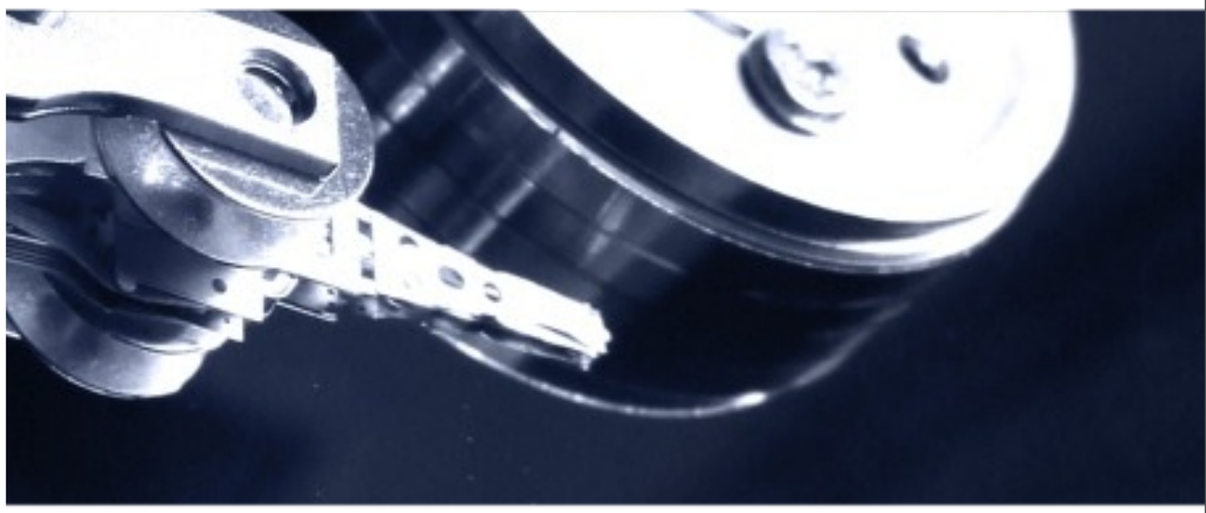
FULL SAIL
UNIVERSITY

web design and development



programming for web applications 1

courseMaterial.7

courseMaterial.**7**

goal6.**Recap**

2

goal6.Recap

- review last assignment - mid term

courseMaterial.**Objective**

- courseMaterial
  - *more.Objects*
    - *constructors*
    - *constructor context (“this”)*
    - *methods and functions in constructors*
    - *prototype*
  - *practice all the new materials*

- assignment
  - *fine tune the concepts from the course materials*

courseMaterial.7

more.Objects

5

more.Objects

- review of objects
  - object's link variables and functions together inside of a storage container
  - the variables and functions are called object member
  - objects are just variables and functions combined into a single data structure
    - variables = properties (this is owned by the object)
    - function = method (this is owned by the object)
  - functions placed within an object can access variables in the object w/o having to pass an argument

more.**Objects**

- custom objects = constructors
  - custom objects extend JavaScript to include features to suit your needs
  - classical inheritance (languages like C++) use classes to create objects - Javascript doesn't have classes, but we do have constructors
  - since object properties and methods have to be initialized when a object is created, a special method called a **constructor** is needed to get an object up and running
  - every custom object requires its own **constructor** which is named the same as the object name
  - the **constructor** is responsible for creating object instances

more.Objects

- constructors
  - **constructors** are a special category of *functions*
  - in syntax, they are no different than any other function
  - what changes is the invocation (how the function is called and run)

```
//the normal non constructor way
var Blog = function(){};
var result = Blog();          //result becomes the return value
```

more.Objects

- constructors
  - if a function is invoked using the keyword **new**, it is executed as a **constructor** - the constructor is called to initialize an object upon creation
  - this causes the function to return an object, with properties inherited from the function itself

```
var Blog = function(){};
var result = new Blog();                    //result is an object
```

more.Objects

- constructors
  - as a best practice, functions that are acting as ***constructors*** should be given a name starting with a capital letter, purely for making it easier to find in the code
  - just like any other function, we can pass arguments into it

```
var Blog = function(str, date) {                    //constructor
  //code goes here
};

var blog = [new Blog("this is a string", 04/13/13)];   //instantiation
```

