
i_X
Embrace Opportunity

Web Development

Week 1 | Day 2

Agenda

- Intro to Git and GitHub
- JavaScript fundamentals
- JavaScript DOM
- Exercises & homework

Git and Github

An explanation, overview and simple common commands.

Git and Github

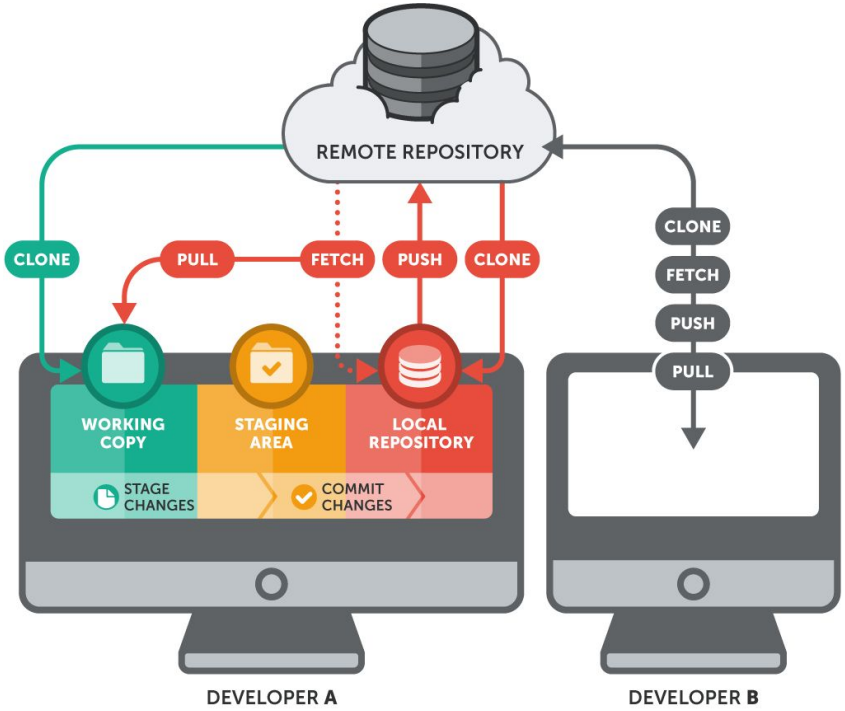
Github

Repository for your code.

Git

Helps you manage different versions.

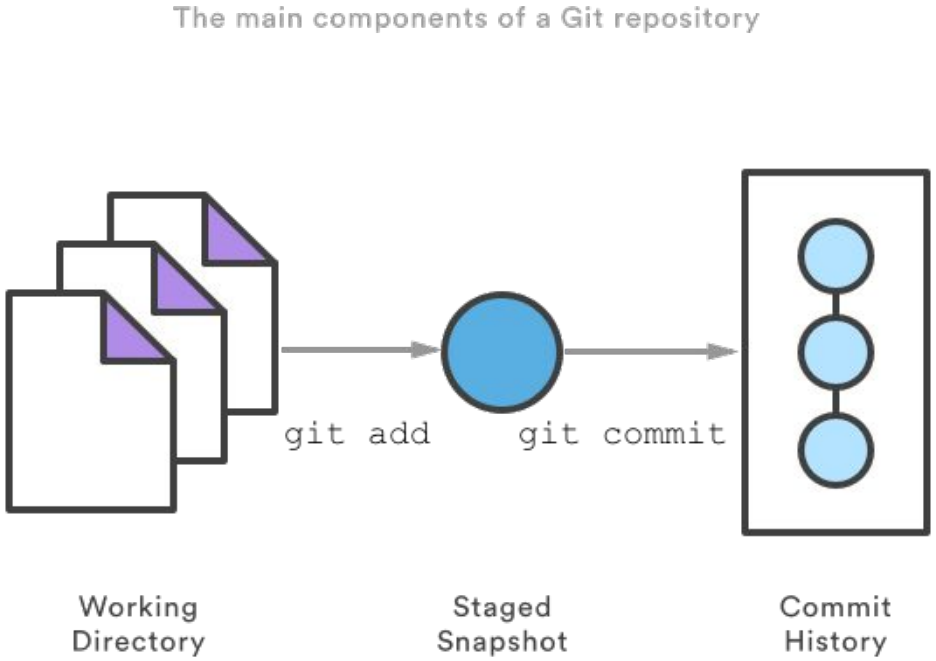
Git


REMOTE REPOSITORY
CLONE
PULL
FETCH
PUSH
CLONE
CLONE
FETCH
PUSH
PULL
WORKING COPY
STAGING AREA
LOCAL REPOSITORY
STAGE CHANGES
COMMIT CHANGES
DEVELOPER A
DEVELOPER B

