

# Welcome to CS571!

# Building User Interfaces

**Cole Nelson**

## A Quick Note

This is an **accelerated course**. We are completing a regular term's worth of content in only 8 weeks!

Please be sure to allocate time accordingly.

# 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?<sup>1</sup>

<sup>1</sup> Kantega | The Mysterious Life of Developers



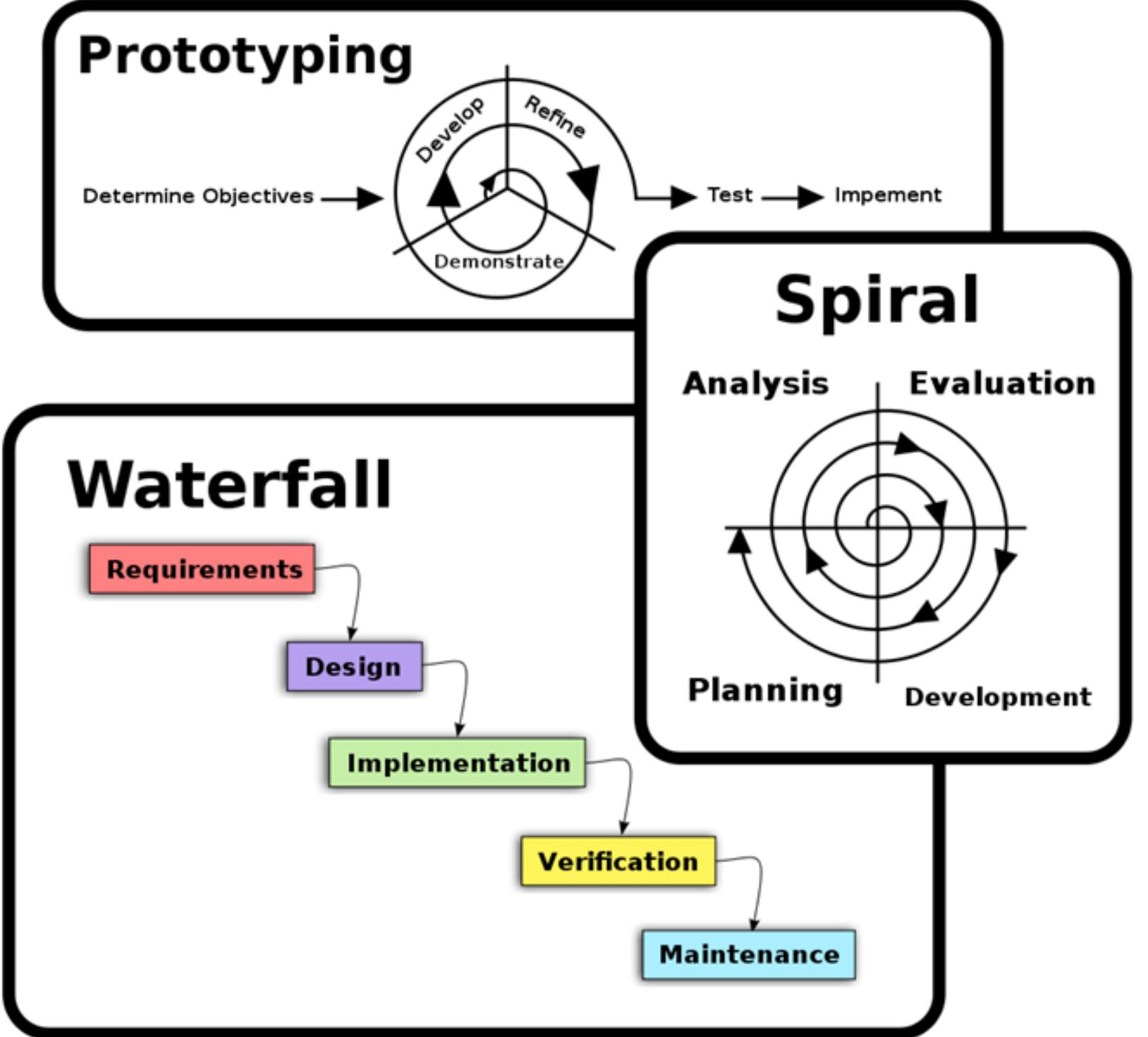
which is devoured in a  
large quantity.

**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?<sup>2</sup>

<sup>2</sup> What is a Software Engineer?

