

Front-end Development Overview



Table of Contents

1. Front-end Web Development
2. Internet
3. Web browsers
4. Domain Name System (DNS)
5. HTTP/Networks
6. Web Hosting
7. User Interface/Interaction Design

Section 1

Front-end Web Development

1 A site is loaded in a browser from the server.



Responsive front-end design allows a site to adapt to a user's device.

2 Client-side scripts

Run in the browser and process requests without call-backs to the server

Request



Everything a user sees in the browser is a mix of **HTML**, **CSS**, and **JavaScript**.

3 When a call to the database **is** required JavaScript and AJAX send requests to the back end.



4 The **back-end server-side scripts** process the request, pull what they need from the database then send it back.

5 Server-side scripts

process the data, then update the site—populating drop-down menus, loading products to a page, updating a user profile, and more.

A Front-end Developer...

A front-end developer architects and develops websites and web applications using web technologies (i.e., [HTML](#), [CSS](#), and [JavaScript](#)), which typically runs on the [Open Web Platform](#) or acts as compilation input for non-web platform environments (i.e., [React Native](#)).

Required knowledge



Section 2

Internet

What is Internet?

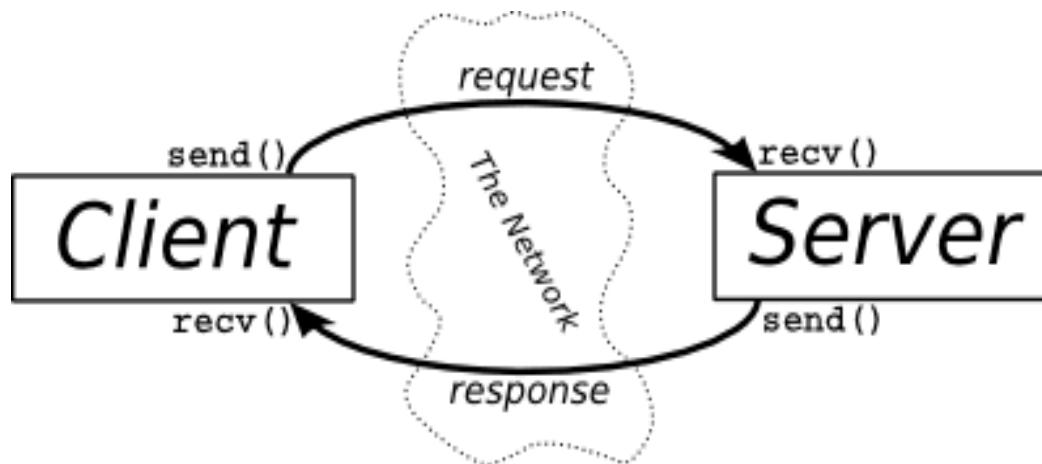
“

The Internet is a global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link several billion devices worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and peer-to-peer networks for file sharing.

— [Wikipedia](#)

- To simplify, Internet is:
 - A global wide area network that connects computer systems across the world.
 - In which users at any one computer can, if they have permission, get information from any other computer

Client-server is a software architecture model consisting of two parts, client systems and server systems, both communicating over a computer network or on the same computer.



➤ *Clients:*

- Always initiates requests to servers.
- Waits for replies from servers.
- Receives replies from servers.
- Usually connects to a small number of servers at one time.
- Usually interacts directly with end-users using any user interface such as graphical user interface.

➤ *Servers:*

- Always wait for a request from one of the clients.
- Serves clients' requests then replies to the clients with the requested data.
- A server may communicate with other servers in order to serve a client request.
- A server may communicate with other servers in order to serve a client request.
- End users typically do not interact directly with a server, but use a client.

- **IP (Internet Protocol)** is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination.

- Data traversing the Internet is divided into smaller pieces, called **Packets**. IP information is attached to each packet, and this information helps routers to send packets to the right place.

Section 3

Web Browsers

➤ ***The most commonly used browsers (on desktop and mobile):***

1. Chrome (engine: Blink + V8)
2. Firefox (engine: Gecko + SpiderMonkey)
3. Internet Explorer (engine: Trident + Chakra)
4. Safari (engine: Webkit + SquirrelFish)

➤ ***Evolution of browsers and Web technologies:***

To see more: <http://www.evolutionoftheweb.com/>

- ***Headless browser:*** A web browser without a graphical user interface, controlled programmatically. Used for automation, testing, and other purposes.

➤ ***The most commonly used headless browser:***

1. *Headless Chromium (engine: Blink + V8)*
2. *SlimerJS (engine: Gecko + SpiderMonkey)*

Web Browser

➤ How browser work?

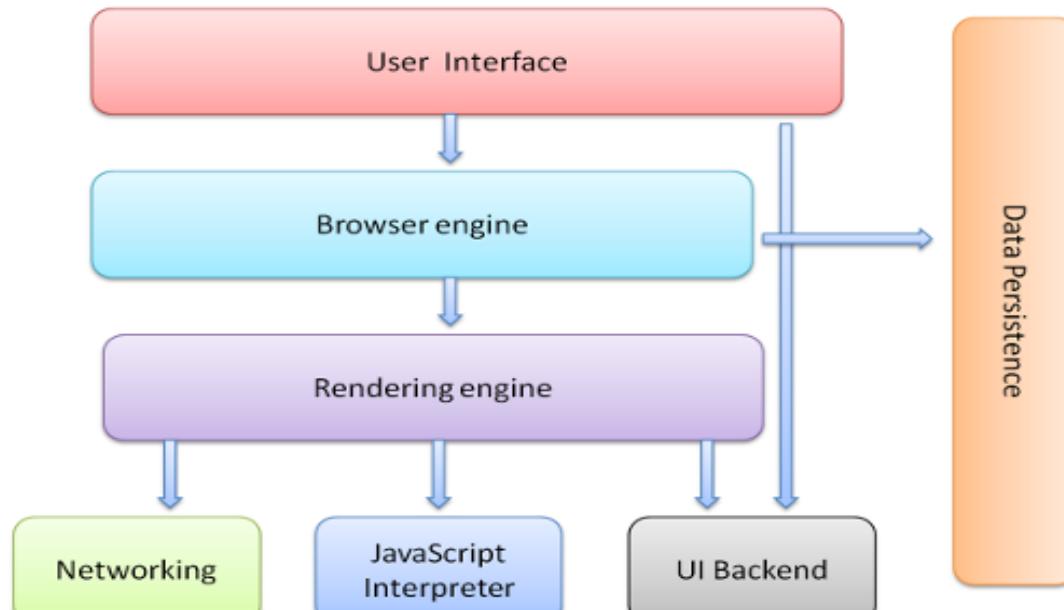
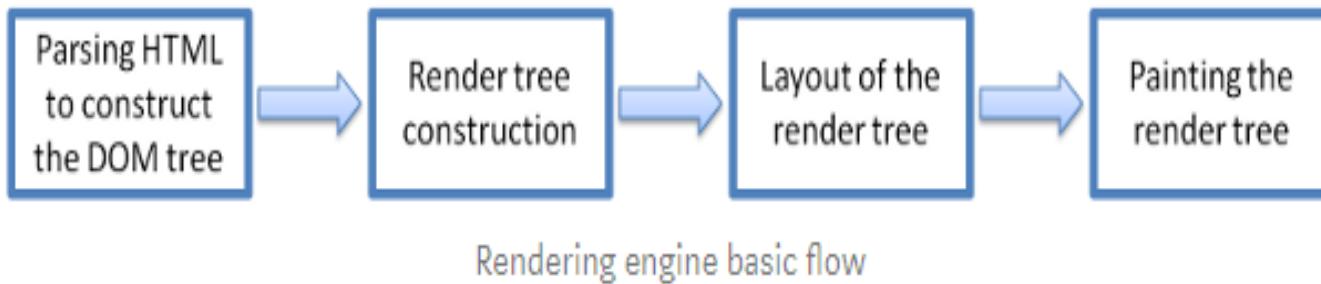


