Bachelor Project
Scripting Objects for the Web

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Software Architecture Group

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SqueakyJS

- Comparison between Squeak and JavaScript
- SqueakyJS class model
- Method name exceptions
- Inheritance and access to super methods
- Metaprogramming
- Block closures and non-local return
- Access to super methods

Comparison between Squeak and JS

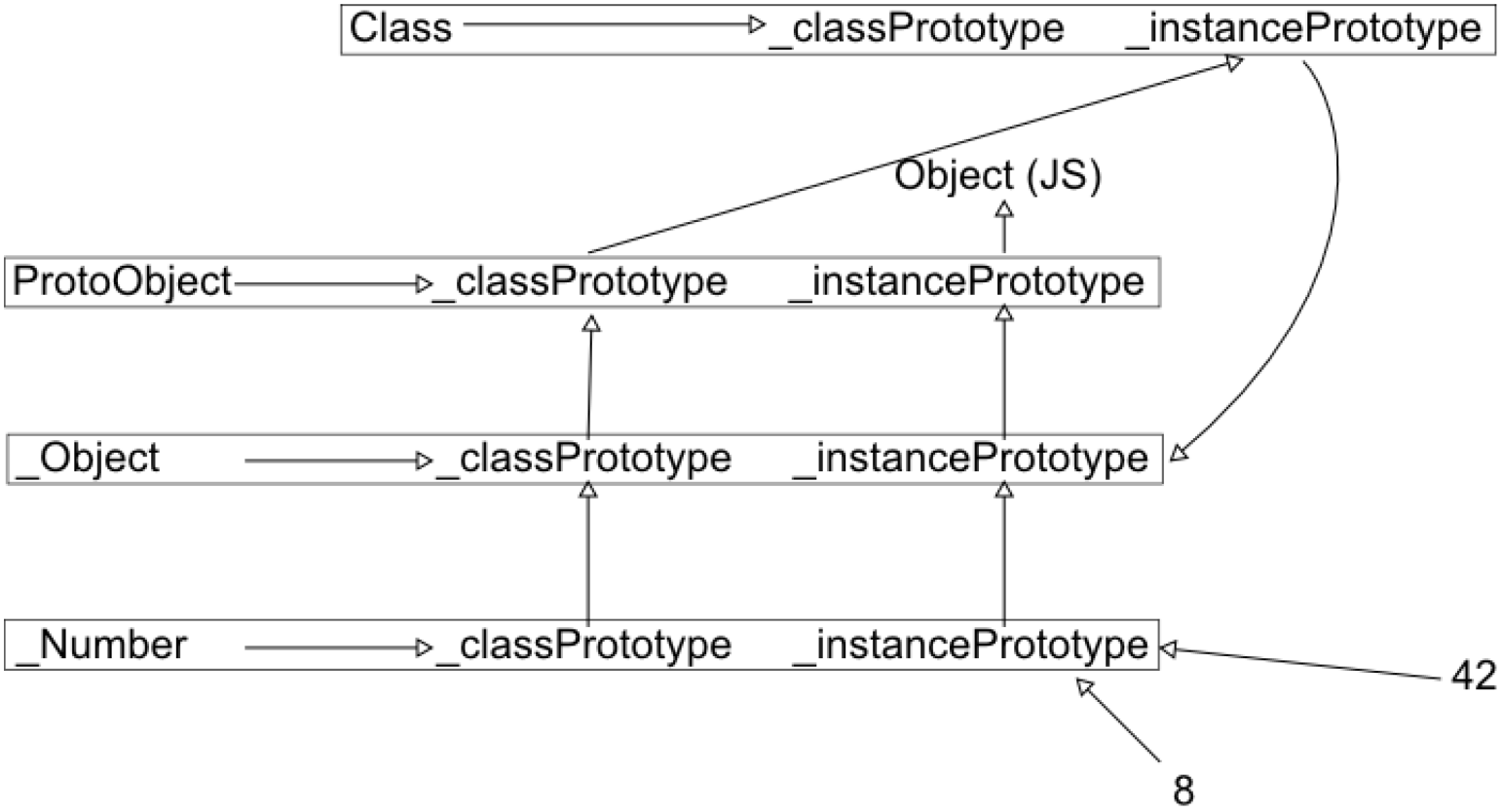
Squeak	JavaScript
Class driven, class methods	Class free
Single inheritance from superclass	Prototype inheritance
Access superclass by using super	Apply can call functions in another context
Block closures with non-local return	No non-local return