Git ‘Trees’

- **Working Directory -** Data on the local filesystem
- **Staging Area (AKA Index) -** Proposed next commit
- **Commit History -** A history of commits in the form of a graph (directed acyclic graph)

Git Recap



atlassian.com/git/tutorials/resetting-checking-out-and-reverting

Git Tutorial

Simply add, commit and push

Create and Initialize

We need to create a new folder, change into it and initialize it

```
mkdir wd-novel

cd wd-novel

git init
```

By running *git init* we add a hidden ***.git*** folder in our working directory. This folder keeps track of all of files and folders for the git command line interface.

Create a new file with content

Create a new file called `page-1.txt` and start writing your awesome novel.

```
git status
```

Reveals that there are untracked files in the working directory.

Stage the changes (pre-commit)

Get ready to commit the file by running:

```
git add page-1.txt
```

After running a *git status* again, we can see that it is now ready to be committed (or staged).

Commit the Content

We are now ready to commit.

```
git commit -m “My first page”
```

The above command commits the work and adds the content to the history.

Push to the server

Create a new repository on GitHub, then connect your local repository to the **remote repository**

```
git remote add <url>
```

You can now push your repository up to the remote repository.

```
git push origin master
```

Git Tutorial

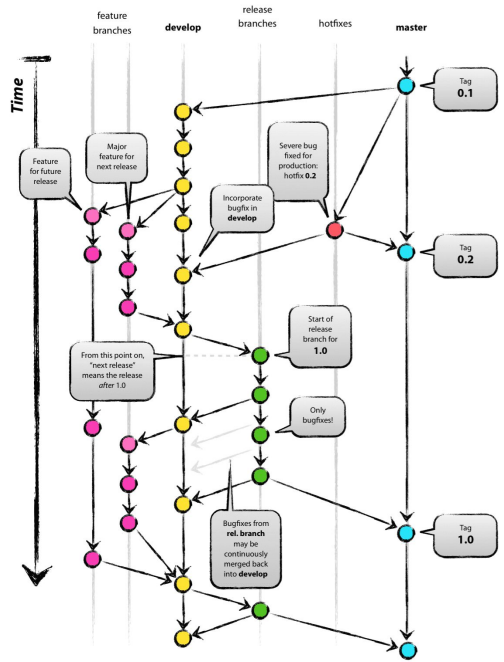
Branching

Git History Visualized

HEAD

- Reference to the commit from which the working directory was initialized
  - Intuitively, “the commit you are on”
  - Reference to the parent of the next commit
- Automatically updates itself with new commits

