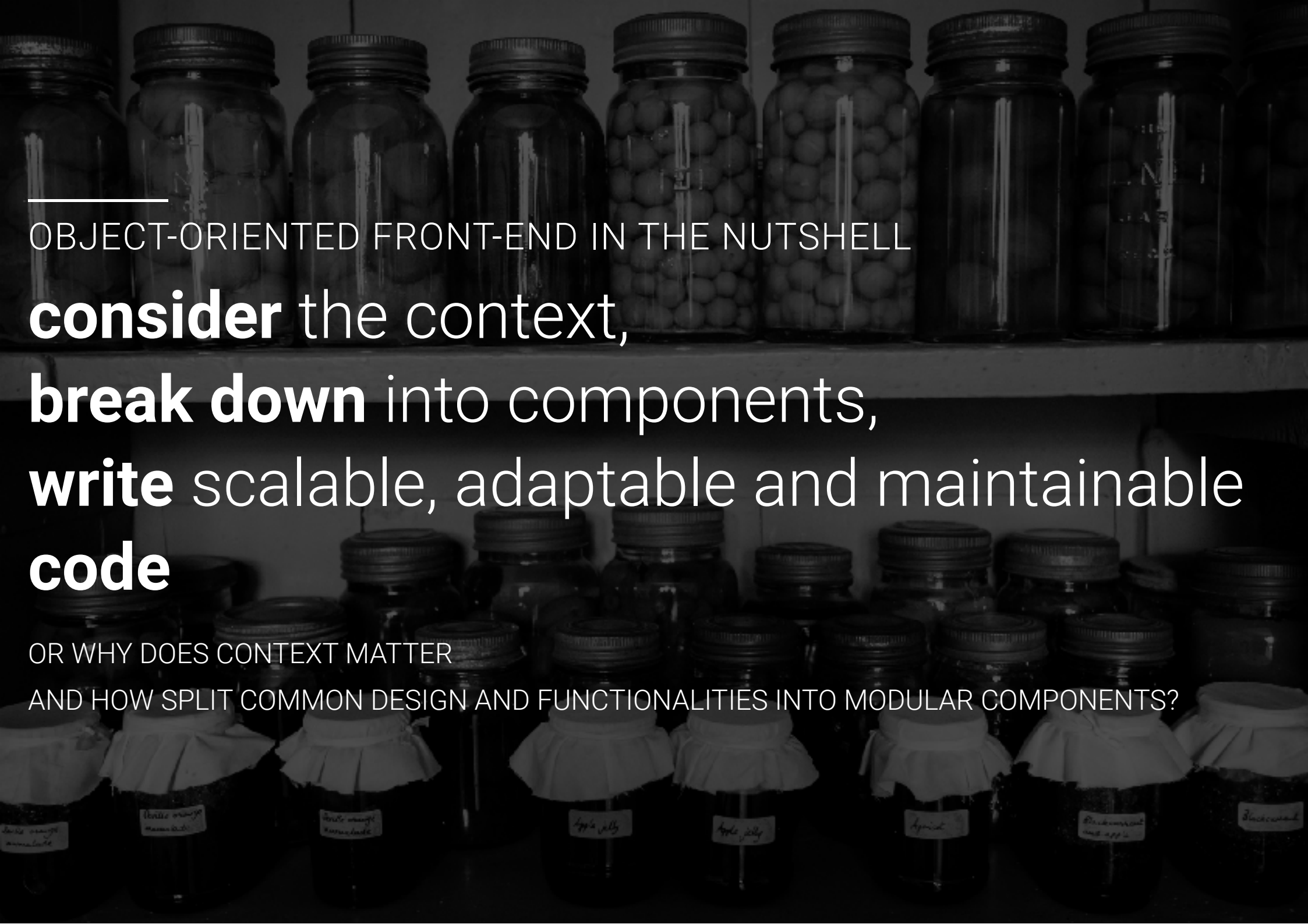


OBJECT-ORIENTED FRONT-END IN THE NUTSHELL

consider the context, **break down** into components, **write** scalable, adaptable and maintainable **code**

OR WHY DOES CONTEXT MATTER

AND HOW SPLIT COMMON DESIGN AND FUNCTIONALITIES INTO MODULAR COMPONENTS?

Table of Contents

1. Prologue 03
2. Atomic Design 07
3. Content First — Design Last 23
4. Store & Share 29
5. Object-Oriented <code> 34
6. Epilogue 44

The facts

In front end web development and design the word "component" has been popping up more and more, from React.js components to new CSS class naming conventions to web components to style guides. While the components which are now gaining in popularity are highly useful, the idea of breaking down systems into smaller, more modular parts (which is nothing new but is a fundamentally strong design pattern) can bring us huge benefits and allow for more unity between design and development. These concepts can stretch far and wide and are well worth exploring.

> We're not designing pages, we're designing systems of components.

—  *Stephen Hay*

@stephenhay

So… what is a component?

component

A part or element of a larger whole

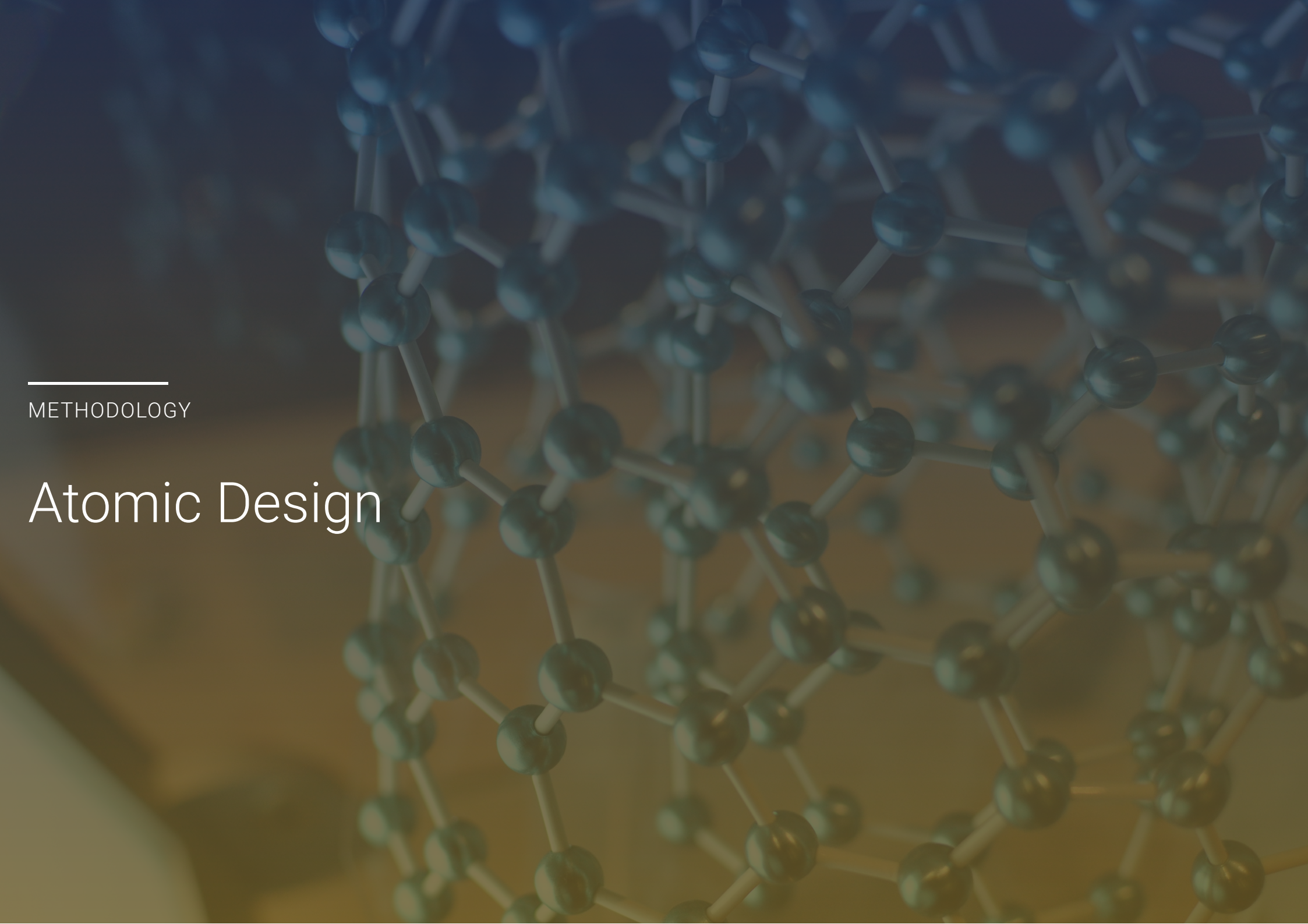
What for?

