CSC 309
The Big Picture

Server ← GET path/to/route / Host: example.com ← Client

- Client sends HTTP request to server

- How?

```
                        ┌─────────────────────────┐
                        │  GET path/to/route      │
     Server      ◄───────│  Host: example.com      │◄─────    Client
                        └─────────────────────────┘
```

- Client sends HTTP request to server

- How?

    - Ajax call (button click or other event)

    - Type in a URL in browser

    - Curl/Postman

    - Link

    - Form submit

Server

- What is the server?

Server

- What is the server?

  - A running process listening for TCP socket connections on a published port (usually 80)

  - It unpacks the HTTP message, determines what to do with it, and sends a response.

Server → `HTTP/1.1 200 OK` → Client
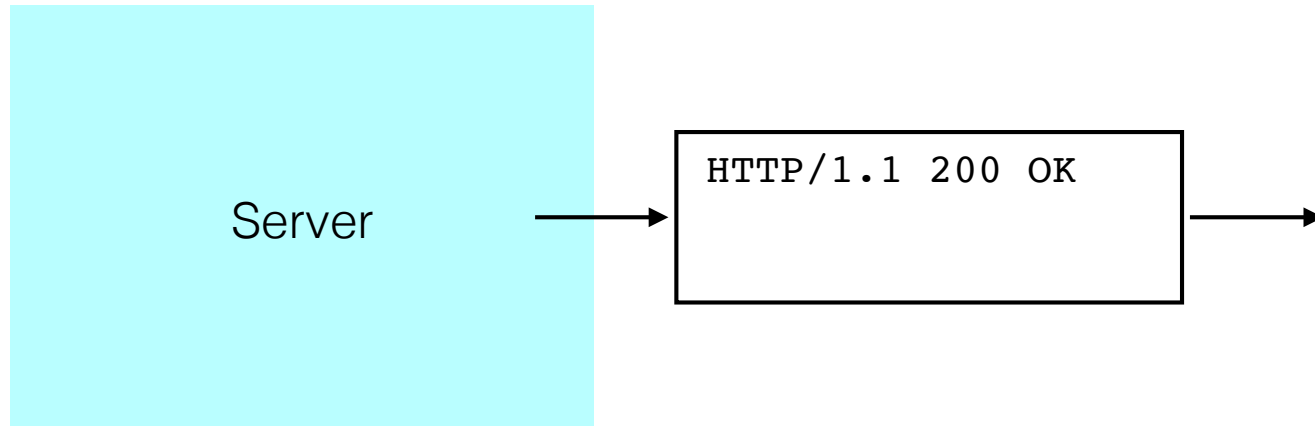
- Response?

- Status?

Server

- Main task of the server is to…

Server

- Main task of the server is to satisfy requests from the client

  - Static files: html, css, javascript, images

  - Dynamically generated HTML

  - Dynamically generated data

- Server Technologies:

- Server Architecture:

- Value of a framework?

- Server Technologies:

  - Node: event loop JavaScript engine

  - Express: minimalist framework

- Server Architecture:

  - route/controller: determine how to handle a request

- Value of a framework

  - Encapsulate common operations in a library
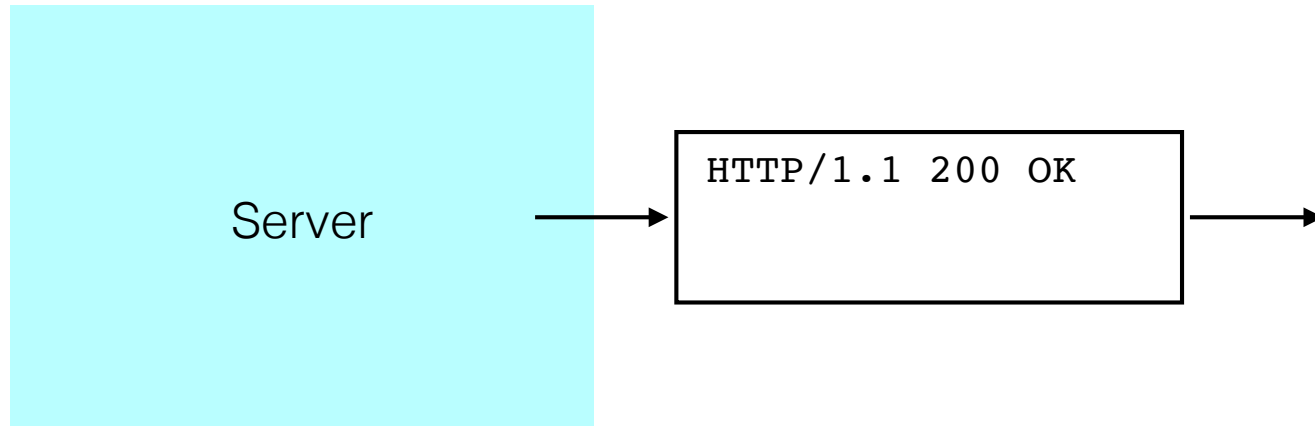
  - Enforce/encourage a structure