Git Branches



nvie.com/posts/a-successful-git-branching-model/

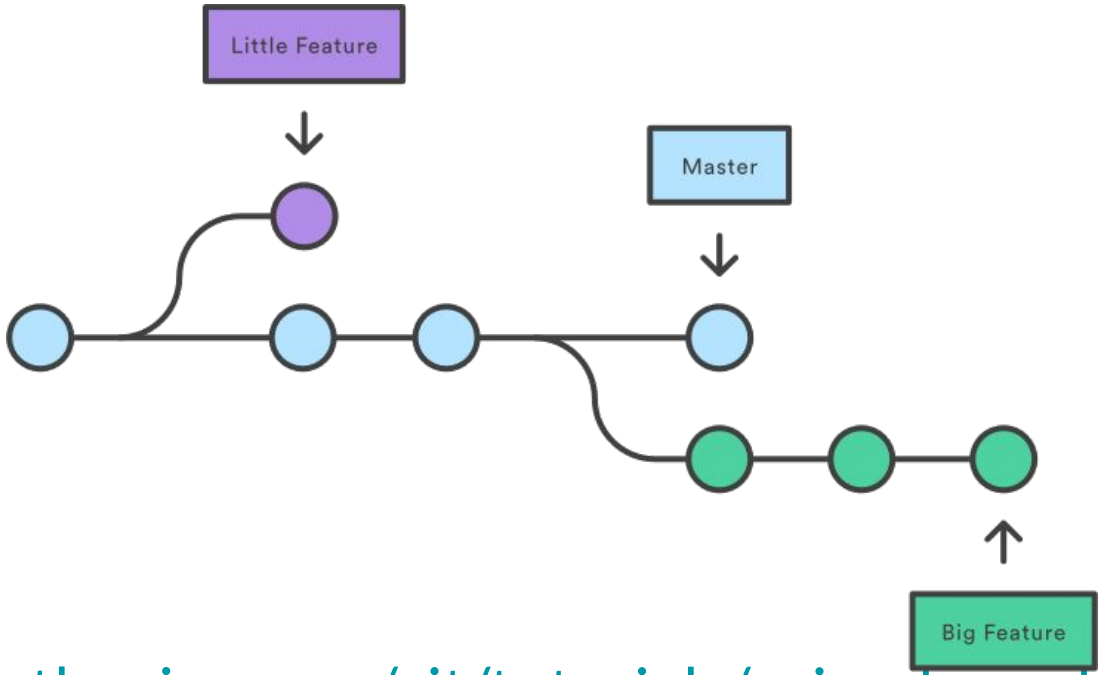
Branching

- Encapsulate changes via independent lines of development
- Prevent introducing unstable code into the “main” codebase
- Chance to clean up project history before integrating changes into the “main” codebase

Branching

- Branches are references to commits, not containers of commits
- Like HEAD, the active branch, if any, updates itself with new commits
- Intuitively, they are “branches” in Git history graph

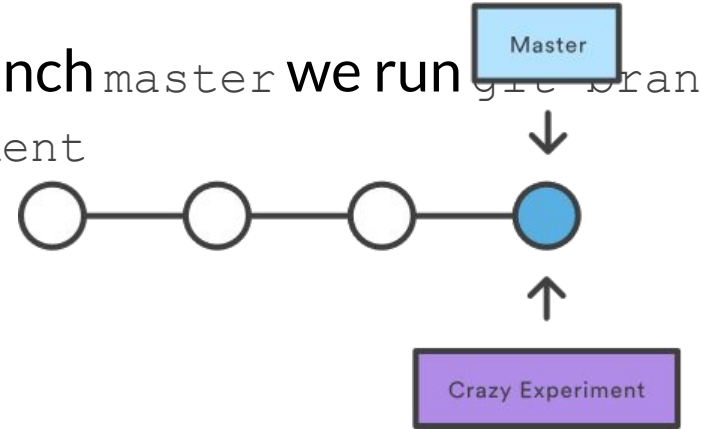
Git Branches



atlassian.com/git/tutorials/using-branches

Creating Branches

- `git branch <branch-name>`
  - Only creates `<branch-name>`
  - Does not make `<branch-name>` the active branch
- Assume on branch `master` we run `git branch crazy-experiment`



