GENERAL ASSEMBLY

JAVASCRIPT DEVELOPMENT

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HELLO!

1. Pull changes from the `svodnik/JS-SF-15-resources` repo to your computer
2. Open the `10-async-callbacks` folder in your editor

JAVASCRIPT DEVELOPMENT

ASYNCHRONOUS JAVASCRIPT & CALLBACKS

LEARNING OBJECTIVES

At the end of this class, you will be able to

- Describe what asynchronous means in relation to JavaScript
- Pass functions as arguments to functions that expect them.
- Write functions that take other functions as arguments.
- Build asynchronous program flow using Fetch

AGENDA

- Asynchronous code
- Functions as callbacks
- Promises & Fetch

WEEKLY OVERVIEW

WEEK 6	Asynchronous JS & callbacks / Advanced APIs
WEEK 7	Project 2 lab / Prototypal inheritance
WEEK 8	Closures & `this` / CRUD & Firebase

EXIT TICKET QUESTIONS

1. I liked how we stopped for a second to consider the code on the screen before presenting the answer!
2. Suggestion: comparing how other people did the same lab
3. Are there any differences between utilizing Vanilla Javascript over Jquery from a browser or back end perspective when making calls such as fetch vs. .get
4. little confused on what exactly AJAX is. Is it just used to fetch data? Is it just JSON? can we fetch anything else?
5. What is your favorite API that you have worked with?

