

Web Programming

Week 2

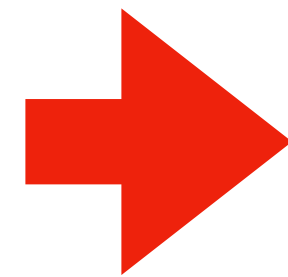
Prof. D. König

Be Empowered

"Aufklärung ist der Auszug des Menschen aus seiner selbstverschuldeten Unmündigkeit. Unmündigkeit ist der Mangel, sich seines eigenen Verstandes ohne die Hilfe eines anderen zu bedienen. Selbstverschuldet ist diese Unmündigkeit, wenn sie nicht auf einem Mangel an Verstand sondern auf einem Mangel an Mut und Entschlusskraft beruht."

Immanuel Kant

Storyboard (initial)



Drehbuch, Intro, Functions
 Scientific foundations
 Algebraic Data Types, Snake
 Applied Science
 Scripting, PWA, Plotter, Excel
 Objects
 Classes
 JS Types, JsDoc
 Async Programming
 Modules
 Data Flow, Excel improved
 Iterator Protocol, Sequences
 Moves, User Interfaces
 Crazy JS

Retrospective

JS Goodie

What we did

Catching up with the snake game

Questions

Agenda

Improving the game

Core topic: JavaScript Scopes

Lambda Calculus: Brain training

Quiz

Practice

Completing Snake

Improving the tests

Simulate motion & gravity (ball)



JavaScript Scopes

global window (in Browser)

function no matter where
defined, variables are
local to the enclosing
function (lambda)

JavaScript Variables

in scope after first use

~~x = ... mutable, global scope~~

~~var x = ... mutable, "hoisted" scope~~

let x = ... mutable, local scope

const x = ... immutable*, local scope

IIFE

immediately invoked function expression

```
function foo() {···}; foo()
```

```
(function foo() {···}) ()
```

```
(function() {···}) ()
```

```
( () => {···}) ()
```