Switching Branches

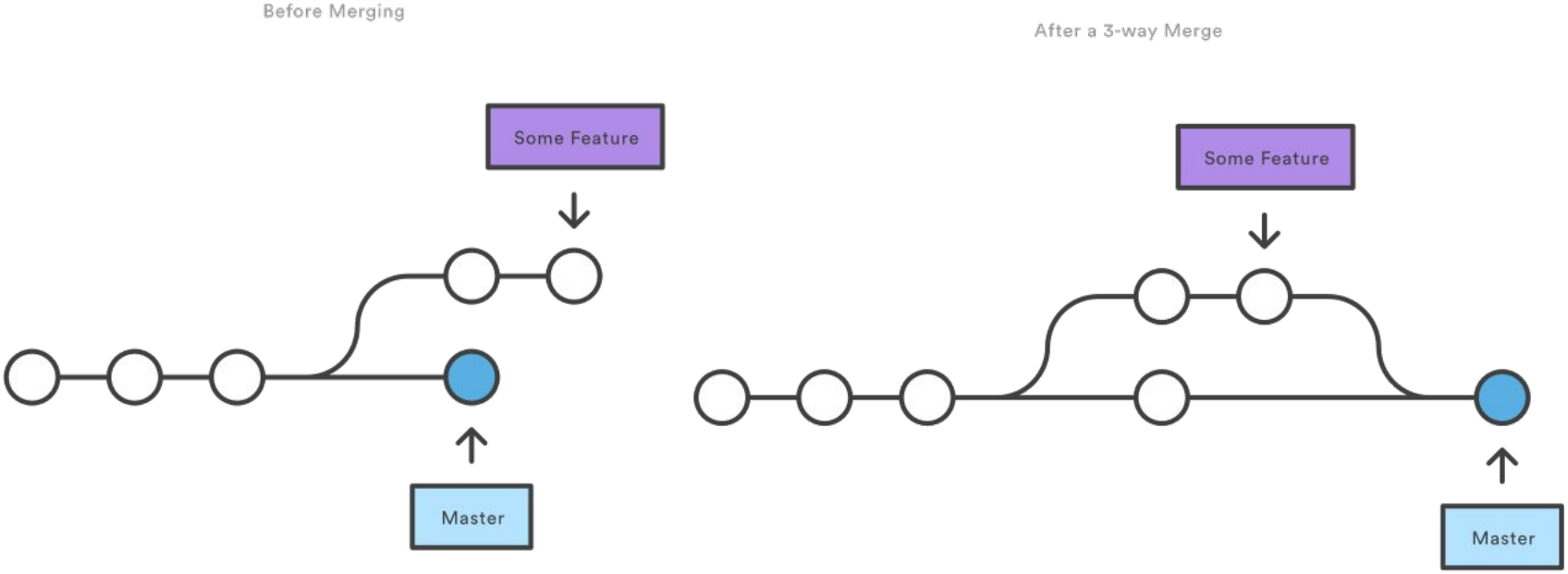
- `git branch <branch-name>`
  - Only creates `<branch-name>`
- `git checkout <branch-name>`
  - Makes <active-branch> the active branch
- **Shortcut!** `git checkout -b <branch-name>`
  - Creates and checks out `<branch-name>`

Merging Branches

- `git branch <branch-name>`
  - Only creates `<branch-name>`
- `git merge <branch-name>`
  - Merges `<branch-name>` into the current branch
  - Remember, only the current branch is updated
- Sometimes Git won't be able to figure out how to merge
  - Merge conflict - we have to manually resolve in the source code

Merging Branches

- Assume on branch `master` we run `git merge crazy-experiment`



Practice

Show history: `git log --graph --decorate --all`

```
1.  mkdir git-practice
2.  cd git-practice
3.  echo “First line\n” >> file.txt

4.  git init
5.  git add -A
6.  git commit -m “first commit”

7.  echo “Second line\n” >> file.txt
8.  git add -A
9.  git commit -m “second commit”

10. git branch feature
11. git checkout feature

12. echo “feature” >> file.txt
13. git add -A
14. git commit -m “commit from feature”

15. git checkout master
16. echo “master” >> file.txt
17. git add -A
18. git commit -m “commit from master”

19. git merge feature
<RESOLVE MERGE CONFLICT>
20. git add -A
21. git commit -m “resolved conflict”
```

JavaScript fundamentals

The need to know basics.

JavaScript

- High level object oriented programming language (abstraction)
- Interpreted (just-in-time compiling)
- ECMAScript specification (ES6)
- Runs in the browser (e.g. google V8 Engine)
- We can also run as a server thanks to run-time environments like node JS

Why JavaScript

- Used in web frameworks like Angular, React, VueJs
- Used to build very fast full stack applications
- Used to build mobile frameworks like React Native and Ionic
- Used in desktop application development

JS - Crash Course

- Variables & Data Types
- Arrays
- Objects Literals
- Methods for string, arrays objects, etc
- Loops - for, while .. of ForEach, map
- Conditions
- Functions
- OOP
- DOM

Variables

- What's a variable?
  - A value given a name so that it can be referred to throughout a program
- Syntax for defining variables in JS
  - Keywords: **var**, **let**, **const**
  - Syntax: `var name = value;`
  - Differ in scope and mutability
- Scope: region of a program where the variable binding is valid
- Mutability: whether or not the value of the variable can be changed

Variables cont.

- **var**
  - Once defined, is defined throughout the function
  - Mutable: value can be changed
- **let**
  - Once defined, is defined for the rest of the code block
  - Mutable: value can be changed
- **const**
  - Once defined, is defined for the rest of the code block
  - Immutable: value cannot be changed

Primitive Types

- Data types that are not objects and have no methods
- Important JavaScript primitive types
  - **string, number, boolean, null, undefined, symbol**
- Immutable: cannot be altered

Primitive Types cont.