Consistency, re-usability, scalability

1. **Write less code**
   The code doesn't grow with the project but only with new components.

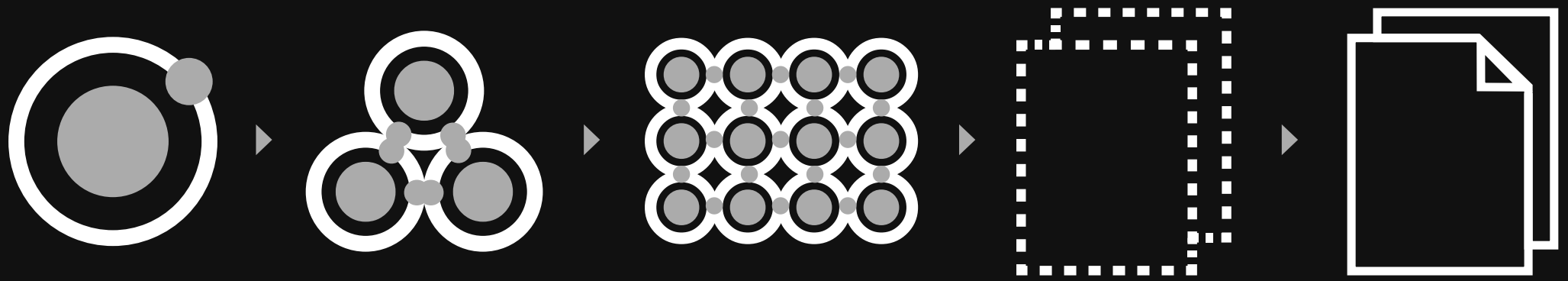
2. **Work better, faster.**
   Create new elements with HTML only. Just reuse what has been already lined up.

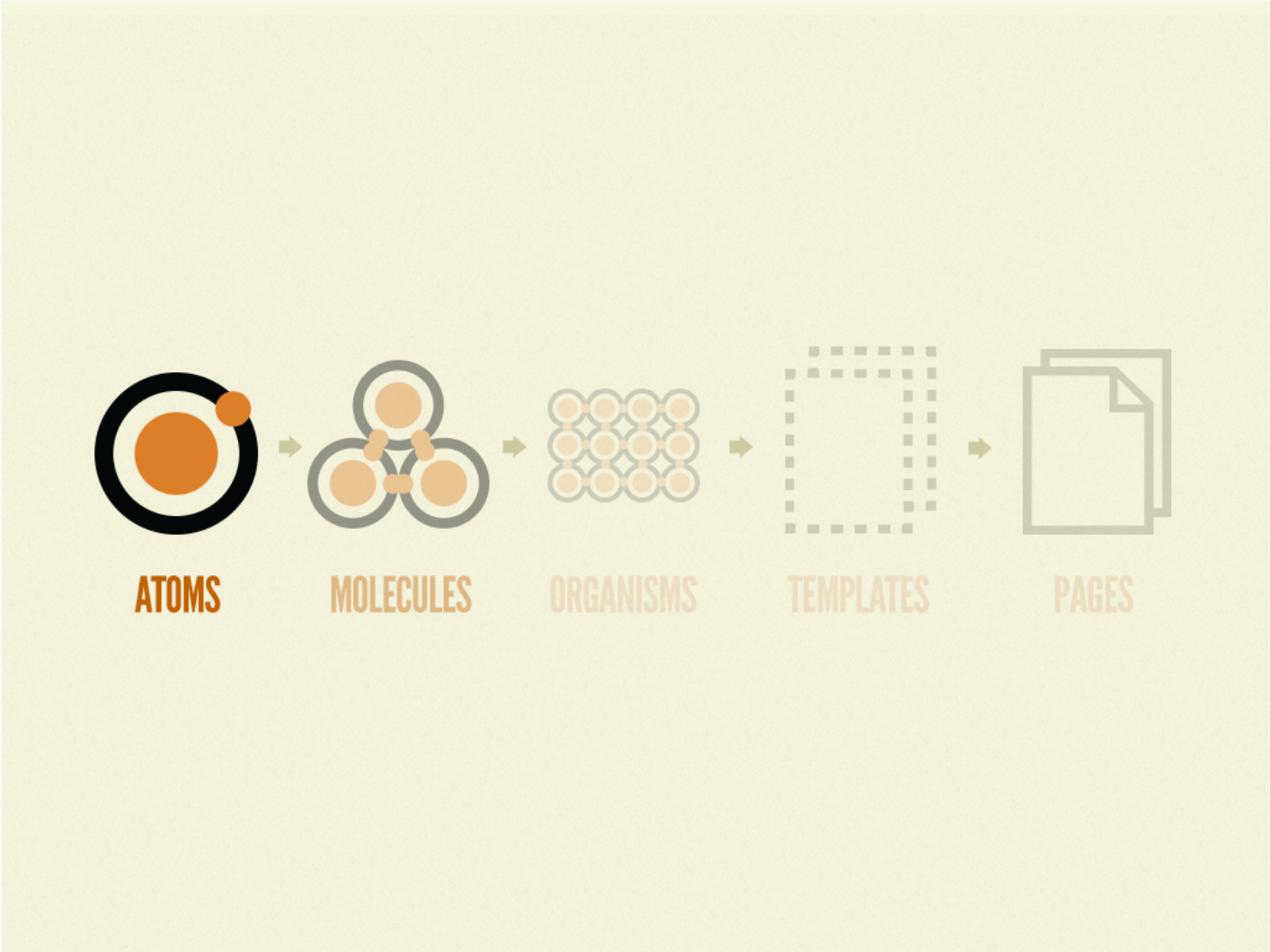
3. **Anticipate easier**
   Each component is independent from its context. They can move anywhere because they aren't defined by their location.