HOMEWORK REVIEW

HOMEWORK — GROUP DISCUSSION

EXERCISE

TYPE OF EXERCISE

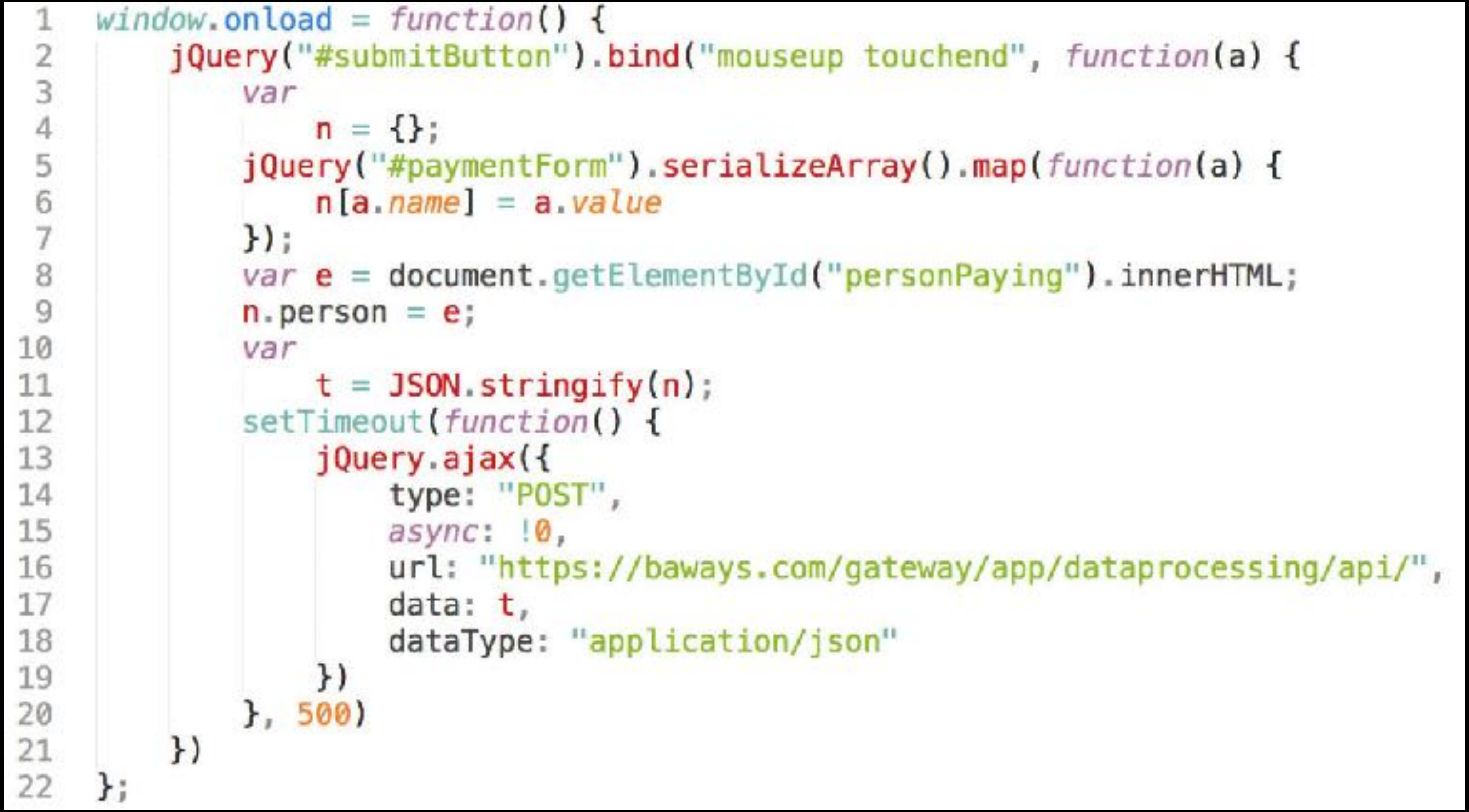
- Groups of 2-3

TIMING

6 min

1. Share your solutions for the homework.
2. Share a challenge you encountered, and how you overcame it.
3. Share 1 thing you found challenging. If you worked it out, share how; if not, brainstorm with your group how you might approach it.

ASYNCHRONOUS JAVASCRIPT & CALLBACKS



```javascript
window.onload = function() {
    jQuery("#submitButton").bind("mouseup touchend", function(a) {
        var
            n = {};
        jQuery("#paymentForm").serializeArray().map(function(a) {
            n[a.name] = a.value
        });
        var e = document.getElementById("personPaying").innerHTML;
        n.person = e;
        var
            t = JSON.stringify(n);
        setTimeout(function() {
            jQuery.ajax({
                type: "POST",
                async: !0,
                url: "https://baways.com/gateway/app/dataprocessing/api/",