Figure : Browser components

Rendering Engine



Section 4

Domain Name System (DNS)

Domain Name System (DNS)

- ***Structure of domain names:*** Every domain consists of at least two parts: the actual domain name and the TLD or Top Level Domain

Domain Name System (DNS)

- **DNS Request:** A demand for information sent from a user's computer (DNS client) to a DNS server. In most cases a DNS request is sent, to ask for the IP address associated with a domain name.

Actually a DNS client querying the DNS servers to get the IP address, related to that domain.

Section 5

HTTP/Networks

What is HTTP?

“

HTTP - The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web.

— [Wikipedia](#)

➤ *HTTP Specifications*

- HTTP/1.1 (1997)
- HTTP/2 (2015)
- HTTP/3 (2019)

➤ ***HTTP Status codes***

- *1xx informational response* – the request was received, continuing process
- *2xx successful* – the request was successfully received, understood, and accepted
- *3xx redirection* – further action needs to be taken in order to complete the request
- *4xx client error* – the request contains bad syntax or cannot be fulfilled
- *5xx server error* – the server failed to fulfil an apparently valid request

➤ What is CORS?

“

CORS - Cross-origin resource sharing (CORS) is a mechanism that allows restricted resources (e.g., fonts) on a web page to be requested from another domain outside the domain from which the resource originated.

— [Wikipedia](#)

➤ *Use cases scenario CORS*

- Invocations of the XMLHttpRequest or Fetch APIs.
- Web Fonts (for cross-domain font usage in @font-face within CSS).
- WebGL textures.
- Images/video frames drawn to a canvas using drawImage().
- CSS Shapes from images.

➤ **What is WebSockets?**

“

WebSockets - WebSocket is a protocol providing full-duplex communication channels over a single TCP connection. The WebSocket protocol was standardized by the IETF as RFC 6455 in 2011, and the WebSocket API in Web IDL is being standardized by the W3C.

— [Wikipedia](#)

➤ *Use case scenario of WebSocket*

- Fast Reaction Time
- Ongoing Updates
- Ad-hoc Messaging
- High-Frequency Messaging with Small Payloads

Section 6

Web Hosting

What is web hosting?

Web hosting

“

A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via the World Wide Web. Web hosts are companies that provide space on a server owned or leased for use by clients, as well as providing Internet connectivity, typically in a data center.

— [Wikipedia](#)

➤ Type of web hosting

- Shared hosting
- VPS hosting
- Dedicated hosting
- Cloud hosting
- Reseller hosting

Section 7

User Interface/Interaction Design Principles

User Interface/Interaction Design

- **UX** is focused on optimization of a product for effective and enjoyable use
- **UI** design is concerned with the look and feel, the presentation and interactivity of a product
- **Usability** is concerned with the ease of use with which a user can interact with your site
- **Design** with tactics, not talent

Layout and Spacing

X

Set up Two-Factor Authentication

STEP 1 OF 3

Every time you sign in to your account, you will need your password and verification code

Setup your phone

Enter the phone number you would like to use.

Country Phone Number

 Canada 

+1 (555) 555-5555 

Next Step

Layout and Spacing

✓

Set up Two-Factor Authentication

STEP 1 OF 3

Every time you sign in to your account, you will need your password and verification code

Setup your phone

Enter the phone number you would like to use.

