

Welcome to CS571!

Building User Interfaces

Cole Nelson & Yuhang Zhao

Instructor



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Instructor



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M.S. Computer Science
Ph.D. Information Science

Research Focus:

HCI, Augmented/Virtual Reality,
Accessibility, AI-powered Assistive
Technology

Course Staff

Many graders and peer mentors also make this possible!

- Hongtao Hao (Epic)
- Hazel Zhu
- Amy Koike
- Ruijia Chen
- Suhas Kurukuri
- Zhaoyang Liu
- Kexin Zhang
- Leo Cui

Who are you?

We'll get to know you in HWo! This information will be shared with your classmates in HW2 & HW4, BadgerBook.

You *can* make this up! :)

Alan Turing

Computer Science

Alan is taking 12 credits and is from Wisconsin.

They have 4 interests including...

- Reading
- Lifting
- Running
- Sudoku

What is **CS571** about?

→ UX Development

...but what is UX Development?

The realm of the UX developer exists somewhere between that of the traditional developer and the designer. We're not really designers, yet to be a good UX developer you certainly need to have an eye for design. In the same vein, we're not traditional developers but we certainly need to have development experience and expertise. Often this experience spans multiple technologies, languages, and platforms.

— Tim R. Todish

It falls on the UX developer to bridge the gap between design and technology. We need to be able to think and speak the language of designers. It's our job to help translate their vision to the development team in a way that they can understand and accept. This can be a critical piece of the puzzle in a project, especially if the design and the interactions behind it are complex.

— Tim R. Todish

*Similarly, we need to speak on behalf **the developers** to help reign in the designers, at times. If they are coming up with concepts that will be extremely difficult or time consuming to implement, we can explain the limitations of the technology and the complexity involved in implementing their designs, and try to come up with an acceptable alternative.*

— Tim R. Todish

UX Development

= Software Engineering + UX Design

What does a Software Engineer do?¹

¹ Kantega | The Mysterious Life of Developers



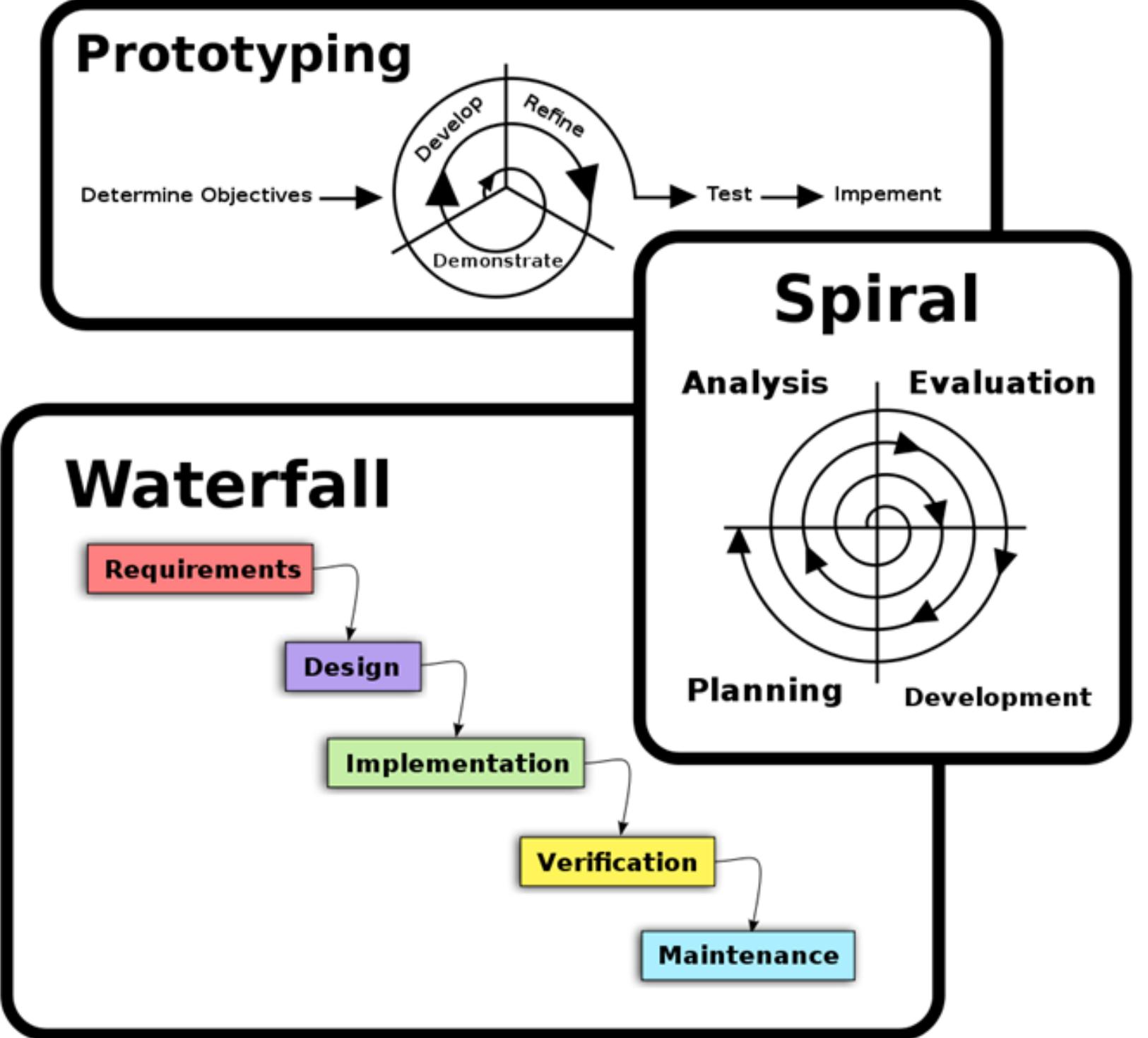
which is devoured in a
large quantity.

