JavaScript: The Good Parts

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Yahoo! Inc.

The World's Most Misunderstood Programming Language

The broadest range of programmer skills of any programming language.

From computer scientists

to cut-n-pasters

and everyone in between.

Complaints

- "JavaScript is not a language I know."
- "The browser programming experience is awful."
- "It's not fast enough."
- "The language is just a pile of mistakes."

Hidden under a huge steaming pile of good intentions and blunders is an elegant, expressive programming language.

JavaScript has good parts.

Influences

- Java
    - syntax
    - conventions
- Self
    - prototypal inheritance
    - dynamic objects
- Scheme
    - lambda
    - loose typing

Bad Parts

- Global Variables
- + adds and concatenates
- Semicolon insertion
- typeof
- with and eval
- phony arrays
- for..in
- == and !=
- false, null, undefined, NaN

```
value = myObject[name];
if (value == null) {
    alert(name + ' not found.');
}
```

```
value = myObject[name];
if (value === undefined) {
    alert(name + ' not found.');
}
```

Bad Heritage

- Blockless statements

```
if (foo)
    bar();
```

- Expression statements

```
this.foo;
```

- Floating point arithmetic

```
0.1 + 0.2 !== 0.3
```

- switch
- ++ and --

Good Parts

- Lambdas
- Dynamic Objects
- Loose Typing

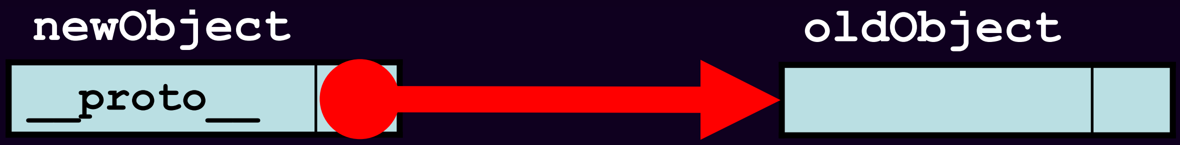
Inheritance

- Inheritance is object-oriented code reuse.
- Two Schools:
  - Classical
  - Prototypal

Prototypal Inheritance

- Class-free.
- Objects inherit from objects.
- An object contains a secret link to another object.

```
var newObject =
        oldObject.begetObject();
```



Prototypal Inheritance

```
Object.prototype.begetObject =
        function () {
    function F() {}
    F.prototype = this;
    return new F();
}
```

begetObject method

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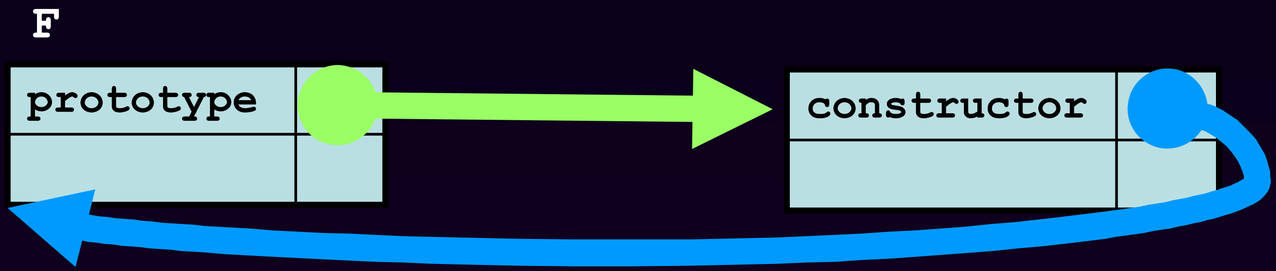

