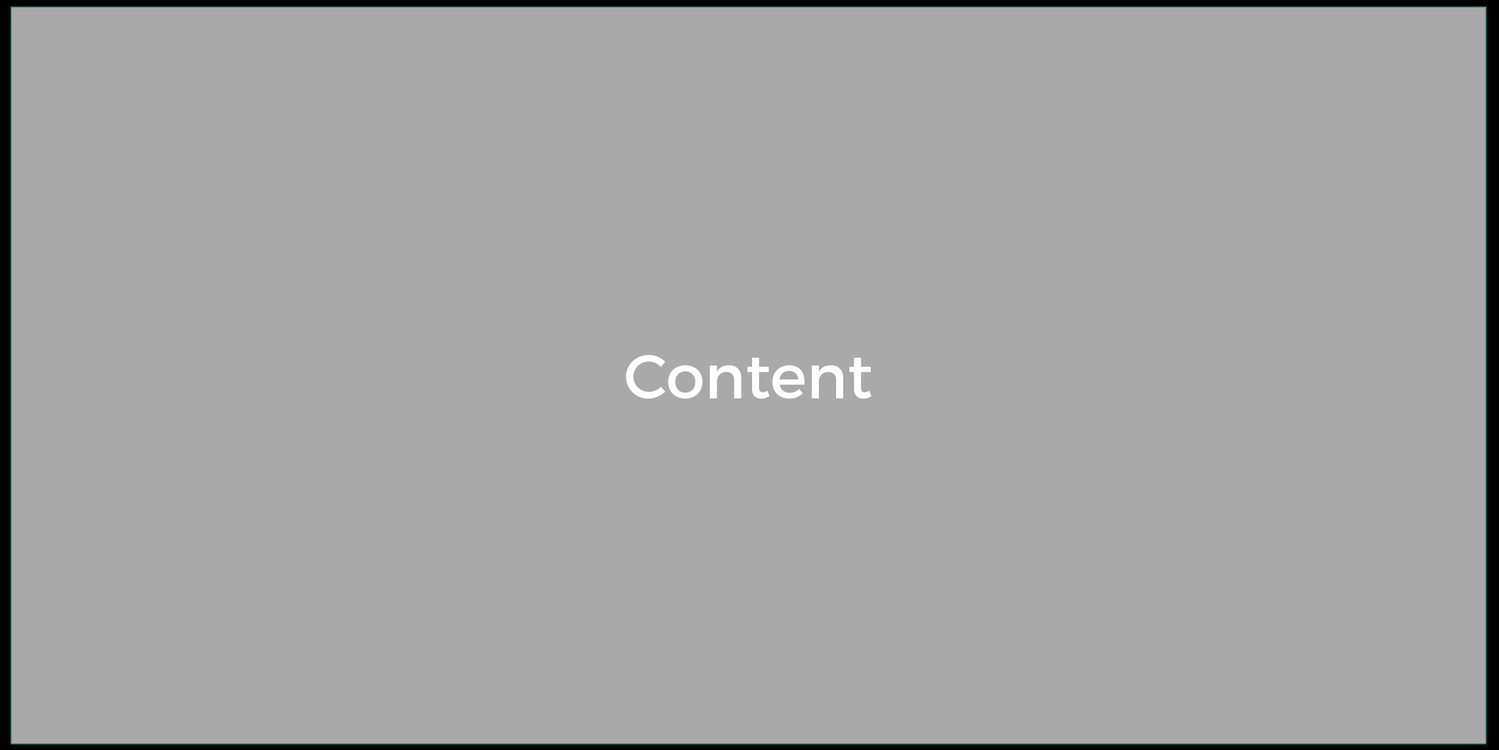
```
0
2
28
-2
-28
...
```

CSS

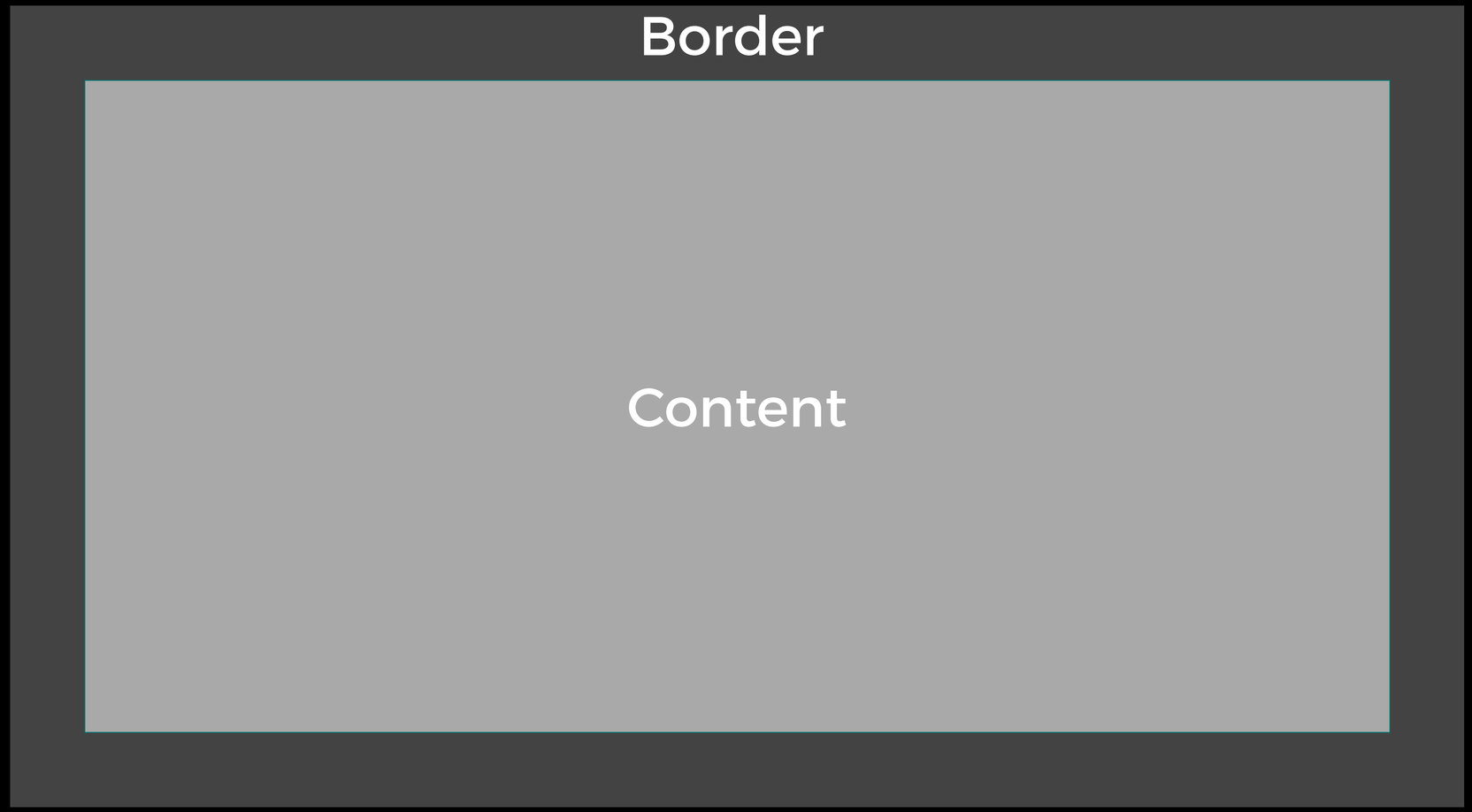
Common CSS Properties

- color
- text-align
- width, height
- margin, padding
- font-family, font-size, font-weight
- border