# Software Development Lifecycle<sup>3</sup>



<sup>3</sup> SDLC Process

# What does a **UX Designer** do?<sup>4</sup>

<sup>4</sup> Kantega | The Mysterious Life Of UX Designers



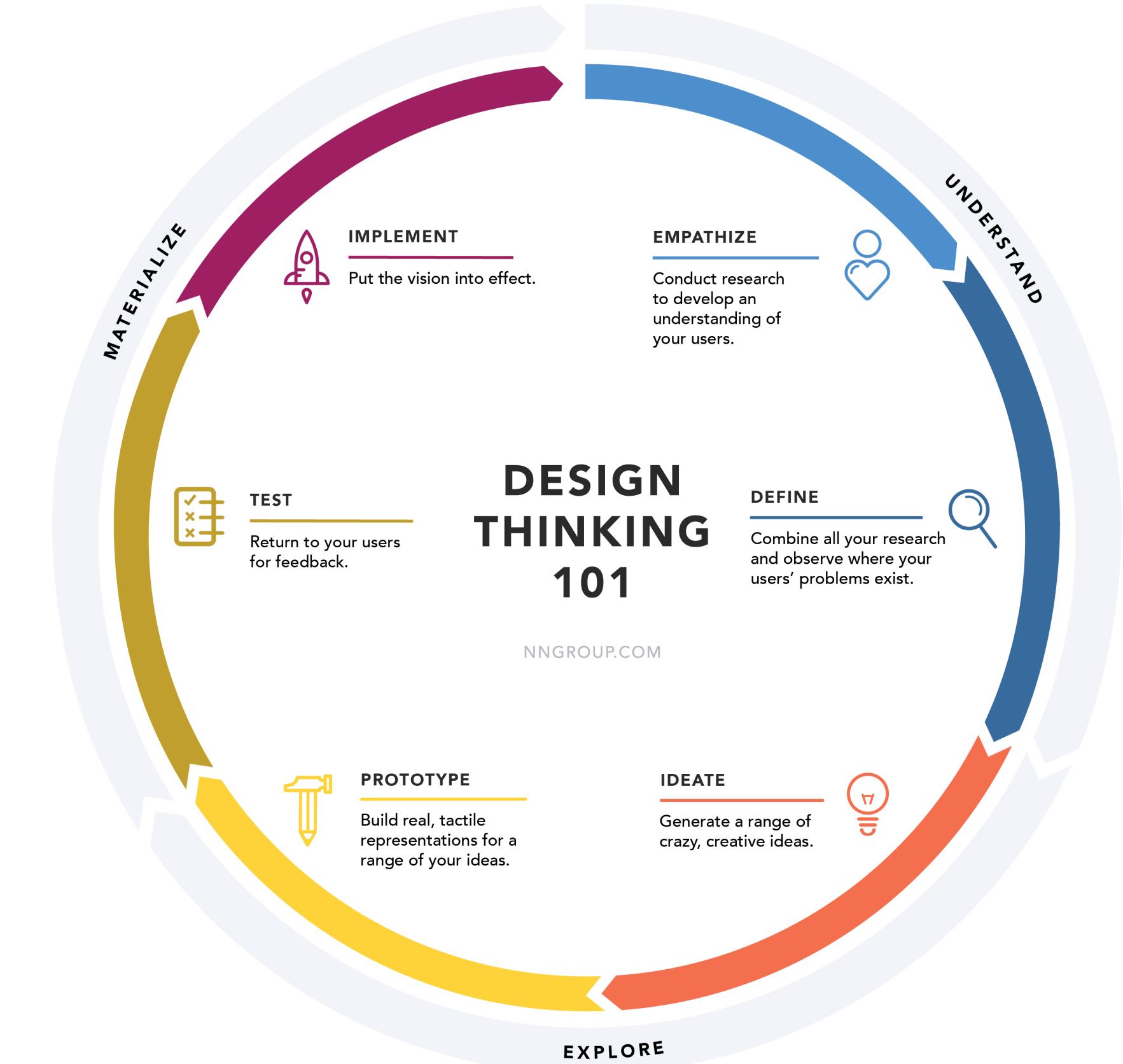
**Definition:** User experience (UX) design is the process that design teams use to create products that provide meaningful and relevant experiences to users. A UX designer is concerned with the entire *process* of acquiring and integrating a product, including aspects of branding, design, usability,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

How does a UX designer go about this?

