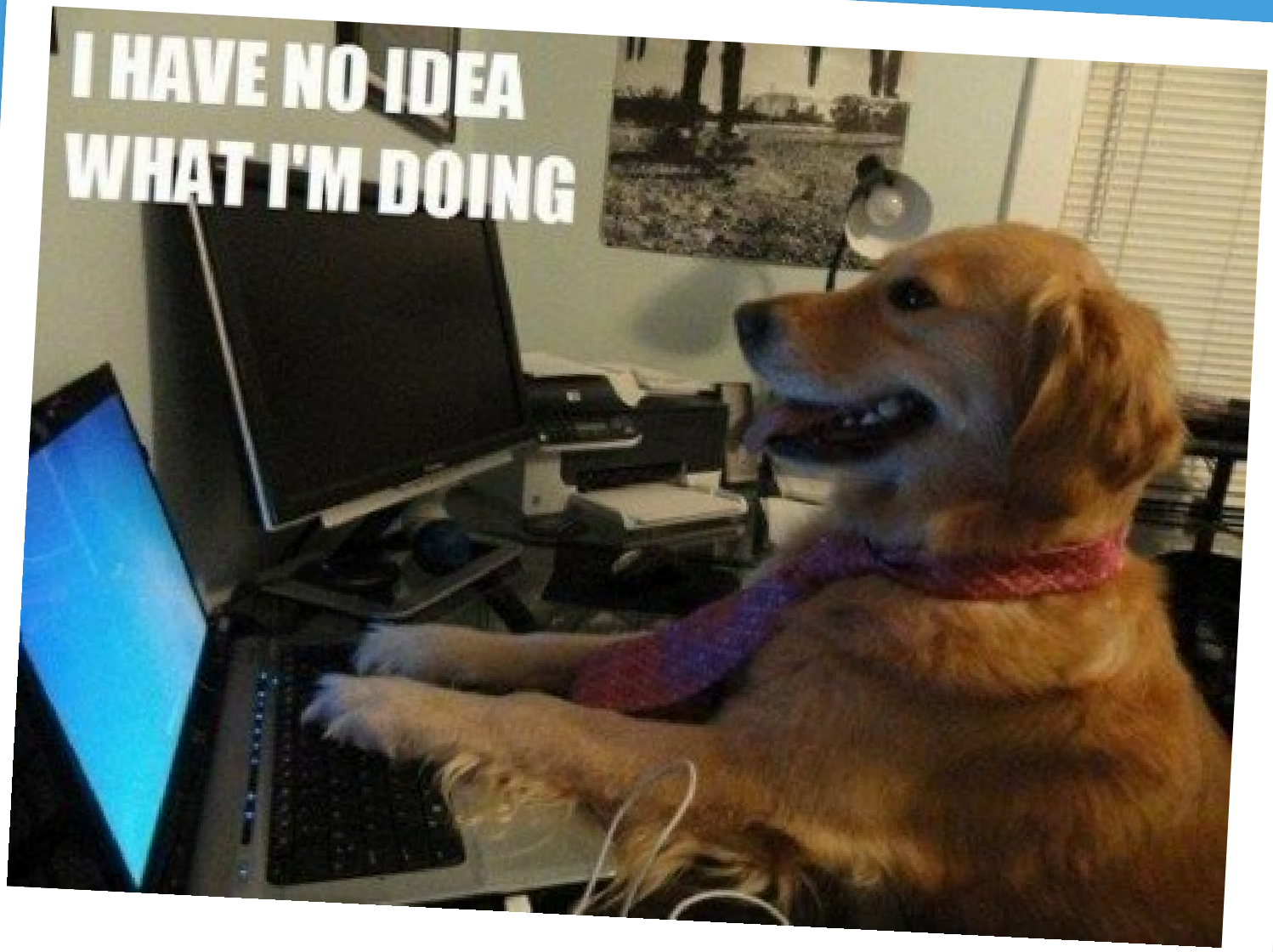
BUILDING DESIGN SYSTEMS WITH WEB COMPONENTS