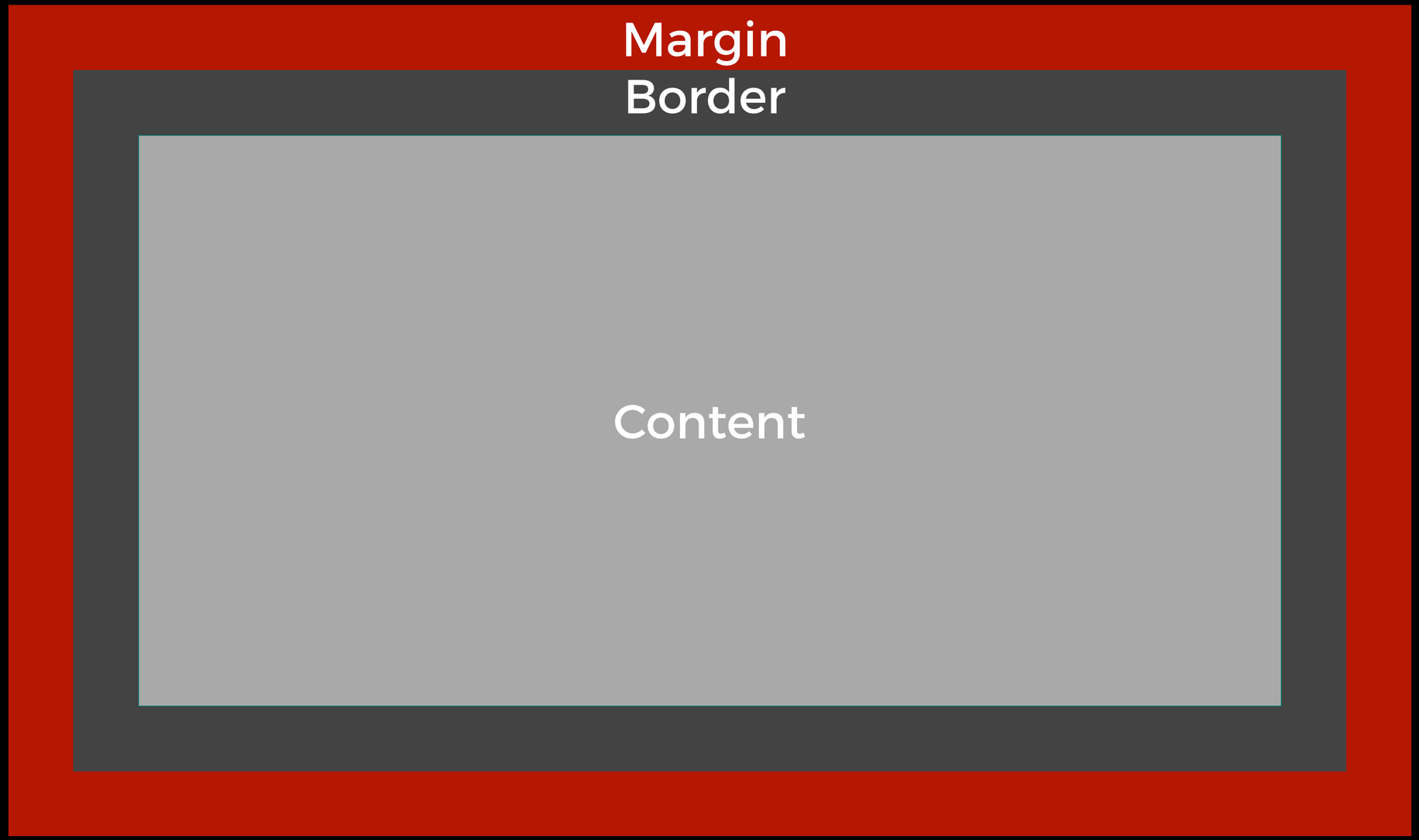
CSS Box Model



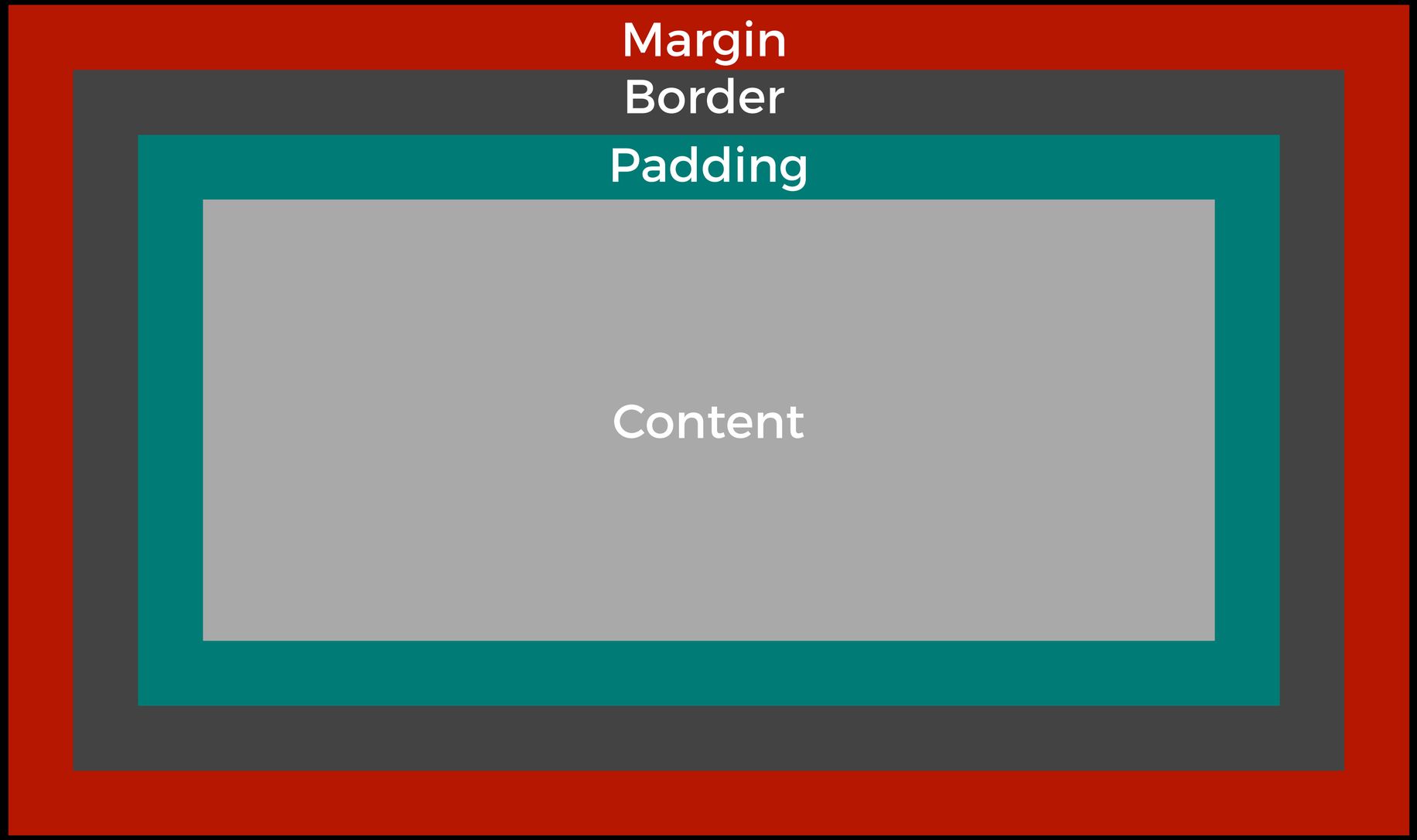
CSS Box Model



CSS Box Model



CSS Box Model



Identifying Elements

- `div`
- `span`
- `id`
- `class`

Selectors

Selector	Purpose
a, b	Multiple Element Selector
a b	Descendant Selector
a > b	Child Selector
a + b	Adjacent Sibling Selector
[a=b]	Attribute Selector
a:b	Pseudoclass Selector
a::b	Pseudoelement Selector

