JavaScript: Memory, Passing, and Objects

CS 115 Computing for the Socio-Techno Web

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JavaScript “Primitive” Data Types

- string
- number
- boolean → true or false
- null
- undefined
- symbol
JavaScript “Primitive” Data Types

• Imagine a variable for a primitive type stores the value (simplification of what really happens)

```javascript
var x = "word";
var y = 12;
someFunction(x, y);
``` 

• The function `someFunction` receives the values “word” and 12
  • Local variables defined by parameters in `someFunction` have these values
  • Altering those local variables will not affect the global variable `x` and `y`

• JavaScript uses “pass by value”
  • Value of a variable passes to a function
  • The alternative, “pass by reference”, would pass the variables themselves
Arrays (and Other Objects)

• Stored and handled differently than primitives
• Imagine the variable stores only the **address** of where the array is actually stored

  ```javascript
  var z = ["dog", "cat", "bee"];  
document.write(z[1]);  // Prints "cat"
  document.write(z.length)  // Prints "3"
  ```

• Suppose z stores the address of a block in memory
  • Can imagine z = <someAddress>

Block of memory storing the array that z points to or refers to
Passing Arrays (and Other Objects) into Functions

var z = ["dog", "cat", "bee"]; // stored at <someAddress>
someFunction(z);

• The function someFunction receives the address <someAddress> of
  • Local variable defined by parameter in someFunction has the address
    <someAddress>
  • someFunction cannot change which address z points to
  • someFunction can change the array at that address

// Change z to ["dog", praying mantis", "bee"]
function someFunction(animals) {
    animals[1] = "praying mantis";
}
Null

• Represents no value
• Represents no address
• Can assign it

```javascript
var a = null;
```
Null versus Undefined

- **null**
  - Indicates no value
  - Can be returned by functions

- **undefined**
  - Value associated with uninitialized variables
  - `var x;`
  - When a function that is expected to return a value does not return one (IMPORTANT case)
  - Value associated with object properties that do not exist

- `==` considers null and undefined equal

- `===` considers null and undefined different
  - Remember using `===` and `!==` is best practice
NaN

- NaN → Not-A-Number (Same as Number.NaN)
  - Unequal to any number including itself
  - Use isNaN function → determines (returns true or false) whether an argument is not a number. It attempts to convert the argument to a number

- The following comparisons return false
  - NaN == NaN
  - NaN === NaN

- The opposite: !isNaN() allow us to determine whether an expression is a number

- Notice: isNaN(20) → False

- You may want to write a function call isNumber that returns !isNaN(x)
Web Data Validation and More on Sources
More on sources

• Be aware of non-peer-reviewed venues
  • Includes preprints like arxiv
• Google to see if journal is reputable
• Cite the conference/journal, not the publisher
• Examples of publishers or search tools
  • Wiley Online Library
  • SpringerLink
  • science direct
  • Sage publications
  • Google scholar
  • ACM Digital Library
In computer science, **data validation** is the process of ensuring data have undergone **data cleansing** to ensure they have **data quality**, that is, that they are both correct and useful. It uses routines, often called "validation rules" "validation constraints" or "check routines", that check for correctness, meaningfulness, and security of data that are input to the system. The rules may be implemented through the automated facilities of a **data dictionary**,\(^1\) or by the inclusion of explicit **application program** validation logic.

Web literacy resource

A Tale of the Board Game Rising Sun and Kōtahi

A Tale of the Board Game Rising Sun and Kōtahi

- Theme of game is Japanese Mythology
  - Designer’s prior game was about Norse Mythology
- Very successful game from publicly traded company
  - Kickstarter campaign selling 30k+ copies and revenue over $4 million
  - Sold tens of thousands more after the Kickstarter
  - Available at Board & Brew next door
- April 4th, 2017 → Kickstarter ends (expected delivery in 2018)
- January 21st, 2018 → A fan asks, “What is Kōtahi?”
What is Kōtahi?

• The only information to be found is on the Wikipedia page "List of legendary creatures from Japan"

• According to Maori Dictionary, Kotahi means “one” or a sense of togetherness
  • But the Maori people live in New Zealand not Japan

• Someone searched the other unfamiliar words “Manawa Bradford”...
What is Kōtahi?

- Kotahi-Manawa Bradford is a farmer in New Zealand
  - Friends make fun of him for being hairy and getting angry while playing games
  - One friend made a fake Wikipedia edit as a joke
  - The designer of Rising Sun (who is brilliant and hard-working) used Wikipedia as reference without checking
An Artist’s Rendering of Kōtahi
Outcome for the Real Kotahi

- Appeared on New Zealand news
- The company sent him a free autographed game
  - He has a plastic figurine of his friends’ inside joke about him
- Moral: Don’t trust Wikipedia for research, but do use it for jokes?
Checking Wikipedia Edits

• Can check a Wikipedia page’s edit history by clicking “View history” in the top right corner of the page
  • Shows you who made edits, what the changes were, and when

• Here is one edit for Kōtahi
  • They changed “gets really angry” to “gets engulfed in rage”

• Warning: Some bogus Wikipedia edits are disgusting, hateful, offensive, etc.
  • Luckily, a bot, ClueBot NG, catches many of these and deletes them fairly quickly, but they are logged in the edit history
Criteria to Evaluate Web Data

• Authorship
  • Who wrote the document?
  • Do you recognize the author (e.g., someone in your field)?
  • Is the document linked to a document you trust?
  • Is biographical information provided?
  • Is the author referred to by a trust authority (persons)?

• Publishing Entity
  • Any organization name provided in the document?
  • Can you contact the web master?
  • Any document parts (headers, images, etc.) associated with an organization?
  • Is the URL associated with an organization you trust?
  • Can you verify the identity of the server via whois servers or dnslookup?
  • How are they funded or what is their revenue model?

• Point of view – Examine who is providing the information and what might be their point of view
  • Is it part of an organization with a philosophical or political agenda?
Criteria to Evaluate Web Data

- **Context**
  - Author situates the work
  - Author displays knowledge or sources, theories, techniques
  - Document includes a bibliography

- **Accuracy**
  - Document relies on sources listed in a bibliography
  - Background information used can be verified for accuracy
  - Methodology presented is appropriate for the topic and allows for study duplication

- **Currency (Timeliness of Information)**
  - Keep in mind that for some documents this is not an issue
  - Document refers to clearly dated information
  - Document includes a publication date

- **Guide to evaluating web pages (sources for most of this content)**
  - [https://guides.library.jhu.edu/evaluate/internet-resources](https://guides.library.jhu.edu/evaluate/internet-resources)
  - [http://guides.lib.berkeley.edu/evaluating-resources](http://guides.lib.berkeley.edu/evaluating-resources)
Web Site Validation (whois servers)

- Importance of finding owner of web site
  - Google dhmo.org author Tom Way

- Whois servers databases that keep track of owners of domains
  - [https://www.whois.com/whois/](https://www.whois.com/whois/)
    - Type domain: umd.edu
    - You get lots of valid contact info because UMD is legit