METHODOLOGY

Atomic Design

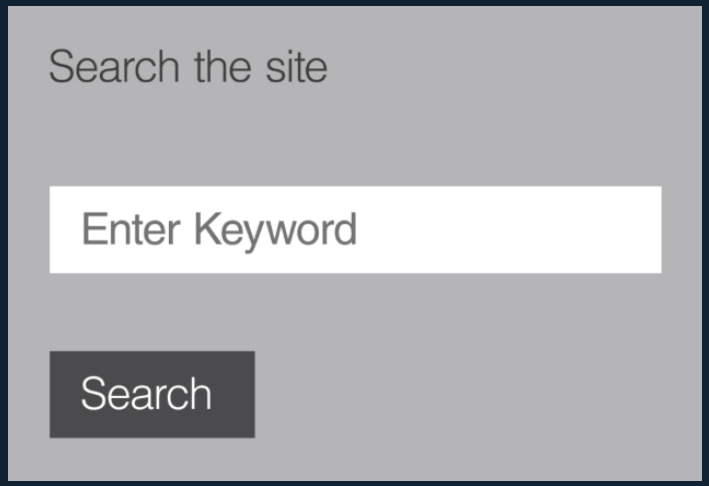




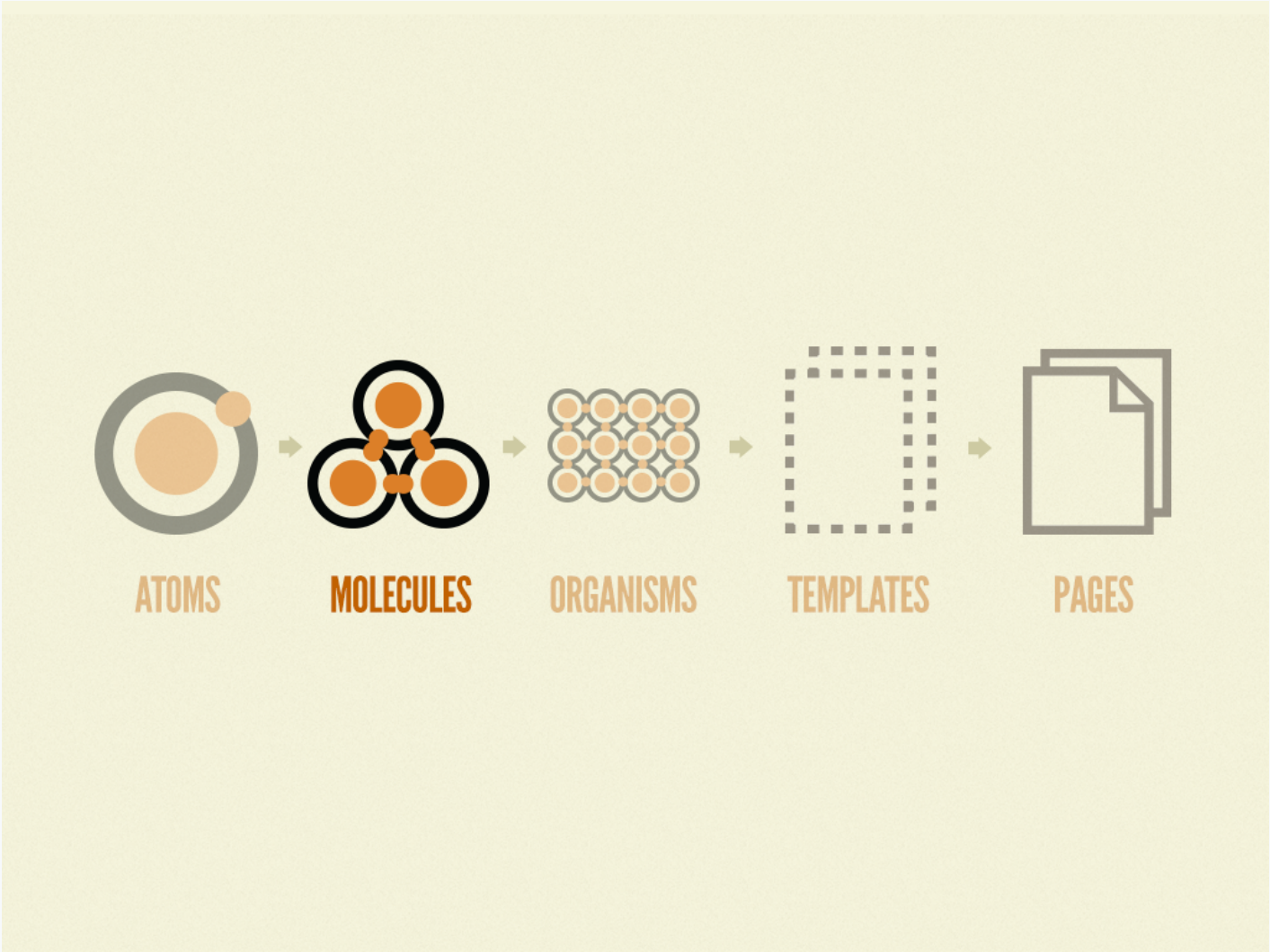
Atoms

are UI elements that can't be broken down any further and serve as the elemental building blocks of an interface.