<sup>5</sup> Interaction Design Foundation

# UX Design Process<sup>6</sup>

Looks familiar?



<sup>6</sup> NN/g Design Thinking

# So then, what is UX Development?<sup>7</sup>

<sup>7</sup> 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 Details

# Instructor



Cole Nelson

*ctnelson2@wisc.edu*

B.S. Software Engineering  
M.S. Computer Science

<https://coletnelson.us>

<https://github.com/ctnelson1997>

# TAs & PMs

Zach Potter (TA)

Yuqing Wang (PM)

Weibing Wang (PM)

# 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

# Course Information

# Course Basics

Topic	Modality	Dates	Deliverable
Design	Synchronous	Tu & Th	ICA (Group)
Implementation	Asynchronous	Mon & Wed	HW (Indv)

A complete course schedule [can be found here.](#)

**Conflict? Let us know.**

# Recordings<sup>z</sup>

Please be aware that the Zoom link changes from meeting to meeting! Find the latest link in [the course schedule](#).

**All lecture content is recorded.**

Topic	Availability
Design	Soon after class meeting.
Implementation	A week <i>before</i> the date.

<sup>z</sup>Image from Harry Potter and the Sorcerer's Stone



## Assignments

Date	Type	Due	Approx Time
Monday	HW	Sunday	6.5 days
Tuesday	ICA	Wednesday	1.5 days
Wednesday	HW	Tuesday	6.5 days
Thursday	ICA	Friday	1.5 days

All assignments are due at 11:59 pm CT. **Use Canvas Calendar!**

# Point Distribution

Item	Points	Notes
HWs	47	13 HWs, 4 pts each. HWs 0, 7 and 10 worth fewer points. <b>None dropped.</b>
ICAs	8	11 ICAs, 1 pt each, 3 lowest dropped.
Midterm Exam	20	Double-sided notesheet
Final Exam	25	Double-sided notesheet

# Late Policies

- ICAs may *not* be submitted late. 3 lowest are dropped.
- HWs may be turned in *up to* 3 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 5 late days used are penalty-free.
    - These are intended to be used in case of sickness or extenuating circumstances. **Use them sparingly!**

# Grading Scale

A	AB	B	BC	C	D	F
<hr/>						
[100, 94]	(94, 88]	(88, 82]	(82, 76]	(76, 70]	(70, 60]	(60, 0]

Grades are not rounded. **WYSISWG!**

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

## Midterm & Final Exam

- Exams will be held *online* through Canvas and HonorLock.
- Midterm Exam is on Thursday, June 13th.
- Final Exam is on Thursday, July 11th.
- Can be taken anytime 12:00 am - 11:59 pm CT.

# 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 *Github Classroom*.
- Questions will be asked via *Piazza*.
- Personal matters will be handled via *email*.
- The course website<sup>w</sup> is <https://cs571api.cs.wisc.edu/ui/>
  - This will mostly be useful for HW assignments.
  - Badger IDs will be issued later today via email!

<sup>w</sup>In past semesters, we have used [cs571.org](http://cs571.org). Please ignore this.

# Office Hours

Please see the schedule here.

1. Fill out the queue form.
2. Join the Zoom link. You will be placed in a waiting room.
3. View your status in queue.
4. We'll try to get to you as soon as we can!

All times are listed in CT.

# 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  $\geq 18$
  - npm -v will need to be  $\geq 9$
- 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