Definition: A software engineer is a person who applies the principles of software engineering to the design, development, maintenance, testing, and evaluation of computer software.

But how does a Software Engineer go about this?²

² What is a Software Engineer?

Software Development Lifecycle³



³ SDLC Process

What does a UX Designer do?⁴

⁴ Kantega | The Mysterious Life Of UX Designers



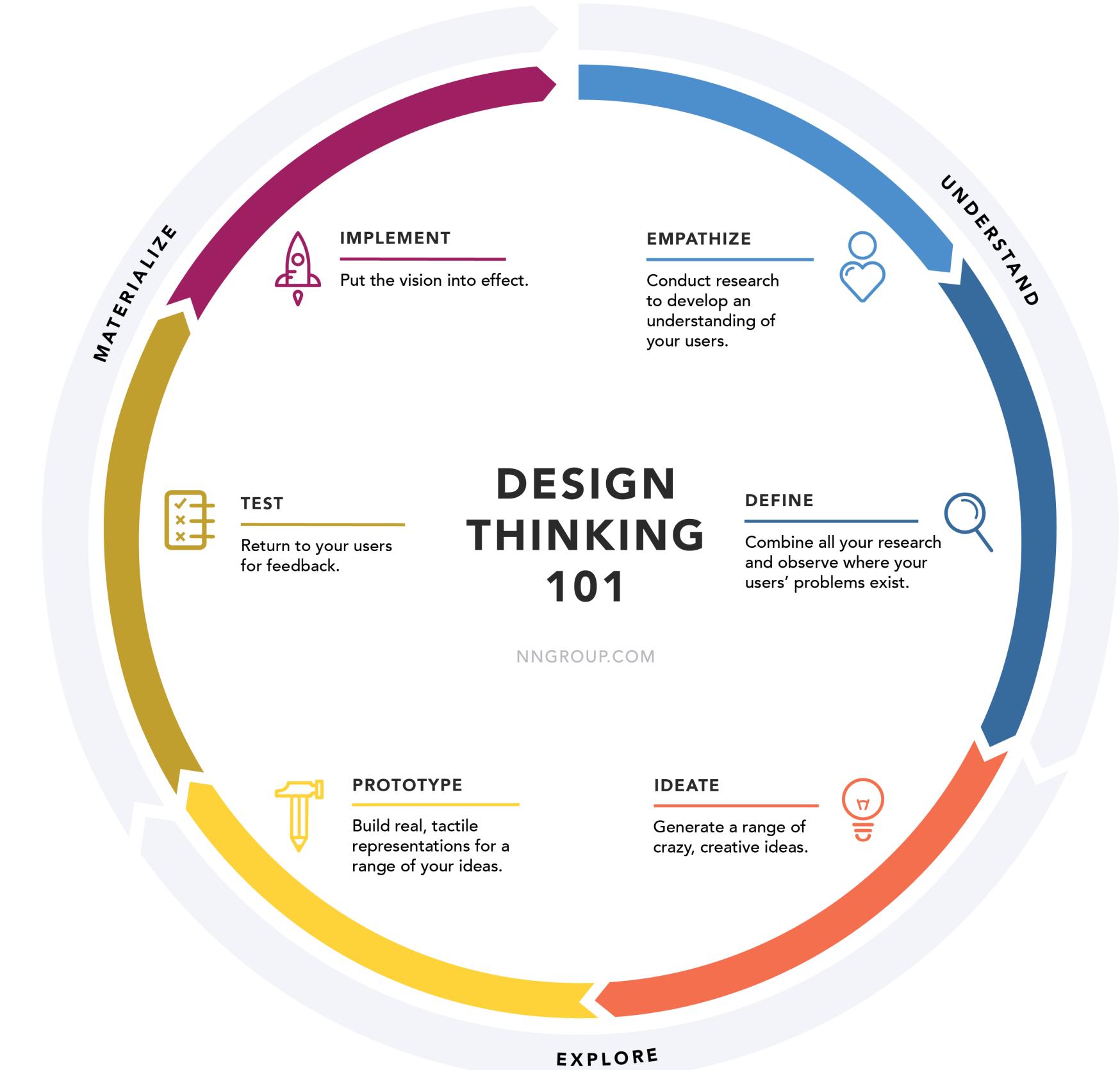
Definition: User experience (UX) design is the process that design teams use to create products that provide meaningful and relevant experiences to users. A UX designer is concerned with the entire *process* of acquiring and integrating a product, including aspects of branding, design, usability, and function.⁵

How does a UX designer go about this?