`<label>` `<input>` `<button>`

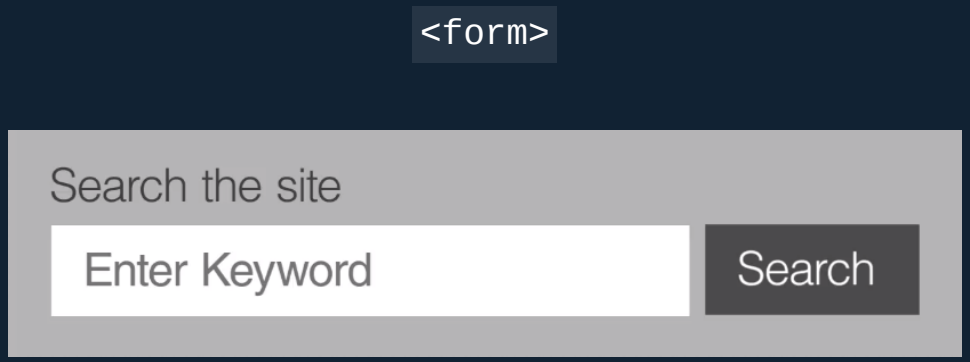


Atoms

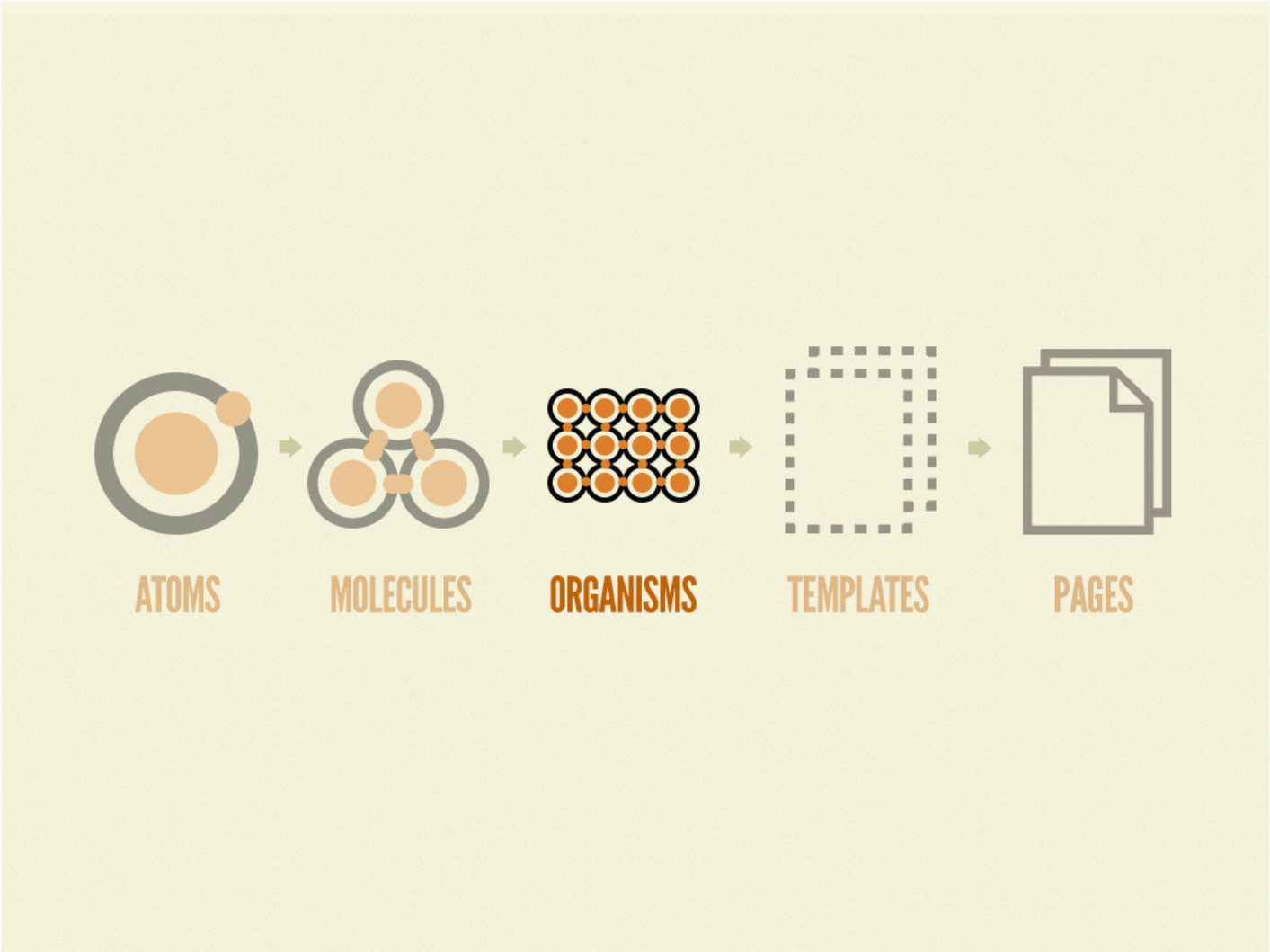


Molecules

are collections of atoms that form relatively simple UI components.



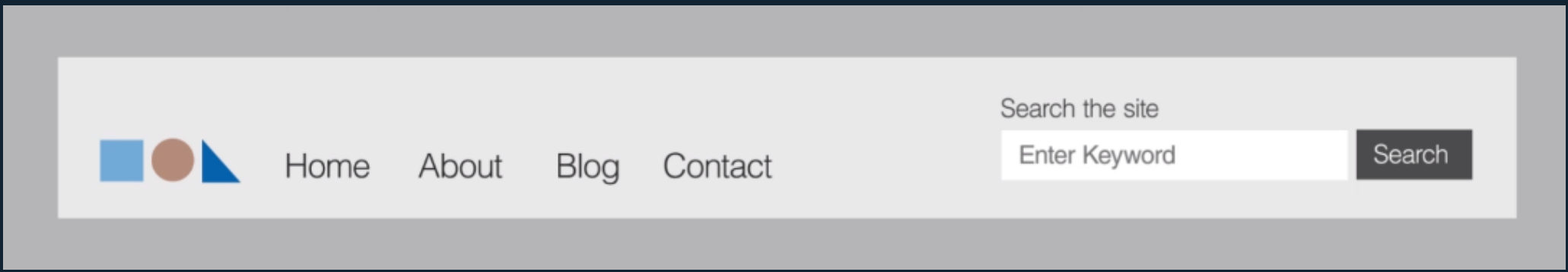
Molecule



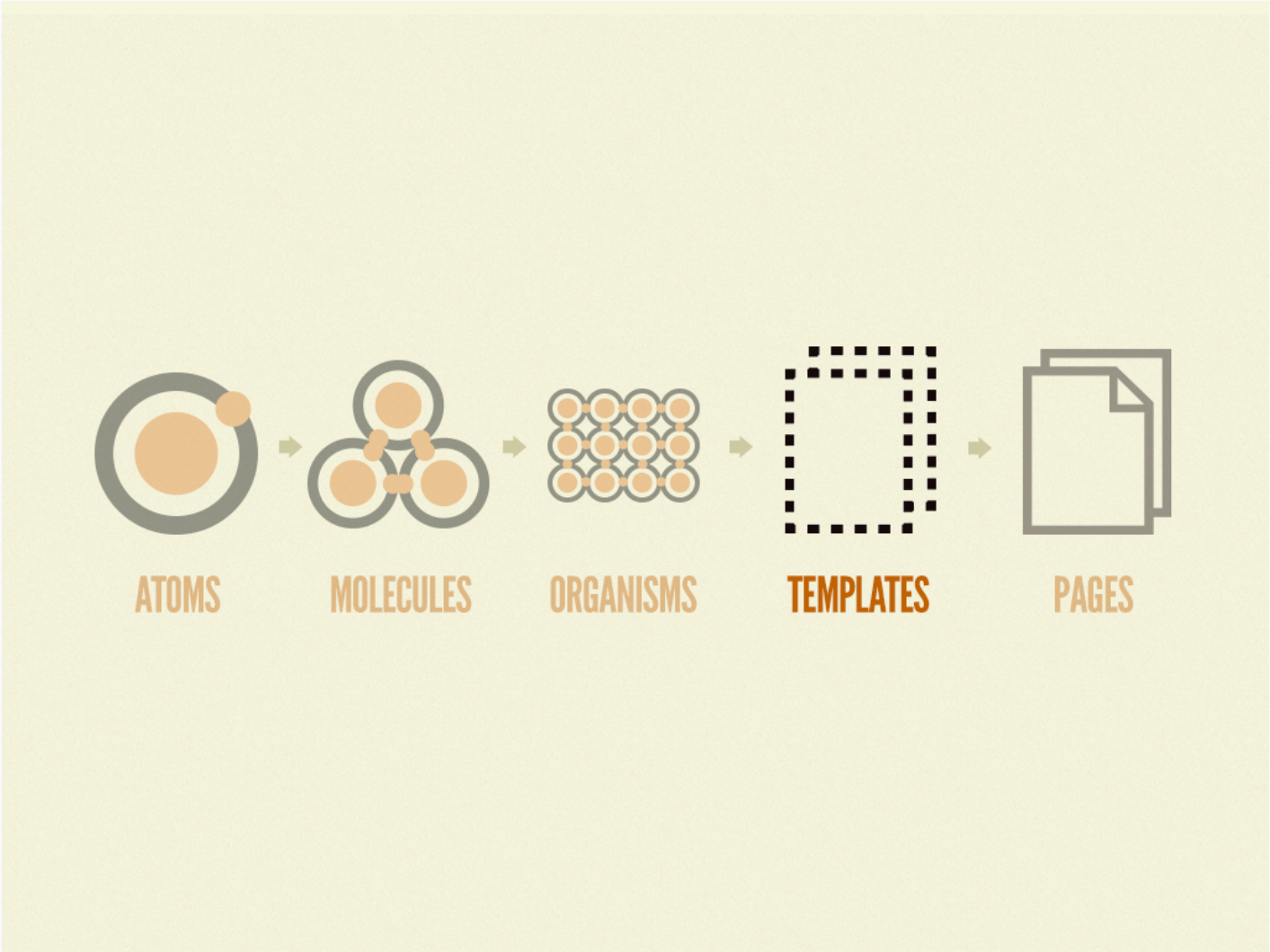
Organisms

are relatively complex components that form discrete sections of an interface.

