ECS 162
WEB PROGRAMMING

5/7

Schedule

□ Mon May 6 - Midterm

□ Thur May 9 – optional, turn in mockups for your own design

□ Thur May 23 – first part of flashcards program due

□ Thur June 6 – last part of flashcards program due

□ Thur June 13 - Final

Midterm

- Midterm on Monday
- Friday's lecture will be devoted to review

- Bring Scantron 2000, pencil
- Open notes, no computers but all the paper you want
- You will get a seat assignment on Sunday night by email
- Similar format as last year's midterm (you saw it in lab)

Designs

Hi, I'm your server. Here at Digital Ocean I am one of many servers answering HTTP requests all day long!
And here's one now!
I'm looking for a Web app called hello.html.
Let's check the static files. That's the first step in my pipeline. Aha!
Great! I'm off.
What did that request want? Oh well, I'm sure he got what he came for.
Who are you?
I was just here? Now I need hello.js.
To be honest, I have a terrible memory for HTTP requests. But I'm always happy to help!
Totally understandable.

Assignment 4

- □ Due Thursday night.
- □ Two javascript files you need to work on:
  - miniServer3.js
  - palindrome.js
- □ Palindrome.js you have to write from scratch. Do you put it on your laptop or on the server, and where?

Assignment 4

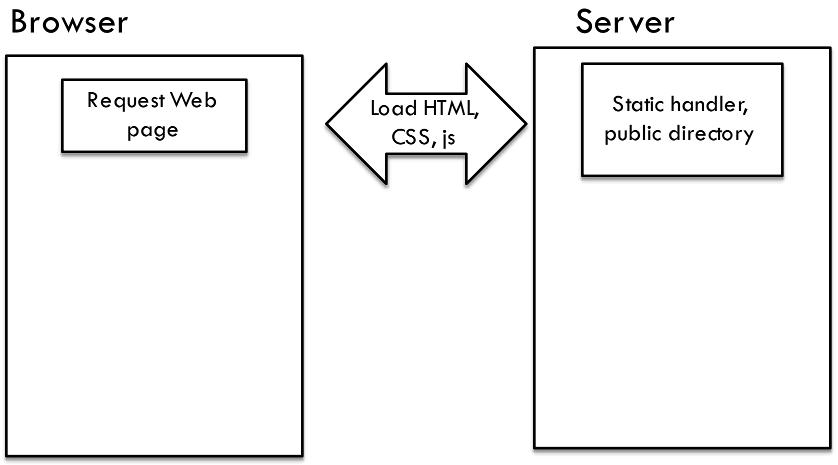
- Due Thursday night.
- Two javascript files you need to work on:
  - miniServer3.js
  - palindrome.js
- Palindrome.js you have to write from scratch. Do you put it on your laptop or on the server, and where?
- On server, in hello/public, along with palindrome.html. If you make a palindrome.css it also goes there. These are all static files.

Who calls what?

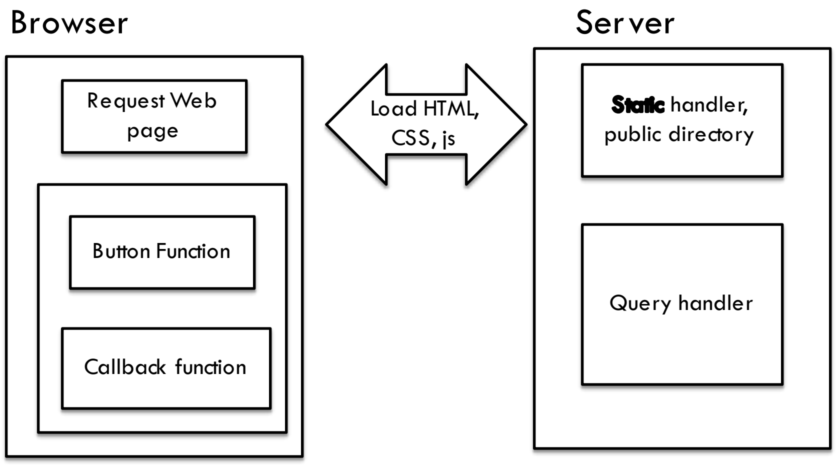
- How does the code in your palindrome.js get called? Who calls it?