more.Objects

- the constructor
  - the constructor's job is establishing the properties of an object, along with their initial values
  - to create a property within a constructor, you set the property using the JavaScript keyword, **this**
  - **this** assigns ownership of the property to the object, and sets it's initial value
  - we are assigning a property that belongs to **this** object, as oppose to just a local variable within the constructor

more.Objects

- keyword: **this**
  - the keyword **this** is essentially a reference to the object that owns the function it is being used in
  - because it is a reference, any changes or updates made to **this** are reflected in the owner object
  - using the **this** keyword, any properties or methods on the owner object are accessible as if **this** was the object itself

more.Objects

- constructor context
  - **this** becomes a reference to the object that the constructor creates
  - object properties are created and initialized in a constructor by using dot notation and the **this** keyword
  - note that if we pass arguments into the constructor, they become part of the constructor's *scope*, as opposed to properties...

```
var Blog = function(str, date){
  this.body = str;          //object property
  this.date = date;         //object property
};

var blog = [new Blog("this is a string", 04/13/13)];   //instantiation
```

more.Objects

- constructor context
  - note the difference between the argument and the property

```
var Blog = function(str, date){
  this.body = str + !!!;          //object property
  this.date = date;               //object property

  alert(str);

  alert(this.body);
};

var blog = [new Blog("this is a string", 04/13/13)];   //instantiation
```

```
this is a string
```

```
this is a string!!!
```

more.Objects

- constructor context
  - similarly, any variables declared inside the constructor function's scope are considered local to the function *(cannot be accessed outside of it)*

```
var Blog = function(str, date){
  var text = 'LOL';          //local variable ONLY
  this.body = str;           //object property
  this.date = date;          //object property
};

var blog = [new Blog("this is a string", 04/13/13)];   //instantiation
```

more.Objects

- methods in constructors
  - since **this** references the new object, we can create **methods** in that object as well
  - **methods** will have access to both local variables and the object's **this**

```
var Blog = function(str, date){
  var text = 'LOL';          //local variable ONLY
  this.body = str;           //object property
  this.date = date;          //object property
  this.toHTML = function(){
    alert( this.body );                  //alert would be "this is a string"
    alert( text );                       //alert would be "LOL"
   };
};

var blog = [new Blog("this is a string", 04/13/13)];  //instantiation
```

more.Objects

- functions in constructors
  - **functions** in a constructor are declared as normal, with the **var** keyword
  - like local variables, they are accessible only inside the constructor...
  - constructors are used to bring instances to life - therefore are NOT capable of creating a class properties - class properties most be created outside of the constructor

more.Objects

- removing object properties
  - the only way to remove an object property is to use the *delete* operator

```
delete obj.property;

//example
delete chapter.title;
```

- prototype-inheritance
  - we addressed earlier that objects inherit from other objects
  - at the core of javascript, *all objects* inherit from a foundation, the **prototype object**
  - the prototype object is an *automatic* part of every constructor, and is what all objects inherit from
  - think of prototype as the cookie cutter that creates all objects in javascript

more.Objects

- prototype-inheritance
  - we addressed earlier that objects inherit from other objects
  - at the core of javascript, *all objects* inherit from a foundation, the **prototype object**
  - the prototype object is an *automatic* part of every constructor, and is what all objects inherit from
  - think of prototype as the cookie cutter that creates all objects in javascript

- prototype-inheritance
  - every *constructor* in javascript is automatically given an internal *prototype object*
  - whenever an object is created, it is inheriting from the constructor's prototype - this is referred to as *prototype chain,* and is what defines **prototypal inheritance**
  - if our constructor was *Person* ...
    - **var** myObj = **new** *Person( );*
  - *`myObj`* is inheriting *Person***.prototype**

more.**Objects**

- prototype-inheritance
  - every *constructor* in javascript is automatically given an internal *prototype object*
  - whenever an object is created, it is inheriting from the constructor's prototype - this is referred to as *prototype chain,* and is what defines **prototypal inheritance**
  - if our constructor was *Person* ...
    - **var** myObj = **new** *Person( );*
  - *`myObj`* is inheriting *Person***.prototype**

