

# Announcements

- ❖ Check class announcements daily
- ❖ You must implement programming projects by yourself

# Two-Dimensional Arrays

- ❖ JavaScript does not support actual two-dimensional arrays
- ❖ You can simulate two-dimensional arrays by using arrays of arrays
- ❖ About two-dimensional arrays
  - ❖ You can pass them and return them from functions like one-dimensional arrays
  - ❖ Any modifications in the function will be permanent
  - ❖ You can have ragged arrays
  - ❖ Nested loops (in particular for loops) are used with two-dimensional arrays
- ❖ **Example:** TwoDimensionalArrays.html
- ❖ **Example:** Let's define a two-dimensional array of strings

# onload/onunload

- ❖ onload → Allow us to execute code when the page is loaded
- ❖ **Example:** clock.html, clock.js, clock.css
- ❖ onunload → Allow us to execute code when the user navigates away from a web page
- ❖ **Example:** clockPopUp.html

# Objects

- ❖ Object – entity with values and operations
- ❖ Example of objects: document (document.writeln)
- ❖ You use the . (period) operator to access an object's properties
  - ❖ **<OBJECT>.<PROPERTY>**
- ❖ A property value can be any data type we have seen including objects
- ❖ You can create your own objects by either:

```
var myObj = {};  
var myOtherObj = new Object();
```
- ❖ You can create properties by assigning a value to it (we do not use var)

```
myObj.created = "Monday";
```
- ❖ You can update the property by assigning a new value
- ❖ You can delete a property with the delete operator

```
delete myObj.created;
```
- ❖ You can check for the existence of a property using the "in" operator
- ❖ **Example:** ObjectEx.java

# for/in

- ❖ General form

***for (propertyName in object)  
statement***

- ❖ Can be used to display the properties of an object
- ❖ for/in does not specify the order in which properties of an object are visited
- ❖ **Example:** ObjectEx.java
- ❖ The for/in does not loop through all the possible properties as some properties are considered non-enumerable
- ❖ User-defined properties are enumerable

# Objects as a Maps

- ❖ We can also view an object as an entity that associates values with strings. How? Let's first see how we can use the [ ] operator to access properties
- ❖ You can use [ ] operator instead of . (period) operator

`myObj.created → myObj["created"]`

`myObj.created = 10;`  
`myObj["created"] = 10;`

- ❖ IMPORTANT: Notice that we have a string on the right side ("created") whereas on the left side it is a property (variable)
- ❖ Using [ ] operator can provide a nice alternative to add properties to an object dynamically (when the program is executing)
- ❖ **Example:** AddingProperties.html

# Global Object

- ❖ **Global object** → created by JavaScript interpreter when it starts up
- ❖ Interpreter initializes the Global object with predefined values and functions. For example, parseInt, Infinity, etc.
- ❖ **Top-level code** → JavaScript code that does not belong to a function
- ❖ **Global variables** → variables in top-level code
- ❖ Global variables are properties of the Global object. When you define a variable outside any function you are defining a global variable (a property of the global object)
- ❖ You should avoid using global variables in your code
- ❖ In client-side JavaScript the Window object (window) represents the global object for all JavaScript code present in the browser window
- ❖ You can use the keyword ***this*** to refer to the Global object
- ❖ **Example:** GlobalObject.html
- ❖ **Example:** DocumentProperties.html

# Sessions

- ❖ Session → time period during which a person views a number of different web pages in a browser and then quit
- ❖ What would you like
  - ❖ To keep track of information throughout the session
  - ❖ For example, keeping track of color preferences, usernames, data selection, etc.
- ❖ What is the problem?
  - ❖ http (the protocol that makes possible the communication between browsers and web servers) is stateless (it has no memory)
  - ❖ Stateless → every page request is independent
- ❖ One Possible Solution
  - ❖ Cookies



# Cookies

- ❖ Cookie → small piece of information sent by a server and stored either in the browser's memory or as a small file in the hard drive. Acceptance of the cookie depends on the client
- ❖ Browser sends the cookie back with every request to the server that sent the cookie
- ❖ Cookie → contains a name/value pair
- ❖ Setting a cookie → associating a value with a name
- ❖ Getting a cookie → getting the value associated with a name
- ❖ Constrains:
  - ❖ Browser typically accept only 20 cookies per domain before dropping old cookies
  - ❖ 4KB per cookie
  - ❖ 300 cookies per domain

# Cookies

- ❖ Each cookie consists of name, value, expiration date, host, and path information
- ❖ This is how the cookie information may look like when sent by the server in the http header  
Set-Cookie: automobile=nelyota; path=/;  
domain=notRealCars.com
- ❖ If no expiration date is set for a cookie, the cookie expires when the user's session expires (i.e., when the user closes the browser)
- ❖ If the user accesses any page matching the path and domain of the cookie, the browser will resend the cookie to the server
- ❖ Let's see cookies in our browser

# Setting/Reading Cookies

## ❖ **Setting cookies**

- ❖ We can set a cookie by using document.cookie  
document.cookie = "school=UMCP";  
document.cookie = "mascot=terp";

❖ **Example:** setCookie.html

## ❖ **Reading cookies**

- ❖ document.cookie has a string with all the cookies
- ❖ You must extract from the string each cookie
- ❖ Cookies are separated by ;
- ❖ **Example:** readCookie.html

# Cookies with an Expiration Date

- ❖ Cookies without an expiration date will expire when the browser is closed
- ❖ Specify expiration date using “expires” and date in GMT
- ❖ GMT (Greenwich mean time)  
Wdy, DD-Mon-YYYY HH:MM:SS GMT  
Sun, 15-Apr-2007 11:29:00 GMT
- ❖ **Example:** setCookieExpiration.html
  - ❖ Syntax is very strict (you must have space after semicolon)
- ❖ When updating a cookie make sure use the same features (expires, path, etc.)
- ❖ To delete a cookie set the expiration time to some point in the past