                data: t,
                dataType: "application/json"
            })
        }, 500)
    })
};
```

What does this code do?

Asynchronous programming

WHAT WOULD YOU SEE IN THE CONSOLE?

```
let status;
function doSomething() {
    for (let i = 0; i < 1000000000; i++) {
      numberArray.push(i);
    }
    status = “done”;
    console.log(“First function done”);
}
function doAnotherThing() {
    console.log(“Second function done”);
}
function doSomethingElse() {
    console.log(“Third function: ” +
status);
}
```

```
doSomething();
doAnotherThing();
doSomethingElse();
```

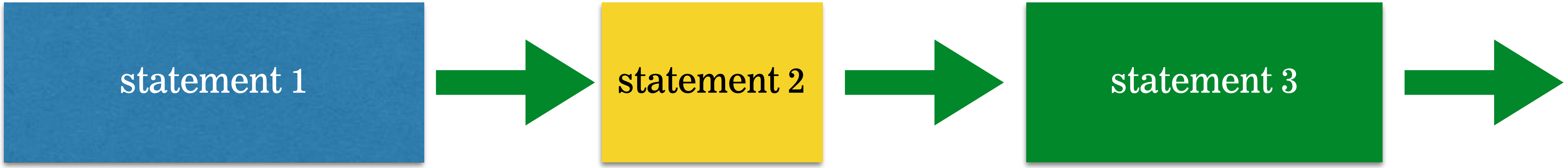
WHAT WOULD YOU SEE IN THE CONSOLE?

```
let status;
function doSomething() {
    for (let i = 0; i < 1000000000; i++) {
      numberArray.push(i);
    }
    status = “done”;
    console.log(“First function done”);
}
function doAnotherThing() {
    console.log(“Second function done”);
}
function doSomethingElse() {
    console.log(“Third function: ” +
status);
}
```