- Server technologies

  - Also need a place to store data persistently

  - Database

    - Relational

    - NoSQL

  - CRUD: Create Read Update Delete

Server → HTTP/1.1 200 OK →

- Constructs a response

  - Status message:
    - 2xx Success
    - 3xx Redirection
    - 4xx Client error
    - 5xx Server error

Server

HTTP/1.1 200 OK
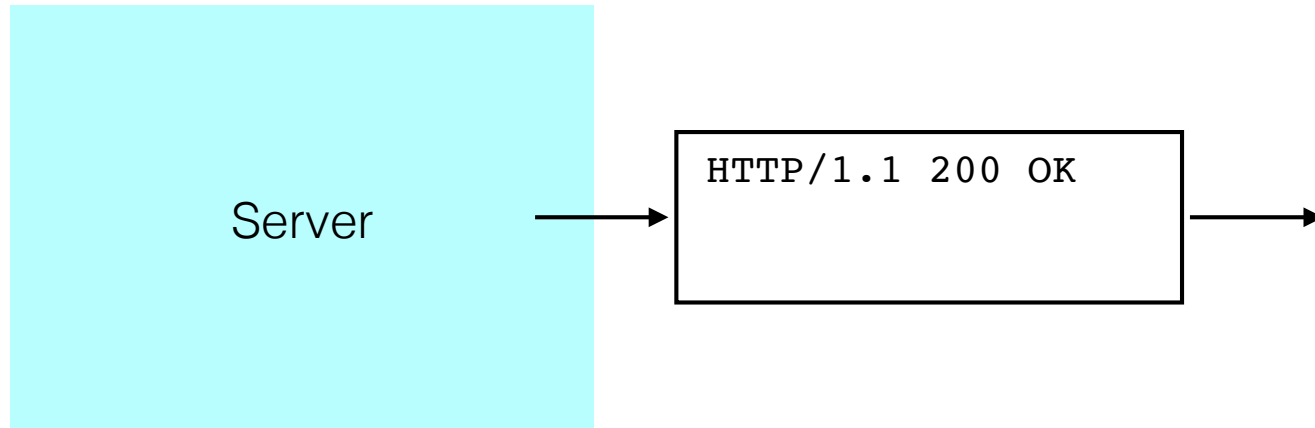
- Sends back data - type?

```
Server            HTTP/1.1 200 OK
```

- Sends back data

  - ContentType:
    - Text
    - XML
    - JSON
    - HTML

Browser

- Browser displays the resource you requested

- How?

