

# **ECE 448/528**

## **Application Software Design**

### **Lecture 18. JavaScript and DOM – Part I**

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**Won-Jae Yi, Ph.D.**

**Department of Electrical and Computer Engineering**  
**Illinois Institute of Technology**

# **Frontend Web User Interface**

# User Interface (UI)

- User interface: something a user can use and get feedback from.
  - Interacting with users
  - Consists of many UI elements: texts, images, buttons, tables, inputs, etc.
- Hierarchical structure: to group relevant information.
  - Like a document, e.g., each section should have a title.
- Visual appearance: to provide additional information and to please human eyes.
  - e.g., different colors on websites, representing traffic lights
  - Need to be consistent throughout an application.
- Interactive behavior: to enable interactions.
  - Associated with UI elements, e.g., clicking a button (create one!)
  - UI elements are updated to provide feedback.
  - Perhaps, interactive behavior would depend on certain users
- Other features: audio (alert users), networking (latency issues), etc.

# Frontend Web UI

- Implemented via a combination of techniques/languages.
- HTML DOM (Document Object Model)
  - Describe the hierarchical structure of the web UI as a tree of HTML elements.
- CSS (Cascading Style Sheets)
  - Provide means to define the appearance of a single or a group of HTML elements.
  - Much useful/easier than applying it to individual HTML files
- JavaScript
  - JavaScript is very different compared to Java
  - Define behavior to associate with HTML elements.
  - Manipulate HTML DOM to update UI.
  - Provide access to additional features like audio and networking.
- HTML files allow to link all above together
  - Browsers process these on the user end

# Tutorials and References

- We will cover the basics in the lecture, but the details are left to you for self-study.
- Let's use <https://www.w3schools.com/> as the primary source.
  - HTML: <https://www.w3schools.com/html/default.asp>
  - CSS: <https://www.w3schools.com/css/default.asp>
    - Bootstrap4:  
<https://www.w3schools.com/bootstrap4/default.asp>
  - JavaScript: <https://www.w3schools.com/js/default.asp>
- You don't need to memorize everything – just need to know where to locate them.
- Our lectures will focus on HTML DOM and JavaScript.

# **A Simple Web Application**

# Dice Throwing

- A simple web application utilizing web UI only.
  - No interaction over network
- A web page displaying a number and a button.
  - Update the number to a random one between 1 and 6 when the button is clicked.
- Nevertheless, the web page need to be hosted by a web server so the browser can access it.
  - Use our Spring Boot application built in Lecture 16/17.
  - Under branch `lec18-dice`

# Fancy Dice Throwing

- Allow users to decide how many dices to throw.
  - Display a total if there are more than once dice.
- Display images visualizing the dice.