⁵ Interaction Design Foundation

UX Design Process⁶

Looks familiar?



⁶ NN/g Design Thinking

So then, what is UX Development?⁷

⁷ Don Norman: The term "UX"

A portrait of an elderly man with a white beard and glasses, wearing a blue denim shirt, pointing his right index finger towards the camera.

NN/g

Don Norman:
The Term UX

UX Development Trajectories

- One-person development team to build full-stack applications
- A developer who speaks the language of the designers
- A designer who can also build native prototypes
- A bridge/translator between designers and developers in large/complex organizations

Course Information

Course Basics

- Meet Tuesdays & Thursdays; lectures will be recorded and posted to Canvas > Kaltura Gallery.
- In-person attendance is *encouraged*; if you attend in-person for design lectures, you can work in a group for your In-Class Activity (ICA)!
- Tuesdays will *typically* cover programming topics, and Thursdays will *typically* cover design topics. **Bring a laptop!**

Week Of	Topics	Homework	ICAs
2-Sept	Intro to CS571	HW0 (1 pt)	No ICA
9-Sept	Web Dev Basics 1 & Design Thinking	HW1	ICA A
16-Sept	Web Dev Basics 2 Web Dev Basics 3	HW2	No ICA
23-Sept	Web Dev 1 & Visual Design	HW3	ICA B
30-Sept	Web Dev 2 & Web Design	HW4	ICA C
7-Oct	Web Dev 3 & Interaction Design	HW5	ICA D
14-Oct	Web Dev 4 & Expert Evaluation	HW6	ICA E
21-Oct	Web Dev 5 & Midterm Exam	No HW	No ICA
28-Oct	Mobile Dev 1 & Prototyping	HW7	ICA F
4-Nov	Mobile Dev 2 & Mobile Design	HW8	ICA G
11-Nov	Mobile Dev 3 & Accessibility	HW9	ICA H
18-Nov	Voice Dev 1 & VUI Design	HW10	ICA I
25-Nov	Designing Agents & Thanksgiving	No HW	ICA J
2-Dec	Voice Dev 2 & User Evaluation	HW11	ICA K
9-Dec	FullStack Development	No HW	No ICA
14-Dec	Final Exam	No HW	No ICA

Point Distribution

Item	Points	Notes
HWs	45	12 HWs, 4 pts each. HW0 worth 1 pt. None dropped.
ICAs	10	11 ICAs, 1 pt each, lowest dropped.
Midterm Exam	20	Double-sided notesheet
Final Exam	25	Cumulative, double-sided notesheet

Grading Scale

A	AB	B	BC	C	D	F
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[100, 94]	(94, 88]	(88, 82]	(82, 76]	(76, 70]	(70, 60]	(60, 0]
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Grades are not rounded. **WYSIWYG!**

Anyone can achieve an A, but you have to earn it.

Weekly Assignments & ICAs

- Keep up with the lectures & course content!
 - Concepts build throughout the semester.
- Every weekly assignment is released on Tuesday and due the following Monday at 11:59 pm
- ICAs are started in-class on Thursdays and are due by 5:00 pm the following day.

Midterm & Final Exam

- Exams will be held *in-person*.
 - **You must be on campus in order to take the exam!**
- Midterm Exam is on Thursday, October 24th at 5:45 pm
- Final Exam is on Saturday, December 14th at 7:25 pm
- If you have a conflict, please use the Google Form linked in the exam's Canvas assignment to let us know.
- See the bottom of Canvas for past exams.

Late Policies

- ICAs may *not* be submitted late. Lowest is dropped.
- HWs may be turned in *up to* 7 days late with the following restrictions:
 - Each late day is 10% off the assignment grade.
 - E.g. a score of 4.5/5.0 two days late is a 3.6.
 - Days are *rounded up*, e.g. 12:01 am is a late day.
 - The first 10 late days used are penalty-free.
 - These are intended to be used in case of sickness or extenuating circumstances. **Use them sparingly!**

Academic Integrity

- **Do not share code with others!**
- **Do not use code from previous semesters!**
- You may *discuss* assignments with others, but all work must be done individually.
- Snippets taken from StackOverflow, ChatGPT, etc. **must be cited** with a comment.
- We use tools like MOSS... Don't risk it!

Course Tools

- General course logistics will be managed via *Canvas*.
- Code will be uploaded to *GithHub Classroom*.
- Questions will be asked via *Piazza*.
- Personal matters will be handled via *email*.
- The course website⁸ is <https://cs571api.cs.wisc.edu/ui/>
 - This will mostly be useful for HW assignments.
 - Badger IDs have been issued via email!

⁸ In past semesters, we have used cs571.org. Please ignore this.

Office Hours

Please see the schedule here.

