The JavaScript Language (Part 2)

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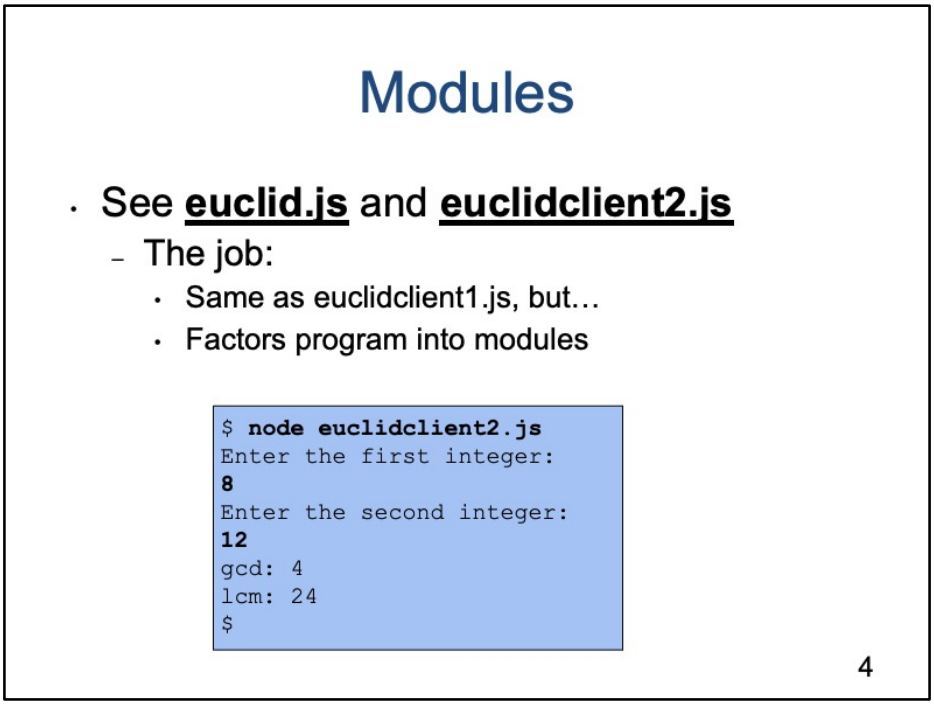
Objectives

- We will cover:
  - A subset of JavaScript…
  - That is appropriate for COS 333…
  - Through example programs

Agenda

- **Modules**
- Objects



Modules

[see slide]

Code notes

Multi-file programs via Node.js modules

Module must explicitly export names to be used by its clients

Generalizing…

Modules

- Kinds of JavaScript modules
  - **Node.js** modules
    - Used by Node.js
    - Not used by browsers
  - **ES6** modules
    - Used in (recent) browsers
    - Not used by Node.js
    - (We'll see when studying React)

Agenda

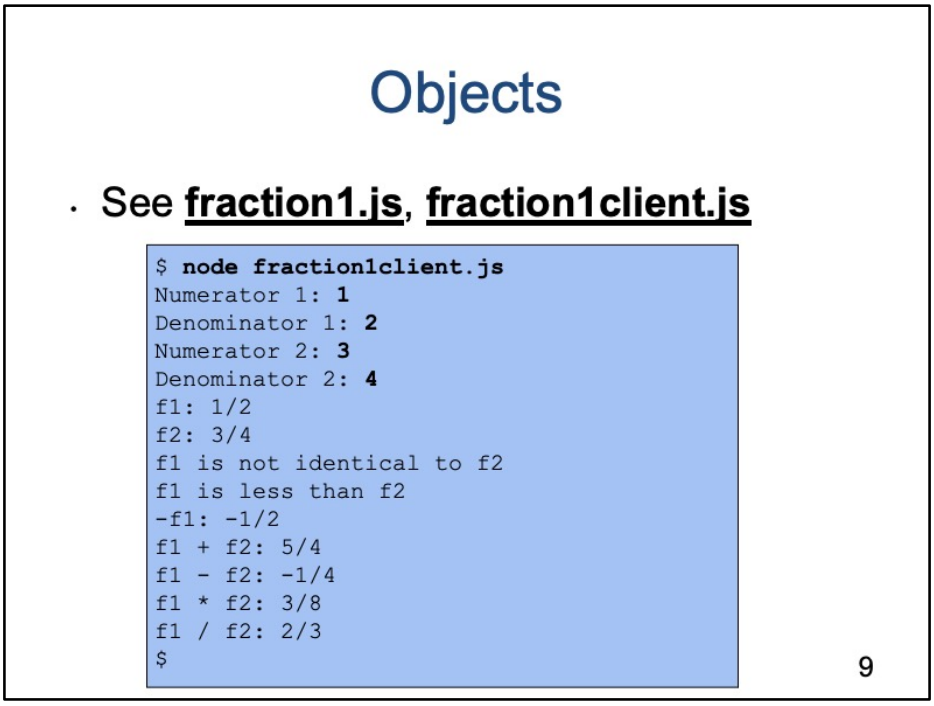
- Modules
- **Objects**

Fraction Examples

- Fraction examples
  - Multiple versions
  - All have (nearly) identical behavior
  - Each uses additional JavaScript features
  - Generally, each is better than the previous

Objects

- See **fraction1.js**, **fraction1client.js**
  - The job:
    - Manipulate fraction objects



Objects

[see slide]