I HAVE NO IDEA
WHAT I'M DOING

SIMON MACDONALD

@MACDONST@MASTODON.ONLINE

INDEX

INDEX

INDEX

- Design Systems
- Web Components

INDEX

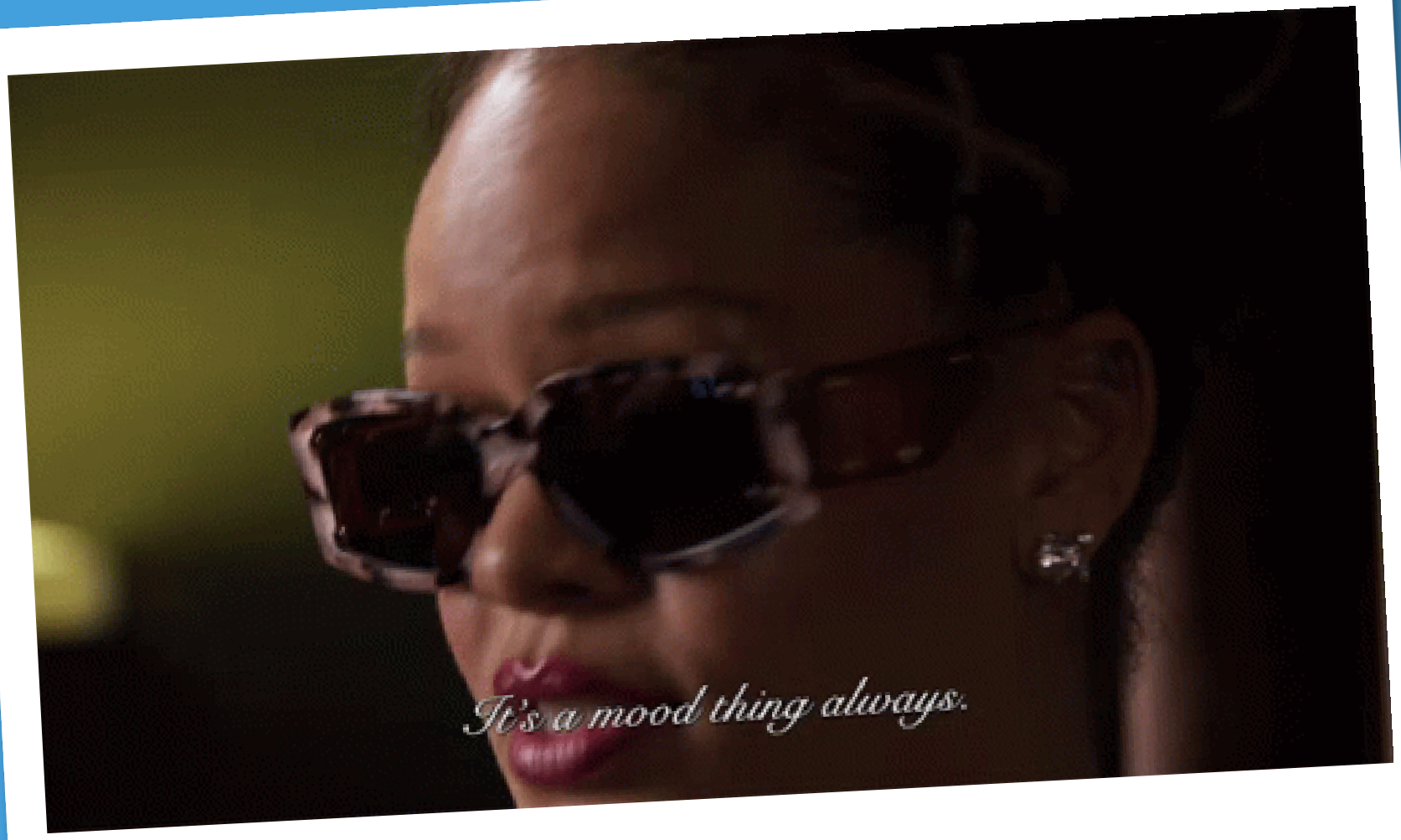
INDEX

INDEX

INDEX

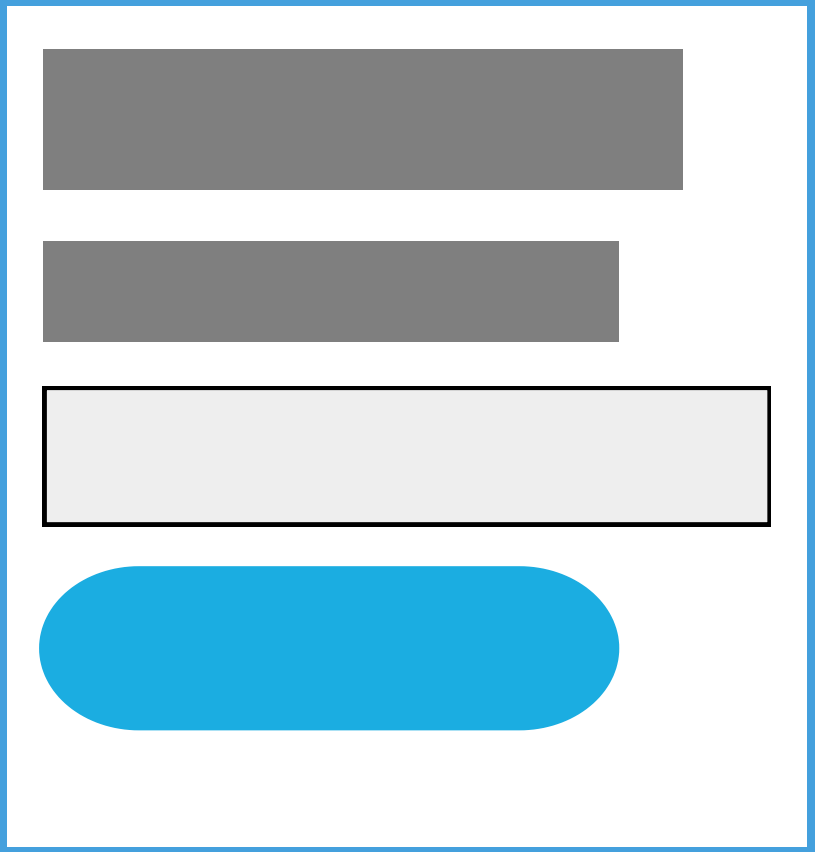
WHAT ARE DESIGN SYSTEMS?

