



# Rock around the Code Block

From Calculator to Closures

# Overview

- Part 1: Evaluate mathematical expressions
- Part 2: Introduce Functions
- Part 3: Closures

There is pleasure in recognising  
old things from a new viewpoint.

RF



# Jan Łukasiewicz

- 1924
- „Polish“ notation  
(prefix notation)
- $+ 1 / 6 3 = 3$



c.)  $16 - 2 \cdot 7$

Postfix:  $16\ 2\ 7\ :\ -$

Prefix:  $(- 16 (\cdot 2 7))$

b)  $(\cdot ( ( + 8 7 ) ( : 100 10 ) ) ( + ( \sqrt{9} ) ( \sqrt{16} ) ) )$

$(\cdot ( ( : 80 ( : 100 10 ) ) ( + ( \sqrt{9} ) ( \sqrt{16} ) ) )$

$(\cdot ( ( : 80 10 ) ( + ( \sqrt{9} ) ( \sqrt{16} ) ) )$

$(\cdot ( ( : 80 10 ) ( + 3 ( \sqrt{16} ) ) )$

$(\cdot ( ( : 80 10 ) ( + 3 4 ) )$

$(\cdot 8 ( + 3 4 ) )$

$(\cdot 8 7 )$

(begin

(define area\_ikosaeder

(lambda (a)

( $\cdot ( \cdot 5 ( \cdot a a ) ) ( \text{sqrt } 3 )$ )

)

⑤

(begin

(define A

(lambda(a)( $\cdot ( \cdot ( \cdot a a ) ( \text{sqrt } 3 ) ) 5$ ))

)

)

(A 3)

)

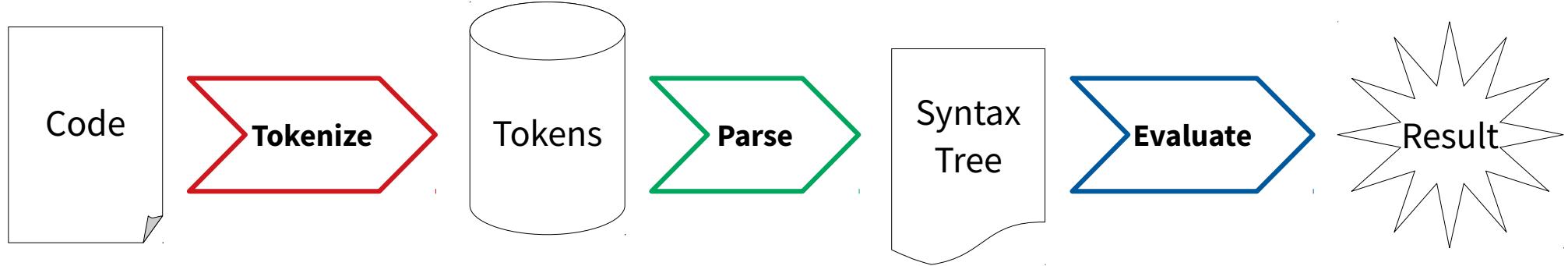


# Grace Hopper

- 1952
- Amazing Grace
- First „compiler“



# Compiler (Interpreter) Phases





# John McCarthy

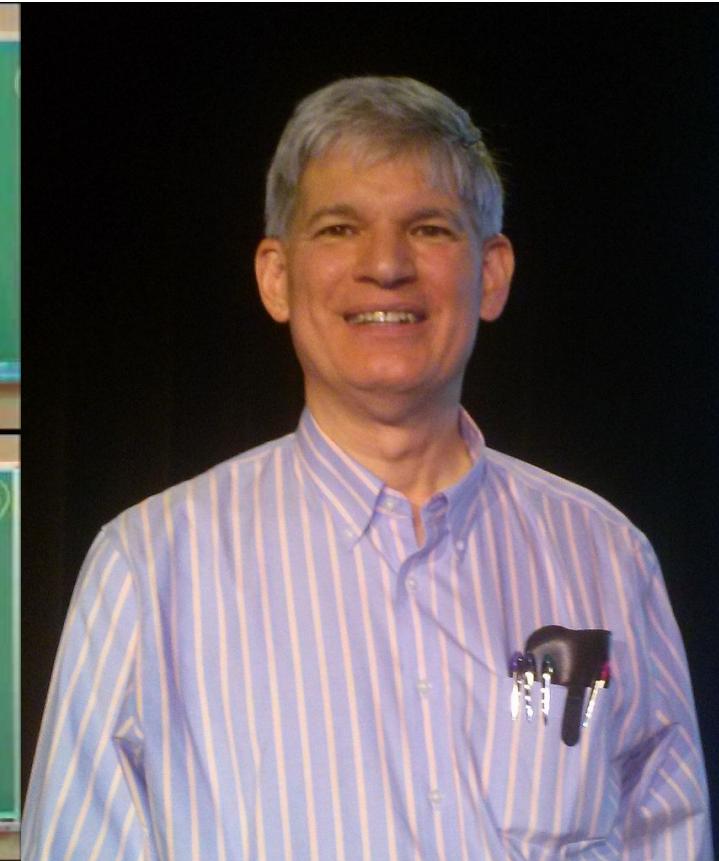
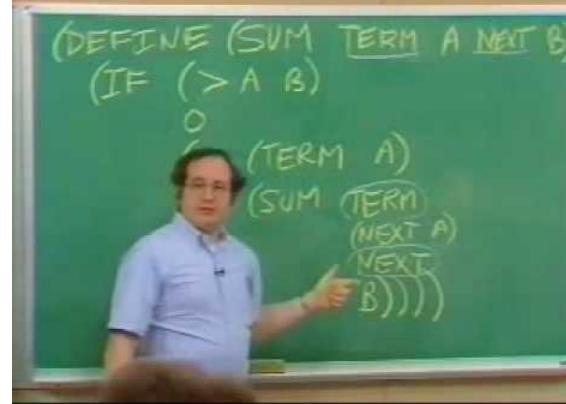
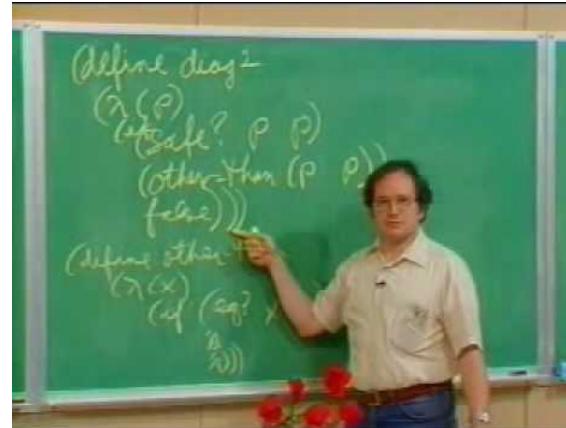
- ~1955
- *Discovered*  
LISP