Code notes

Creating an object:

```
let obj1 = {};
let obj2 =
  {prop1: value1, prop2: value2, …};
```

Accessing property values

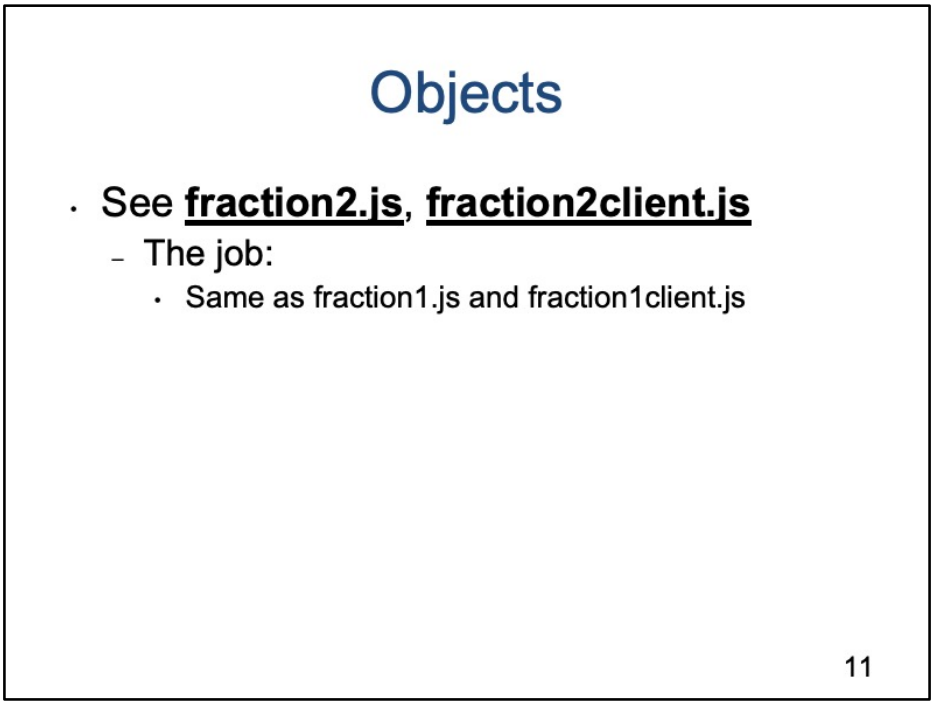
```
let value1 = obj2.prop1;
```

Adding properties dynamically

```
obj2.prop3 = value3;
```

Objects

- **Problem**
  - Instead of calling functions:
    - `f3 = fraction.add(f1, f2);`
  - We want to send messages:
    - `f3 = f1.add(f2);`
- **Solution**
  - The value of an object property can be a function definition…



Objects

Code notes

Value of an object property can be a function definition

obj.prop = function(…) {…};

To call a function that is the value of an object property

obj.prop(…);

Within the function, this is bound to obj

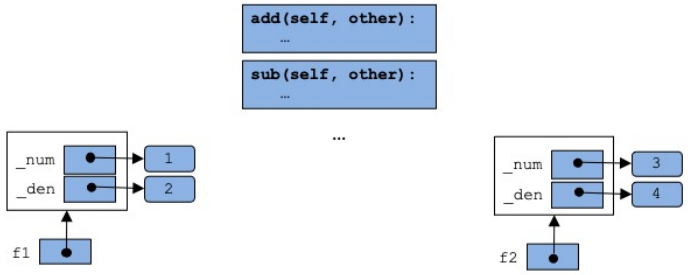
Objects

- **Problem**:
  - Space inefficiency…

Objects

Python

```
f1 = Fraction(1, 2)
f2 = Fraction(3, 4)
```

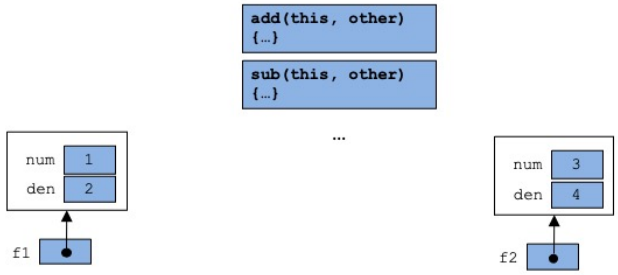


Explicit `self` parameter allows `Fraction` objects to share same function defs

Objects

Java

```
Fraction f1 = new Fraction(1, 2);
Fraction f2 = new Fraction(3, 4);
```

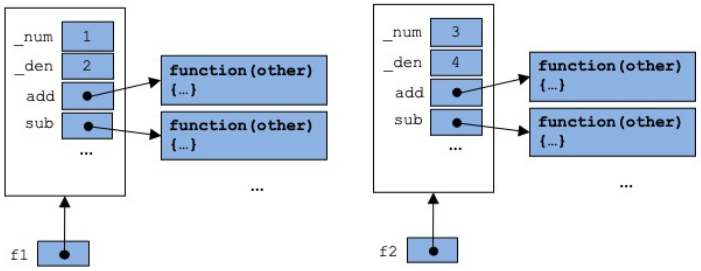


Implicit `this` parameter allows `Fraction` objects to share same method defs

Objects

JavaScript (so far)

```
let f1 = createFraction(1, 2);
let f2 = createFraction(3, 4);
```



Each fraction object has its own set of function defs
Many fraction objects => massive space inefficiency

Summary

- We have covered:
  - Modules
  - Objects