" A DESIGN SYSTEM IS A SET OF STANDARDS TO MANAGE DESIGN AT SCALE BY REDUCING REDUNDANCY WHILE CREATING A SHARED LANGUAGE AND VISUAL CONSISTENCY ACROSS DIFFERENT PAGES AND CHANNELS.

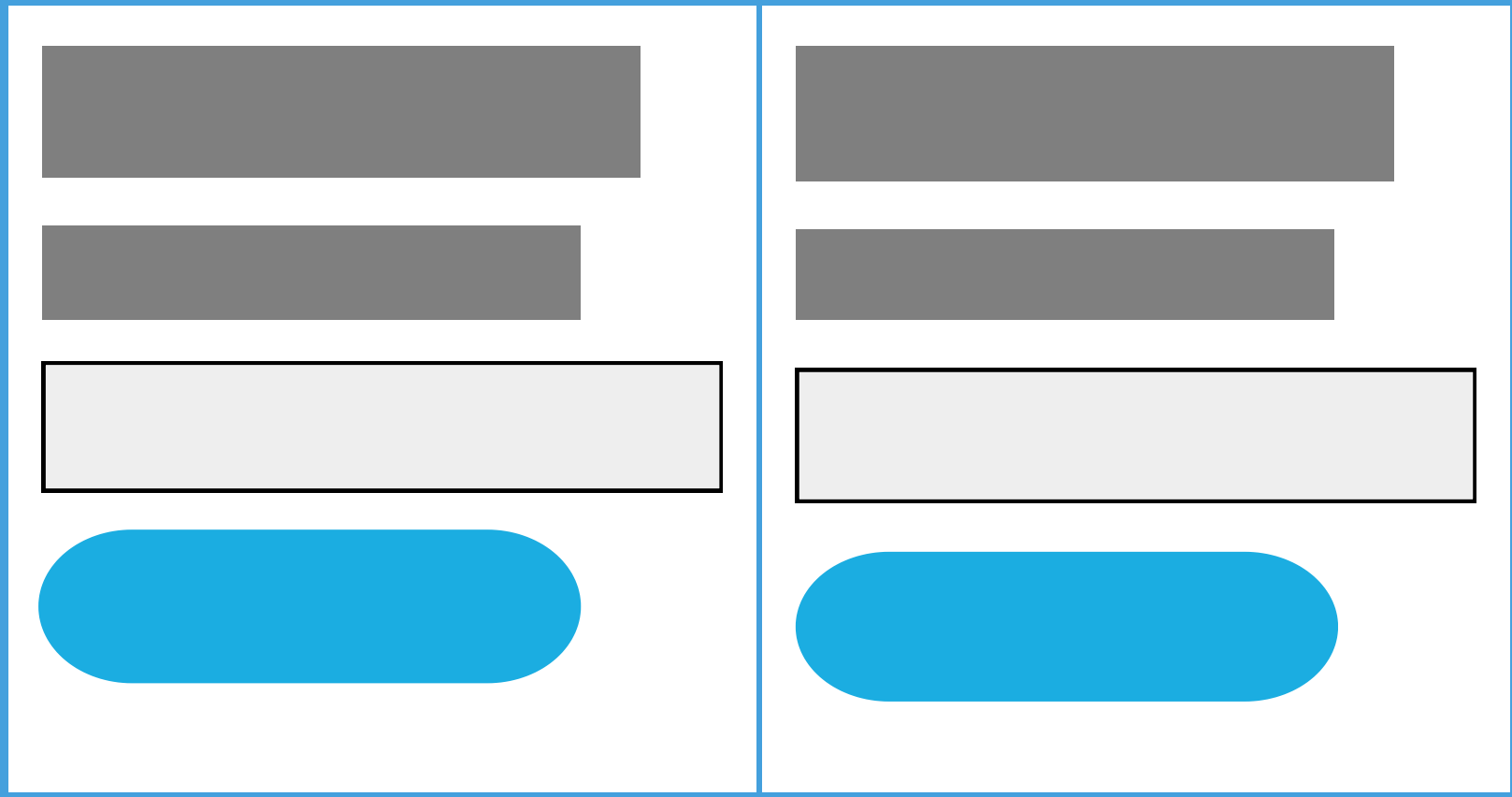

It's a mood thing always.

WHAT ARE THE COMPONENTS OF DESIGN SYSTEMS?