# Gerald Jay Sussman & Guy L. Steele

- ~1975
- $\lambda$ -Papers
- Scheme
- Closures





# Brendan Eich

- 1995
- Hired to write Scheme for the Browser
- Scheme functions +  
Self prototypes +  
C syntax =  
JavaScript



```
(function() {  
    var constructor = function(settings) {  
        var self = {}  
        self.update(settings);  
        var priv_var;  
        self.pub_func = function() {  
            return priv_var;  
        };  
        return self;  
    }  
}());
```



# Peter Norvig

- 2010
- lis.py: Lisp interpreter in 120 lines of Python

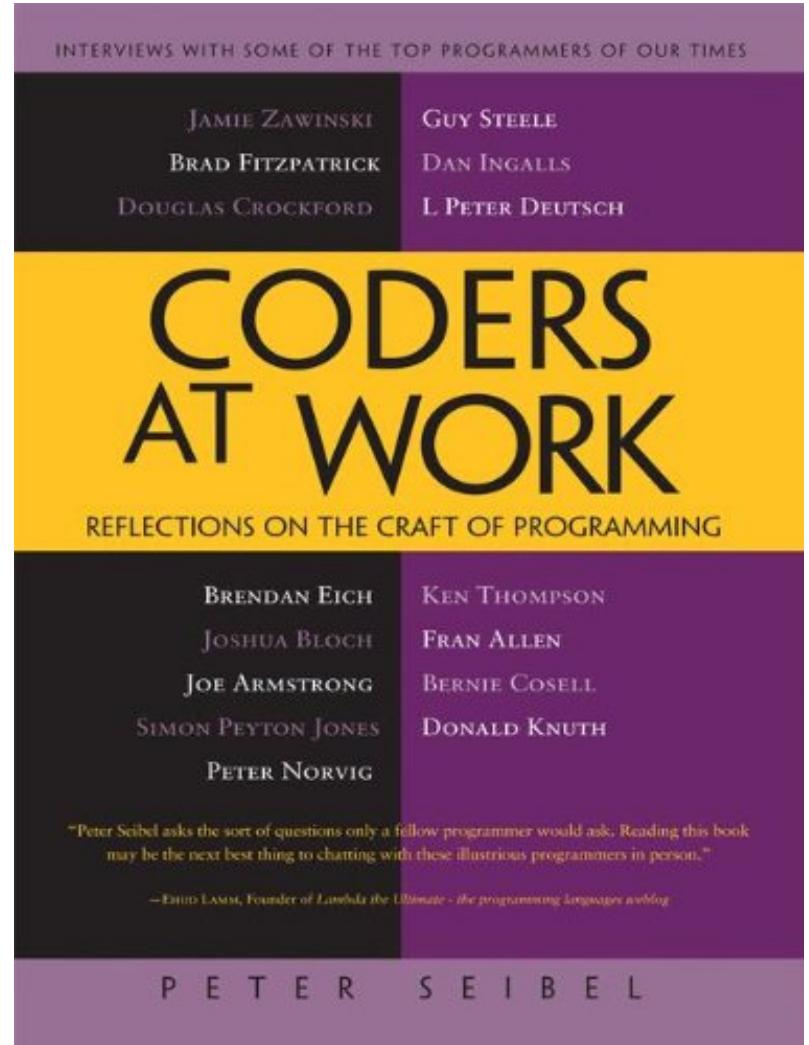


# Links

- Peter Norvig's Lispy: <http://norvig.com/lispy.html>
- Steve Yegges explanation on why compilers matter:  
<https://steve-yegge.blogspot.ch/2007/06/rich-programmer-food.html>
- Source code to this tutorial:  
<https://github.com/smlz/mini-scheme-tutorial>

# Book: Coders at Work

- Donald Knuth
- Ken Thompson
- Guy Steele
- Peter Norvig
- Brendan Eich
- Douglas Crockford
- Jamie Zawinski
- ...



A photograph of a bartender with dark hair, wearing a black jacket over a grey shirt, smiling and holding a martini glass filled with a brown liquid. He is standing behind a bar counter with various bottles of alcohol in the background. To his right is a vintage television set displaying a game of Pong. The word "Thanks!" is overlaid in large white letters.

Thanks!