Specificity

1. inline
2. id
3. class
4. type

RGB Colors

#4682b4

R G B

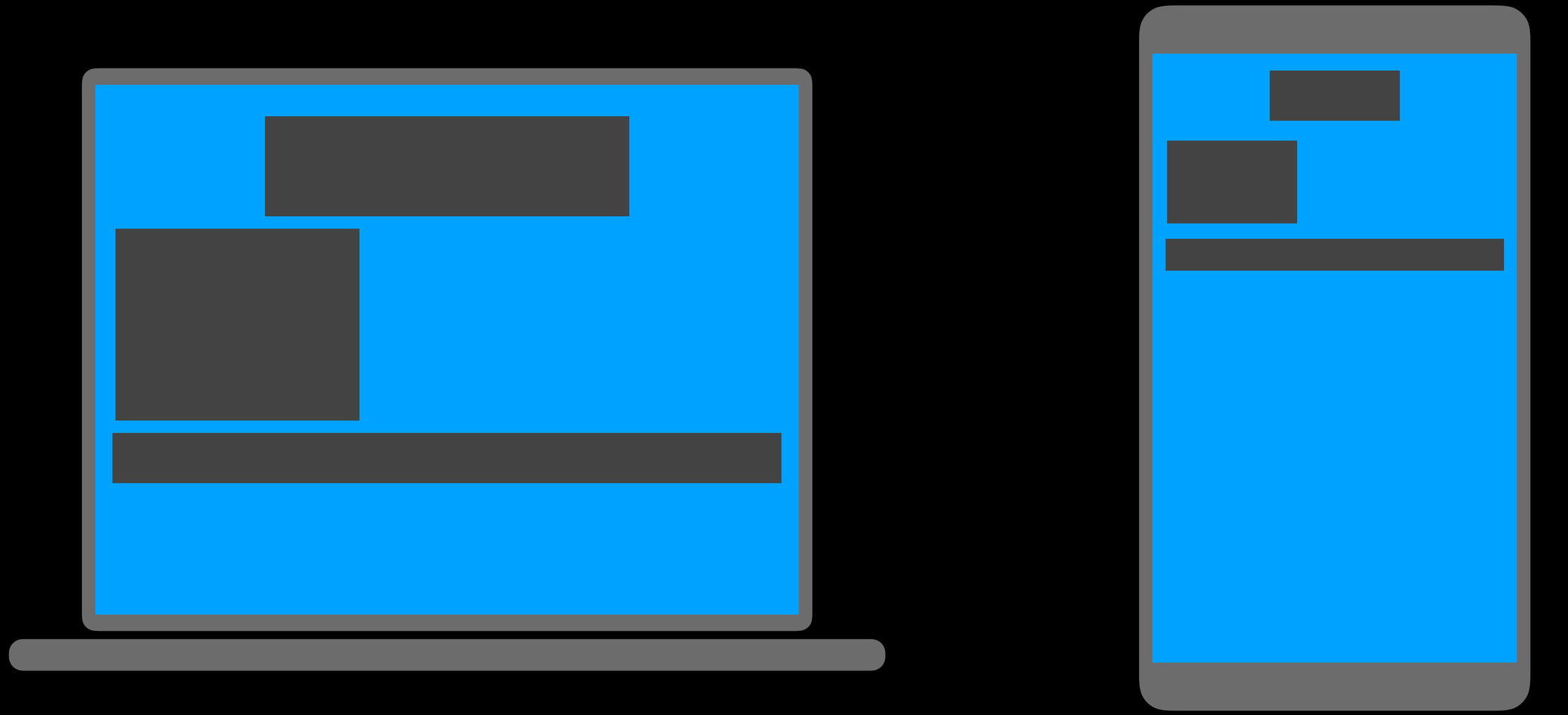
00 – ff

0 255

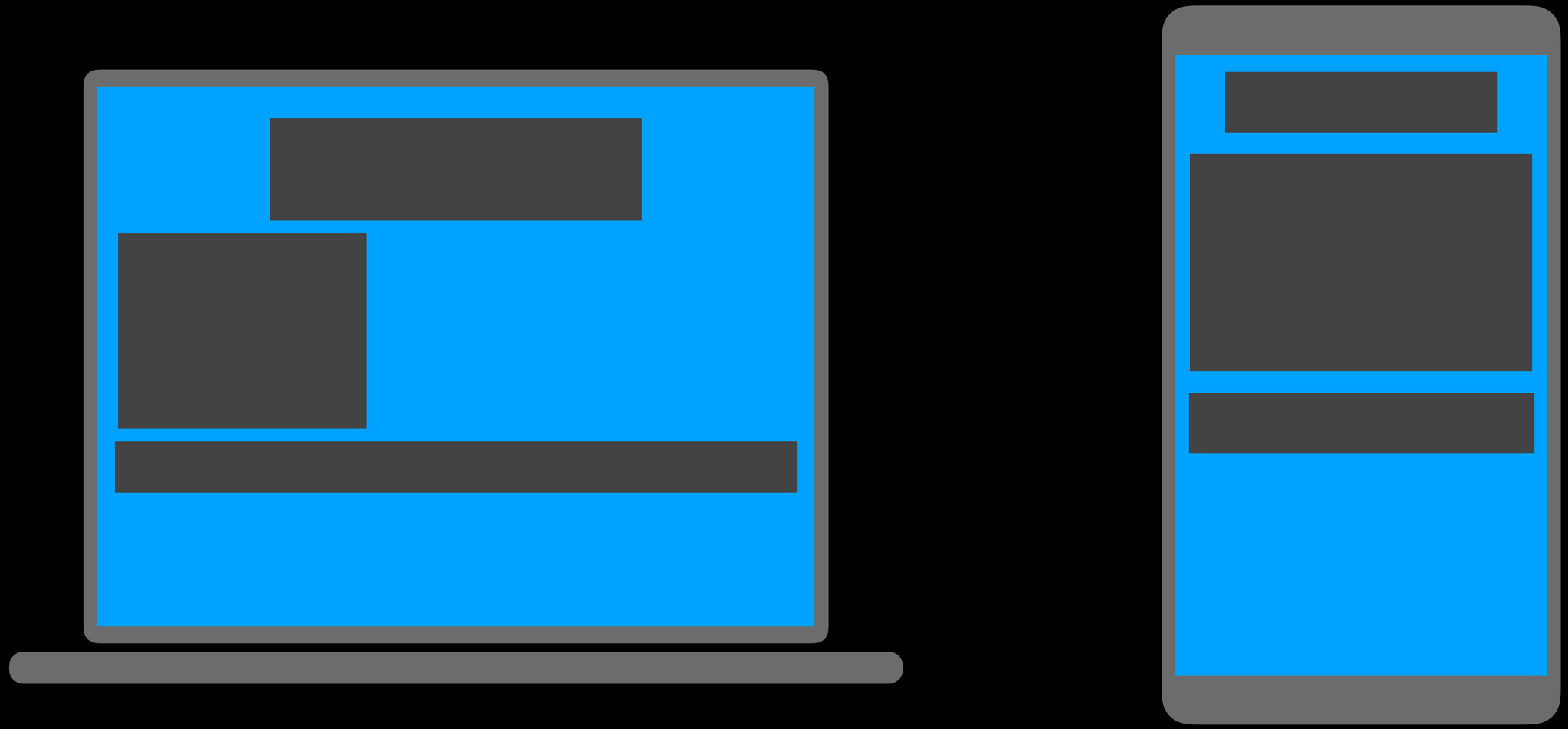