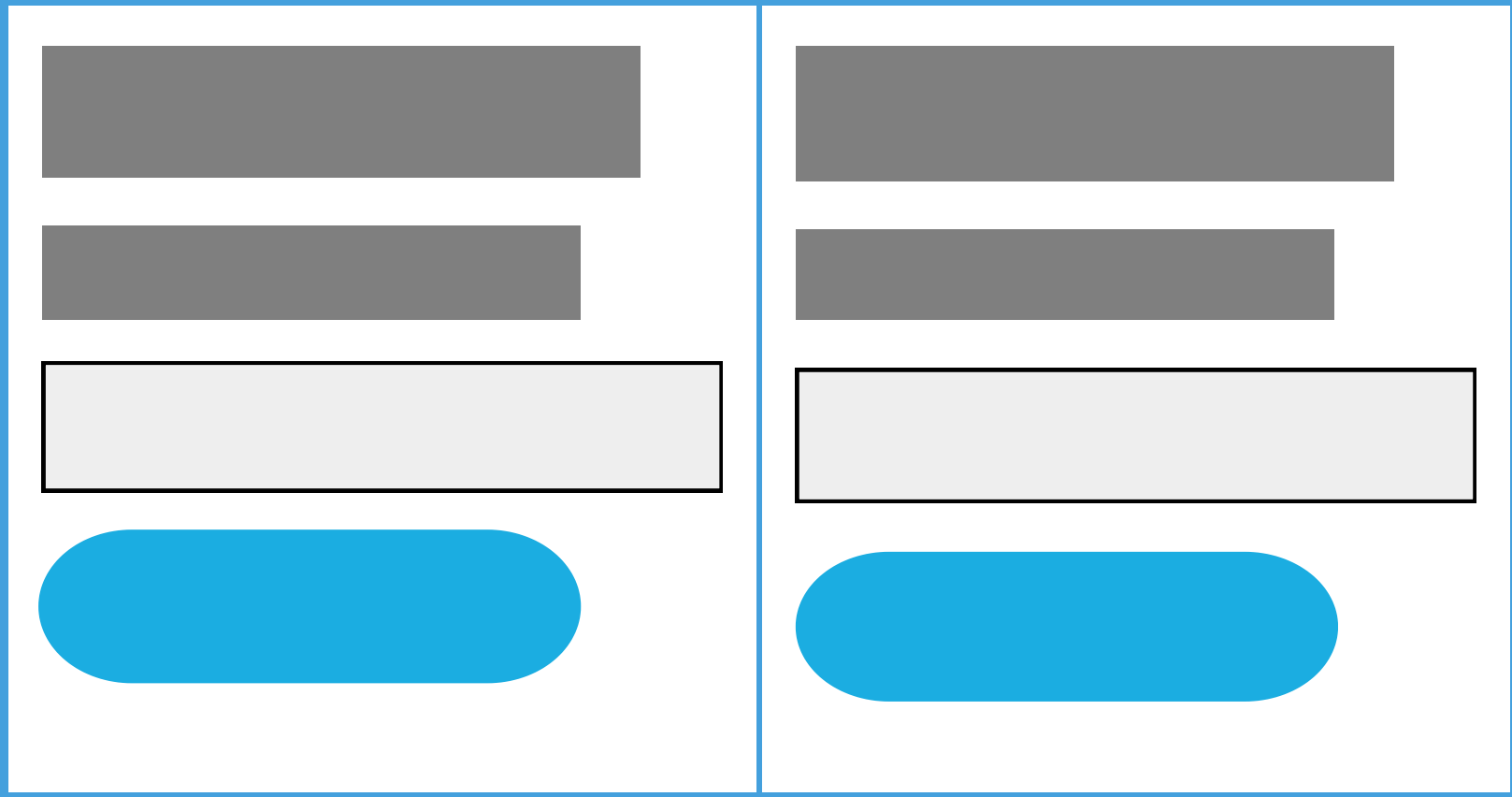
SPACING



SPACING

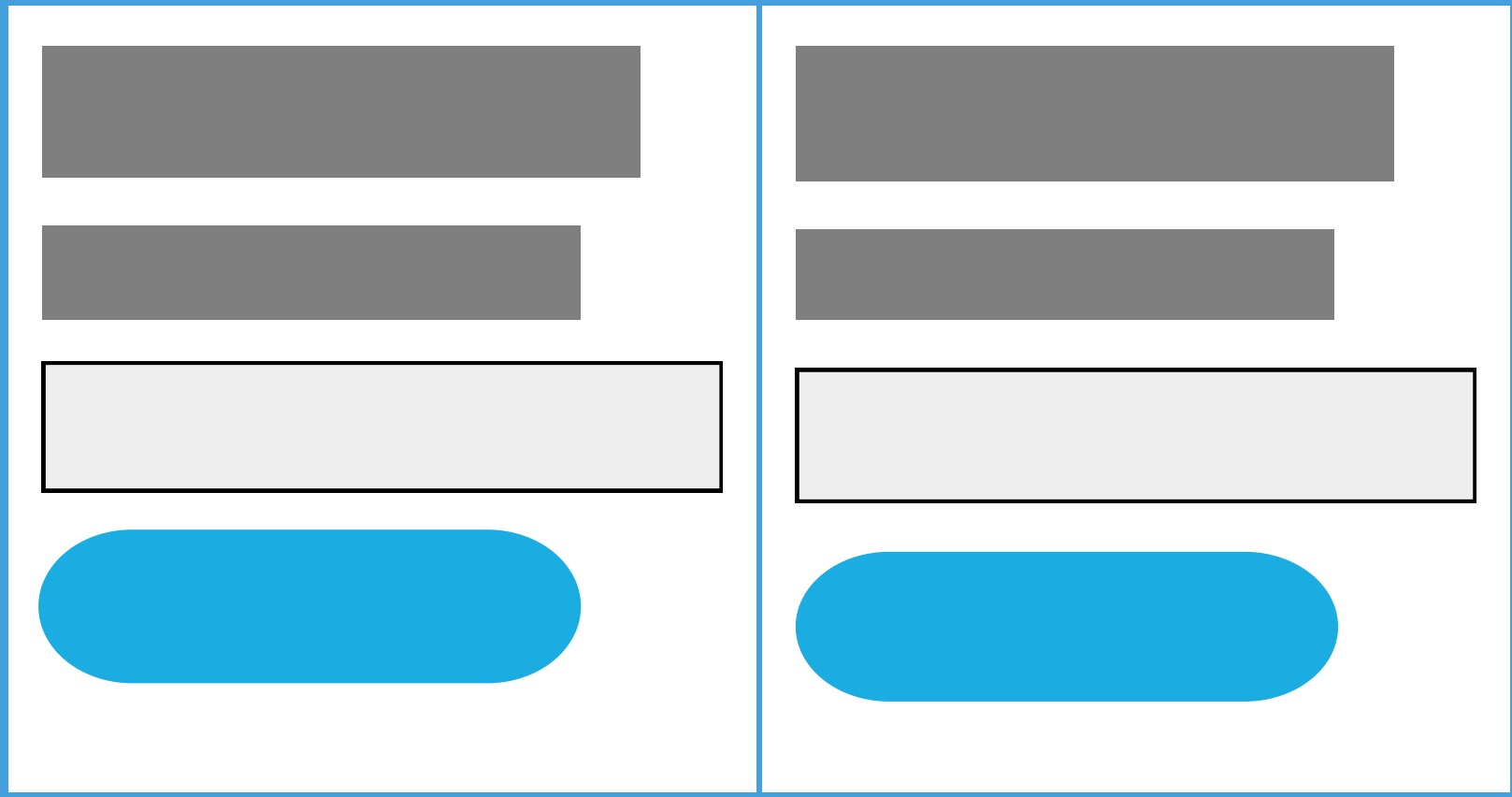


SPACING



- Select a base value

SPACING