Country

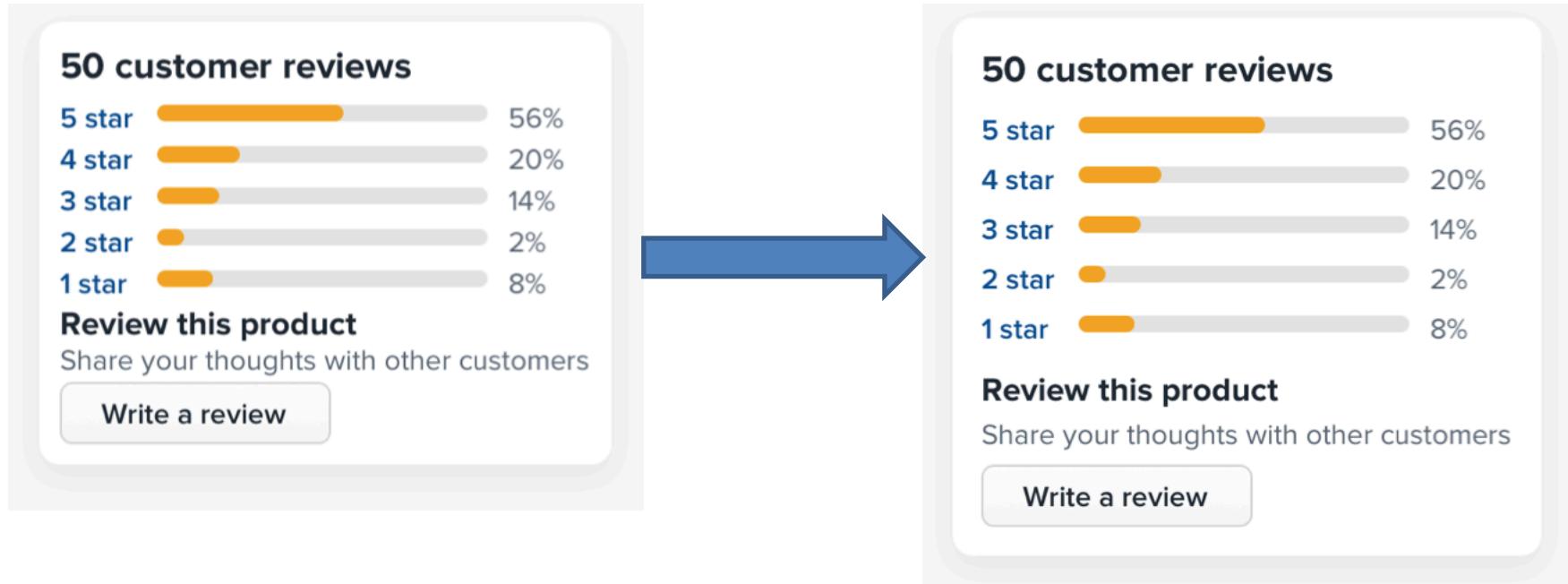
Phone Number

 Canada

+1 (555) 555-5555 

Next Step

Layout and Spacing



Layout and Spacing

The screenshot shows a mobile-style e-commerce checkout interface. At the top, there's a header bar with a red 'X' button, three dots, and a navigation bar with arrows and a house icon. Below the header, the brand name "URBANFAIR" is displayed in a large, bold, dark font. To the right of the brand name are "Shop", a magnifying glass icon, and a shopping cart icon.

The main content area shows a single item: "Eleanor Chair" (Ampchair, Yellow) with a price of \$429.00. Below the item, there's a "Discount code" input field and an "Apply" button. The total cost breakdown is as follows:

Line Item	Amount
Subtotal	\$429.00
Taxes	\$55.77
TOTAL	CAD \$484.77

Layout and Spacing

The screenshot shows a web browser window displaying an e-commerce website for "URBANFAIR". The page includes a header with a search bar, navigation icons, and user links. Below the header, there's a product listing for an "Eleanor Chair" with a yellow patterned fabric. A discount code input field and an "Apply" button are present. The page then displays a breakdown of costs: Subtotal (\$429.00), Taxes (\$55.77), and a final TOTAL of CAD \$484.77.

URBANFAIR

Shop

3 items

	Eleanor Chair Armchair Yellow	\$429.00
<input type="text" value="Discount code"/> <input type="button" value="Apply"/>		
Subtotal		\$429.00
Taxes		\$55.77
TOTAL		CAD \$484.77

Layout and Spacing

2 BILLING ADDRESS

Are you purchasing for someone else?

Full name

Street address

City

Province/Territory

Layout and Spacing

2 BILLING ADDRESS

Are you purchasing for someone else?

Full name

Street address

City

Province/Territory

Postal code

20px

10px

Layout and Spacing



designers, developers, marketers, and support folks. CoffeeKit uses Level to communicate.

24px

Monday morning has arrived.

24px

After eating a waffle, Sarah starts her workday by checking her Level Inbox. First up, Joe Gibraltar posted a direct question for



designers, developers, marketers, and support folks. CoffeeKit uses Level to communicate.

36px

Monday morning has arrived.

12px

After eating a waffle, Sarah starts her workday by checking her Level Inbox. First up, Joe Gibraltar posted a direct question for

Layout and Spacing



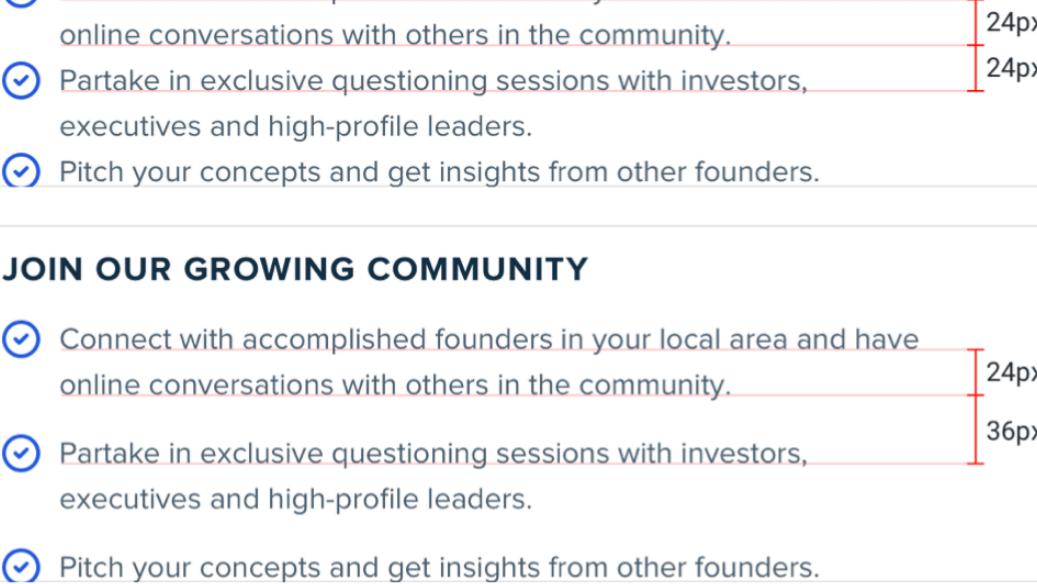
JOIN OUR GROWING COMMUNITY

- Connect with accomplished founders in your local area and have online conversations with others in the community.
- Partake in exclusive questioning sessions with investors, executives and high-profile leaders.
- Pitch your concepts and get insights from other founders.



JOIN OUR GROWING COMMUNITY

- Connect with accomplished founders in your local area and have online conversations with others in the community.
- Partake in exclusive questioning sessions with investors, executives and high-profile leaders.
- Pitch your concepts and get insights from other founders.