Responsive Design

- Viewport
- Media Queries
- Flexbox
- Grid

Viewport



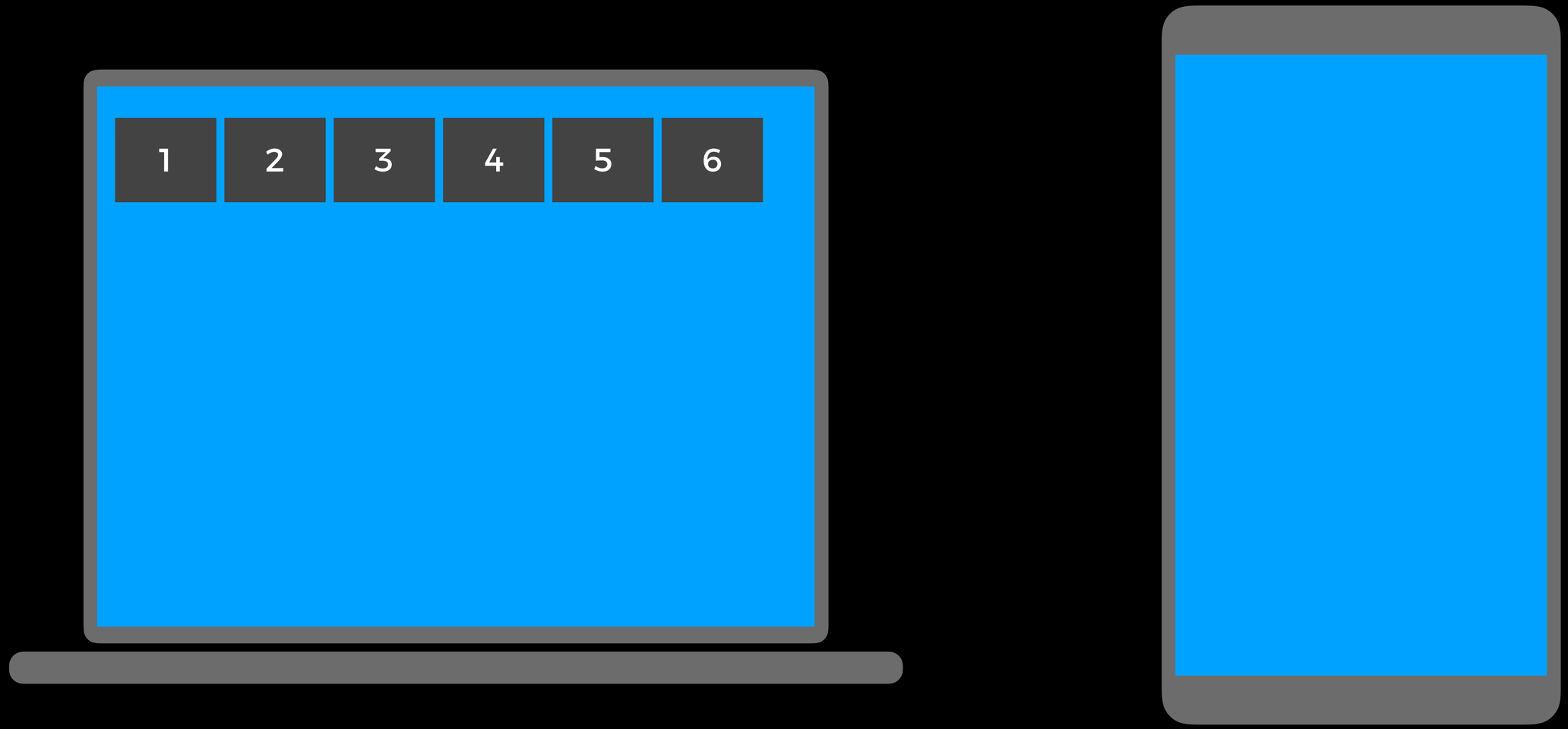
Viewport



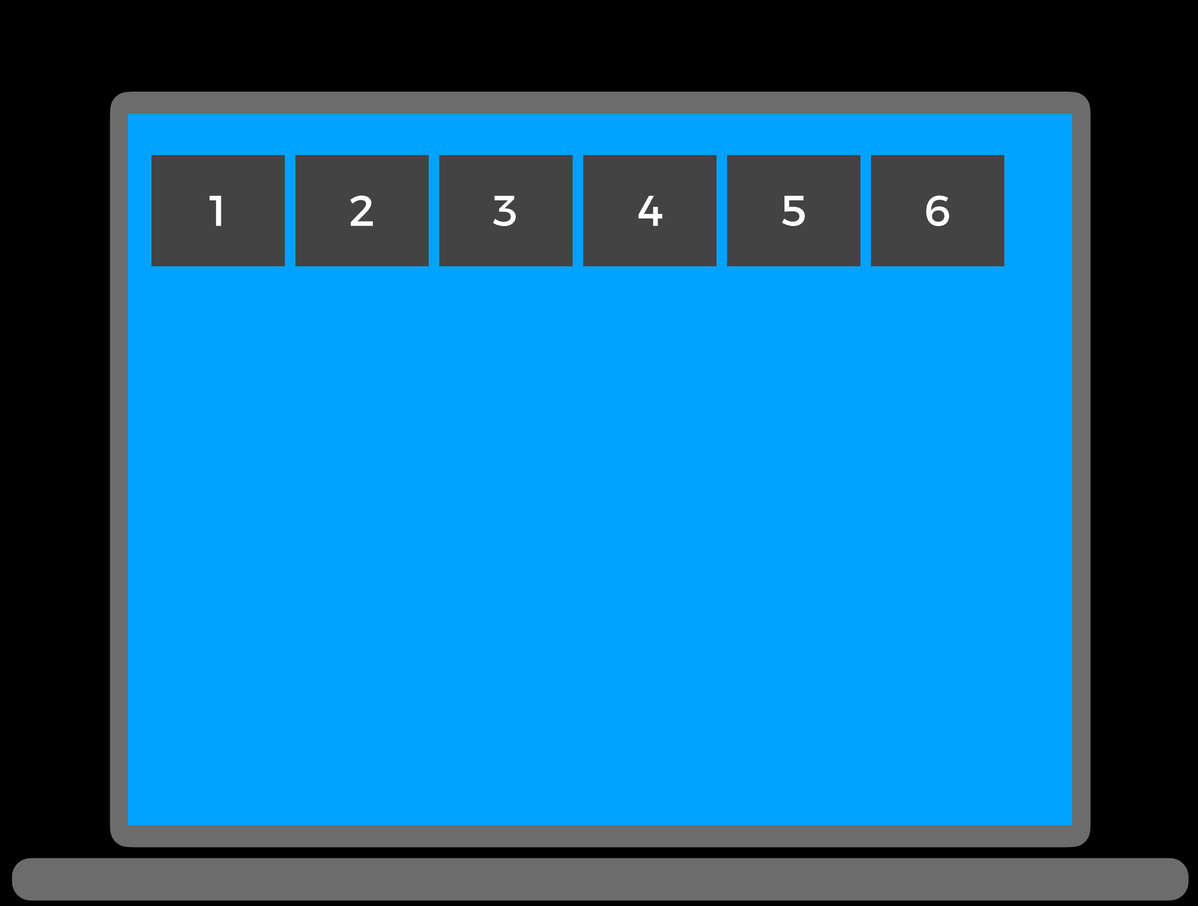