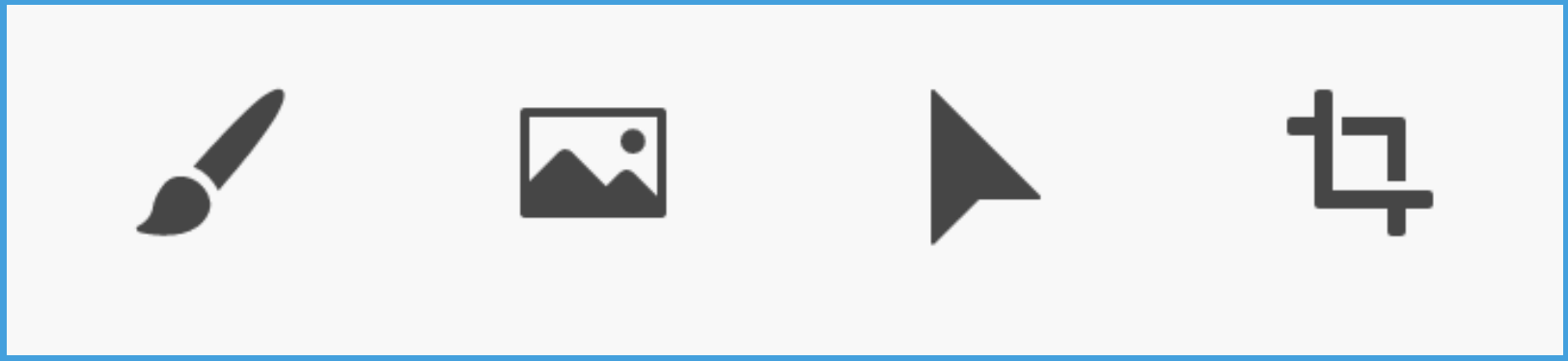
- Select a base value
- Calculate all spacing values off the base unit. Fibonacci sequence anyone?