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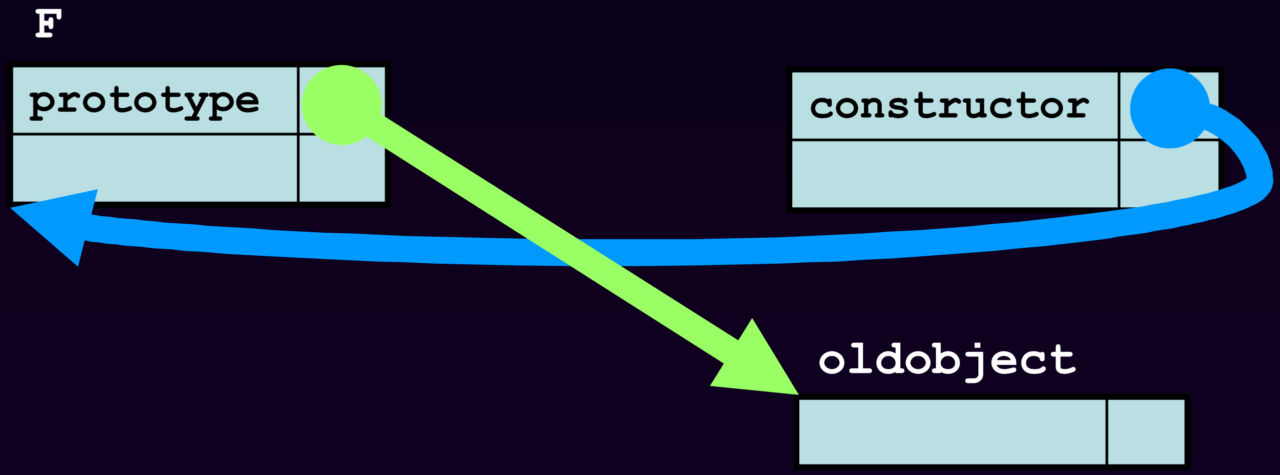

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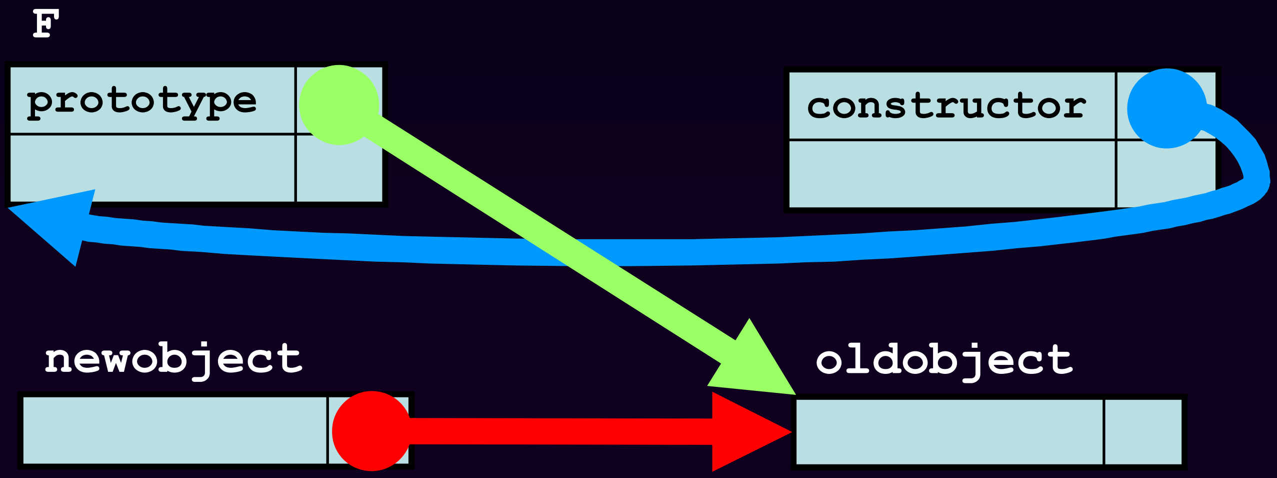

`begetObject` method

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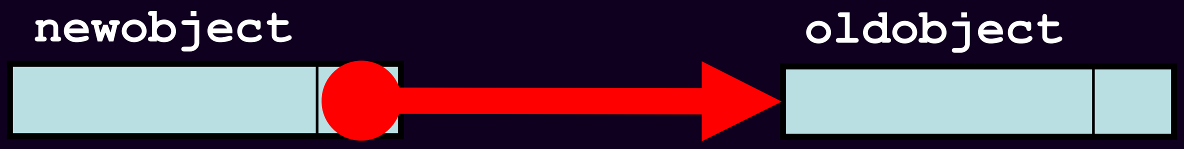

new

- The `new` operator is required when calling a Constructor.
- If `new` is omitted, there is no compile-time or run-time warning.
- The global object is clobbered by the constructor.