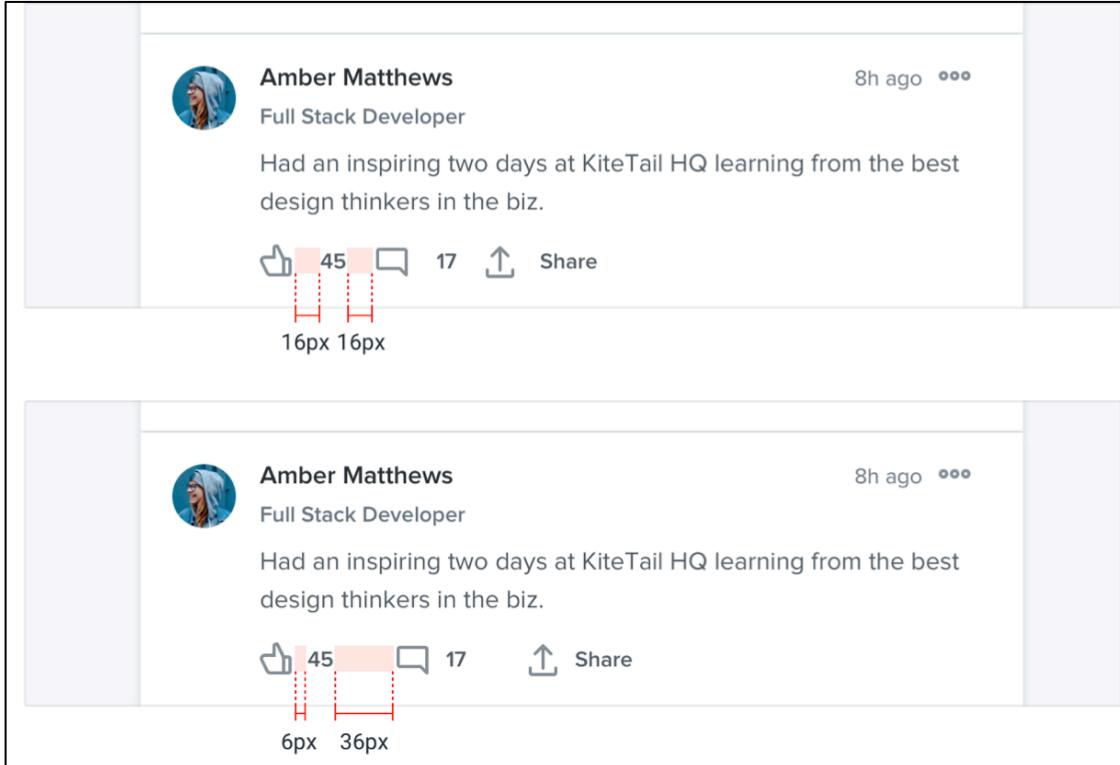
24px

24px

36px

Layout and Spacing

- It's not just vertical spacing that you have to worry about:



Layout and Spacing

- **Rule of thumb:** Whenever you're relying on spacing to connect a group of elements, always make sure there's more space *around* the group than there is within it — UI that are hard to understand always look **worse**.

Typography

- Lines that are too long, making text harder to read



~120 characters per line

Call me Ishmael. Some years ago—never mind how long precisely—having little or no money in my purse, and nothing particular to interest me on shore, I thought I would sail about a little and see the watery part of the world. It is a way I have of driving off the spleen and regulating the circulation. Whenever I find myself growing grim about the mouth; whenever it is a damp, drizzly November in my soul; whenever I find myself involuntarily pausing before coffin warehouses, and bringing up the rear of every funeral I meet; and especially whenever my hypos get such an upper hand of me, that it requires a strong moral principle to prevent me from deliberately stepping into the street, and methodically knocking people's hats off—then, I account it high time to get to sea as soon as I can. This is my substitute for pistol and ball. With a philosophical flourish Cato throws himself upon his sword; I quietly take to the

- For the best reading experience, make your paragraphs wide enough to fit between 45 and 75 characters per line

55 - 65 characters per line

There was no possibility of taking a walk that day. We had been wandering, indeed, in the leafless shrubbery an hour in the morning; but since dinner (Mrs. Reed, when there was no company, dined early) the cold winter wind had brought with it clouds so sombre, and a rain so penetrating, that further out-door exercise was now out of the question.

65 - 75 characters per line

There was no possibility of taking a walk that day. We had been wandering, indeed, in the leafless shrubbery an hour in the morning; but since dinner (Mrs. Reed, when there was no company, dined early) the cold winter wind had brought with it clouds so sombre, and a rain so penetrating, that further out-door exercise was now out of the question.

Typography

- Line-height and paragraph width should be proportional

✓

There was no possibility of taking a walk that day. We had been wandering, indeed, in the leafless shrubbery an hour in the morning; but since dinner (Mrs. Reed, when there was no company, dined early) the cold winter