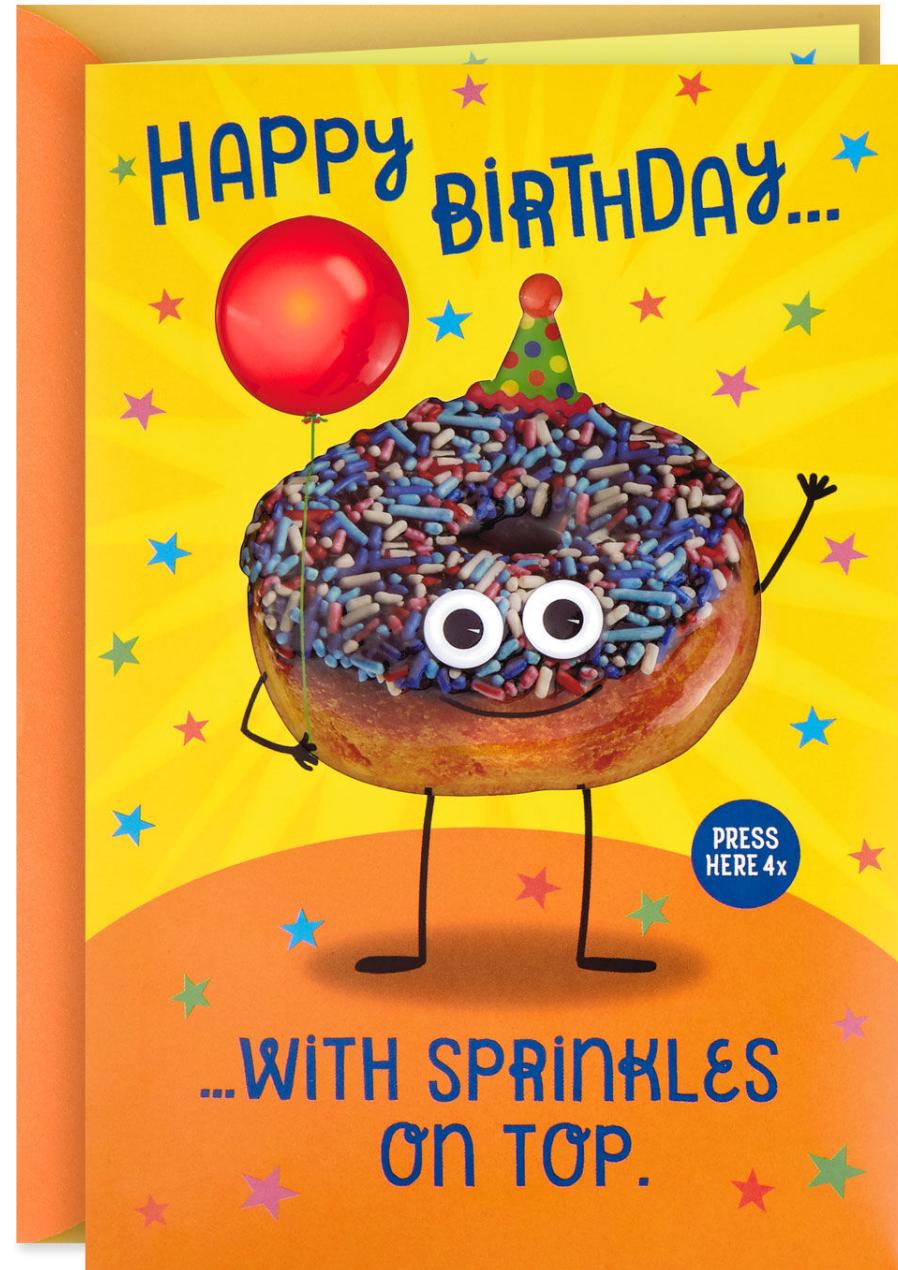
The Web.