Media Queries

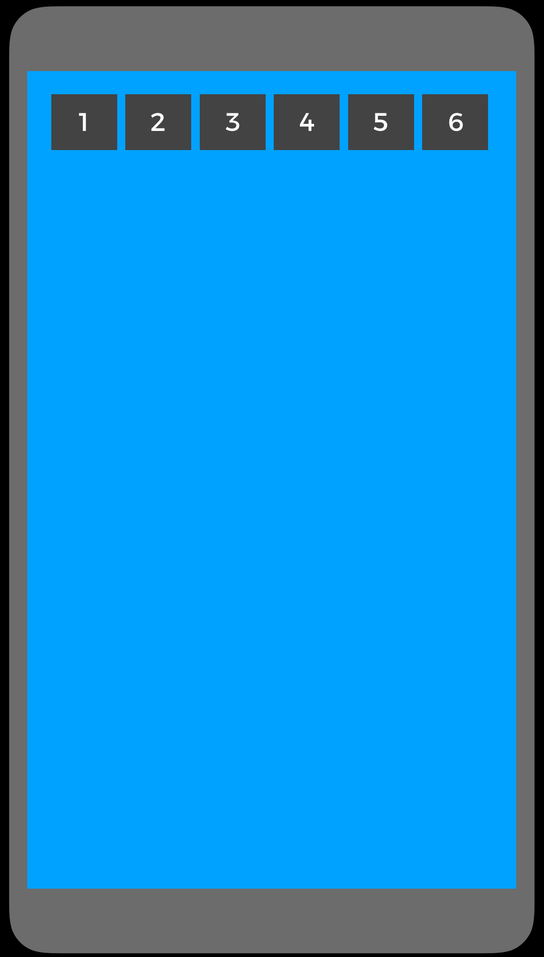
- Media Types: print, screen, ...
- Media Features: height, width, orientation, ...