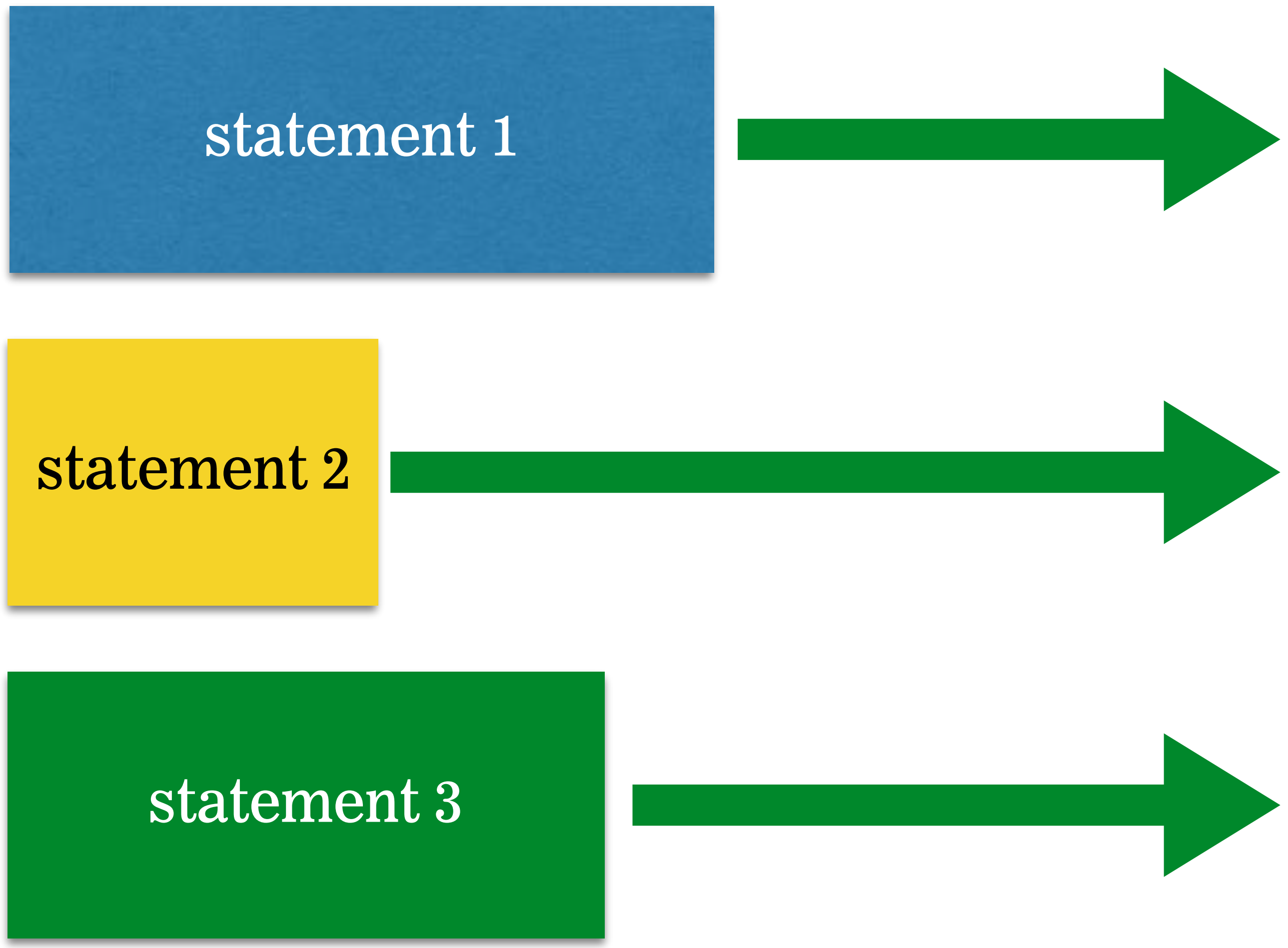
```
doSomething();
doAnotherThing();
doSomethingElse();
```

```
// result in console
// (after a few seconds):
> “First function done”
> “Second function done”
> “Third function: done”
```