# A Website<sup>9</sup>

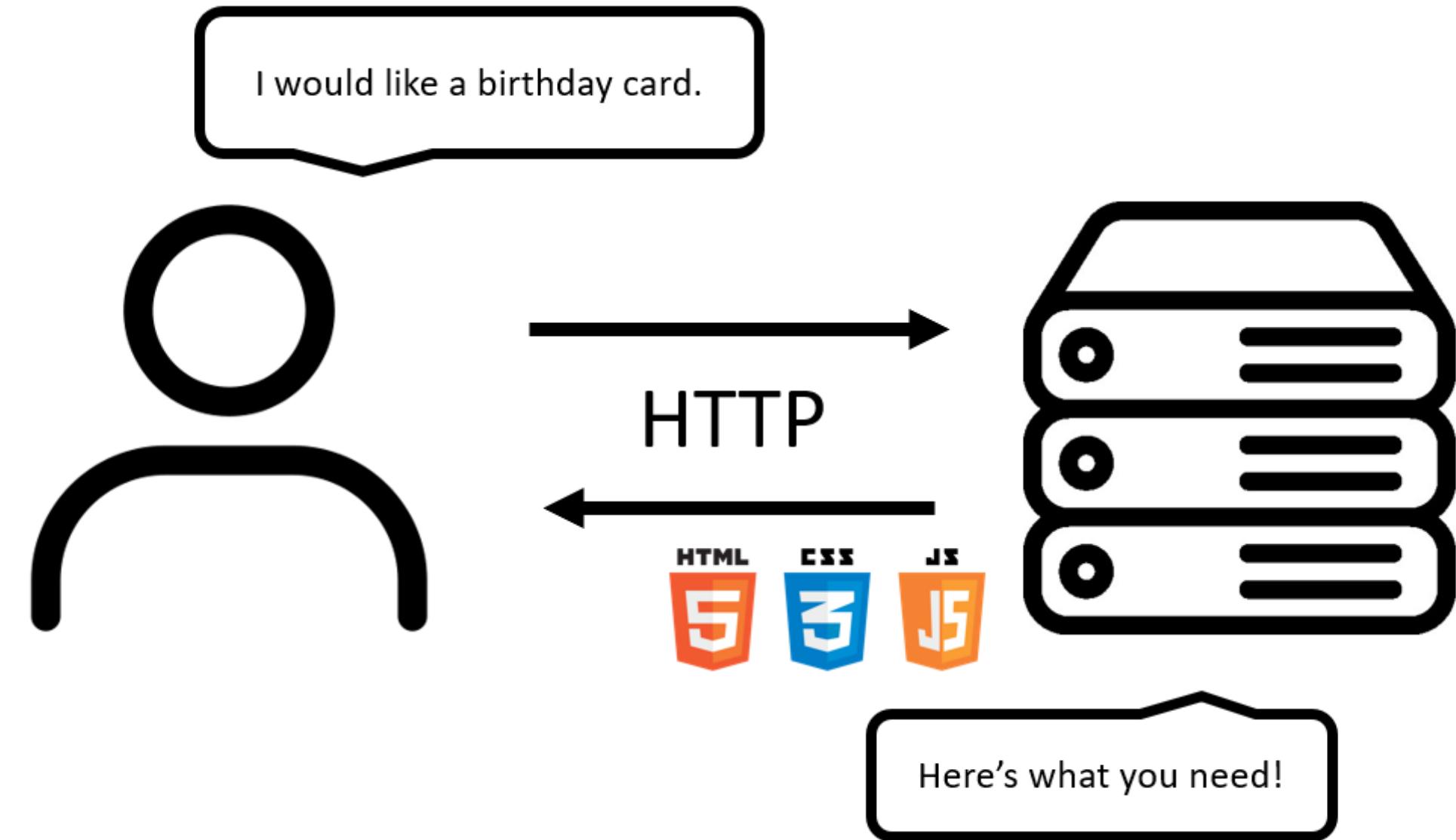
It's like a birthday card!

Concept	Behavior
HTML	Structure
CSS	Design
JS	Behavior

How does it get delivered? HTTP!



<sup>9</sup> Personal Website [Codepen](#)