- How does the code in palindrome.js get called? Who runs it?
- The browser runs it. Once the browser has its html, css and js files, it runs them just like it did in Assignments 2 and 3.

Flow of code



Flow of code



Browser

Request Web page

Button Function

Callback function

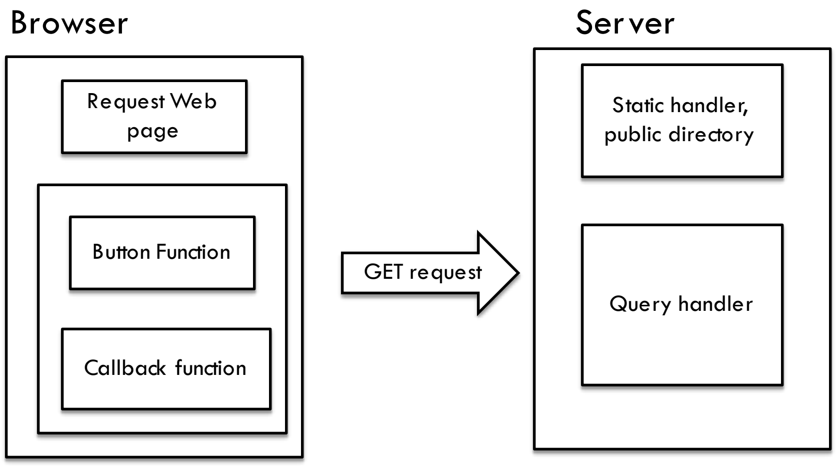
Load HTML, CSS, js

Server

Static handler, public directory

Query handler

Flow of code



Browser

Request Web page

Button Function

Callback function

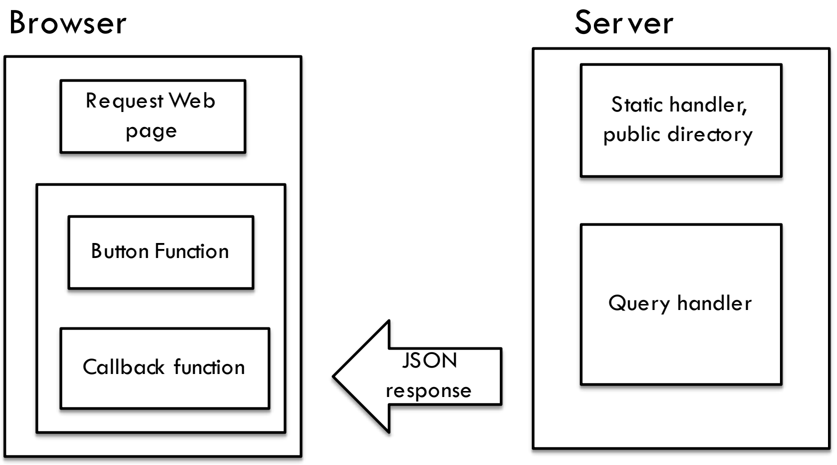
GET request

Server

Static handler, public directory

Query handler

Flow of code



Browser

Request Web page

Button Function

Callback function

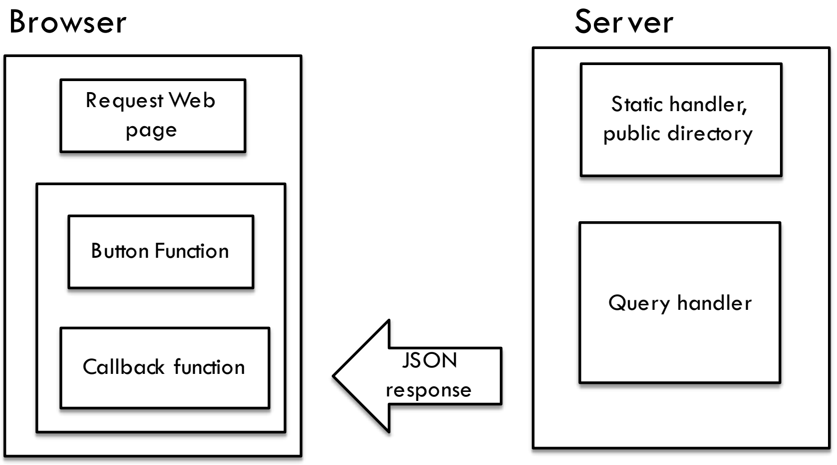
JSON response

Server

Static handler, public directory

Query handler

Flow of code



Browser

Request Web page

Button Function

Callback function

JSON response

Server

Static handler, public directory

Query handler

Server on your own computer

□ Some people prefer to develop entirely on their own machines, with it acting as both browser and server

□ See the section on “Setting up a Web server” in Interactive Data Visualization for the Web

□ Use the port number we assigned you, even on your own machine, so you don't forget!

□ Please make sure your code runs on the “real server” before turning it in; we will grade on the real server.

Data validation

□ Notice we just stuck ”word" into the query; the user could have typed anything.

□ Validating input in the browser is nice.

□ But we always have to validate it again on the server. Why?

Data validation