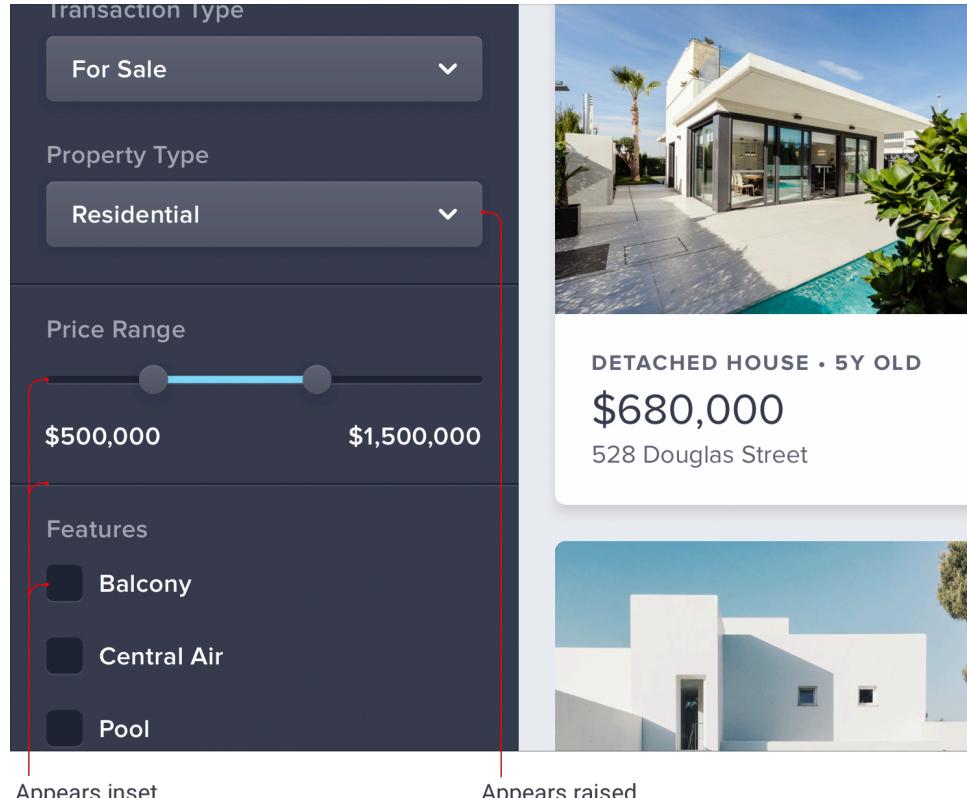
1.5

There was no possibility of taking a walk that day. We had been wandering, indeed, in the leafless shrubbery an hour in the morning; but since dinner (Mrs. Reed, when there was no company, dined early) the cold winter wind had brought with it clouds so sombre, and a rain so penetrating, that further out-door exercise was now out of the question.

2

Creating Depth

- Have you ever noticed how some elements in an interface feel like they're raised off of the page, while others feel like they are inset into the background?



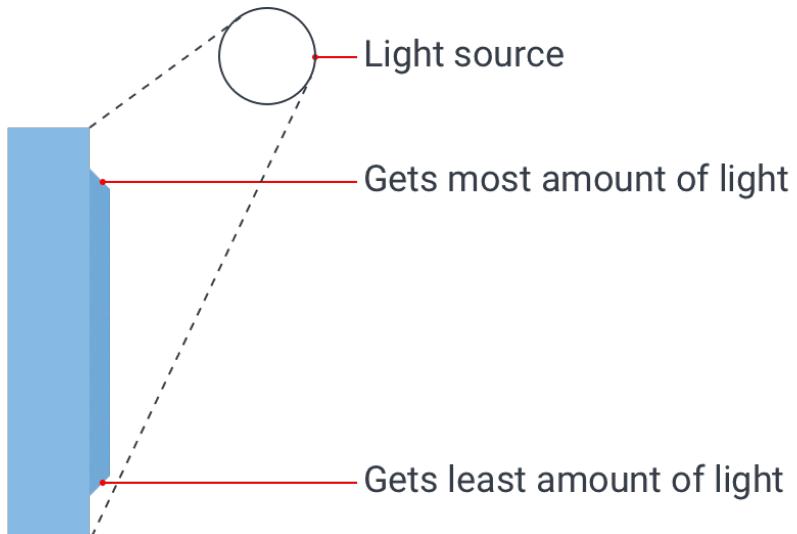
Creating Depth

- Light comes from above



Creating Depth

- Notice how the top edge of the panel is lighter? That's because it's angled towards the sky and receives more light. Similarly, the bottom edge is darker because it's angled *away* from the sky, receiving *less* light.



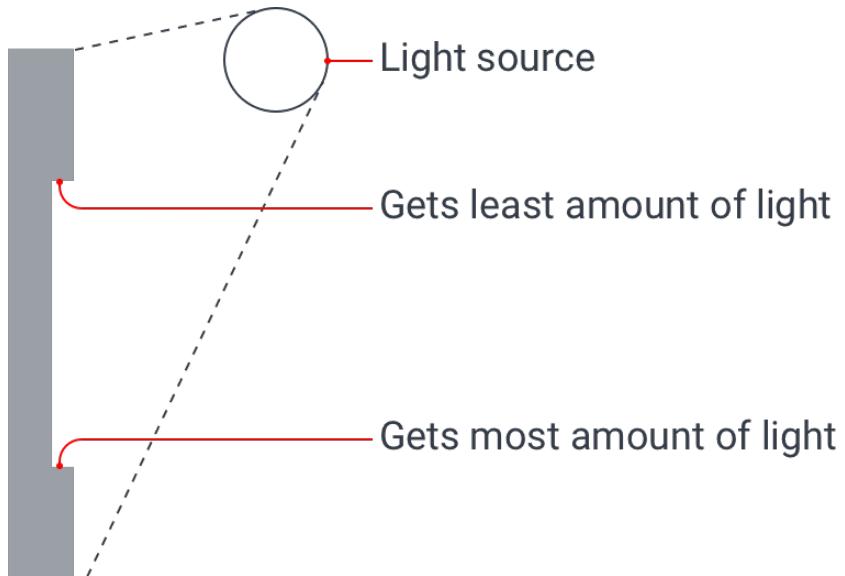
Creating Depth

- Now take a look at the panelling on this cabinet:



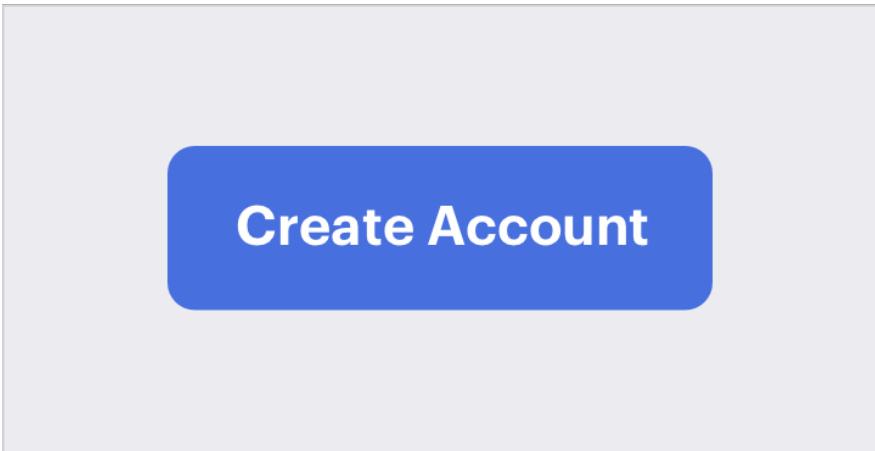
Creating Depth

In this case it's clear that the panels are *inset* because there's a shadow at the top indicating that the lip above is blocking the light, and the bottom edge is lighter, indicating that it's angled upward.