Flexbox

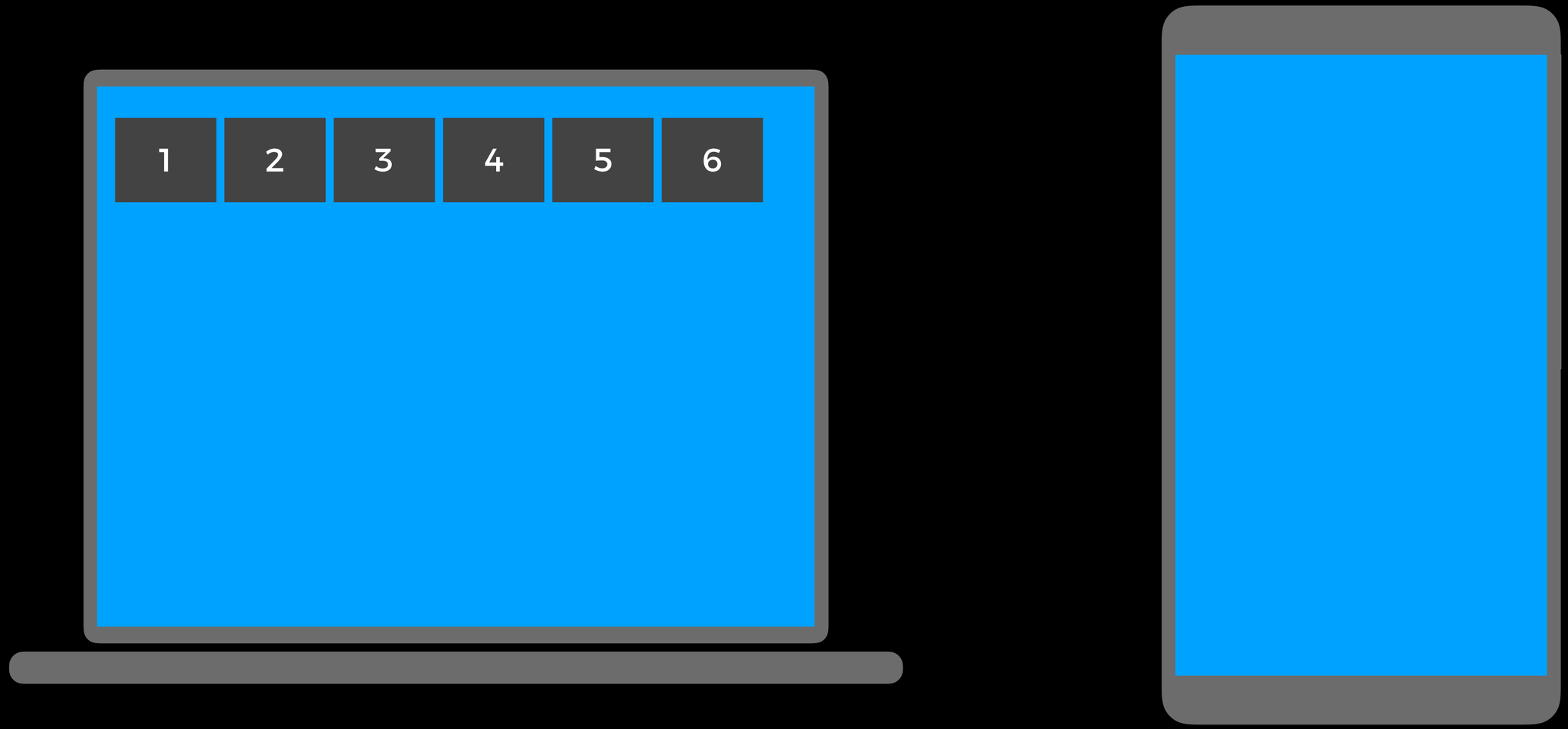


Flexbox

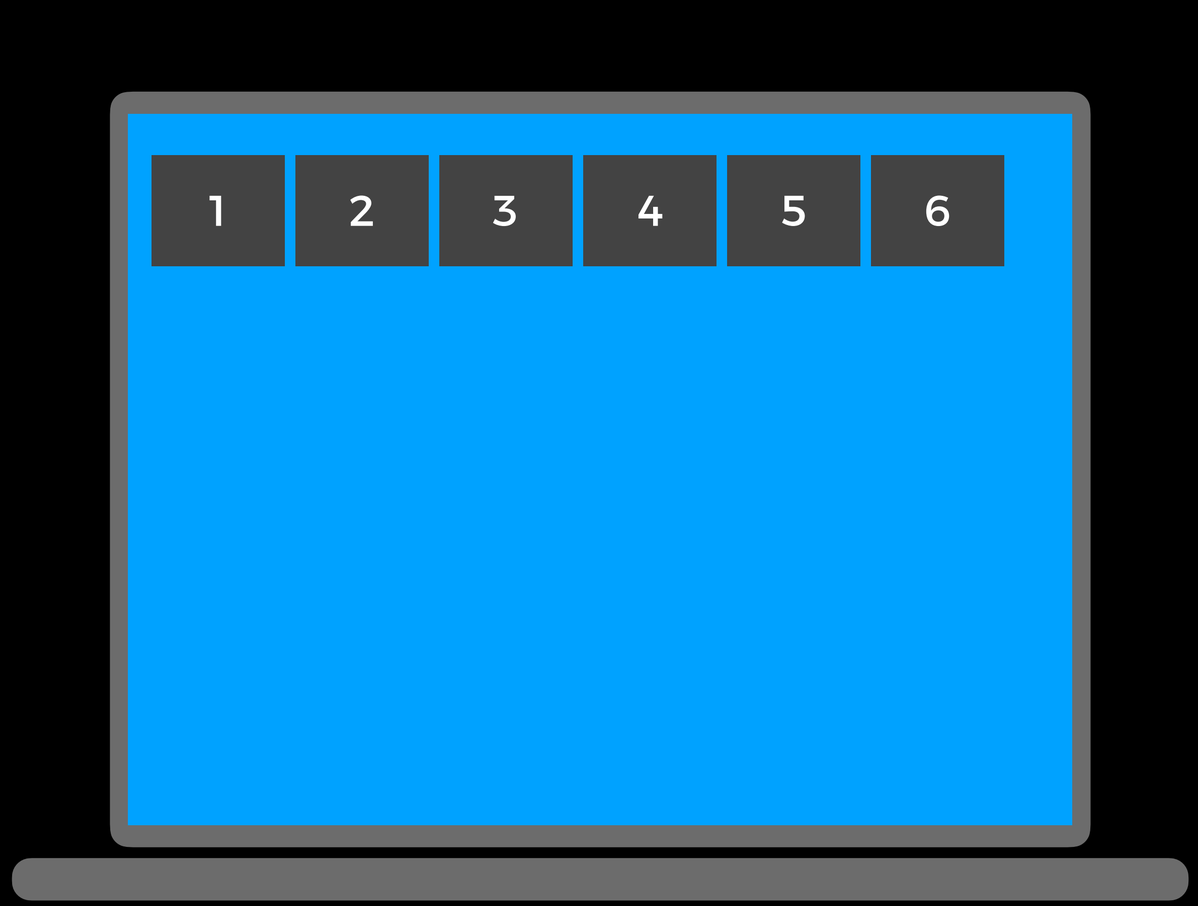


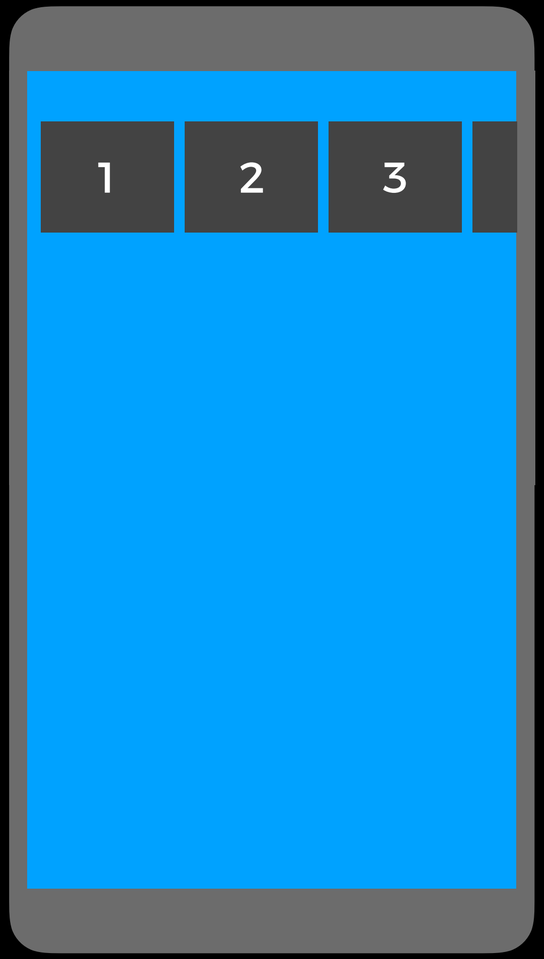


