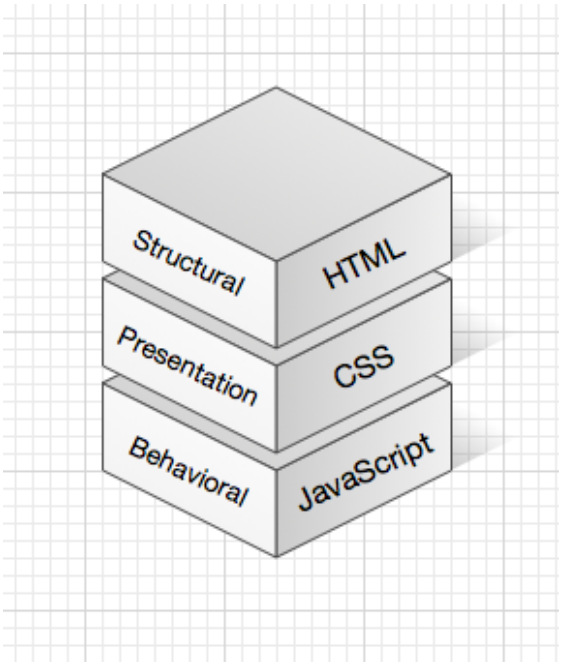
Week 4: Introduction to JavaScript

The World Web Web can be seen as a three-layer cake of technologies.

We will briefly cover the structure (HTML) of webpages and the code to provide presentation instructions (CSS). But we will lead off in this course with the most powerful of the three: JavaScript, which can control the behavior of any modern Web browser.

In this section, we will cover some JavaScript basics. We will cover the basics of objects, variables, function, and events. These are the building blocks of JavaScript and a number of other programming languages.



The web can be seen as a three-layer cake:

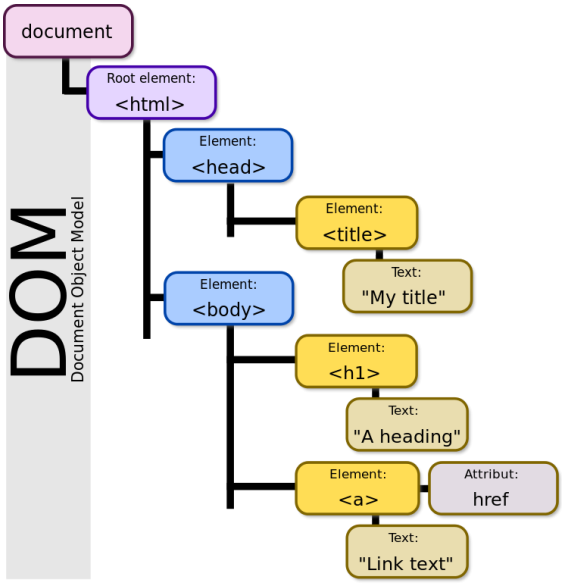
1. **HTML** represents the structural layer
2. **CSS** represents the presentation layer
3. **JavaScript** represents the behavioral layer

HTML defines all the parts of a webpage; **CSS** says what those parts should look like. But neither of these languages allow for logic. If you want to interact with your webpage, you need a scripting language.

JavaScript is the language of choice. It has access to the entire page and the window it is displayed in. It is a scripting language designed to make HTML pages more responsive. It is lightweight, unencumbered by licenses, and can run client-side in the user's own browser. Browser support for JavaScript has improved greatly and is largely cross-browser friendly. JavaScript is an ECMA language and it shares syntax with other popular web languages like PHP and ActionScript. In fact, JavaScript is also known as ECMA Script.