`<header>`

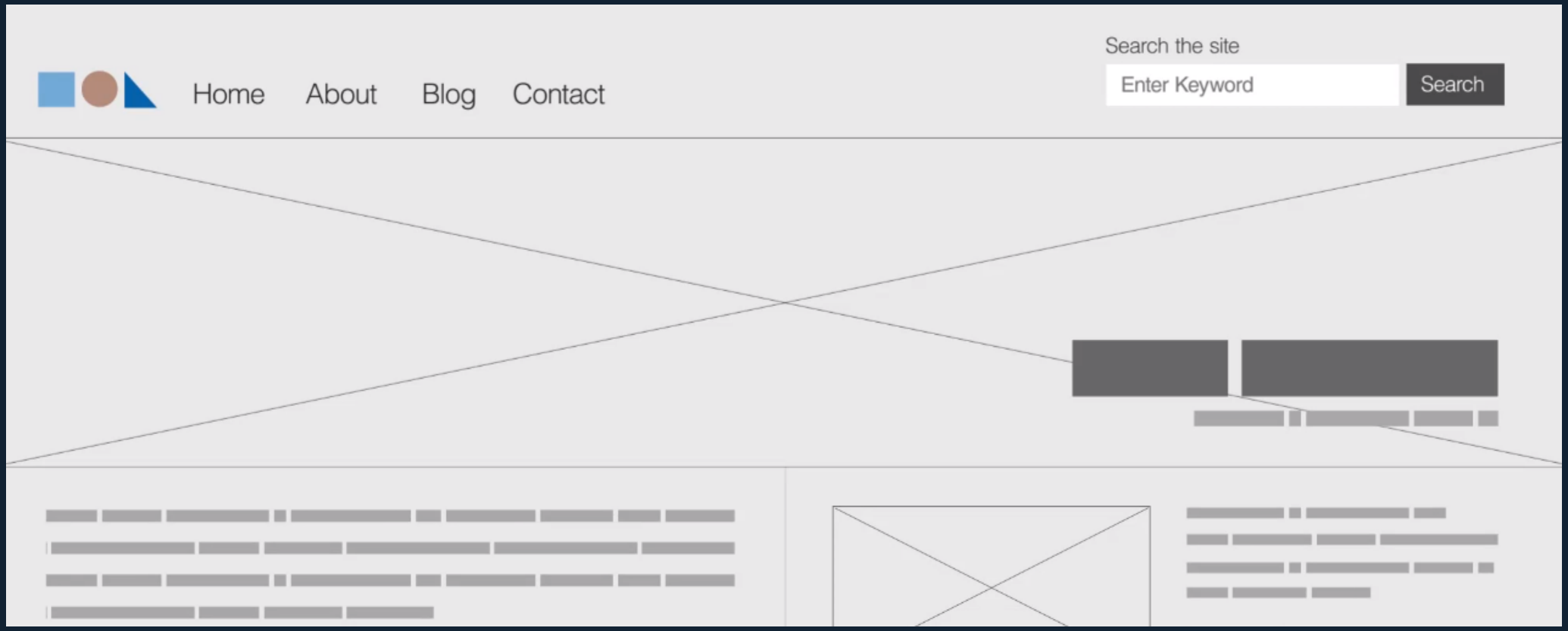


Organism

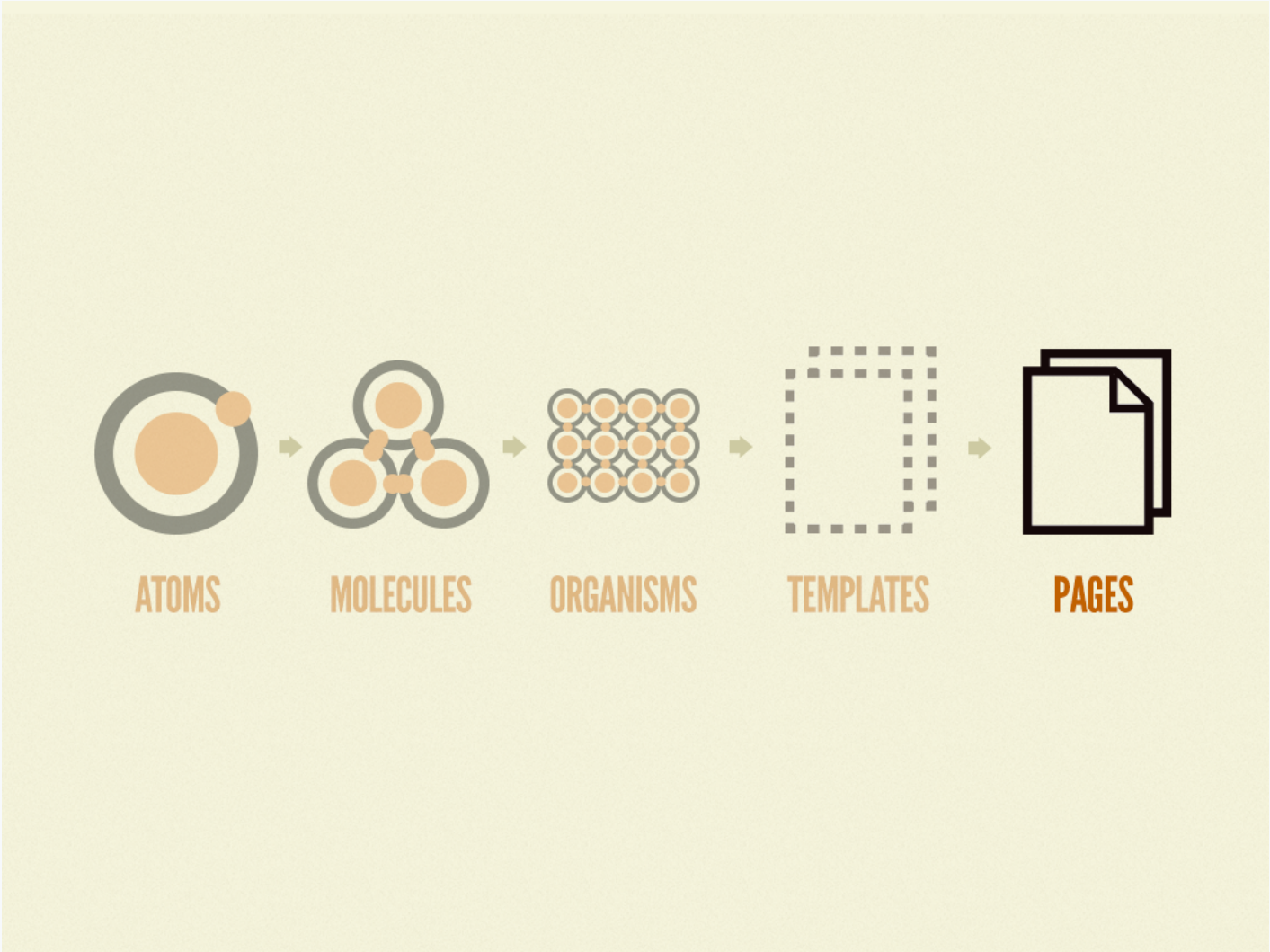


Templates

place components within a layout and demonstrate the design's underlying content structure.