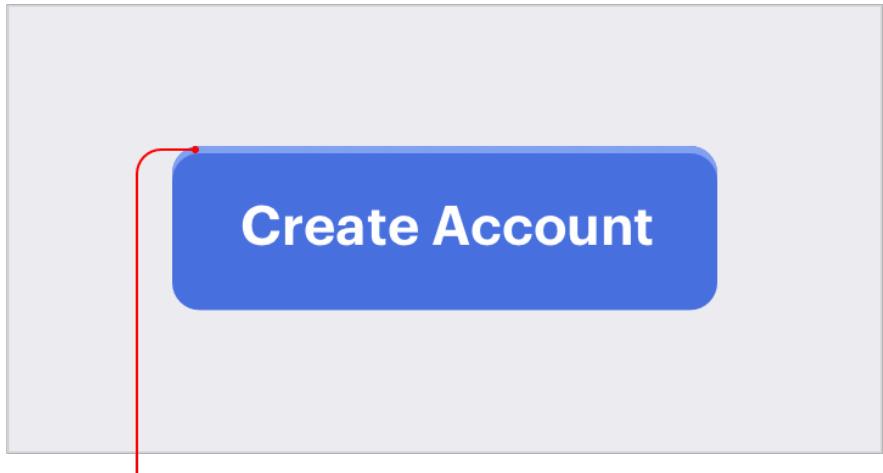


Creating Depth

BEFORE



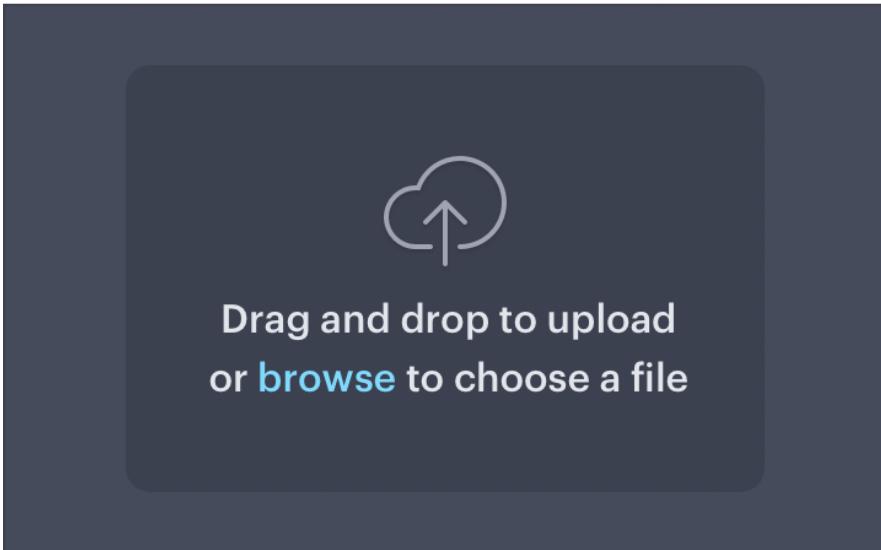
AFTER



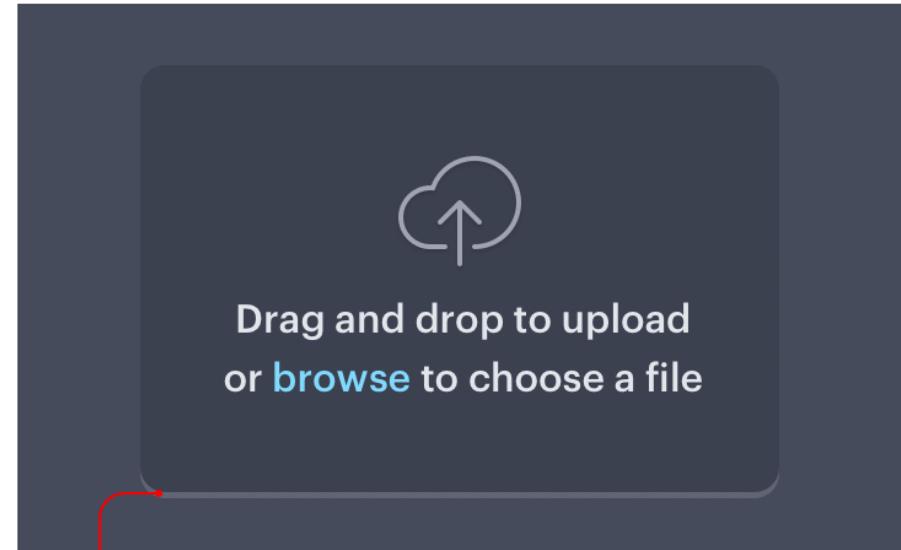
box-shadow: inset 0 1px 0 hsl(224, 84%, 74%);

Creating Depth

BEFORE

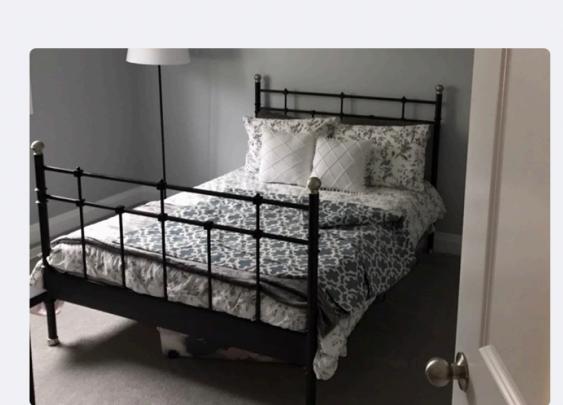


AFTER



box-shadow: 0 2px 0 hsla(0, 0%, 100%, .15);