1. Empty? Go right in! Otherwise...
2. Fill out the queue form.
3. If it's virtual, join the Zoom link. You will be placed in a waiting room.
4. View your status in queue.
5. We'll try to get to you as soon as we can!

Software & Downloads

- Visual Studio Code for JS Development
- Node 20 and NPM 10 for React Development
 - Please be sure that you have a modern version!
 - node -v will need to be ≥ 18
 - npm -v will need to be ≥ 9
- Postman for API Exploration
- Git for Version Control/Submission

McBurney & Accommodations

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity.

Please inform me of your need for instructional accommodations during the beginning of the semester, or as soon as possible after being approved for accommodations.

Mental Health

UHS offers no-cost services in psychiatry, individual, couple, and group counseling, alcohol and drug abuse, and other mental health needs.

Schedule an access appointment at 608-265-5600 option 2 or contact 24/7 crisis support at option 9.

You matter!

Today's Topic

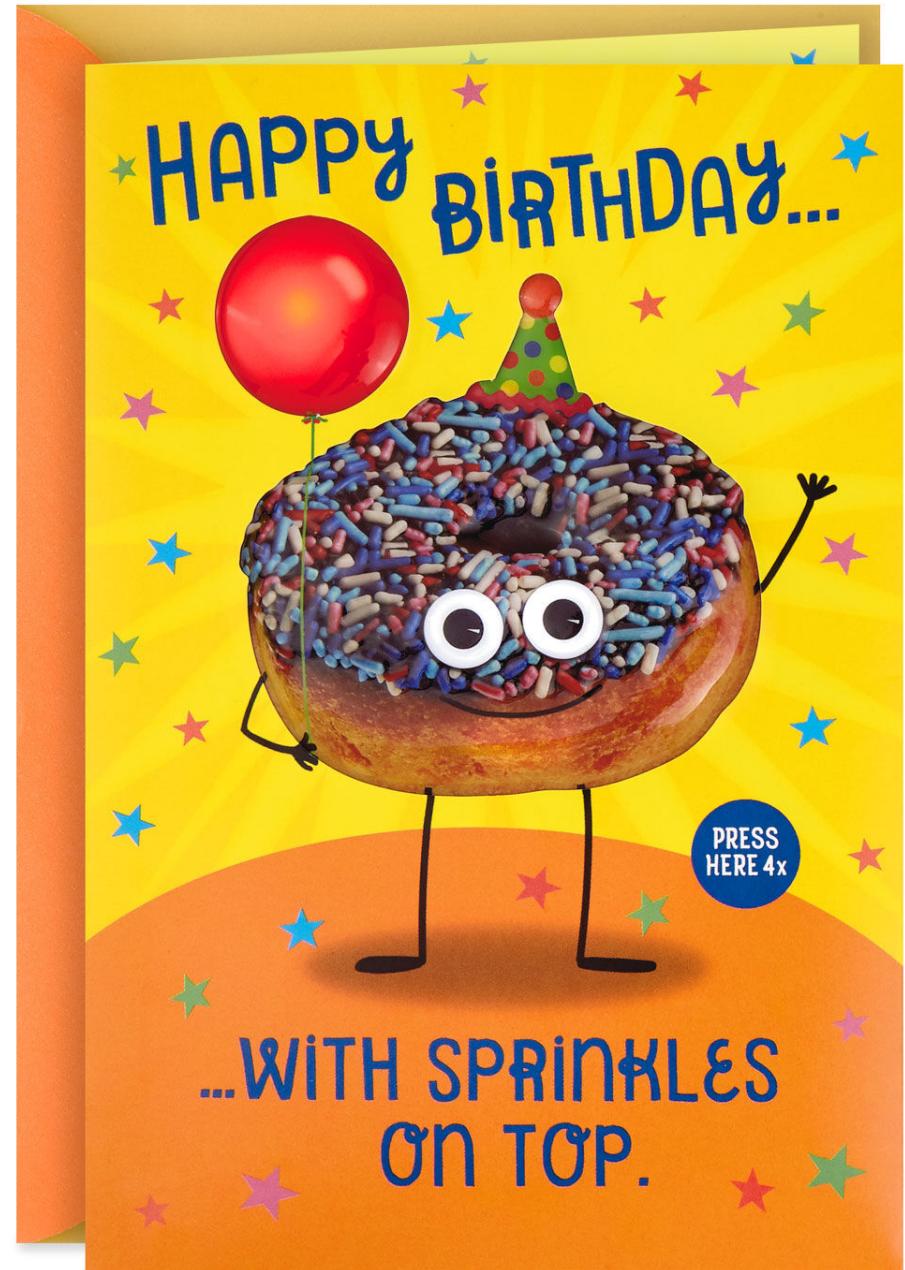
The Web.