Lambda Calculus

α alpha: Rename parameter

β beta: Apply argument


η eta: Cancel parameter

Alpha Translation

$\text{const id} = x \Rightarrow x$

$\text{const id} = y \Rightarrow y$

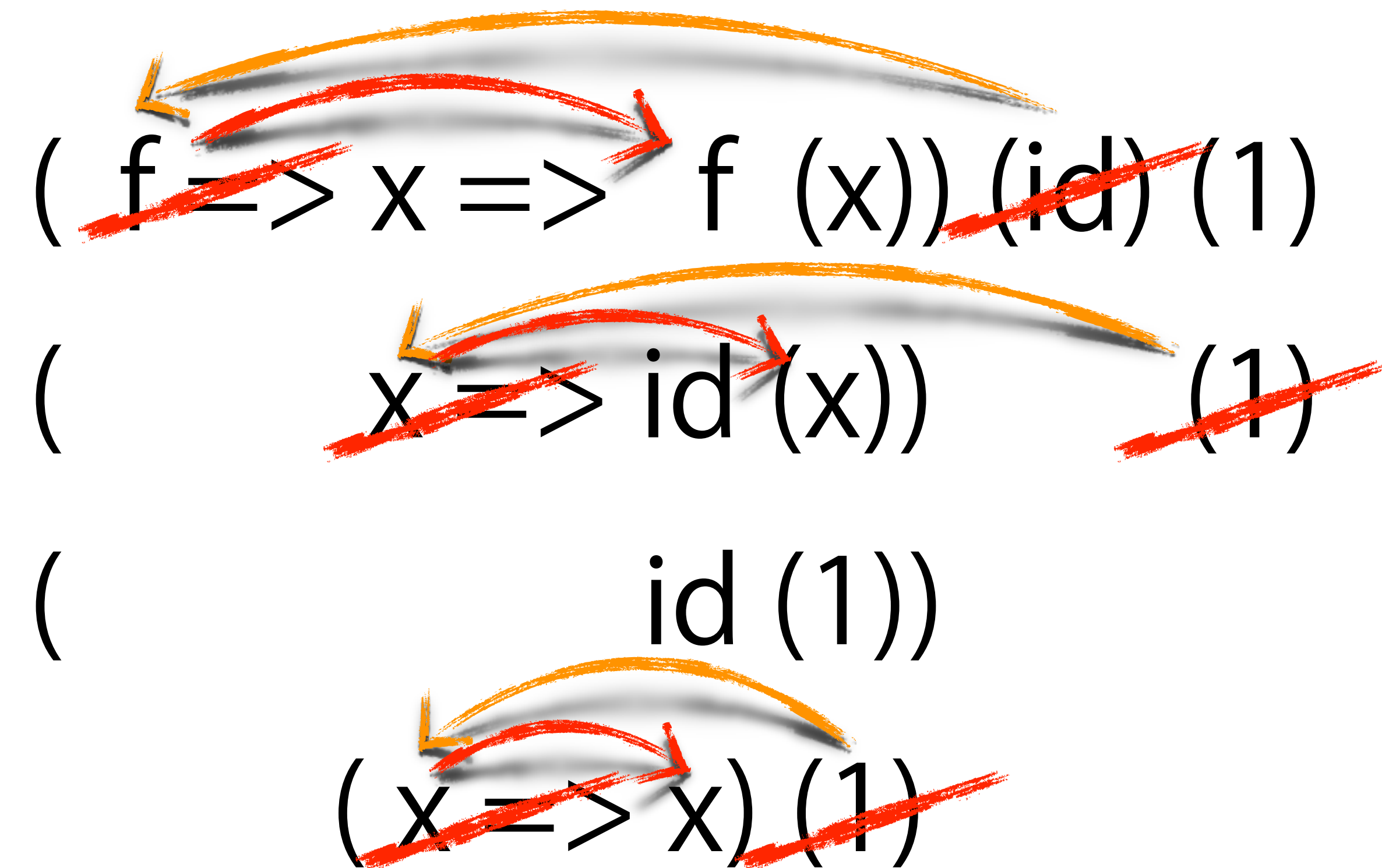
Beta Reduktion I


 $(x \Rightarrow x) (1)$

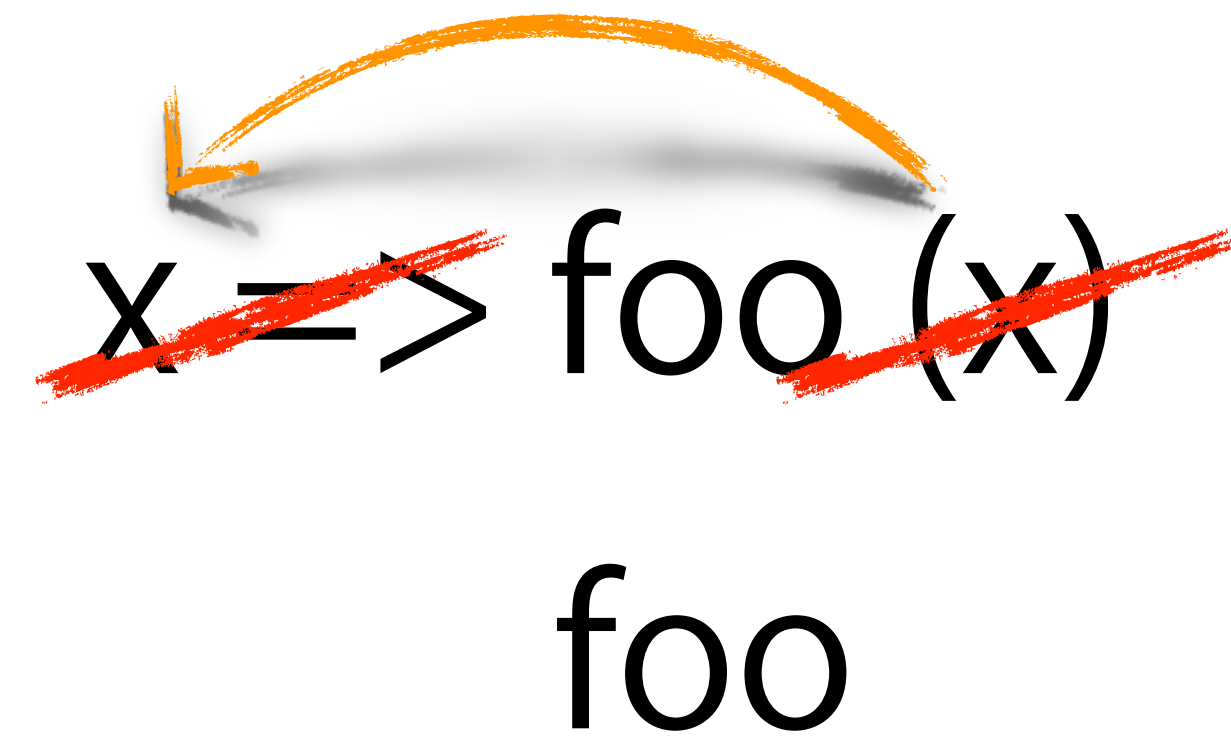
~~$(x \Rightarrow 1) (1)$~~

1