- **Strings**
  - `“Hello”` or `‘Hello’`
  - Concatenation: `“Hello” + “ world”`

    → `“Hello world”`
- **Numbers**
  - `1 21 734`
  - `parseInt(78.5)` → `78`
  - `parseFloat(78.5)` → `78.5`

Primitive Types cont.

- **Booleans**
  - `true` and `false`
  - Truthy values such as `"hello"` and `5`
  - Falsy values such as `null`, `undefined`, `NaN`, `''`, and `0`
- **Undefined**
  - Value indicating that a variable has not been assigned a value or declared yet

Arrays

- Type of **data structure**
- Collection of elements that are each accessible at an **index**
- **Instantiation**: `let myArray = [3, 1, 10];`
- Add elements: `my_array.push(4, 2)`
  - → `[3, 1, 10, 4, 2]`
- Remove last element: `my_array.pop()`
- Indexing into the array: `myArray[3]` → `4`
- Size of the array: `myArray.length` → `5`

Objects

- **Object**: a collection of properties
- **Property**: an association between a key and a value
- ```
  let personObject = {
        name: sam,
        age: 25,
        country: Portugal
  }
  ```
  ```

Objects cont.

- personObject
  - {name: Sam, age: 25, country: Portugal}
- personObject.name
  - Sam
- personObject.country = United States
- personObject.hasOwnProperty('friend')
  - false
- personObject.hasOwnProperty('age')
  - true

Operators

- **Arithmetic**
  - `+, -, /, *, %` (modulo)
- **Relational**
  - <, >, <=, >=, ==, ===
    - == checks if two values are equal, regardless of type
    - === checks if two values are equal and have the same type
- 1 == '1' → true
- 1 === '1' → false

Conditionals

- **if-then** statements
- Different actions are performed depending on the **boolean** value of a statement
- Any statement that evaluates to a boolean can be used in a conditional

Conditionals cont.

- ```
  if (myVar > 0) {
     console.log('greater than zero');
  } else if (my_var <= -20) {
     console.log('less than/equal to -20');
  } else {
     console.log('in range');
  }
  ```
- ```
  const color = myVar >= 0 ? "red" : "blue";
  ```

Switch Statements

- Allows the value of a variable to **control the flow** of a program
- Provide a number of possible values for the variable
- For each case a course of action is taken
- Must **break** after each case for the evaluation of the switch statement to stop

Switch Statements cont.

```
let my_var = 0;
switch (my_var) {
    case 0:
        console.log(false);
        break;
    case 1:
        console.log(true);
        Break;
    default:
        console.log('error');
}
```

Loops

- Used to repeat a block of code a given number of times or until a certain condition is met
- 3 types of loop
  - **for**
    - Allows a block of code to be repeated a given **number** of times
  - **while** & **do-while**
    - Allow a block of code to be repeated until a **condition** is met

Loops cont.

- **do-while** loops: code is executed, then condition is checked
- **while** loops: condition is checked, then code is executed
- Exit condition must be reachable to avoid an **infinite loop**
- ```
  var i = 0;
  do {
     console.log(i);
     i++;
  }
  while (i < 5);
  ```
  ```

Exercise

Write a loop that counts sheep

Have it execute 5 times.

Example output,

“Sheep number 1”

“Sheep number 2”

….

“Sheep number 5”

Functions

- **Block of code** written for a specific task
- Must be **called** to be executed
- Can take in data as **parameters**
- Can also return data
- Make code more readable and easier to understand and scale

Functions cont.

- ```
  function concat(str1, str2) {
      return str1 + str2;
  }

  console.log(concat("hello ", "world"));
  ```

- → "hello world"
  ```

OOP - Object Oriented Programming

- **Prototypes (ES5)**
- **function** Person(firstName,lastName, dob) {

```
    this.firstName;
    this.lastName;
    this.dob;
}
const person1 = new Person("John", "Doe", "4-3-1993")
console.log(person1);
```

- Using Date object: this.dob = new Date(dob);

OOP - Cont (Prototypes - ES5)

- Add methods to objects
- ```
  function Person(firstName,lastName, dob) {
  this.firstName;
  this.lastName;
  this.dob;
  This.getFullName = function(){
      return this.firstName+" "+this.lastName;
  }
}
```
```

OOP - Cont (Prototypes - ES5)

```
function Person(firstName,lastName, dob) {
    this.firstName;
    this.lastName;
    this.dob;
    this.getFullName
}
Person.prototype.getFullName() = function(){
    return this.firstName+" "+this.lastName;
}
```