SYNCHRONOUS CODE



ASYNCHRONOUS CODE



ASYNCHRONOUS PROGRAM FLOW

```
$(‘button’).on(‘click’, doSomething);
```

```
$.get(url, function(data) {
  doAnotherThing(data);
});
```

```
fetch(url).then(function(response) {
  if (response.ok) {
    return response.json();
  } else {
   console.log('There was a problem.');
  }
}).then(doSomethingElse(data));
```

APPROACHES TO ASYNCHRONOUS PROGRAM FLOW

CALLBACKS

PROMISES

ASYNC/
AWAIT

Functions & callbacks

HOW MANY ARGUMENTS IN THIS CODE?

```
$button.on('click', function() {
  // your code here
});
```

APPROACHES TO ASYNCHRONOUS PROGRAM FLOW

CALLBACKS

PROMISES

FUNCTIONS ARE FIRST-CLASS OBJECTS

FUNCTIONS ARE FIRST-CLASS OBJECTS

Can store a function as a variable value

```
const getWeather = (city, state, zip) => {
  $.ajax({
    url: weatherUrl + city + '&appid=' + apiKey,
    success: function (response) {
      updateUISuccess(response.main.temp)
    },
    error: function () {
      updateUIError();
    },
  });
};
```

FUNCTIONS ARE FIRST-CLASS OBJECTS

Can pass a function as an argument to another function

```
function helloWorld() {
  console.log("Hello world");
}

setTimeout(helloWorld, 1000);
```

FUNCTIONS ARE FIRST-CLASS OBJECTS

Can return a function from another function

```
const colorsModule = (() => {
  let colors = [];
  return {
    addColor: function(newColor) {
      colors.push(newColor);
    },
    getColorCount: function() {
      return colors.length;
    },
  };
})();
```

FUNCTIONS ARE FIRST-CLASS OBJECTS

Can run a function without otherwise assigning it

```
departments.forEach((dept) => {
  return cart[dept] = '';
});
```

HIGHER-ORDER FUNCTION

Takes another function as an argument

or

Returns a function

HIGHER-ORDER FUNCTION — EXAMPLE

`setTimeout()`

```
setTimeout(function, delay);
```

where

- `function` is a function (reference or anonymous)
- `delay` is a time in milliseconds to wait before the first argument is called

SETTIMEOUT WITH ANONYMOUS FUNCTION ARGUMENT

callback

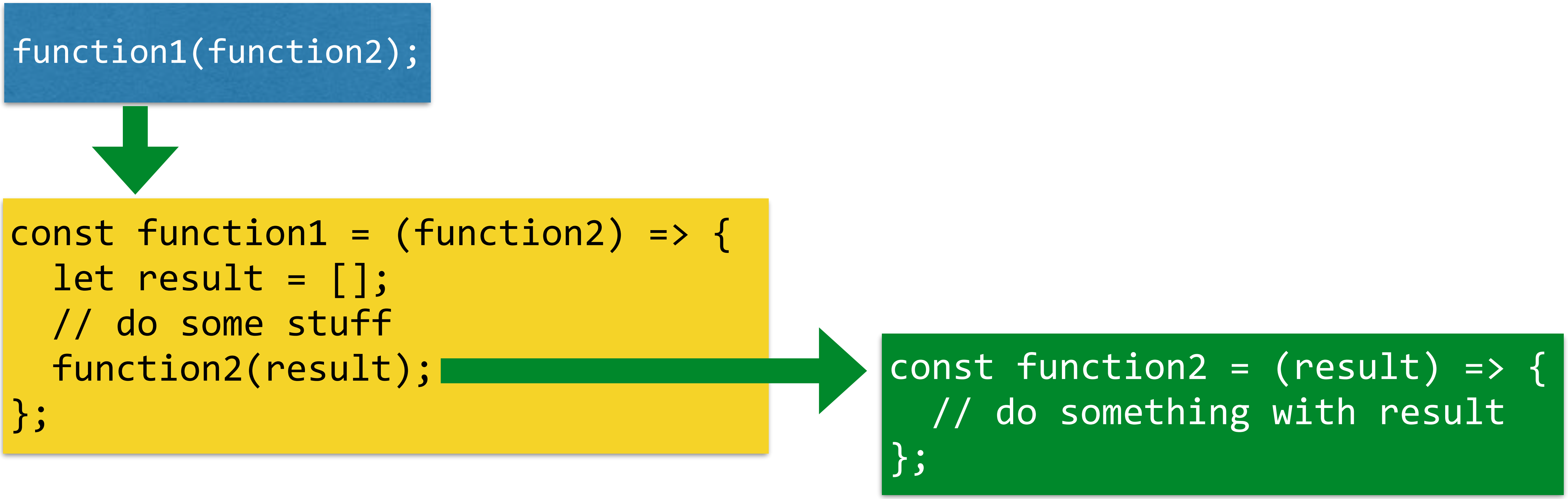
```
setTimeout(function(){
  console.log("Hello world");
}, 1000);
```