SqueakyJS class model

```
// class example
Class('Person', {
   instanceVariables: ['name'],
   instanceMethods: {
        setName: function(aName) {
                this.name = aName;
        },
        getName: function() {
                return this.name;
        },
        makeNoise: function() {
                return this.getName() + " says: ";
        }
   },
});

// create an instance
aPerson = Person._newInstance();
```

SqueakyJS class model



Method name exceptions (1)

Exact mapping from Squeak to JS methods not possible

-> we need to escape methods

Goal: avoid name conflicts!!

Method name exceptions (2)

Issue:

special characters can not be used as method names in JavaScript (e.g. +,*)

Solution:

provide dictionary for compiler, convert to _plus, _times – leading underscore assures, that there is no conflict with a possible plus or times Squeak method

Method name exceptions (3)

Issue:

accessor and variables have different namespaces in Squeak, but only one namespace in JavaScript

Solution:

all instance variables have a leading $ which is not a valid character in Squeak -> conflicts avoided

Method name exceptions (4)

Issue:

getters and setters only differ in trailing colon

e.g. foobar, foobar: -> colon not valid in JavaScript

Solution:

setters have trailing underscores (foobar_)

Method name exceptions (5)

Issue:

multiple method parameters in Squeak

Squeak:

```
OrderedCollection>>at: anInteger put: anObject
```

Solution:

concatenation of selector parts

JavaScript:

```
at_put_(anInteger, anObject)
```

Method name exceptions (6)

Issue:

reserved keywords in JavaScript, (*new*, *class*)

Solution:

escape method names with leading underscore (_new, _class)

Inheritance and access to super methods

```
Class('Pirate', {
    // inherits from Person
    superclass: Person,
    instanceMethods: {
        makeNoise: function() {
            return this._super.makeNoise() +
                this._class().noise();
        }
    },
    classMethods: {
        noise: function() {
            return 'Arrrrrr!!!';
        }
    }
});

aPirate = Pirate._newInstance();
```

Metaprogramming

```
Pirate._addClassMethods({
   printFoobar: function() {
        alert("foobar");
   }
});

// prints foobar
aPirate._class().printFoobar();
```

Block closures and non-local return

```
Pirate>>evaluateBlock: aBlock
    aBlock value.

Pirate>>noise
    self evaluateBlock: [ :a | [ :b | ^ a + b] ]
    ^ 'Arrrrrr!!!'

// JAVASCRIPT
aPirate._addClassMethods({
    evaluateBlock: function(aBlock) {
          aBlock.value(3).value(4);
    },
    // overwrite noise method
    noise: function() {
          aBlock = block(function(a) {
                return block(function(b) {
                      nonLocalReturn(a+b);
                });
          });

          this.evaluateBlock(aBlock);
          return 'Arrrrrr!!!';
});
```

Access to super methods (1)

Optimal: super as global object

```
super.foobar(a, b);
```

Issue:

this not bound to object!

Next idea: super as global function

```
super().foobar(a, b);
```

Issue:

could get callers context (this), but can‘t provide method slot for this context

Access to super methods (2)

Current solution: super as instance‘s slot

```
this._super.foobar(a, b);
```

Benefit: comfortable use for programmer

Issue:

methods have to be copied into the _super slots on class creation -> no prototypical inheritance

Alternative: super as function with method parameter

```
this._super(‘ f oobar ' ) (a, b);
```

Benefit: use of prototypical inheritance

Issue: uncomfortable for the JavaScript programmer

Access to super methods (3)

What would you prefer?

Comfortability

vs.

Implementation