Introduction

**What’s a Scripting Language?**

Language used to write programs that compute inputs to another language processor

One language embedded in another

* + - Embedded JavaScript computes HTML input to the browser
    - Shell scripts compute commands executed by the shell

**Common characteristics of scripting languages**

* + String processing – since commands often strings
  + Simple program structure, define things “on the fly”
  + Flexibility preferred over efficiency, safety

**Why JavaScript?**

* **Active” web pages**
* **Web 2.0**
  + **AJAX, huge number of Web-based applications**
* **Some interesting and unusual features**
  + **First-class functions - interesting**
  + **Objects without classes - slightly unusual**
  + **Powerful modification capabilities - very unusual**
    - **Add new method to object, redefine prototype, …**
* **Many security and correctness issues**
* **“The world’s most misunderstood prog. language”**

**JavaScript History**

* **Developed by Brendan Eich at Netscape** 
  + **Scripting language for Navigator 2**
* **Later standardized for browser compatibility**
  + **ECMAScript Edition 3 (aka JavaScript 1.5)**
* **Related to Java in name only**
  + **“JavaScript is to Java as carpet is to car”**
  + **Name was part of a marketing deal**
* **Various implementations available**
  + **SpiderMonkey C implementation (from Mozilla)**

**Rhino Java implementation (also from Mozilla**

**Common Uses of JavaScript**

* **Form validation**
* **Page embellishments and special effects**
* **Navigation systems**
* **Basic math calculations**
* **Dynamic content manipulation**
* **Sample applications**
  + **Dashboard widgets in Mac OS X, Google Maps, Philips universal remotes, Writely word processor, hundreds of others…**

**Object features**

* + **Dynamic lookup**
    - **Method depends on run-time value of object**
* **Encapsulation**
  + **Object contains private data, public operations**
* **Subtyping** 
  + **Object of one type can be used in place of another**
* **Inheritance**
  + **Use implementation of one kind of object to implement another kind of object**

**Concurrency**

* **JavaScript itself is single-threaded**
  + **How can we tell if a language provides concurrency?**
* **AJAX provides a form of concurrency**
  + **Create XMLHttpRequest object, set callback function**
  + **Call request method, which continues asynchronously**
  + **Reply from remote site executes callback function**
    - **Event waits in event queue…**
  + **Closures important for proper execution of callbacks**
* **Another form of concurrency**
  + **Use SetTimeout to do cooperative multi-tasking**