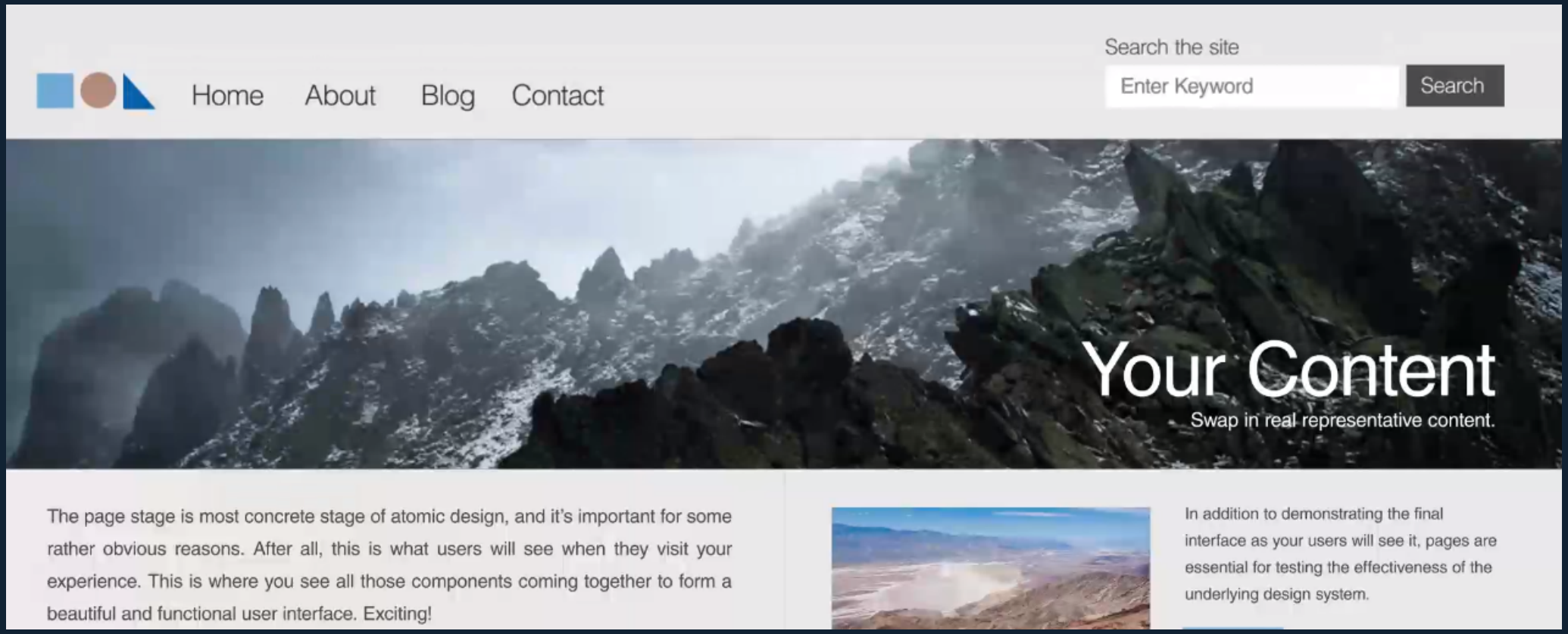

Home
About
Blog
Contact
Search the site
Enter Keyword
Search

Template

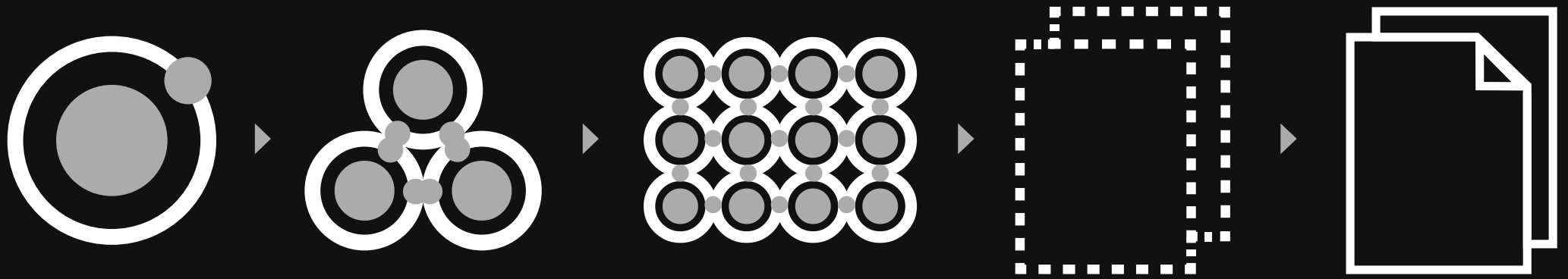


Pages

apply real content to templates and articulate variations to demonstrate the final UI and test the resilience of the design system.


Home
About
Blog
Contact
Search the site
Enter Keyword
Search
Your Content
Swap in real representative content.
The page stage is most concrete stage of atomic design, and it's important for some rather obvious reasons. After all, this is what users will see when they visit your experience. This is where you see all those components coming together to form a beautiful and functional user interface. Exciting!
In addition to demonstrating the final interface as your users will see it, pages are essential for testing the effectiveness of the underlying design system.

Page



The part and the whole

One of the biggest advantages atomic design provides is the ability to quickly shift between abstract and concrete.

We can simultaneously see our interfaces broken down to their atomic elements and also see how those elements combine together to form our final experiences.

> The painter, when at a distance from the easel, can assess and analyze the whole of the work from this vantage. He scrutinizes and listens, chooses the next stroke to make, then approaches the canvas to do it. Then, he steps back again to see what he's done in relation to the whole. It is a dance of switching contexts, a pitter-patter pacing across the studio floor that produces a tight feedback loop between mark-making and mark-assessing.

—  *Frank Chimero*

@frank_chimero

Atomic design is not a linear process

Think of the stages of atomic design as a mental model that allows us to think of our user interfaces as both a cohesive whole and a collection of parts at the same time.

CUTTING DESIGN FILES

Content First — Design Last

With a content-first approach, we move from designing without content to designing based on content — a very important distinction.