<sup>10</sup> Server Icon by Pixel Perfect

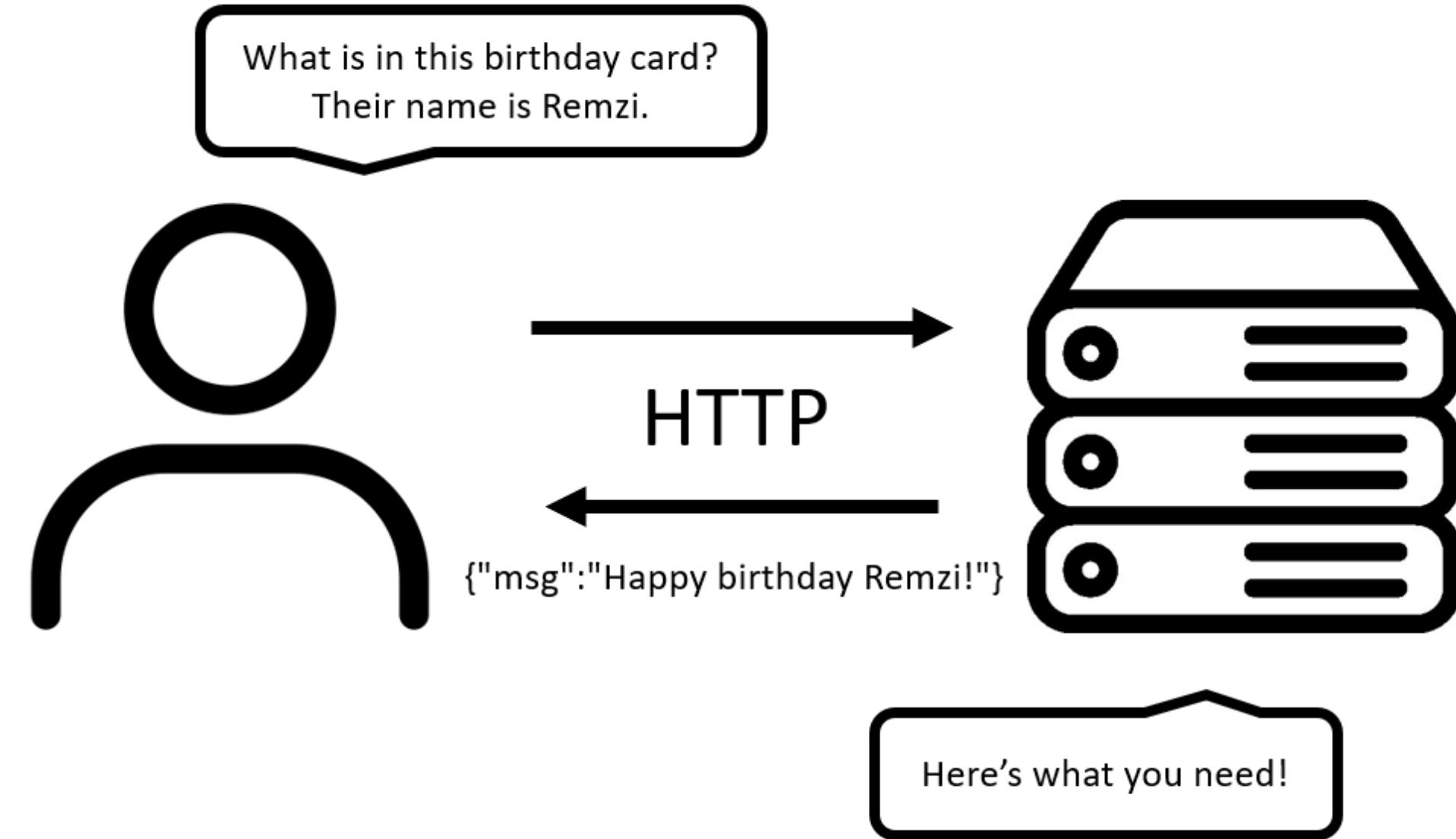


There's nothing inside of the card?!