SETTIMEOUT WITH NAMED FUNCTION ARGUMENT

```
function helloWorld() {
  console.log("Hello world");
}

setTimeout(helloWorld, 1000);
```

callback

CALLBACK

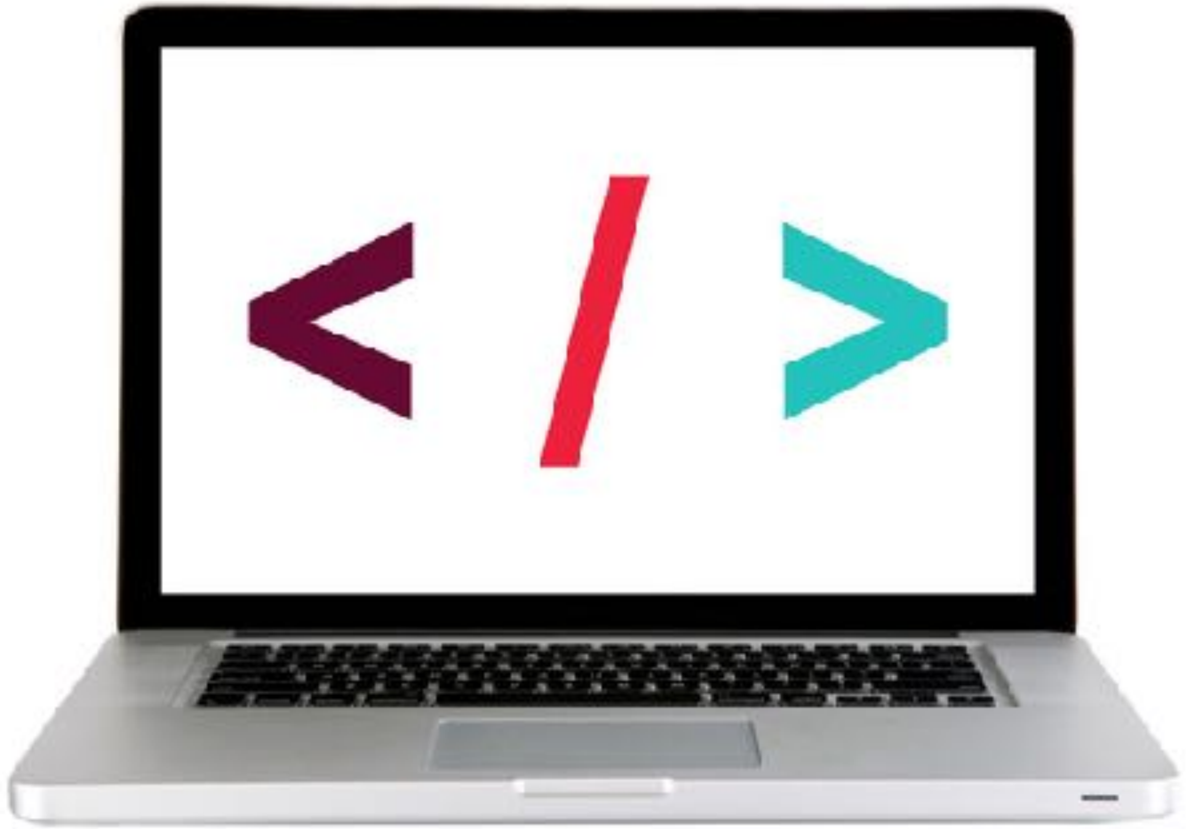


```
function1(function2);
```

```
const function1 = (function2) => {
  let result = [];
  // do some stuff
  function2(result);
};
```

```
const function2 = (result) => {
  // do something with result
};
```