- prototype-inheritance
  - so what does this mean?
  - any constructor's *prototype* property can be accessed and even modified
  - we can access the **.prototype** property of our constructors to add new properties and methods on the fly, or change existing ones

```
var Person = function(name) {
    this.name = name;
};
Person.prototype.newMethod = function( ) { } ;
Person.prototype.newProp = "Im new!";
Person.prototype.name = "James Bond";
```

more.Objects

- prototype-inheritance
  - so what does this mean?
  - any constructor's *prototype* property can be accessed and even modified
  - we can access the **.prototype** property of our constructors to add new properties and methods on the fly, or change existing ones

```
var Person = function(name) {
    this.name = name;
};
Person.prototype.newMethod = function( ) { } ;
Person.prototype.newProp = "Im new!";
Person.prototype.name = "James Bond";
```

prototype-inheritance

- it is extremely important to note that any *methods* created using .*prototype* will NOT have access to local variables inside the constructor
- we can still utilize the **this** variable to reference *public* members:

```
var Person = function(name){
  this.name = name;
  var species = "Human";
};

Person.prototype.sayHi = function(){
  alert(this.name);                    //works
  alert(species);                      //causes error
};
```

more.Objects

- prototype-inheritance
  - it is extremely important to note that any *methods* created using .*prototype* will NOT have access to local variables inside the constructor
  - we can still utilize the **this** variable to reference *public* members:

```
var Person = function(name){
  this.name = name;
  var species = “Human”;
};

Person.prototype.sayHi = function(){
  alert(this.name);                    //works
  alert(species);                      //causes error
};
```

prototype-inheritance

- the next important concept is that any object created from a constructor will automatically inherit any **prototype** changes, even after being created

```
var Person = function(name) {
  this.name = name;
}

var me = new Person("JamesBond");

Person.prototype.sayHi = function( ) {
  alert (this.name);
};

me.sayHi( );                          //alerts "JamesBond"
```

more.Objects

- prototype-inheritance
  - the next important concept is that any object created from a constructor will automatically inherit any **prototype** changes, even after being created

```
var Person = function(name) {
  this.name = name;
}

var me = new Person("JamesBond");

Person.prototype.sayHi = function( ) {
  alert (this.name);
};

me.sayHi( );                          //alerts "JamesBond"
```

- prototype-inheritance
  - one efficient use of *prototype* we will see is to create a method based on what browser the user has
  - by using the **prototype** object, we can do the browser check during the declaration
  - we can also use prototype to extend javascript's existing constructors...

more.Objects

- prototype-inheritance
  - one efficient use of *prototype* we will see is to create a method based on what browser the user has
  - by using the **prototype** object, we can do the browser check during the declaration
  - we can also use prototype to extend javascript's existing constructors...

more.Objects

- prototype (using the Blog example)
  - the methods in the Blog object were created inside of the constructor using the "this" keyword
  - this approach works but it ends up creating a new copy of the methods for EVERY Blog object that is created - so if there are 100 entries, there are 100 copies of all the methods of the object - since it is just duplicating code and NOT values it is inefficient
  - versus a property which normally has a unique value for each different object
  - so, a better design would be for methods to share a single copy of each method and each instance of the object has access to the method
  - we do this by understanding the following....

more.Objects

- prototype (object class vs object instance)
  - **Object class**:
    - is an object description - a template that outlines what an object is made of
    - describes the properties and methods of an object
    - like the blue print of a house
  - **Object instance**:
    - an actual object that has been created from a object class - house that was built from the blue print (above)

more.Objects

- prototype
  - **classes** in JavaScript are made possible by a hidden object called a "prototype" - it exists in every object as a property
  - the **prototype object** allows us to **set properties and methods** that are owned at the class level as oppose to within an instance - this provides the mechanism for creating a class
  - a "prototype" object is how we establish that a class owns a method OR a property

```
Blog.prototype.toHTML = function(){};
    // Blog = class name
    // prototype = prototype object - accessed as a property of the
        class
    //toHTML = name of the function
```

more.Objects

- prototype property
  - **properties in a class** are similar to a class owned instance method - owned by the class with a **single copy** available for all instances
  - the property in a class means the property only has one value that is shared by all instances - if we change the value, it changes the property for all instances
  - an example might be a bloggers signature that is readily accessible to any instance that wants to access the blog authors signature

```
Blog.prototype.signature = 'James Bond';
    // Blog = class name
    // prototype = prototype object - accessed as a property of the
        class
    //signature = property name
```

Assignment / Goal 7

- Goal7: Assignment:
  - Log into FSO. This is where all your assignment files will be located as well as Rubrics and assignment instructions
- Commit your completed work into GitHub
  - As part of your grade you will need at least 6 reasonable GIT commits for each assignment.
- In FSO there is an announcement with “Course Schedule & Details” in the title, in that announcement you will see a “Schedule” link which has the due dates for assignments.

29