APIs

Web APIs

- API stands for Application Programming Interface
- Web APIs are servers that are configured to provide access to a data or a service, e.g.
  - Flickr API – access to retrieve/upload/etc. images
  - Facebook API – access to user's likes/posts/photos/etc.
  - SoundCloud API – search by bmp/genre/etc. & stream
  - Giphy API – [GIFs](#)!

Talking to API from JS?

- We need to cover two things:
    - Data – how is information stored & shared on the web?
    - AJAX – how can we communicate with a server that has an API?

Data

Common Data Formats

- JSON – loaded via [loadJSON(...)](#) in p5
- CSV – [example file](#), loaded via [loadTable(...)](#) in p5
- XML – [example file](#), loaded via [loadXML(...)](#) in p5
- Text file – loaded via [loadStrings(...)](#) in p5

```json
{
    "id": 1,
    "name": "bulbasaur",
    "base_experience": 64,
    "height": 7,
    "is_default": true,
    "order": 1,
    "weight": 69,
    "abilities": [
        {
            "is_hidden": true,
            "slot": 3,
            "ability": {
                "name": "chlorophyll",
                "url": "http://pokeapi.co/api/v2/ability/34/"
            }
        }
    ]
}
```

JSON
(JavaScript Object Notation)

- Why?
  - Lightweight
  - Human readable & writable
  - Easy for computers to read and write
  - Subset of JS, so we already know it*
- JSON tutorials:
  - [Shiffman video](#), [blog post 1](#), [blog post 2](#)

JSON !== JavaScript

- JSON properties must be in double quotes
- JSON data must be saved in a .json file
- More differences

bulbasaur.json

```json
{
    "id": 1,
    "name": "bulbasaur",
    "base_experience": 64,
    "height": 7,
    "is_default": true,
    "order": 1,
    "weight": 69
}
```

bulbasaur.js

```javascript
var bulbasaur = {
    id: 1,
    name: "bulbasaur",
    base_experience: 64,
    height: 7,
    is_default: true,
    order: 1,
    weight: 69
};
```

Common JSON

- Almost all JSON files you encounter will container either:
  - A single object – e.g. [Ryan Gosling Giphy search](#)
  - A single array – e.g. [3 random jeopardy clues](#)
- In either case, the data will likely involve a lot of nesting…
  (e.g. an object that contains an array of objects)

(01_AdjectivesJson)

- https://github.com/dariusk/corpora/blob/master/data/words/adjs.json

Talking to an API

Viewing JSON in the Browser

- [Chrome extension](), [Firefox addon](), [Safari thing]()
- API response from Giphy ([url]()) before and after:

{"data":{"type":"gif","id":"12Qp08BXdIYs0g","url":"http:\/\/giphy.com\/gifs\/american-psycho-movie-working-out-12Qp08BXdIYs0g","image_original_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/giphy.gif","image_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/giphy.gif","image_mp4_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/giphy.mp4","image_frames":"28","image_width":"500","image_height":"305","fixed_height_downsampled_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/200_d.gif","fixed_height_downsampled_width":"328","fixed_height_downsampled_height":"200","fixed_width_downsampled_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/200w_d.gif","fixed_width_downsampled_width":"200","fixed_width_downsampled_height":"122","fixed_height_small_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/100.gif","fixed_height_small_still_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/100_s.gif","fixed_height_small_width":"164","fixed_height_small_height":"100","fixed_width_small_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/100w.gif","fixed_width_small_still_url":"http:\/\/media0.giphy.com\/media\/12Qp08BXdIYs0g\/100w_s.gif","fixed_width_small_width":"100","fixed_width_small_height":"61","username":"","caption":""},"meta":{"status":200,"msg":"OK","response_id":"5849ce6a97ff9d90fbc557fe"}}

Raw   Parsed
{
    "data": {
        "type": "gif",
        "id": "12Qp08BXdIYs0g",
        "url": "http://giphy.com/gifs/american-psycho-movie-working-out-12Qp08BXdIYs0g",
        "image_original_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/giphy.gif",
        "image_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/giphy.gif",
        "image_mp4_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/giphy.mp4",
        "image_frames": "28",
        "image_width": "500",
        "image_height": "305",
        "fixed_height_downsampled_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/200_d.gif",
        "fixed_height_downsampled_width": "328",
        "fixed_height_downsampled_height": "200",
        "fixed_width_downsampled_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/200w_d.gif",
        "fixed_width_downsampled_width": "200",
        "fixed_width_downsampled_height": "122",
        "fixed_height_small_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/100.gif",
        "fixed_height_small_still_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/100_s.gif",
        "fixed_height_small_width": "164",
        "fixed_height_small_height": "100",
        "fixed_width_small_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/100w.gif",
        "fixed_width_small_still_url": "http://media0.giphy.com/media/12Qp08BXdIYs0g/100w_s.gif",
        "fixed_width_small_width": "100",
        "fixed_width_small_height": "61",
        "username": "",
        "caption": ""
    },
    "meta": {
        "status": 200,
        "msg": "OK",
        "response_id": "5849ce6a97ff9d90fbc557fe"
    }
}

API Terminology

- Example: http://hipsterjesus.com/
- Endpoint
  - The specific URL that is hosting a service
  - http://hipsterjesus.com/api
- Query string
  - Parameters to be passed to the service
  - http://hipsterjesus.com/api?paras=3
  - http://hipsterjesus.com/api?paras=3&html=false
- URL Encoding
  - Spaces get replaced with "+" or "%20"
  - Encoding tool
- How do you find out these?
  - API documentation

Data from an API: Preload

- Figure out your API request URL

- Use loadJSON in preload with that URL

- Synchronous
  - The rest of your code won't start until the JSON is loaded
  - This is the easy way to load data, but it is also limiting

(02_HipsterApi)

Giphy API

- Documentation: https://github.com/Giphy/GiphyAPI
- Authentication – API Key
- Search endpoint
  - http://api.giphy.com/v1/gifs/search
  - http://api.giphy.com/v1/gifs/search?q=funny+cat&api_key=dc6zaTOxFJmzC
- What's the GIF URL for the first search result?

(03_GiphyApi)

Data from an API: Callback

- loadJSON with an extra parameter - a callback function
- Asynchronous
    - You can call loadJSON from anywhere
    - You won't get the JSON data immediately
    - Some time in the future your callback function gets the data

```javascript
function setup() {
    var url = "http://api.giphy.com/v1/gifs/translate?" +
        "api_key=dc6zaTOxFJmzC" +
        "&s=help+me";
    // The second parameter is a callback function
    loadJSON(url, onGiphyLoaded);
}

function onGiphyLoaded(jsonData) {
    // The JSON is passed in as a variable
    console.log(jsonData);
}
```

(04_GiphyApiWithInput)

Wordnik API

- API for
  - Word pronunciation, definitions, example sentences, random words, frequency of word use, etc.
- Setup
  - Create an account: https://www.wordnik.com/signup
  - Request an API key: http://developer.wordnik.com/
  - Documentation: http://developer.wordnik.com/docs.html

CORS

- Cross-Origin Resource Sharing
- When your JS makes a request to an API from the browser, it has to cross domains, e.g.
    http://username.github.io/testing -> http://pokeapi.co/api/v2/pokemon/1
- Servers can be configured to only allow certain domains to access them
- Workaround: JSONP

Additional Resources

- Dan Shiffman's [tutorial series](#) on data and APIs
- [p5 tutorial](#) on loading external data
- Zapier in-depth [tutorial series](#) on APIs