OOP - Cont (Classes - ES6)

```
class Person{
    constructor(firstName,lastName, dob) {
        this.firstName;
        this.lastName;
        This.dob;
    }
    getFullName(){
    return this.firstName+“ ”+this.lastName;
    }
}
```

JavaScript documentation

https://developer.mozilla.org/en-US/docs/Web/JavaScript

JS Exercise

- Create and array of object of the following structure:
  - Use let keyword
  - Name array “people”
  - Object Structure
    - { name: “name”, age: 25, email: “name@mail.com” }
- Use the map array function to create a new array called “names” populated with all the name properties from the objects in the people array

JS Exercise

- Use the forEach array function to loop through all names and print out the name to the console
- Create a function called “getNames” and add the logic you wrote using the map function
- Now when creating your variable called names use you “getNames” function instead

JavaScript DOM

A comprehensive outline of the document object model.

The JavaScript DOM

- The DOM is a structured representation of an HTML document
- Tree of nodes or elements created by the browser
- Node or element: any html tags
- Use JS to manipulate these dom elements or nodes
- The DOM is object oriented, each node has its own set of properties and methods
- We can change and add or remove them

- The browser gives us a window object and inside that we have a document object (loaded web-page or document)
- Root element, html element
- head tag, body tag same level
- head: meta-tags title
- body: output, h1 tags, links, headers, footers etc

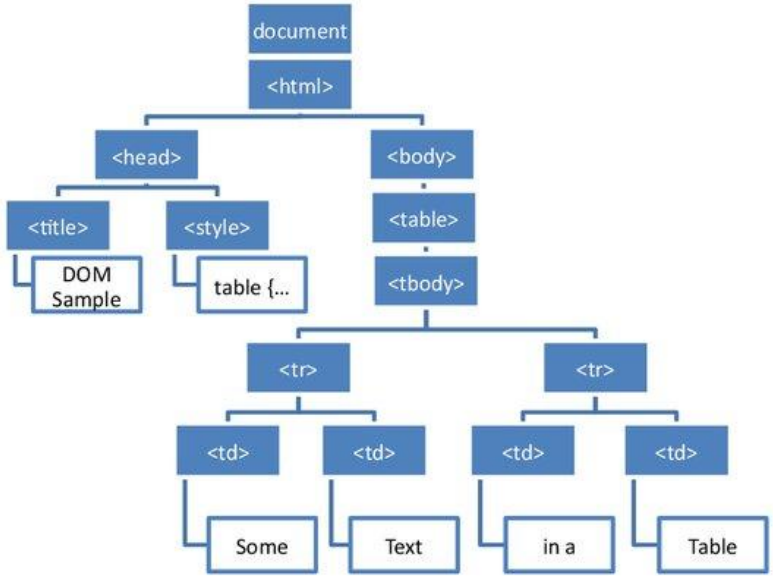
Let's check the Document object

console.log(document);

The JavaScript DOM


```
<!DOCTYPE html>
<html>
    <head>
        <title>DOM Sample</title>
        <style type="text/css">
            table {
                border: 1px solid black;
            }
        </style>
    </head>
    <body>
        <table>
            <tbody>
                <tr>
                    <td>Some</td>
                    <td>Text</td>
                </tr>
                <tr>
                    <td>in a</td>
                    <td>Table</td>
                </tr>
            </tbody>
        </table>
    </body>
</html>
```

DOM tree



The DOM

- Examining the DOM
- Single element selectors
- Multiple element selectors (HTML collection or Node list)
- Traversing the DOM
- Creating element and adding attributes
- Editing/Removing elements and attributes
- Event listeners and the event object
- Mouse, Input and form events
- Event bubbling and delegation
- Local Storage

Document Object Model

- What is the DOM?
  - https://www.w3schools.com/whatis/whatis_htmldom.asp
- HTML tree of objects. This Defines:
  - Properties, Methods, Events
- Enables binding between HTML, JS and CSS (API for JS)

Exercise and homework

Exercises: DOM projects
Homework: Movie Game

Looking ahead and homework

Exercise

- Simple Interest calculator
- Number Guesser

Homework

- Movie guessing game using what we have learned so far

Thanks for listening!

Tomorrow we will take a look at object oriented programming.


See you tomorrow