Remember the definition of semantic HTML:

GIVING MEANING TO CONTENT

CONTENT

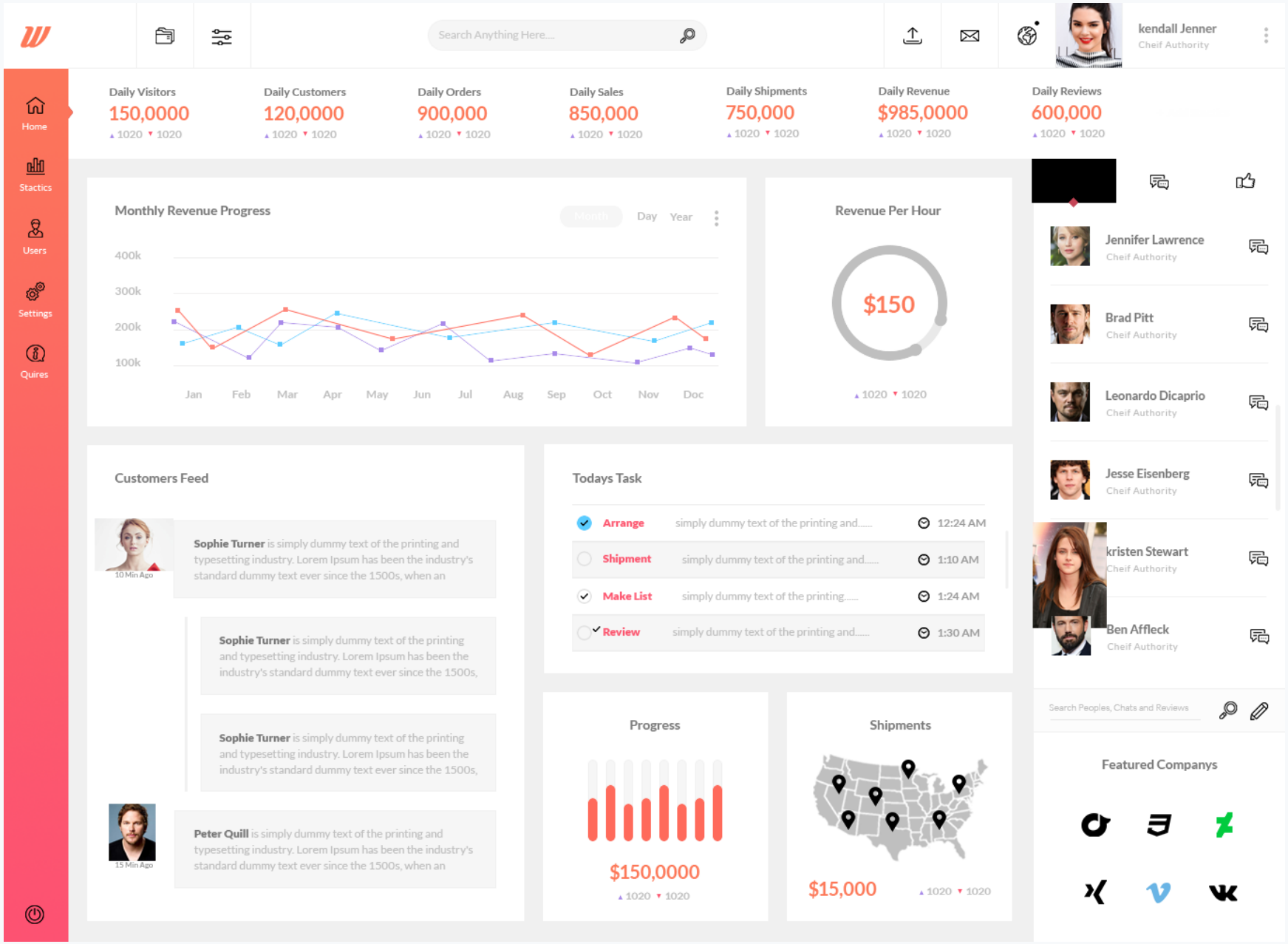
HTML

DESIGN

Really think about what’s important

Before we start writing HTML, we need to determine what content to present on the page and how to prioritize it.

`<nav>` `<main>` `<aside>` `<article>` `<section>`



Wofsus Dashboard by Sajal Jahan (2017)

What's this element?

CLICK HERE

```
<button type="button"
onclick="location.href='https://developer.mozilla.org/en-
US/docs/Web/HTML/Element/button';">Click here</button>

<a class="button" href="https://developer.mozilla.org/en-
US/docs/Web/HTML/Element/a">Click here!</a>
```

#RTFD

The HTML `<button>` element creates an interactive control.

The HTML `<a>` element (or anchor element) creates a hyperlink to other web pages, files, locations within the same page, email addresses, or any other URL.

What's about design?

CLICK HERE

```
// it could be a <button>, <a>, <span>, <div> or whatever
.button {

    // reset user agent stylesheet
    border: 0 none;
    text-shadow: none;
    box-shadow: none;
    background-color: transparent;
    color: black;

    // common styles
    margin: 0;
    padding: 0 20px;
    display: inline-flex;
    justify-content: center;
    align-items: center;
    height: 40px;
    font-weight: 700;
    text-transform: uppercase;
    transition: background-color .3s ease;

    // specific styles
    &.fill-blue {
        background-color: blue;
        color: #fff;
    }

    // styles according to context
    + .button {
        margin-left: 10px;
    }
}
```

STYLE GUIDE

Store & Share

A front-end style guide is both a **deliverable** created by the UX team (in concert with the engineering team, typically) and a **tool** used by the entire team for maintaining consistent, nimble product design in a modular format.

What is a style guide?

> A style guide is a living document of code, which details all the various elements and coded modules of your site or application. Beyond its use in consolidating the front-end code, it also documents the visual language, such as header styles and color palettes, used to create the site. This way, it's a one-stop place for the entire team—from product owners and producers to designers and developers—to reference when discussing site changes and iterations.

—  *Susan Robertson*

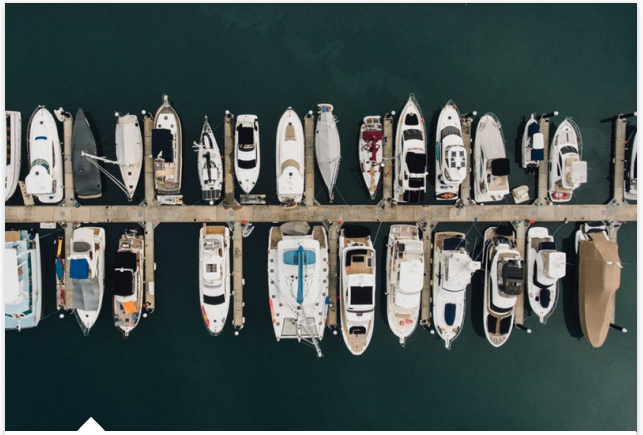
@susanjrobertson

Why should we use a style guide?

As your team grows and changes over time, your style guide will help you in several ways.

BUILD FAST

Creating your guide will take some time up front, but this pays off with **faster build times for new sections and pages**.



BUILD STRONG

A guide allows us to **standardize the CSS, keeping it small and quick to load**.

BUILD ACCURATE

Design consistency is easier to maintain, as the designer can look in one place to reference the site's components and ensure a cohesive look and feel throughout.

A REAL LIFE EXAMPLE

Azureva style guide

I N T H R E E W O R D S

central reference point

Benefits

- **ACCURATE OVERVIEW OF THE UI**
- **DEVELOPMENT PLAYGROUND**
- **KICKSTART FOR NEW PAGES**
- **SIMPLIFIED TESTING**
- **COMPONENT CULTURE**
- **COMMUNICATION BENEFITS**

GET STARTED

Download/fork style guide boilerplate

APPROACH

Object-Oriented <code>

Object-oriented definition

WHICH ONE?

NOBODY AGREES ON WHAT OO IS

3 principles

ENCAPSULATION

enforces Modularity

Encapsulation is the idea that the attributes of an entity are enclosed in that entity.

INHERITANCE

passes "knowledge" down

Inheritance is the idea that an entity can inherit attributes from another entity.

POLYMORPHISM

takes any shape

Polymorphism means “having many forms”: when any thing perform more than type of task.