- Notice we just stuck ”word" into the query; the user could have typed anything.
- Validating input in the browser is nice.
- But we always have to validate it again on the server (sanitization). Why?
- Anyone can send a query to the server. It does not have to come from our app!!
- So server has to sanitize query input carefully!
- What could go wrong?

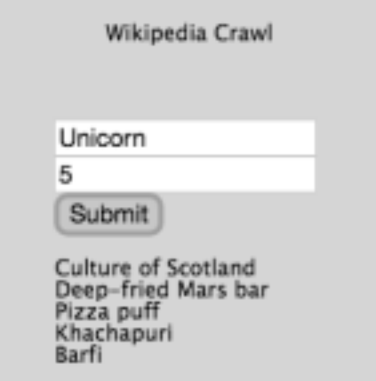
Possible issues

- Cause server to crash, or go into infinite loop (a form of Denial of Service)
- Cause server to execute malicious code (Code injection). Never execute input directly! (as HTML, as SQL, as CSS, etc.)
- Express has a module we might use for Assn 5.
- For text:

check('name').isLength({ min: 3, max: 100 }).trim().
encodeURI()

Last year's midterm

- Programming problem about using Wikipedia API



Wikipedia Crawl

Unicorn

5

Culture of Scotland
Deep-fried Mars bar
Pizza puff
Khachapuri
Barfi

- What is Web crawling?

Wikipedia API

- A little bit simplified for exam
- Uses JSONp, an older protocol, instead of CORS
- Let's do it with CORS
- Query format:

https://en.wikipedia.org/w/api.php?action=query&format=json&prop=links&titles=unicorn&origin=*

Response JSON (simplified)

```
{ query:  { pages:
        { count: 357,
           title: unicorn,
           links:  [
                 title: "A & C Black”,
                 title: "Achievement (heraldry)”,
                 title: "Acts of Union 1707”,
                 title: "Al-mi'raj”,
                 title: "Alexandria”,
```

Some given functions

getLinks(title) – issues CORS request, using URL, to get links on the Wikipedia page with given title.