A Website⁹

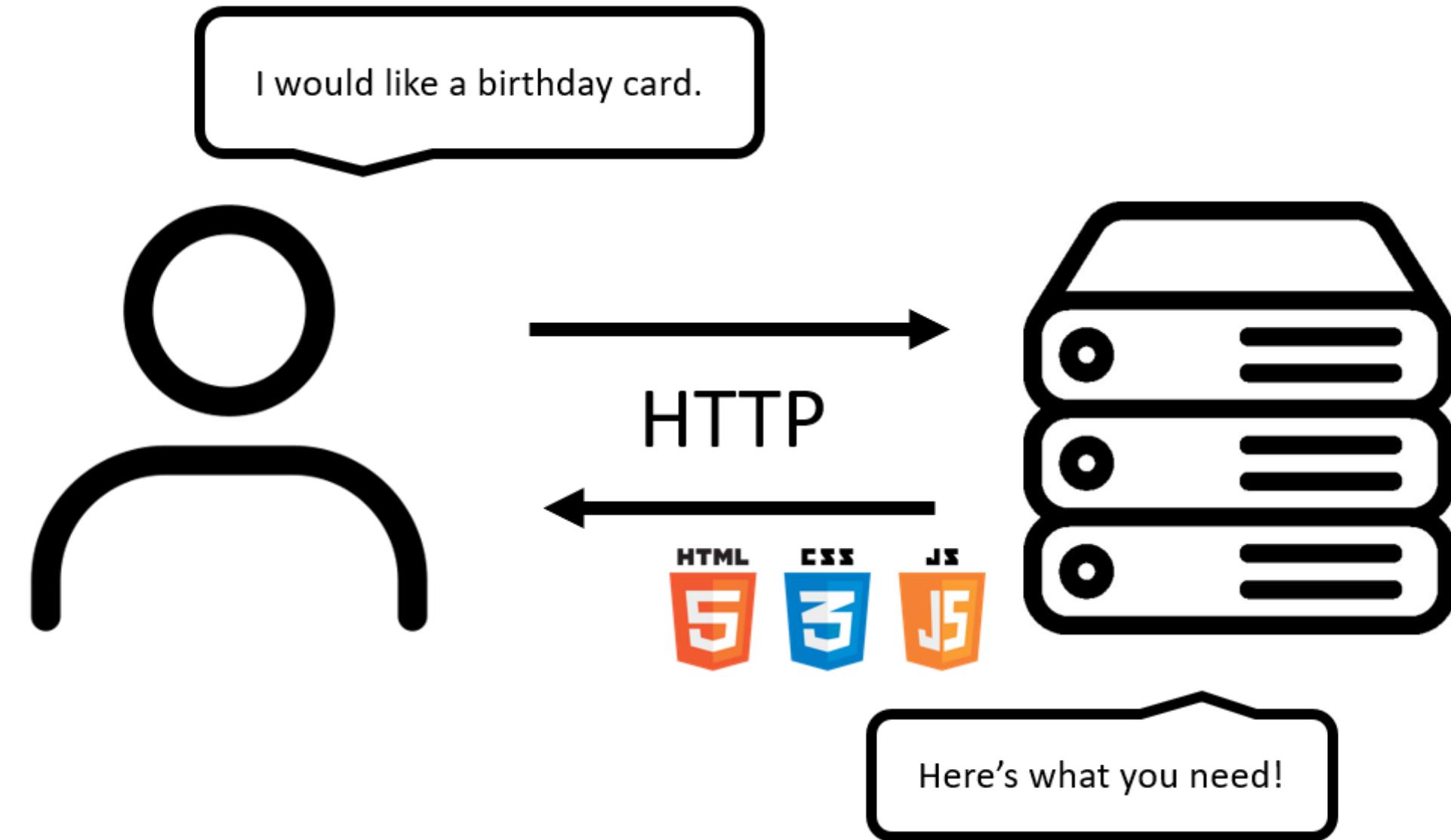
It's like a birthday card!

Concept	Behavior
HTML	Structure
CSS	Design
JS	Behavior

How does it get delivered? HTTP!



⁹[Personal Website Codepen](#)



