



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

5) $(\cdot ((: (+ 8 \ 72) (: 100 \ 10)) (+ (\sqrt{9}) (\sqrt{16}))))$

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

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

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

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

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

$(\cdot 8 \ 7)$

56

(begin

(define area_ikosaeder

(lambda (a)

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

)

⑤

(begin

(define A

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

)

)

(A 3)

)

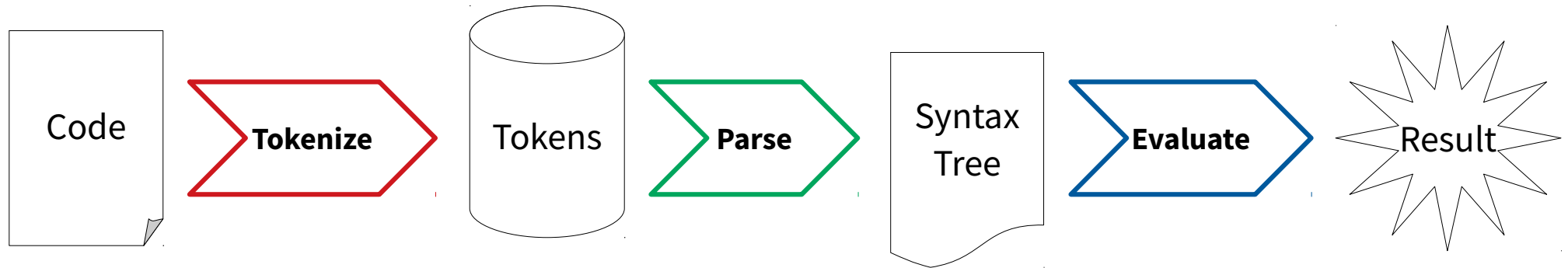


Grace Hopper

- 1952
- Amazing Grace
- First „compiler“



Compiler (Interpreter) Phases





John McCarthy

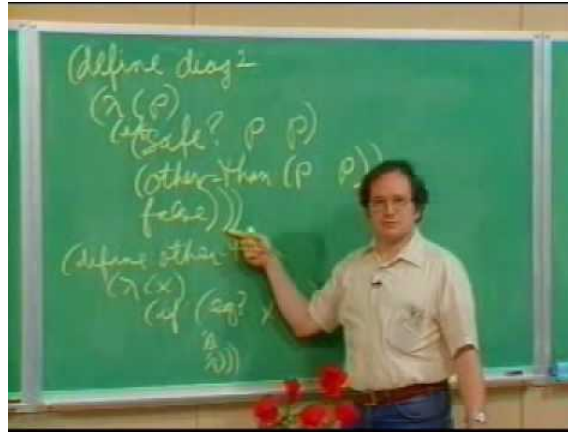
- ~1955
- *Discovered*
LISP





Gerald Jay Sussman & Guy L. Steele

- ~1975
- λ -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

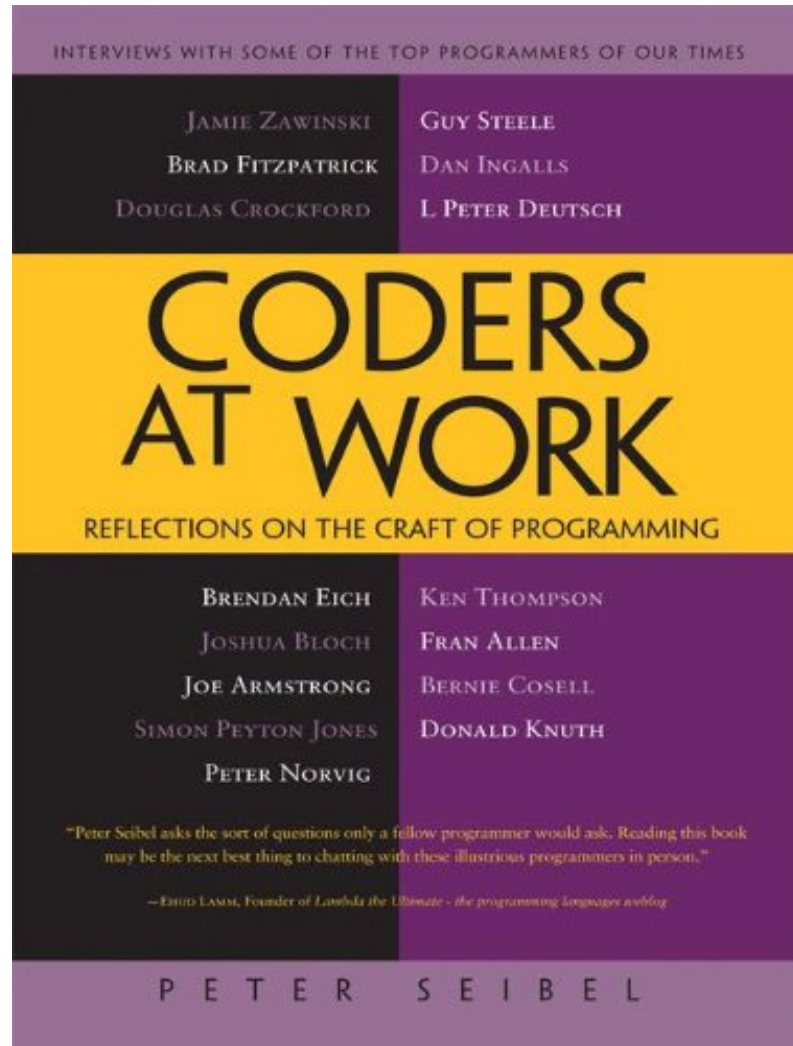


Links

- 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
- ...



Thanks!