LET'S TAKE A CLOSER LOOK



EXERCISE – CREATING A CALLBACK FUNCTION

EXERCISE

LOCATION

▸ `starter-code > 1-callback-exercise`

TIMING

20 min

1. In your editor, open script.js.
2. Follow the instructions to create the add, showAnswer, calcResult, and subtract functions, and to call the calcResult function using the add and subtract functions as callbacks.
3. Test your work in the browser and verify that you get the expected results.
4. BONUS: Update the showAnswer function to change the content of the element with the id value 'operator' to a plus symbol after the user clicks the Add button, or to a minus symbol after the user clicks the Subtract button.

Promises & Fetch

APPROACHES TO ASYNCHRONOUS PROGRAM FLOW

CALLBACKS

PROMISES

PROMISES

traditional callback:

```
doSomething(successCallback, failureCallback);
```

callback using a promise:

```
doSomething().then(
  // work with result
).catch(
  // handle error
);
```

MULTIPLE CALLBACKS — TRADITIONAL CODE

```
doSomething((result) => {
  doSomethingElse(result, (newResult) => {
    doThirdThing(newResult, (finalResult) => {
      console.log('Got the final result: ' + finalResult);
    }, failureCallback);
  }, failureCallback);
}, failureCallback);
```

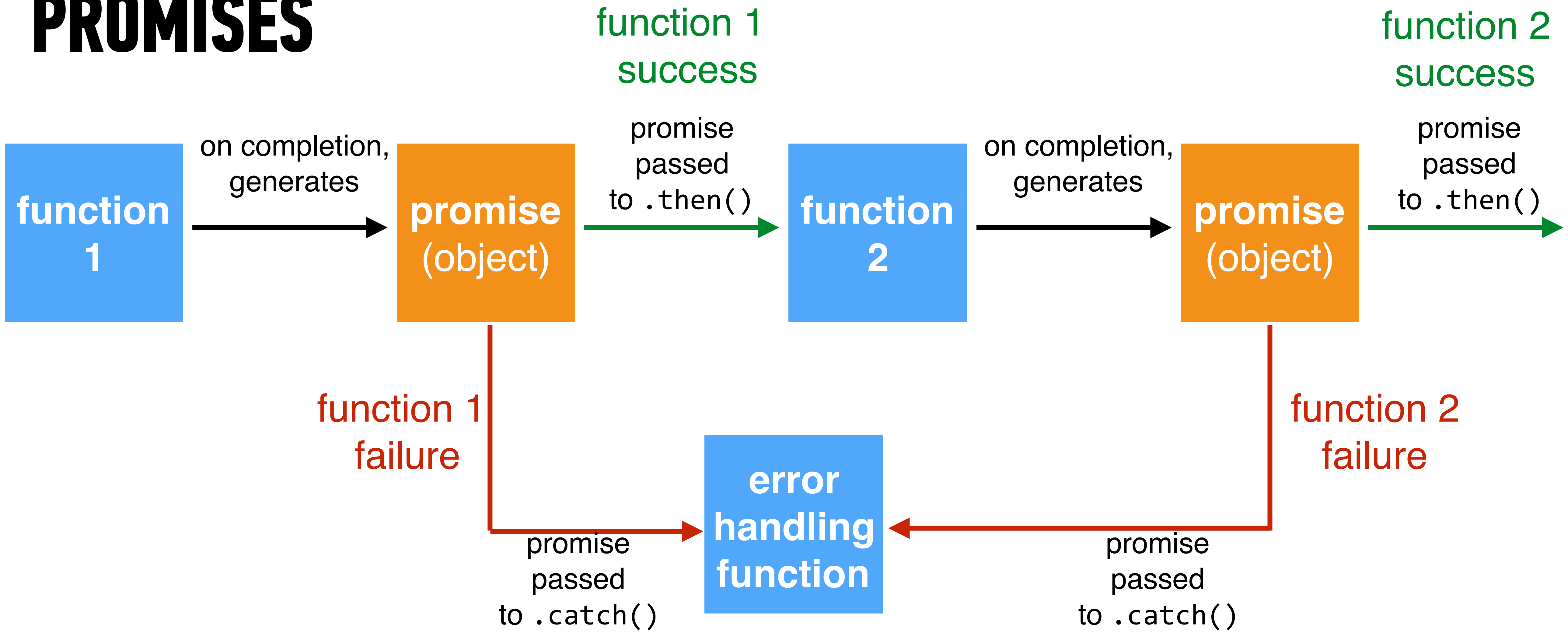
MULTIPLE CALLBACKS WITH PROMISES

```
doSomething()
  .then((result) => {
    return doSomethingElse(result);
  })
  .then((newResult) => {
    return doThirdThing(newResult);
  })
  .then((finalResult) => {
    console.log('Got the final result: ' + finalResult);
  })
  .catch((error) => {
    console.log('There was an error: ' + error);
  });
```