¹⁰ Server Icon by Pixel Perfect

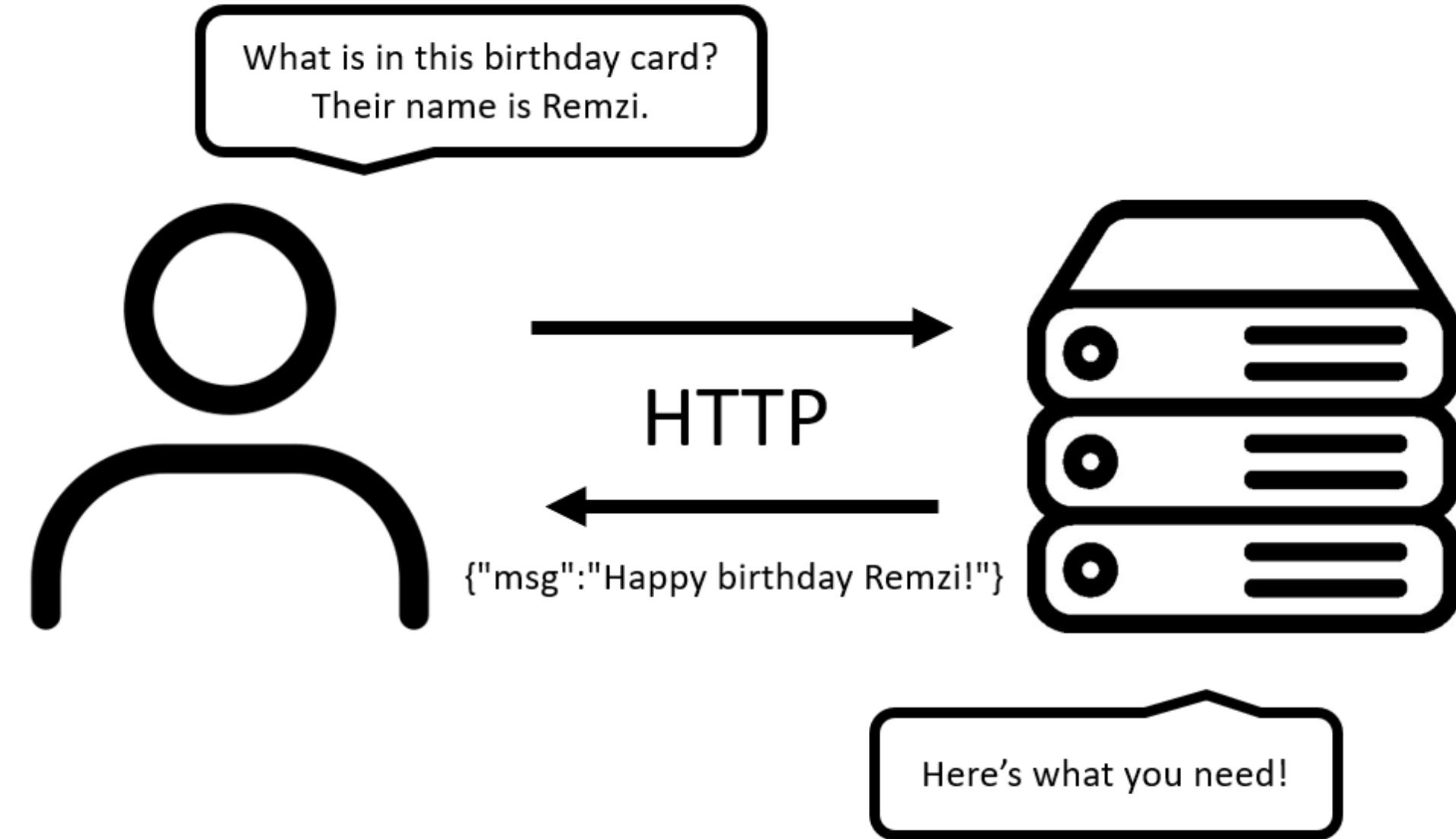


There's nothing inside of the card?!