Flexbox



Flexbox





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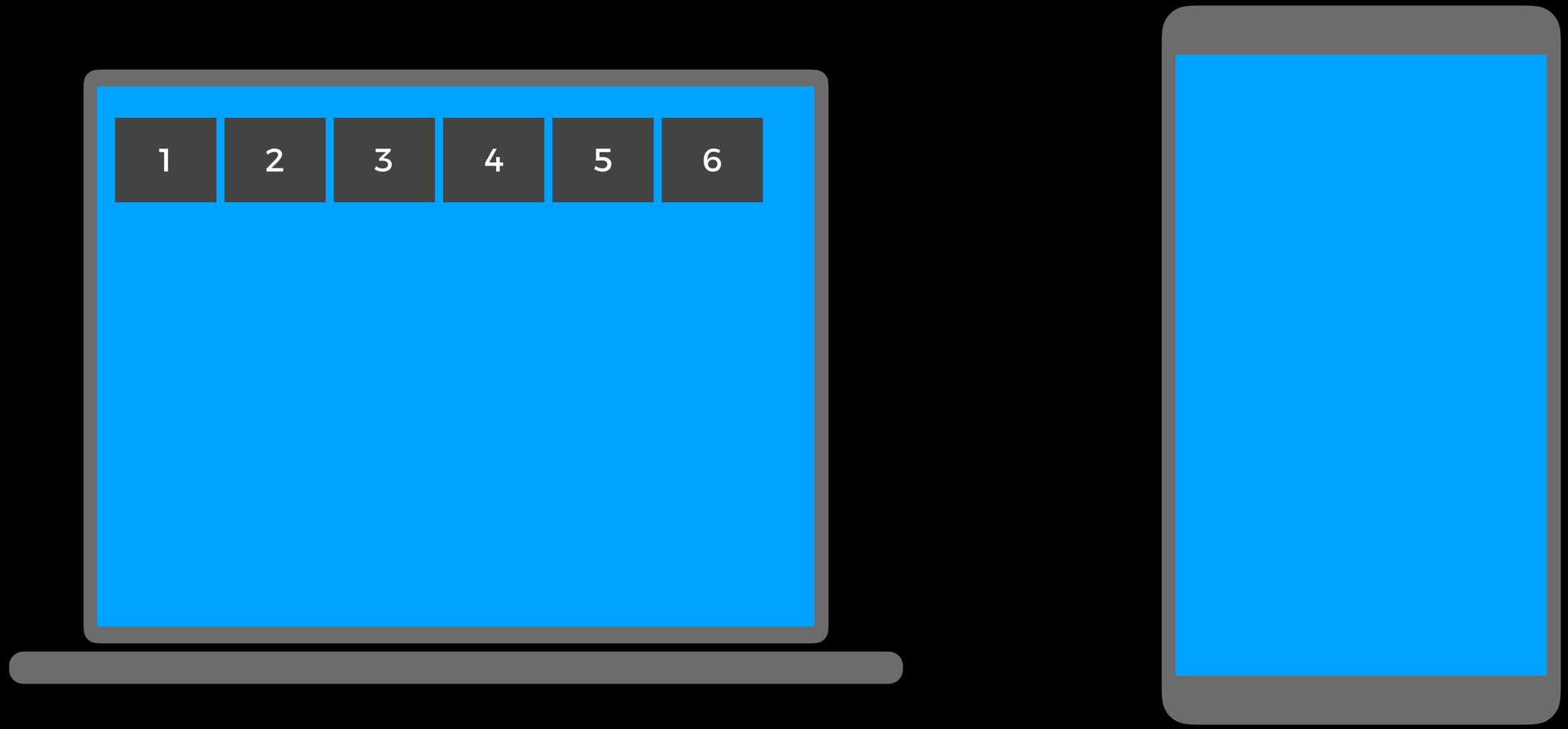