ICONOGRAPHY

ICONOGRAPHY

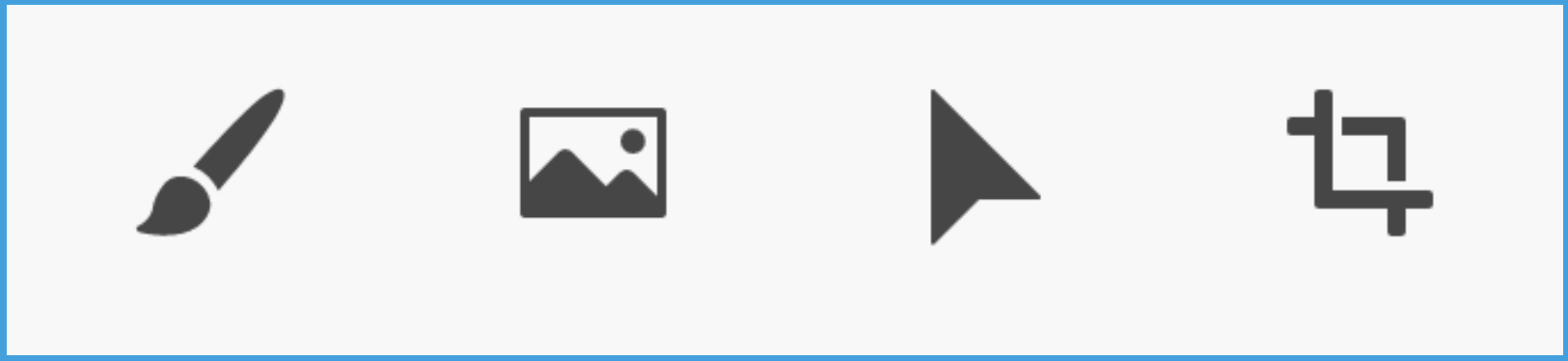
ICONOGRAPHY

ICONOGRAPHY



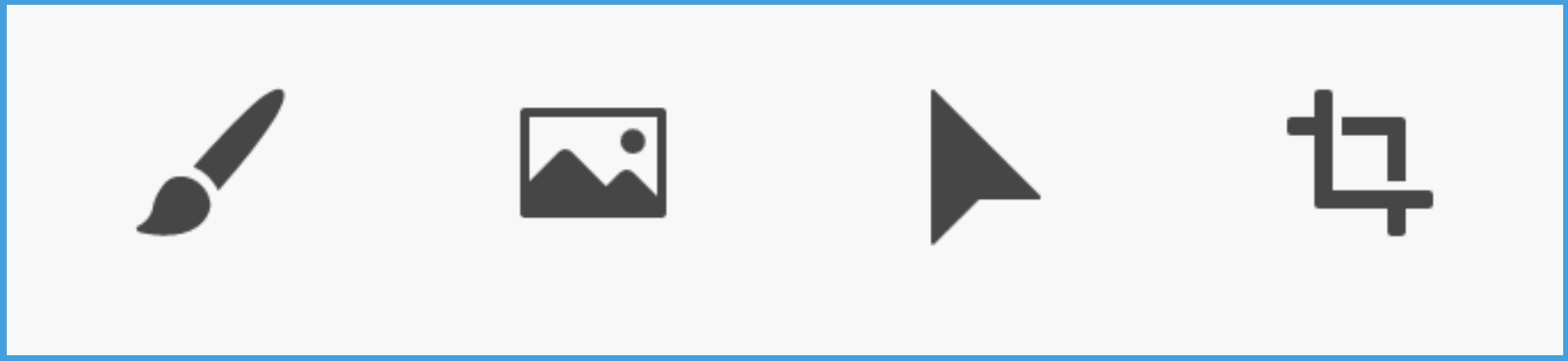
- Use consistent sizing when building icons

ICONOGRAPHY



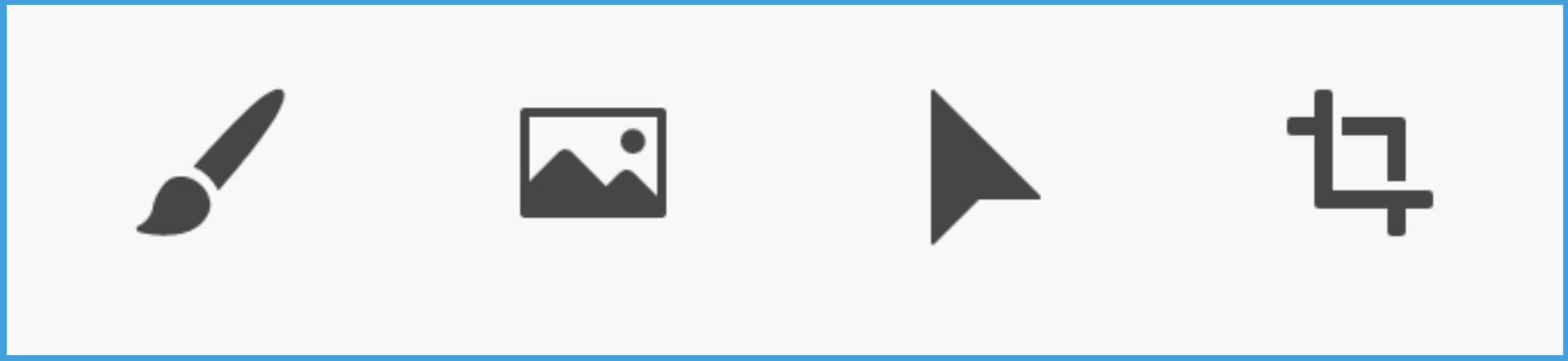
- Use consistent sizing when building icons
- Use one colour