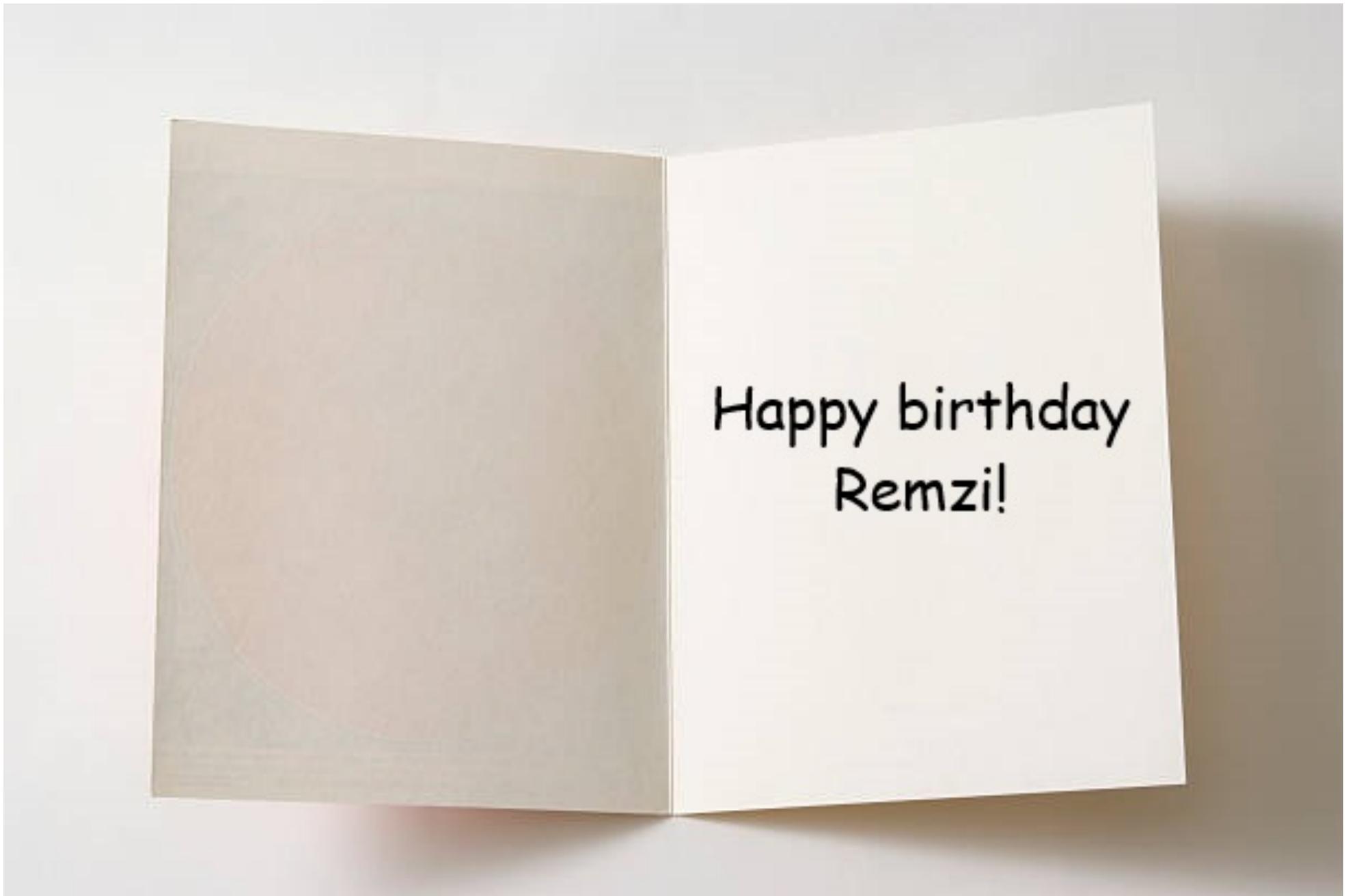
Communication

We need a *structured way* to communicate data. We'll use **JSON**.

```
[  
 {  
   "id": 1,  
   "title": "New interactive mural invites  
             exploration and engagement with  
             science",  
   "img": "https://www.coletnelson.us  
          /cs571/f22/hw7/api/news/images  
          /exhibit",  
   "tags": [  
     "science",  
     "entertainment"  
   ]  
 },  
 {  
   "id": 2,  
   "title": "Sewer sleuthing, air
```



¹⁰ Server Icon by Pixel Perfect



Better!

Real-World Example

How does GitHub display profile webpages?

The screenshot shows a user profile interface. At the top, there's a navigation bar with four tabs: 'Overview' (selected), 'Repositories', 'Projects', and 'Packages'. Below the navigation is a large, light-gray placeholder area containing a large gray user icon. In the top right corner of this area are two buttons: 'Send feedback' and a pencil icon. To the left of the main content area is a smaller placeholder with a circular loading icon and an 'Edit profile' button below it. The main content area has a heading 'Pinned' and contains two identical placeholder cards, each with a circular loading icon and three vertical dots on the right side. To the right of the pinned section is a text link 'Customize your pins'.

What can be displayed with HTML/CSS/JS on load...

```
HTTP/1.1 200 OK
Server: GitHub.com
Date: Fri, 20 Jan 2023 21:36:04 GMT
Content-Type: application/json; charset=utf-8
Cache-Control: public, max-age=60, s-maxage=60
Vary: Accept, Accept-Encoding, Accept, X-Requested-With
Last-Modified: Fri, 20 Jan 2023 12:09:09 GMT
{
  "login": "ctnelson1997",
  "id": 37457808,
  "node_id": "MDQ6VXNlcjM3NDU3ODA4",
  "avatar_url": "https://avatars.githubusercontent.com/u/37457808?v=4",
  "gravatar_id": "",
  "url": "https://api.github.com/users/ctnelson1997",
  "public_repos": 6,
  "public_gists": 1,
  "followers": 3,
  "following": 3,
  "created_at": "2018-03-16T20:56:14Z",
  "updated_at": "2023-01-20T12:09:09Z"
}
```



Response Code

Response Headers

Response Body

JSON data received!



Mona Lisa Octocat

octocato

Hi, I'm Mona 🙌 You might recognize me as @github's mascot 🐙😺

[Edit profile](#)

Overview Repositories Projects Packages

octocato / README.md

Hi there 🙌

- 🔭 I'm currently working on something cool!
- 🌱 I'm currently learning with help from [docs.github.com](#)
- 💬 Ask me about GitHub

[Send feedback](#)

Pinned

atom

Forked from atom/atom

The hackable text editor

JavaScript

⋮

vscode

Forked from microsoft/vscode

Visual Studio Code

TypeScript

Customize your pins

⋮

Why JSON?¹¹

- easy to understand
- human-readable
- language agnostic
- easily convertible to JS objects

```
[  
 {  
   "id": 1,  
   "title": "New interactive mural invites  
             exploration and engagement with  
             science",  
   "img": "https://www.coletnelson.us  
          /cs571/f22/hw7/api/news/images  
          /exhibit",  
   "tags": [  
     "science",  
     "entertainment"  
   ]  
 },  
 {  
   "id": 2,  
   "title": "Sewer sleuthing, air
```

¹¹Try json

JSON Basics

- Valid value types include...
 - string e.g. "hello world"
 - number e.g. 24
 - boolean e.g. false
 - array e.g. [1, true, 2, 4.2, "smith"]
 - object e.g. {"name": "Carl", "age": 24}
 - null
- Values can be nested!