Working with Images



ENTIRE APARTMENT

Modern Studio in Central San Francisco

\$120 USD per night

★★★★★ 23



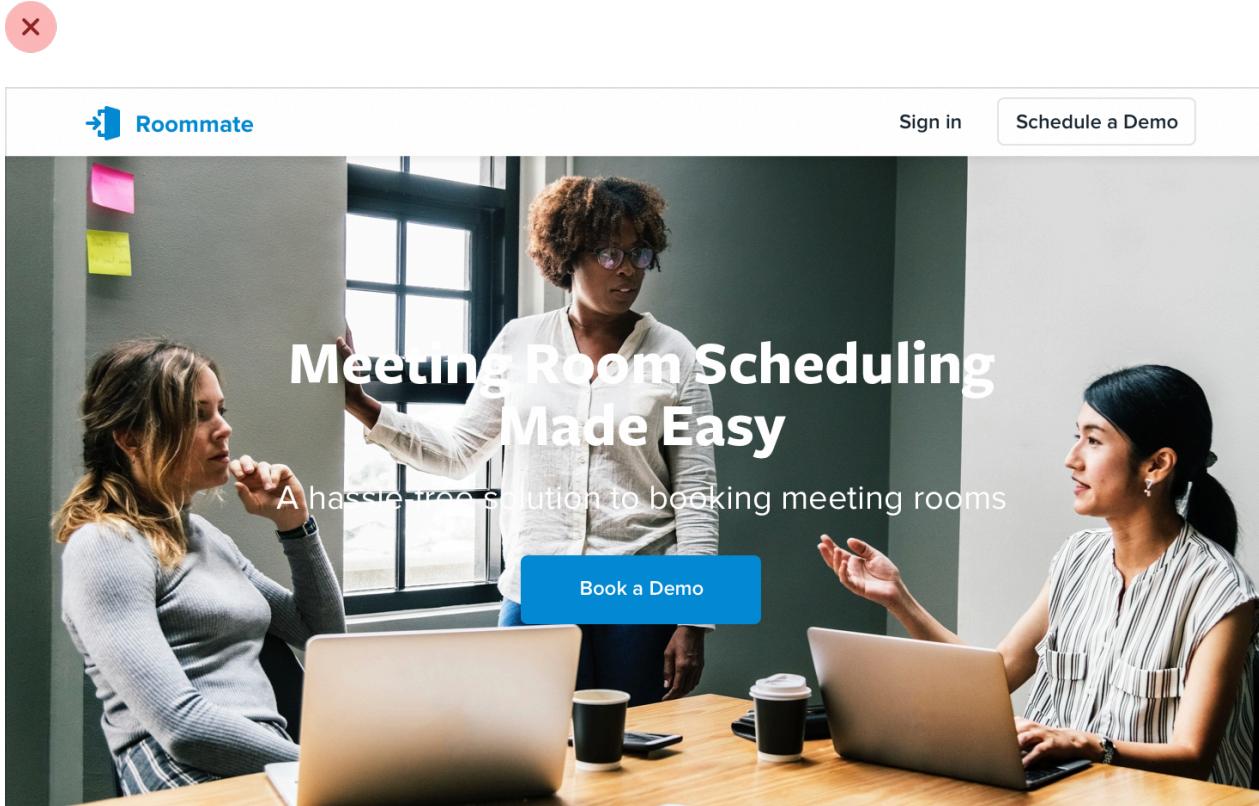
ENTIRE APARTMENT

Modern Studio in Central San Francisco

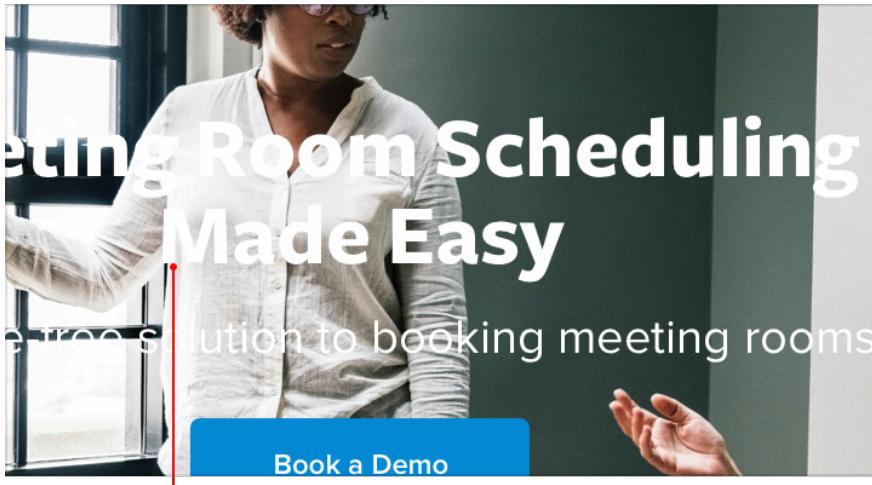
\$120 USD per night

★★★★★ 23

Working with Images



Working with Images



Too light

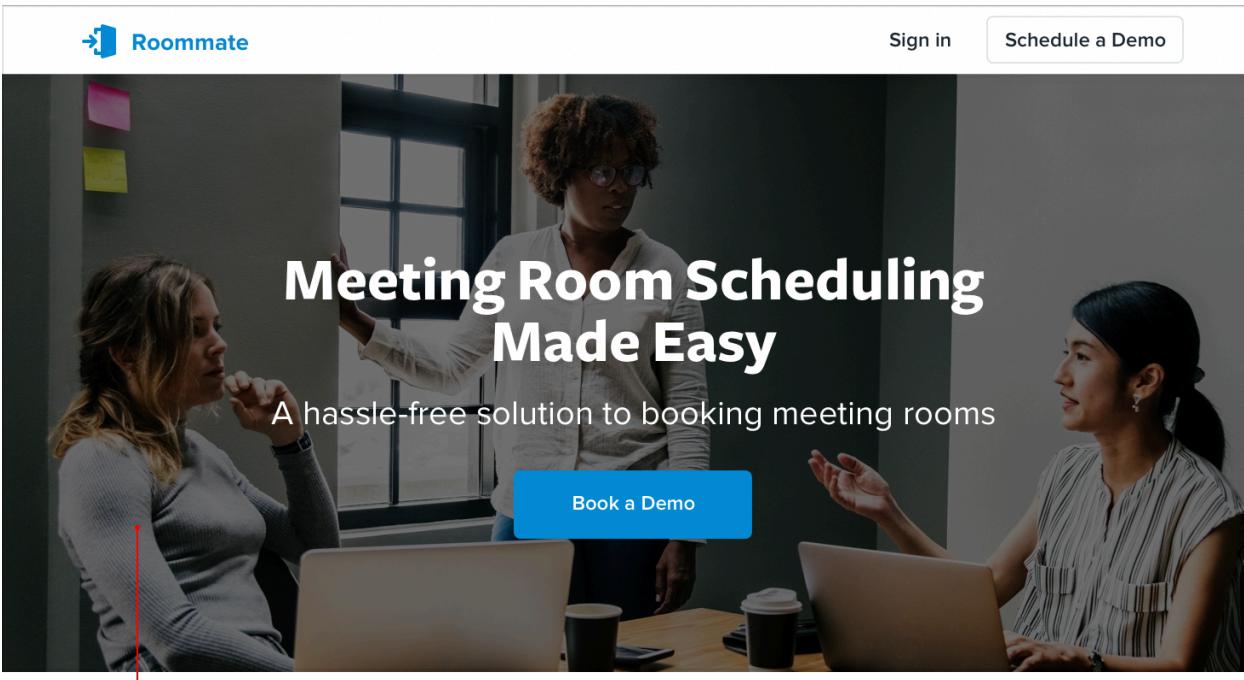


Too dark

Working with Images



Add an overlay

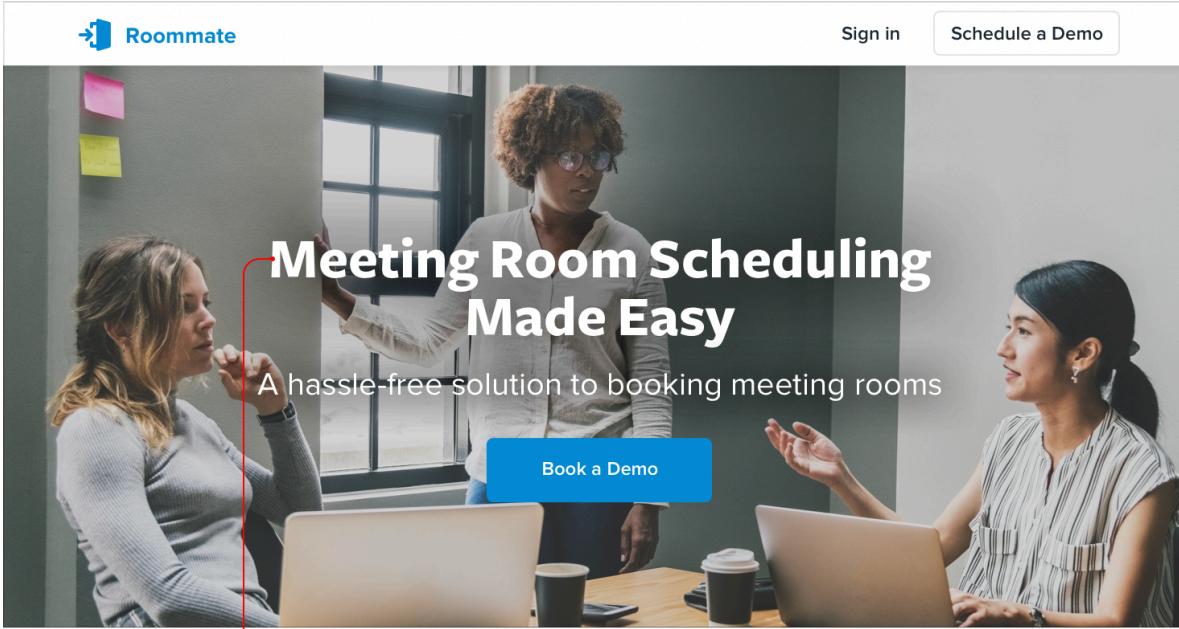


```
background-color: hsla(0, 0%, 0%, .55);
```

Working with Images