displayHop(title) – display title of a hop on our Web page

removeHops() – remove all displayed hops

JSON parsing question

```
// Input: response object, Output: random link
randomLink(obj) {
        // local functin to choose random integer
        function rando (n) {
        return(Math.floor(Math.random() * n);
         };

// fill in !!
}
```

getLinks()

```
url = "https://…;
let xhr = new XMLHttpRequest();
xhr.open("GET",url,true);
xhr.onload = function () {
        resObj = JSON.parse(xhr.responseText);
        callback(resObj); // call callback function on response
        }
xhr.onerror = function () {console.log("error response from
        Wikipedia API");        }
xhr.send();
```

Interaction structure question

- You need to write the callback function

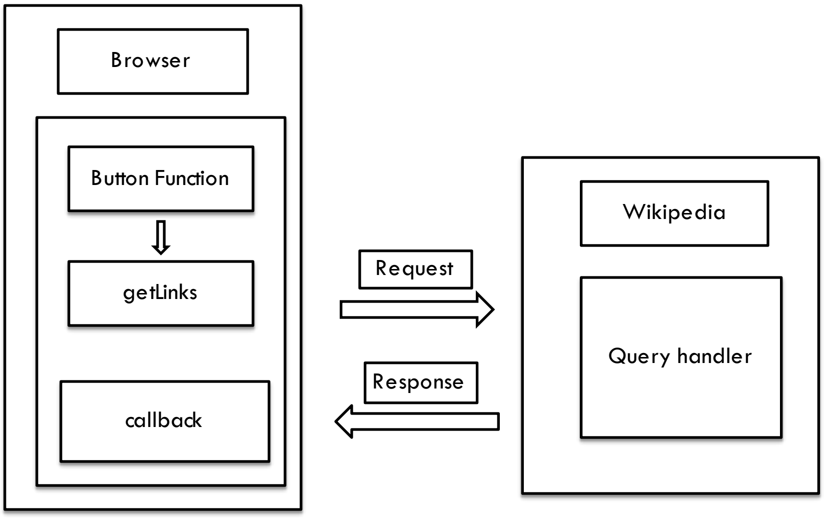
- What I am testing: can you recognize and handle situations in which your browser has to set up a listener and execute a callback later? Examples:
  - button press onclick,
  - animation frame,
  - AJAX request onload,
  - CORS request onload,
  - image onload

More sophisticated

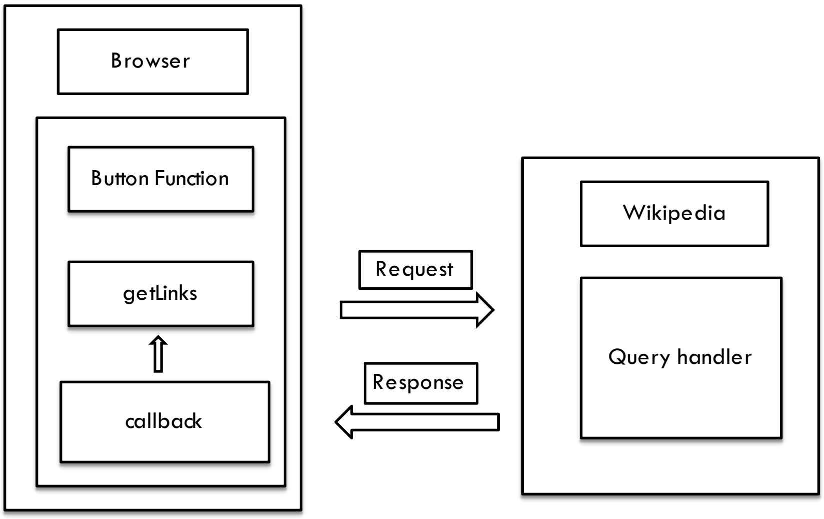
- When multiple request-response sequences are required, how are they sequenced? Two patterns:

- Parallel: issue all requests, count/accumulate responses as they come in.
  - What piece of code did we see that did this in Assn 3?
- Sequential: issue one request, when response comes back, issue next, iterate.
  - This question requires a sequential pattern

Sequential pattern in WikiHops



Repeat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Wikipedia
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