How about design?

Concept

HTML

CSS

JS

Behavior

Structure

Design

Behavior

An Example¹²

Consider this profile page/component

What do you think comprises *design*?

What about *behavior*?

We'll see in later design lectures that appearance, type, behavior, etc. are all part of *design*.

→ Let's see how these are expressed in code.

¹² [CodePen](#)

The image shows a profile page with a yellow header. In the top right corner is a circular profile picture of a man with short brown hair and a beard, looking slightly to the left. Below the picture, the name 'John Smith' is displayed in a large, bold, black font. Underneath the name, the title 'Full Stack Developer' is written in a smaller, regular black font. At the bottom of the yellow header, there is a horizontal navigation bar with three items: 'About', 'Bio', and 'Contact'. The 'Bio' item is highlighted with a blue underline. Below the header, the word 'Story' is written in bold black text. Underneath 'Story', there is a block of placeholder text in a smaller gray font: 'Lorem ipsum, dolor sit amet consectetur adipisicing elit. Quod quis eius eos soluta doloribus a recusandae cum distinctio? Adipisci esse recusandae laborum eligendi voluptas. Eos, impedit dolores! Fugiat, sed unde.'

Private < > codepen.io Stan + Follow

Interactive Profile Card using tailwind css

HTML

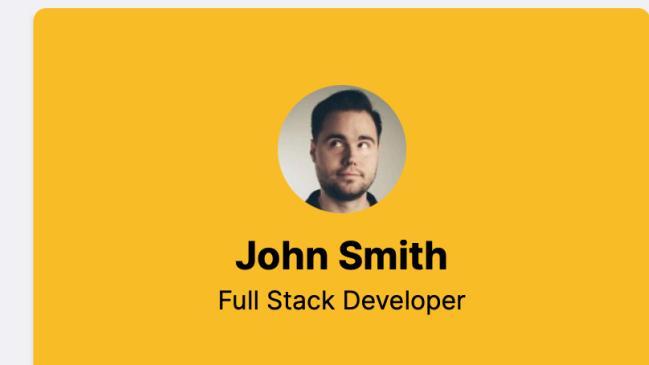
```
1 <div class="min-h-screen bg-gray-100 pt-8">
2   <div class="card mx-auto max-w-sm shadow-md">
3     <!-- header -->
4     <header class="text-center pt-12 pb-8 px-4 bg-yellow-400 rounded-t-lg">
5       <img class="block h-auto mx-auto rounded-full w-20 h-20 mb-3" alt="Profile picture of John Smith" data-tsx="img"/>
6     </header>
7     <div class="p-4">
8       <img alt="Placeholder for profile picture" data-tsx="img"/>
9     </div>
10    <div class="p-4">
11      <img alt="Placeholder for profile picture" data-tsx="img"/>
12    </div>
13  </div>
14</div>
```

CSS

```
1 @import url("https://fonts.googleapis.com/css?family=Inter:wght@400;600;700&display=swap");
2
3 const tabNavButtons = document.querySelectorAll(".tab-nav button");
4 const marker = document.querySelector(".tab-nav-marker");
5
6 function setMarker() {
7   const activeTab = document.querySelector(".tab-nav button.active");
8   if (activeTab) {
9     marker.style.left = activeTab.offsetLeft + "px";
10    marker.style.width = activeTab.offsetWidth + "px";
11    marker.style.height = activeTab.offsetHeight + "px";
12    marker.style.top = activeTab.offsetTop + "px";
13    marker.style.backgroundColor = activeTab.style.backgroundColor;
14    marker.style.color = activeTab.style.color;
15  }
16}
```

JS (Babel)

```
1 console.clear();
2
3 const tabNavButtons = document.querySelectorAll(".tab-nav button");
4 const marker = document.querySelector(".tab-nav-marker");
5
6 function setMarker() {
7   const activeTab = document.querySelector(".tab-nav button.active");
8   if (activeTab) {
9     marker.style.left = activeTab.offsetLeft + "px";
10    marker.style.width = activeTab.offsetWidth + "px";
11    marker.style.height = activeTab.offsetHeight + "px";
12    marker.style.top = activeTab.offsetTop + "px";
13    marker.style.backgroundColor = activeTab.style.backgroundColor;
14    marker.style.color = activeTab.style.color;
15  }
16}
```



A screenshot of a CodePen interface showing the source code and preview of an interactive profile card. The preview shows a yellow header with a circular profile picture of a man, the name 'John Smith', and the title 'Full Stack Developer'. Below the header is a navigation bar with 'About', 'Bio', and 'Contact' tabs. Underneath the navigation bar are sections for 'Superpower' (described as 'Writing clean and optimized code') and 'Tools' (listed as 'VS Code, Figma, Github, Netlify'). The CodePen interface includes tabs for 'Console', 'Assets', 'Comments', and 'Keys', and buttons for 'Fork', 'Embed', 'Export', and 'Share'.

HWo & GitHub Classroom

Expressing yourself in JSON.

What's next?

- Check out HWo.
- See you in class next week!