ICONOGRAPHY



- Use consistent sizing when building icons
- Use one colour
- Use the same stroke weight

ICONOGRAPHY



- Use consistent sizing when building icons
- Use one colour
- Use the same stroke weight
- Don't put text in icons

TYPOGRAPHY

TYPOGRAPHY

- Leverage modern font stacks if performance is a key consideration

TYPOGRAPHY

- Leverage modern font stacks if performance is a key consideration
- Pick your typeface

TYPOGRAPHY

- Leverage modern font stacks if performance is a key consideration
- Pick your typeface
- Define a modular scale
  - Base text size
  - Scale ratio

TYPOGRAPHY

- Leverage modern font stacks if performance is a key consideration
- Pick your typeface
- Define a modular scale
  - Base text size
  - Scale ratio
- Setup breakpoints

WHY ARE DESIGN SYSTEMS IMPORTANT?

WHY ARE DESIGN SYSTEMS IMPORTANT?

- Development work can be completed quickly and at scale

WHY ARE DESIGN SYSTEMS IMPORTANT?

- Development work can be completed quickly and at scale
- It allows the design team to focus on harder problems

WHY ARE DESIGN SYSTEMS IMPORTANT?

- Development work can be completed quickly and at scale
- It allows the design team to focus on harder problems
- Unified development language between teams

WHY ARE DESIGN SYSTEMS IMPORTANT?

- Development work can be completed quickly and at scale
- It allows the design team to focus on harder problems
- Unified development language between teams
- Visual consistency across products

WHY ARE DESIGN SYSTEMS IMPORTANT?

- Development work can be completed quickly and at scale
- It allows the design team to focus on harder problems
- Unified development language between teams
- Visual consistency across products
- Helps onboard junior developers

INDEX

WHAT ARE WEB COMPONENTS?

WHAT ARE WEB COMPONENTS?

WHAT ARE WEB COMPONENTS?

- Custom Elements

WHAT ARE WEB COMPONENTS?

- Custom Elements
- Shadow DOM

WHAT ARE WEB COMPONENTS?

- Custom Elements
- Shadow DOM
- HTML Templates

CUSTOM ELEMENTS

https://codepen.io/macdonst/embed/ZErMzrr?default-tab=html%2Cresult&editable=true

SHADOW DOM

https://codepen.io/macdonst/embed/oNdpNKQ?default-tab=html%2Cresult&editable=true

HTML TEMPLATES

https://codepen.io/macdonst/embed/vYjpYpV?default-tab=html%2Cresult&editable=true

WHY ARE WEB COMPONENTS USEFUL?

WHY ARE WEB COMPONENTS USEFUL?

Component reuse and interoperability

WHY ARE WEB COMPONENTS USEFUL?

Component reuse and interoperability

Uses less JavaScript

WHY ARE WEB COMPONENTS USEFUL?

Component reuse and interoperability

Uses less JavaScript

Accessible

WHY ARE WEB COMPONENTS USEFUL?

Component reuse and interoperability

Uses less JavaScript

Accessible

Shorter learning path

WHY ARE WEB COMPONENTS USEFUL?

Component reuse and interoperability

Uses less JavaScript

Accessible

Shorter learning path

Encapsulation

INDEX

- Design Systems
- Web Components
- Authoring Web Components 
- Web Component Frameworks
- Design System Governance

AUTHORING WEB COMPONENTS FOR DESIGN SYSTEMS

CUSTOM BUTTON

https://codepen.io/macdonst/embed/KKEYBXx?default-tab=html%2Cresult&editable=true

VARIANT

https://codepen.io/macdonst/embed/oNVOMPL?default-tab=html%2Cresult&editable=true

SHADOW BARRIER

SHADOW BARRIER

The Shadow DOM doesn't provide total encapsulation.

SHADOW BARRIER

The Shadow DOM doesn't provide total encapsulation.

Inheritable styles, like color or font-family among others, continue to inherit in shadow DOM, will pierce the shadow DOM and affect your component's styling.

THEMING

https://codepen.io/macdonst/embed/poYBZBY?default-tab=html%2Cresult&editable=true

PORTABILITY

ANGULAR

```
1  // src/app/app.module.ts
2  import { NgModule, CUSTOM_ELEMENTS_SCHEMA } from '@angular/core';
3  import { BrowserModule } from '@angular/platform-browser';
4
5  import { AppComponent } from './app.component';
6
7  @NgModule({
8    declarations: [
9      AppComponent
10   ],
11   imports: [
12     BrowserModule
13   ],
14   providers: [],
15   bootstrap: [AppComponent],
16   schemas: [
17     CUSTOM_ELEMENTS_SCHEMA,
18   ]
19 })
20 export class AppModule { }
```

ANGULAR

```
// src/app/app.module.ts
import { NgModule, CUSTOM_ELEMENTS_SCHEMA } from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';

import { AppComponent } from './app.component';

@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule
  ],
  providers: [],
  bootstrap: [AppComponent],
  schemas: [
    CUSTOM_ELEMENTS_SCHEMA,
  ]
})
export class AppModule { }
```