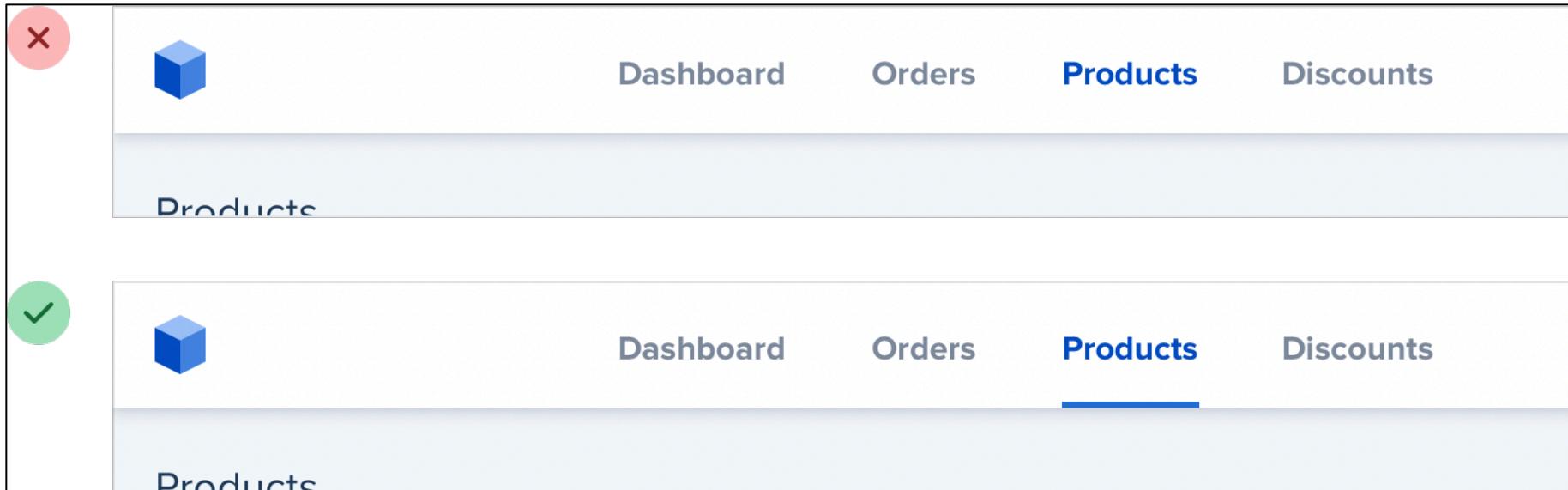
Add text shadow



```
text-shadow: 0 0 50px hsla(0, 0%, 0%, .4);
```

Others

- Highlight user navigation



Summary

1. Front-end web development is the practice of producing HTML, CSS and JavaScript for a website
2. A site must be easy to read and relevant to users
3. A web site also must support multiple devices and resolutions
4. Front-end relies greatly on HTTP protocols. A good understanding of HTTP protocols will help Front-end developer a lot
5. Main UI/UX Design Principles is to always “Put yourself in other's shoes”

Thank you 