What is an object?

object

In essence, an object is a discrete entity that has only the necessary dependencies on other objects to perform its tasks.

> Objects are like people. They're living, breathing things that have knowledge inside them about how to do things and have memory inside them so they can remember things. And rather than interacting with them at a very low level, you interact with them at a very high level of abstraction, like we're doing right here.
>
> Here's an example: if I'm your laundry object, you can give me your dirty clothes and send me a message that says, "Can you get my clothes laundered, please." I happen to know where the best laundry place in San Francisco is. And I speak English, and I have dollars in my pockets. So I go out and hail a taxicab and tell the driver to take me to this place in San Francisco. I go get your clothes laundered, I jump back in the cab, I get back here. I give you your clean clothes and say, "Here are your clean clothes."
>
> You have no idea how I did that. You have no knowledge of the laundry place. Maybe you speak French, and you can't even hail a taxi. You can't pay for one, you don't have dollars in your pocket. Yet, I knew how to do all of that. And you didn't have to know any of it. All that complexity was hidden inside of me, and we were able to interact at a very high level of abstraction. That's what objects are. They encapsulate complexity, and the interfaces to that complexity are high level.
>
> — *Steve Jobs*

WHAT ABOUT FRONT-END?

Everything starts with

HTML

To build websites, you should know about HTML.

Place to learn?

MDN

The main entry point for HTML documentation, including detailed element and attribute references — if you want to know what attributes an element has or what values an attribute has, for example, this is a great place to start.

Why learn?

Semantics tags have many benefits beyond pure efficiency, device compatibility and SEO. They help us build better site structures, make all programmatic interaction and manipulation much easier, and more importantly, they can seriously improve websites' accessibility.

CSS from scratch

METHODOLOGIES

OOCSS	Object-oriented CSS — Separating container and content with CSS “objects” An Introduction To Object Oriented CSS
BEM	Block Element Modifier — Structured way of naming your classes, based on properties of the element in question
SMACSS	Scalable and Modular Architecture for CSS — Style-guide to write your CSS with five categories for CSS rules

No matter what methodology you choose to use in your projects, you will benefit from the advantages of more structured CSS and UI. Some styles are less strict and more flexible, while others are easier to understand and adapt in a team.

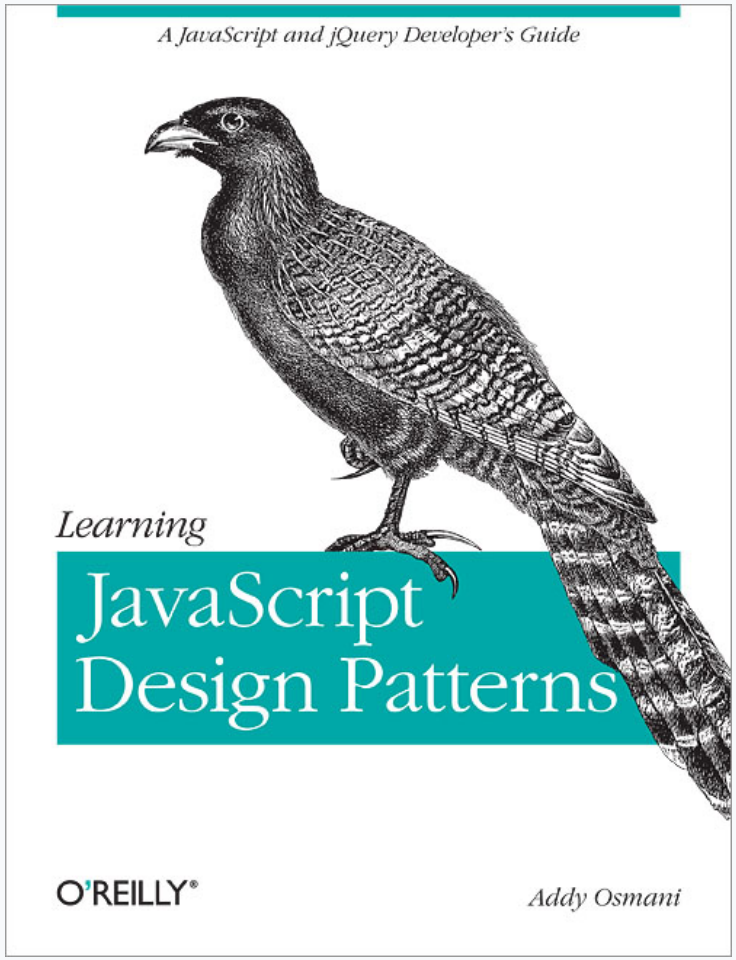
Front-end frameworks

BOOTSTRAP

FOUNDATION

SEMANTIC UI

For sites that need to be heavily customized or introduce a new kind of interaction that isn't standard, it may take longer to customize a framework than to build from scratch.



JavaScript Module Pattern

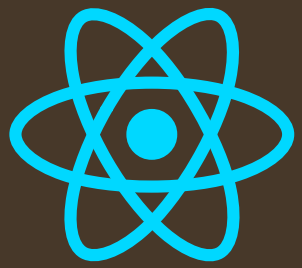
READ THE EBOOK

For further reading: You Don't Know JS, a series of books diving deep into the core mechanisms of the JavaScript language.

JavaScript libraries

Vue.js

"The cool kid on the block"



React.js

"Leading the satisfaction statistics"

Angular

"Wisdom of elders"

For further reading: Angular vs. React vs. Vue: A 2017 comparison

Whether you're building a JavaScript application, crafting some CSS or designing a website there are common themes of what a component is.

Independent

Components should be able to be used on their own and rely on only a limited set of dependencies. They should be built so they don't 'leak' or cross-over into other components.

Clearly defined

Useful but limited scope - E.g a 'button' component + a 'search box' component is better than a 'navbar' component, but a search button and search input shouldn't be split up into two separate components if they'll never be used independently.

Encapsulated

Components should 'wrap up' their functionality within themselves and provide set ways of implementation. E.g a button component could expose "size" and "colour" options.

Reusable

Components are often built with reusability in mind, although they may initially only be implemented once.

Componentising our front end has some immediate major advantages, such as:

CONSISTENCY

Implementing reusable components helps keep design consistent and can provide clarity in organising code.

MAINTAINABILITY

A set of well organised components can be quick to update, and you can be more confident about which areas will and won't be affected.

SCALABILITY

Having a library of components to implement can make for speedy development, and ensuring components are properly namespaced helps to avoid styles and functionality leaking into the wrong place as projects scale.

Sources

Prologue, Epilogue	Thinking in Components by Hedley Smith (2015)
Atomic Design	Atomic Design by Brad Frost (2013) Pattern Lab by Dave Olsen and Brian Muenzenmeyer (2017)
Content First — Design Last	Content First — Design Last by Rik Schennink (2015)
Store & Share	Creating Style Guides by Susan Robertson (2014) How To Automate Style Guide-Driven Development by Varya Stepanova & Juuso Backman (2015)
Object-Oriented <code>	Vue, React, AngularJS, and Angular2. Our take on popular JavaScript frameworks by Antoni Żółciak (2017)

So many thanks to them.

Credits

Cover	Jars by wibblefish
Atomic Design	molecular model by @yb_woodstock
Content First — Design Last	Keep Clear by Tom Ducat-White
Store & Share	Sharing by Travis Wise
Object-Oriented <code>	Lego Technic "Truncated Octahedron" sphere shape by David Luders