VUE

```
// vite.config.js
import { fileURLToPath, URL } from 'node:url'

import { defineConfig } from 'vite'
import vue from '@vitejs/plugin-vue'
import vueJsx from '@vitejs/plugin-vue-jsx'

export default defineConfig({
  plugins: [vue({
    template: {
      compilerOptions: {
        isCustomElement: tag => tag.inclues('-')
      }
    }
  }), vueJsx()],
  resolve: {
    alias: {
      '@': fileURLToPath(new URL('./src', import.meta.url))
    }
  }
})
```

VUE

```
// vite.config.js
import { fileURLToPath, URL } from 'node:url'

import { defineConfig } from 'vite'
import vue from '@vitejs/plugin-vue'
import vueJsx from '@vitejs/plugin-vue-jsx'

export default defineConfig({
  plugins: [vue({
    template: {
      compilerOptions: {
        isCustomElement: tag => tag.inclues('-')
      }
    }
  }), vueJsx()],
  resolve: {
    alias: {
      '@': fileURLToPath(new URL('./src', import.meta.url))
    }
  }
})
```

REACT

```
1 import React from 'react';
2
3 function MyComponent() {
4   return <my-button>Click me!</my-button>;
5 }
6
7 export default MyComponent;
```

REACT

```
1 import React from 'react';
2
3 function MyComponent() {
4   return <my-button>Click me!</my-button>;
5 }
6
7 export default MyComponent;
```

1. React can't listen to custom events dispatched by web components without the use of refs and manual event listeners.

REACT

```
1 import React from 'react';
2
3 function MyComponent() {
4   return <my-button>Click me!</my-button>;
5 }
6
7 export default MyComponent;
```

1. React can't listen to custom events dispatched by web components without the use of refs and manual event listeners.
2. React can't pass complex data (like objects or arrays) as props to web components. You can only pass simple data types like strings or numbers.

INDEX

- Design Systems
- Web Components
- Authoring Web Components
- Web Component Frameworks
- Design System Governance

WEB COMPONENT FRAMEWORKS

WEB COMPONENT FRAMEWORKS

Lit

WEB COMPONENT FRAMEWORKS

Lit

FAST

WEB COMPONENT FRAMEWORKS

Lit

FAST

LIT

https://codepen.io/macdonst/embed/PoLgXZa?default-tab=html%2Cresult&editable=true

FAST

https://codepen.io/macdonst/embed/bGZyVoY?default-tab=html%2Cresult&editable=true

ENHANCE

https://codepen.io/macdonst/embed/zYbQvQY?default-tab=html%2Cresult&editable=true

SSR

SSR

- Why server side render?

SSR

- Why server side render?
  - Needs JavaScript

SSR

- Why server side render?
  - Needs JavaScript
  - FOUCE

SSR

- Why server side render?
  - Needs JavaScript
  - FOUCE
  - Native forms

SSR

- Why server side render?
  - Needs JavaScript
  - FOUCE
  - Native forms
- SSR Support

SSR

- Why server side render?
  - Needs JavaScript
  - FOUCE
  - Native forms
- SSR Support
  - Lit ⚠️

SSR

- Why server side render?
  - Needs JavaScript
  - FOUCE
  - Native forms
- SSR Support
  - Lit ⚠️
  - Fast ❌

SSR

- Why server side render?
  - Needs JavaScript
  - FOUCE
  - Native forms
- SSR Support
  - Lit ⚠️
  - Fast ❌
  - Enhance ✅

INDEX

- Design Systems
- Web Components
- Authoring Web Components
- Web Component Frameworks
- Design System Governance

DESIGN SYSTEM GOVERNANCE

OWNERSHIP

OWNERSHIP

- Identify a clear Owner or Team

POLICIES AND STRATEGY

POLICIES AND STRATEGY

- Clear decision making policy
  - How to decide if a component will be added to the design system?

POLICIES AND STRATEGY

- Clear decision making policy
  - How to decide if a component will be added to the design system?
- Tone

STANDARDS AND GUIDELINES

STANDARDS AND GUIDELINES

- Naming Conventions

STANDARDS AND GUIDELINES

- Naming Conventions
- Colour Palettes

STANDARDS AND GUIDELINES

- Naming Conventions
- Colour Palettes
- How should components be used?

DOCUMENTATION

DOCUMENTATION

- How to use the system

DOCUMENTATION

- How to use the system
- How to suggest changes

DOCUMENTATION

- How to use the system
- How to suggest changes
- How to report issues

COMMUNICATION

COMMUNICATION

- Communicate

COMMUNICATION

- Communicate
- Communicate some more

COMMUNICATION

- Communicate
- Communicate some more
- Over-communicate

METRICS

METRICS

- Adoption rate

METRICS

- Adoption rate
- Consistency

METRICS

- Adoption rate
- Consistency
- Time-to-market

METRICS

- Adoption rate
- Consistency
- Time-to-market
- Cost savings


THANKS!