- User Interface

  - Address bar

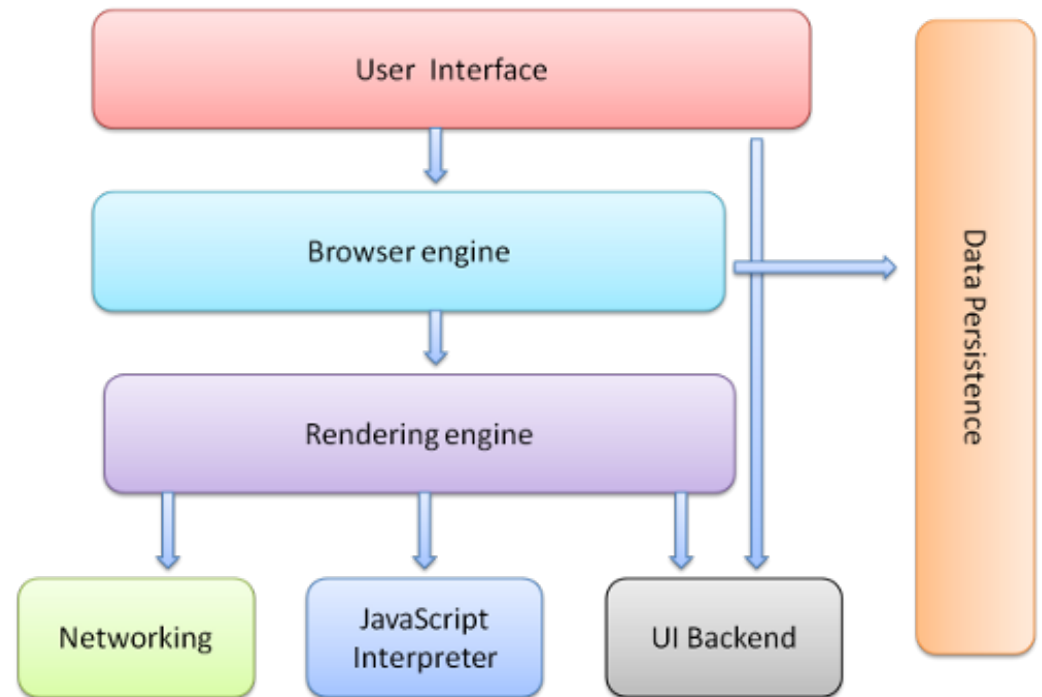 - Forward/back buttons, etc

- Browser Engine

  - marshals actions between UI and rendering engine
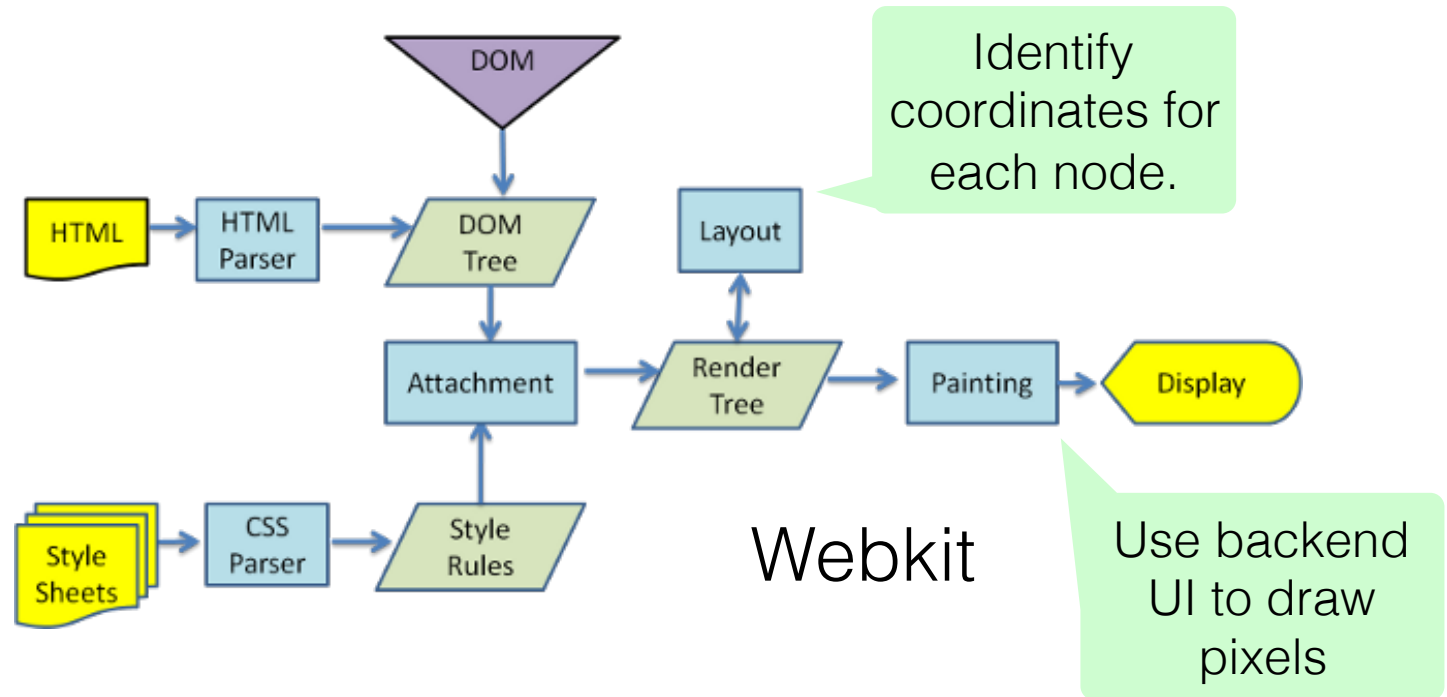
- Rendering Engine