Objects

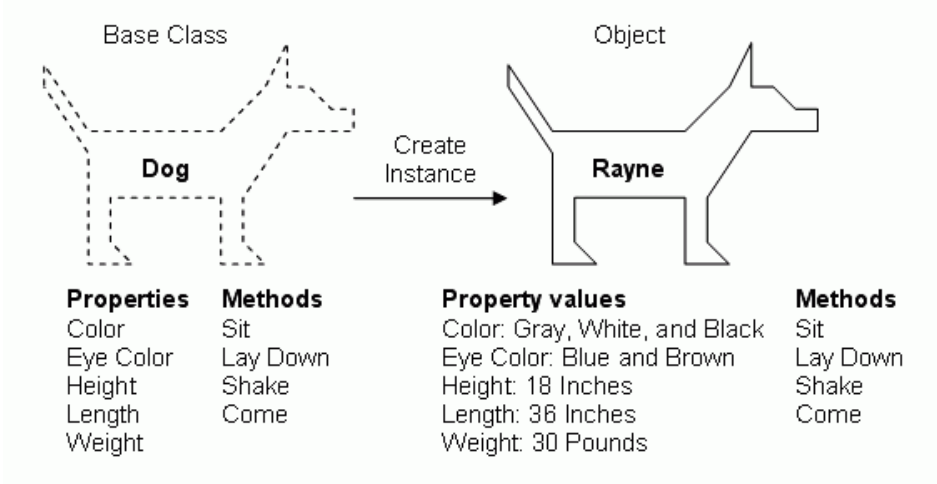
JavaScript is an object-oriented programming language. It doesn't need to be compiled. All you need to run JavaScript is a browser. You don't need any special software to write JavaScript, either—any good text editor will do just fine.



What is an object?

JavaScript is an object-oriented language. The language itself is almost entirely object-based. That means it is structured into objects—but what is an object? Objects are essentially templates. They can contain properties that you change and methods that you can use to get work done.

Objects contain goodies. To get at the goodies, you make a unique copy of the object and give it a name. This is called an "instance." It is an "instance" of the object. The instance will give you access to the object's goodies. To understand this concept, let's think for a moment about dogs.



There are all types of dogs: big dogs, scrawny dogs, fat dogs, tiny dogs, dumb dogs, clever dogs, psychotic dogs, striped dogs, spotted dogs, dogs without tails, cross-eyed dogs, feral dogs, and on and on. There are a lot of dogs. However, they all share the qualities of dog-ness.

The qualities of dog-ness might include some items like these:

- Warm-blooded
- Furry
- Four legs
- Bear live young
- Meat eaters
- Hunters
- Sharp, piercing teeth
- Pointy ears
- Whiskers

Looking at this list, it is clear that most of these characteristics are shared with other animals.
Dogs represent a branch from the tree of life. The list above is a list of generic qualities. The list is like a template for making a generalized dog—an outline of dog potential, if you will.

A generic dog has fur, four legs, and so forth. These are properties of the Dog object.

A generic dog can hunt, bark, and chase its tail. These are all methods of the Dog object.

But to actually have a dog, we need a real flesh-and-blood dog, created from our template. We need an instance of the Dog object. In short, we need an actual pet dog like Rayne.

Common JavaScript Objects

JavaScript has lots of different objects. Some of the more common ones include the following:

Window object: This gives you access to all the properties and methods of the user's browser window. Using the window object, you can retrieve how wide the browser window is or how tall the browser is. You could pop open a tiny new browser window and scoot it across the user's monitor. (Whether you should do this or not is open to debate.)

Document object: This gives you access to the entire HTML page and the elements inside. You can use it to activate a button, change the style of a single element, add new text, remove unneeded content, and much, much more.

Image object: The image object allows you to preload heavy images to make your pages feel livelier. It can track when an image finishes loading.

Date object: This contains properties and methods related to the date and time. Using it, you can get the current day, or find the exact time in a completely different time zone.

Math object: This has many valuable methods for working with numbers. Using it, you can round numbers off, up, or down. You could use the Math object to do elaborate trigonomic functions, find the square root of a number, and much more.

There are many fascinating JavaScript objects. Please feel free to explore them as you work through the course.