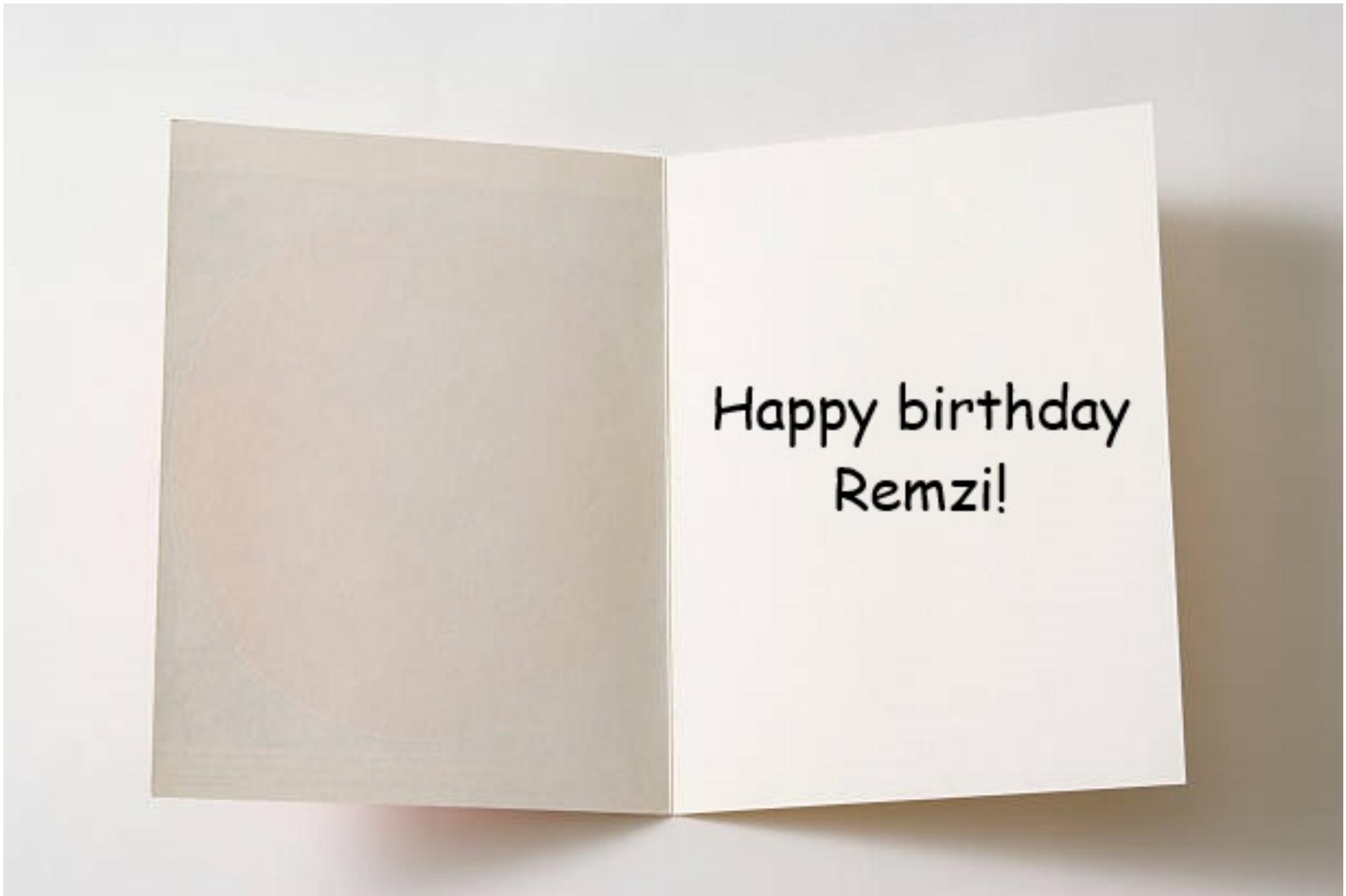
# Communication

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
```



<sup>10</sup> Server Icon by Pixel Perfect



Better!

# Real-World Example

How does GitHub display profile webpages?

The screenshot shows a user profile page with the following elements:

- Header:** A navigation bar with four tabs: "Overview" (selected), "Repositories", "Projects", and "Packages".
- User Placeholder:** A large, light gray placeholder image of a person's head and shoulders.
- Feedback Button:** A button labeled "Send feedback" with a pencil icon.
- Pinned Section:** A section titled "Pinned" containing two items, each represented by a placeholder circular icon with a black curved line.
- Customization Option:** A link "Customize your pins" next to the pinned section.
- Edit Profile Button:** A button labeled "Edit profile" at the bottom left.

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

Customize your pins



atom

Forked from atom/atom



The hackable text editor



JavaScript



vscode

Forked from microsoft/vscode



Visual Studio Code



TypeScript

# Why JSON?<sup>11</sup>

- 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
```

<sup>11</sup>Try 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 Example<sup>12</sup>

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.

<sup>12</sup> [CodePen](#)

John Smith  
Full Stack Developer

About   [Bio](#)   Contact

**Story**

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-tailwind="rounded-full w-20 h-20 mb-3"/>
```

CSS

```
1 @import url("https://fonts.googleapis.com/css?family=Inter:wght@400;600;700&display=swap");
2
3 const tabNavButtons =
4   document.querySelectorAll(".tab-nav button");
5 const marker =
6   document.querySelector(".tab-nav-marker");
7
8 function setMarker() {
9   const activeTab = document.querySelector(".tab.nav-active");
10  if (activeTab) {
11    marker.classList.add("marker-active");
12    activeTab.classList.add("tab-active");
13  }
14}
```

JS (Babel)

```
1 console.clear();
2
3 const tabNavButtons =
4   document.querySelectorAll(".tab-nav button");
5 const marker =
6   document.querySelector(".tab-nav-marker");
7
8 function setMarker() {
9   const activeTab = document.querySelector(".tab.nav-active");
10  if (activeTab) {
11    marker.classList.add("marker-active");
12    activeTab.classList.add("tab-active");
13  }
14}
```

John Smith  
Full Stack Developer

About Bio Contact

**Superpower**  
Writing clean and optimized code

**Tools**  
VS Code, Figma, Github, Netlify

Console Assets Comments ⌘ Keys Fork Embed Export Share

# **HWo & GitHub Classroom**

Expressing yourself in JSON.

# What's next?

- Check out HWo.
- See you in class on Thursday!