A Module Pattern

```
var singleton = function () {
    var privateVariable;
    function privateFunction(x) {
        ...privateVariable...
    }
    return {
        firstMethod: function (a, b) {
            ...privateVariable...
        },
        secondMethod: function (c) {
            ...privateFunction()...
        }
    };
}();
```

Closure

- A function object contains
  - A function (name, parameters, body)
  - A reference to the environment in which it was created (context).
- This is a very good thing.

`later` method

- The `later` method causes a method on the object to be invoked in the future.

```
my_object.later(1000, "erase", true);
```

later method

```
Object.prototype.later =
        function (msec, method) {
    var that = this;
    var args = Array.prototype.slice.
            apply(arguments, [2]);
    if (typeof method === 'string') {
        method = that[method];
    }
    setTimeout(function () {
        method.apply(that, args);
    }, msec);
    return that;
};
```

Event Reg

```
myObject.
    on('ready', beginProc).
    on('busy', reschedule, [a, b]).
    on('delete', 'erase');

myObject.fire({type: ready});
```

Event Reg

```
function eventreg(o) {
    var handle = {};
    o.on = function (type, method, parameters) {
        var e = {
            method: method,
            parameters: parameters
        };
        if (handler[type]) {
            handler[type].push(e);
        } else {
            handler[type] = [e];
        }
        return o;
    };
    o.fire = function (event) {...};
    o.off = function (type, method) {...};
    return o;
}
```

```
o.fire = function (event) {...};
    var e,    // handler record
        f,    // handler function
        i,    // loop index
        h = handler[m.type];  // array of handler records
    if (handler) {
        for (i = 0; i < h.length; i += 1) {
             e = h[i];
             f = e.method;
             if (isString(f)) {
                 f = o[f];
             }
             f.apply(this, e.parameters || [event]);
        }
    }
    return o;
}
```

Inheritance Patterns

- Prototypal Inheritance works really well with public methods.
- Parasitic Inheritance works really well with privileged and private and public methods.
- Pseudoclassical Inheritance for elderly programmers who are old and set in their ways.

Working with the Grain

- Pseudoclassical patterns are less effective than prototypal patterns or parasitic patterns.
- Formal classes are not needed for reuse or extension.
- Be shallow. Deep hierarchies are not effective.

A Personal Journey

Beautiful Code

JSLint

- JSLint defines a professional subset of JavaScript.
- It imposes a programming discipline that makes me much more confident in a dynamic, loosely-typed environment.
- //http://www.JSLint.com/

WARNING!

JSLint will hurt your feelings.

Unlearning Is Really Hard

Perfectly Fine == Faulty

Style Isn't Subjective

```
block {
        ....
}
```

- Works well in JavaScript

```
block
{
        ....
}
```

- Might work well in other languages

Fixing JavaScript

- Deprecate the weak features.
- Fix the blunders carefully.
- Add new features that do not break syntax.
- Keep it simple. Keep it safe.
- Make it simpler. Make it safer.

Fixing JavaScript

- toJSONString and parseJSON
- a safe eval method
- object.dontEnum(name)

- No experiments.
- No radical changes.

The Very Best Part:

Stability

No new design errors

since 1999!

More Languages!

- The world is full of programming languages. Why restrict ourselves to just JavaScript?
- We need a classical Ajax language for programmers without the mental capacity to master JavaScript.

More Languages!

- We need a secure programming language.
- I believe it is possible to make a capability secure, JavaScript-like language.
- JavaScript will never be that language.

JavaScript

- It is a really good language if you avoid its weaknesses.
- Don't destabilize the language.
- Let's make new languages.
- This time without so many bad parts.