  - displays requested content

- UI Backend

  - Used for drawing basic objects like windows

https://www.html5rocks.com/en/tutorials/internals/howbrowserswork/

- What is the DOM?

- DOM is the data structure that results from parsing the HTML

- The DOM is combined with CSS rules to form the render tree for painting

- HTML

  - Mixture of semantic and layout information

  - Hierarchical structure matches the DOM

  - Elements, attributes

  - Forms

- What is HTML?

- How does it relate to the DOM?

- What is CSS? (How does it work?)

- CSS

  - Style rules are applied to the DOM before rendering

  - Algorithm

  - EXAMPLE

- How is Javascript used in the browser?

- Javascript: constructing DOM nodes dynamically

- EXAMPLE

- Common operations:

    - construction and combining DOM nodes

    - listen for and respond to events

- What is JQuery? What is it for?

  - Simplify and shorten syntax for common JavaScript operations

  - Finding, constructing, and modifying DOM nodes

  - Attaching event listeners

  - Handling events (button clicks, key press, mouse movements, etc)

- What is JQuery? What is it for?

- What is Ajax?

- Ajax

  - once we have events, we need a way to update data

  - XMLHttpRequest - JavaScript

  - Sends an HTTP request to the server, but doesn't require that the whole DOM be re-rendered

Application Architecture Concepts

- REST

- Application structure:

    - Templates

    - SPA

    - MVC

- Persistent storage options

- Security

- Authentication options

Final Exam

- No aids allowed

- Some programming - vanilla JavaScript

- Short answer type questions

- Some code reading

- Comprehensive

Note: You may detach this page for easier reference.

Basic JavaScript

```
JSON.parse()
JSON.stringify()

document.getElementById(string)
document.getElementsByTagName(string)
document.createElement(string)
element.innerHTML
element.apend(element)
element.empty()
alert(value)

array.length()
array.push()
array.splice()
object.toJSON()

event.preventDefault()
```
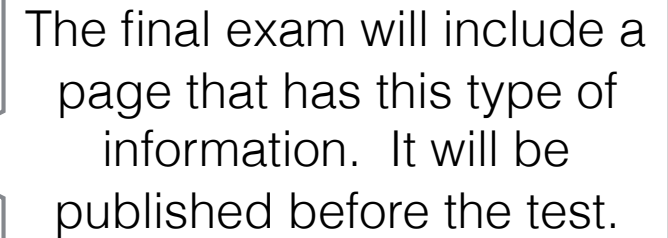
JQuery

```
$(selector).append()
$(selector).html()
$(selector).empty()
$(selector).parent()
$(selector).insertAfter()
$(selector).on()
```

Express route handling

```
req.send()
req.get()
req.params()
req.query()
req.body()
req.route()
```

The final exam will include a page that has this type of information. It will be published before the test.

Topics

Browser

- HTML5

- CSS

- DOM

- Forms

- Validation

- JQuery

- React

- Templates

Server

- Node

- Express

- MongoDB/Mongoose

- Validation

- JSON

- REST

Topics

- Communication

  - HTTP

  - GET, POST, PUT, DELETE

  - Sessions, Cookies

  - AJAX

  - JSON

- Security

- Promises

Office hours

- Check calendar on course web site, or book an appointment.

- Review session:
  - Options (I will make a poll on Piazza)
    - Thursday April 19 2-4pm ?
    - Friday April 20 1-3pm ?
    - Monday April 23 10-12am ?