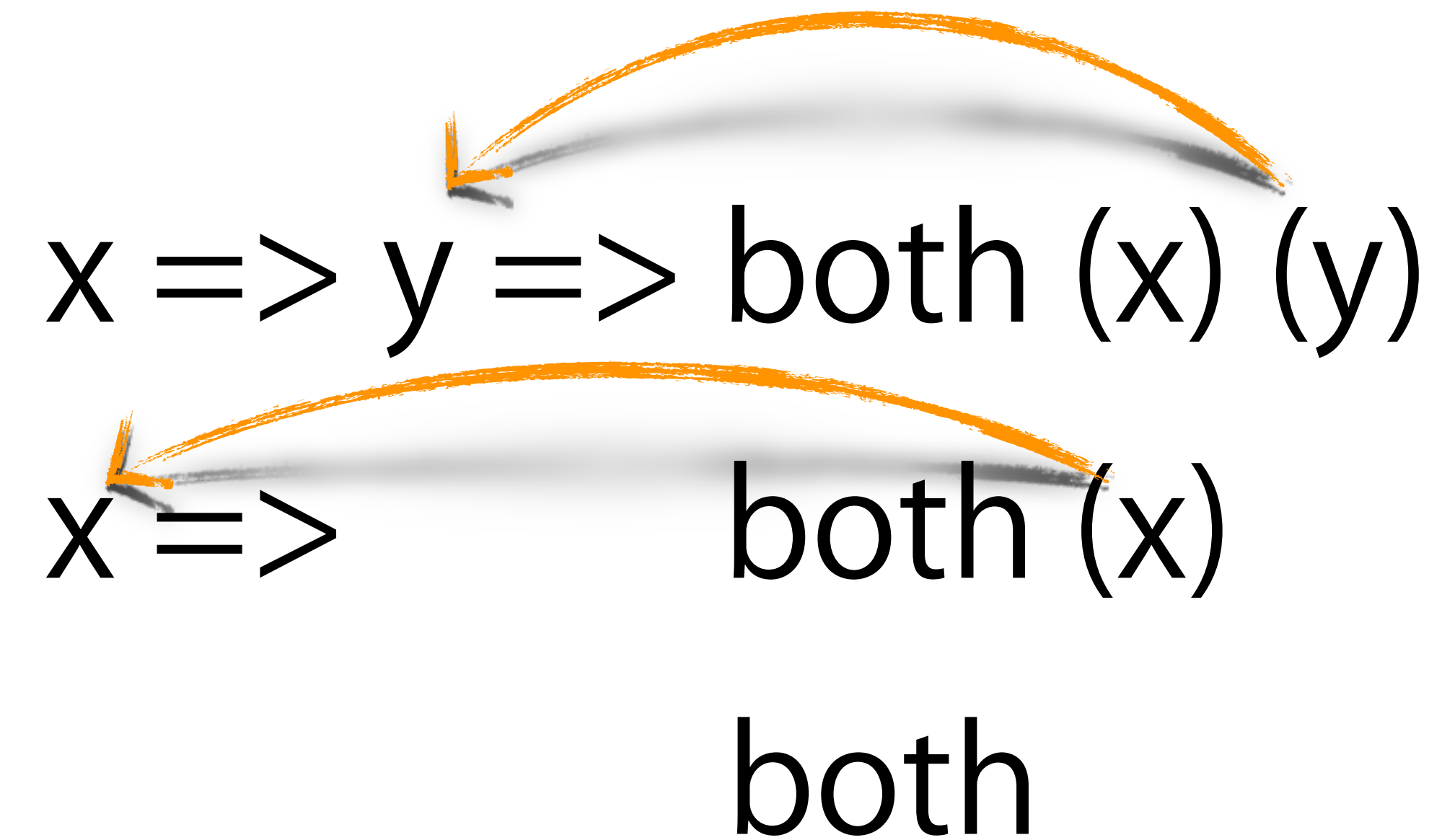
Beta Reduktion II



Eta Reduktion I



Eta Reduktion II



rightmost argument with rightmost parameter

Homework

watch Gabriel Lebec (~1:40) **again!**
Fundamentals of Lambda Calculus &
Functional Programming in JavaScript,
Parts I and II.

[https://www.youtube.com/watch?
v=3VQ382QG-y4](https://www.youtube.com/watch?v=3VQ382QG-y4)