ERROR HANDLING WITH PROMISES

```
doSomething()
  .then((result) => {
    return doSomethingElse(result);
  })
  .then((newResult) => {
    return doThirdThing(newResult);
  })
  .then((finalResult) => {
    console.log('Got the final result: ' + finalResult);
  })
  .catch((error) => {
    console.log('There was an error: ' + error);
  });
```

PROMISES


function 1
success
function 2
success
function 1
on completion, generates
promise (object)
promise passed to .then()
function 2
on completion, generates
promise (object)
promise passed to .then()
function 1
failure
function 2
failure
error handling function
promise passed to .catch()
promise passed to .catch()

FETCH

```
fetch(url)
  .then((response) => {
    if(response.ok) {
      return response.json();
    } else {
      throw 'Network response was not ok.’;
    }
  })
  .then((data) => {
    // DOM manipulation
  })
  .catch((error) => {
    // handle lack of data in UI
  });
```

Fetch

```
fetch(url).then(function(res) {
  if(res.ok) {
    return res.json();
  } else {
    throw ‘problem';
  }
}).then(function(data) {
  // DOM manipulation

}).catch(function(error) {
  // handle lack of data in UI
});
```

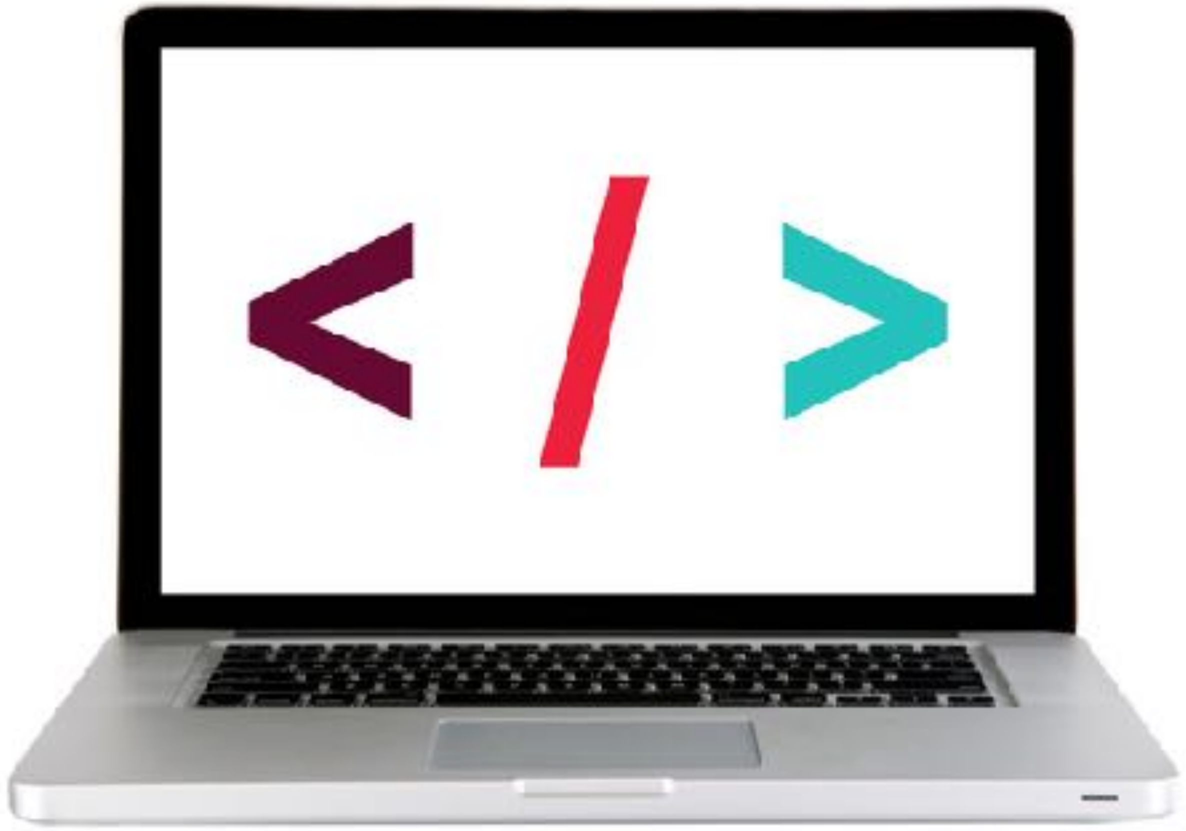
jQuery .get()

```
$.get(url).done(function(data) {
  // DOM manipulation
})







.fail(function(error) {
  // handle lack of data in UI
});
```

ERROR HANDLING FOR INITIAL FETCH REQUEST

```
fetch(url)
  .then((response) => {
    if(response.ok) {
      return response.json();
    } else {
      throw 'Network response was not ok.';
    }
  })
  .then((data) => {
    // DOM manipulation
  })
  .catch((error) => {
    // handle lack of data in UI
  });
```

LET'S TAKE A CLOSER LOOK



RETURNING PROMISES TO A PROMISE CHAIN

```
doSomething()
  .then((result) => {
    return doSomethingElse(result);
  })
  .then((newResult) => {
    return doThirdThing(newResult);
  })
  .then((finalResult) => {
    console.log('Got the final result: ' + finalResult);
  })
  .catch((error) => {
    console.log('There was an error: ' + error);
  });
```

LAB — ASYNC

LOCATION

- `starter-code > 3-async-lab`

TIMING

until 9:10

1. In your editor, open script.js.
2. Follow the instructions to add a Fetch request for weather data that uses the results of the existing zip code lookup.

Project 2: Feedr

- **GitHub repo to fork**:
  https://git.generalassemb.ly/vodnik/feedr
- **Project overview & instructions**:
  https://pages.git.generalassemb.ly/vodnik/JSD14/pages/feedr.html

Exit Tickets!

(Class #10)

LEARNING OBJECTIVES - REVIEW

- Describe what asynchronous means in relation to JavaScript
- Pass functions as arguments to functions that expect them.
- Write functions that take other functions as arguments.
- Build asynchronous program flow using Fetch

NEXT CLASS PREVIEW

Advanced APIs

- Generate API specific events and request data from a web service.
- Process a third-party API response.
- Make a request and ask another program or script to do something.
- Search documentation needed to make and customize third-party API requests.

Q&A