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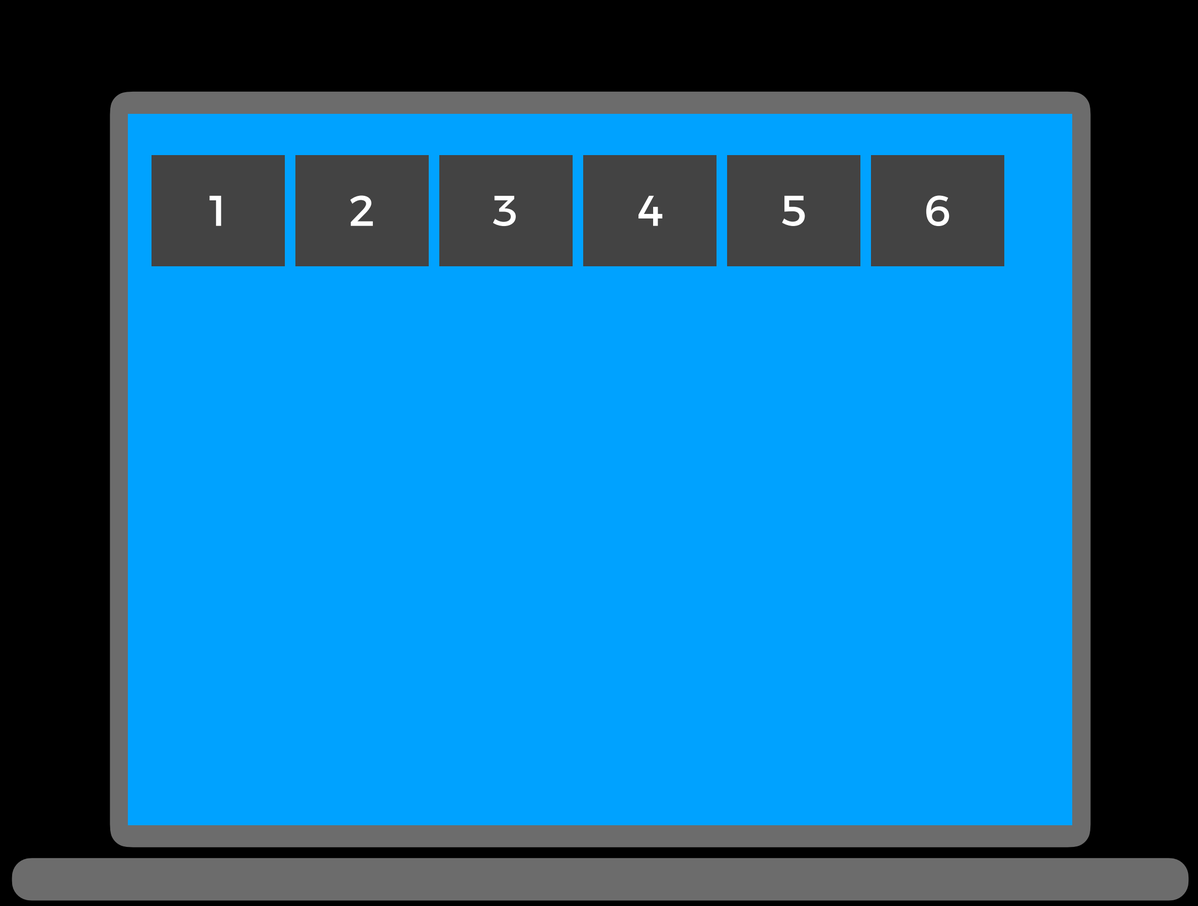

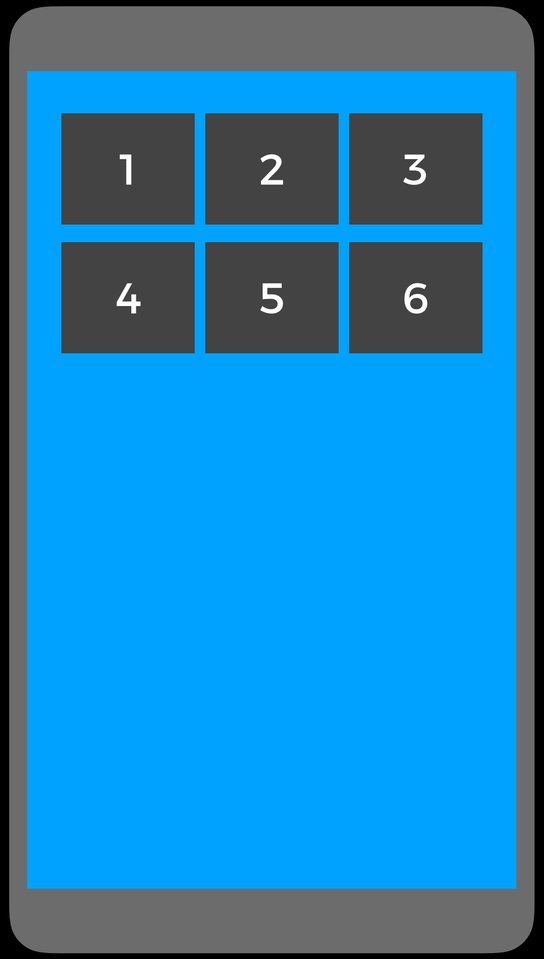

Bootstrap

- A front-end component library.

Morning Project

- Experiment!
- Design an HTML page using...
  - HTML5 features (contenteditable, datalist, etc.)
  - CSS selectors and combinators
  - Responsive design (media queries, flexbox, etc.)
- Try to replicate an existing webpage

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