

# From SICP to Lisp

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# About Me

- 大三接触 SICP，进入 Lisp 世界
- Clojure 2年摸索经验
- 喜欢写作 <http://liujiacai.net/>
- 微信公众号：



≡ sicp

SICP 读书笔记，习题解答

● Scheme ★ 365 🍴 59

<https://github.com/jiacai2050/sicp>



# Agenda

- Why SICP
  - 抽象（数据，函数）
  - 编程语言三要素
    - 图形语言
- Why Lisp
- Tips for Reading SICP



# Why SICP

当我们在编程时，我们在干嘛？



# Why SICP

- 抽象
  - 现实世界事物映射到计算机的概念
- 软件越复杂，抽象层次越多
  - 构建复杂软件的方法论



# Why SICP

- 数据抽象
  - 数据导向（函数式编程）
  - 消息传递（面向对象编程）
- 过程抽象
  - 求值模型（正则序与应用序）
  - 环境模型（静态语言与动态语言）

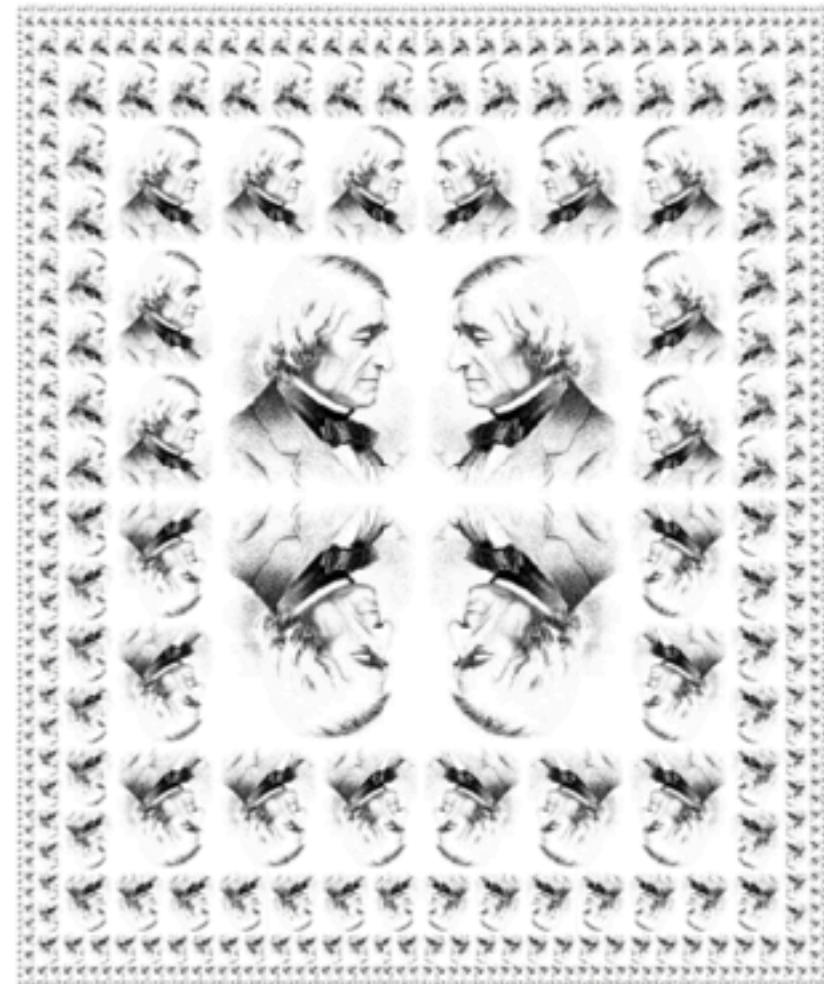
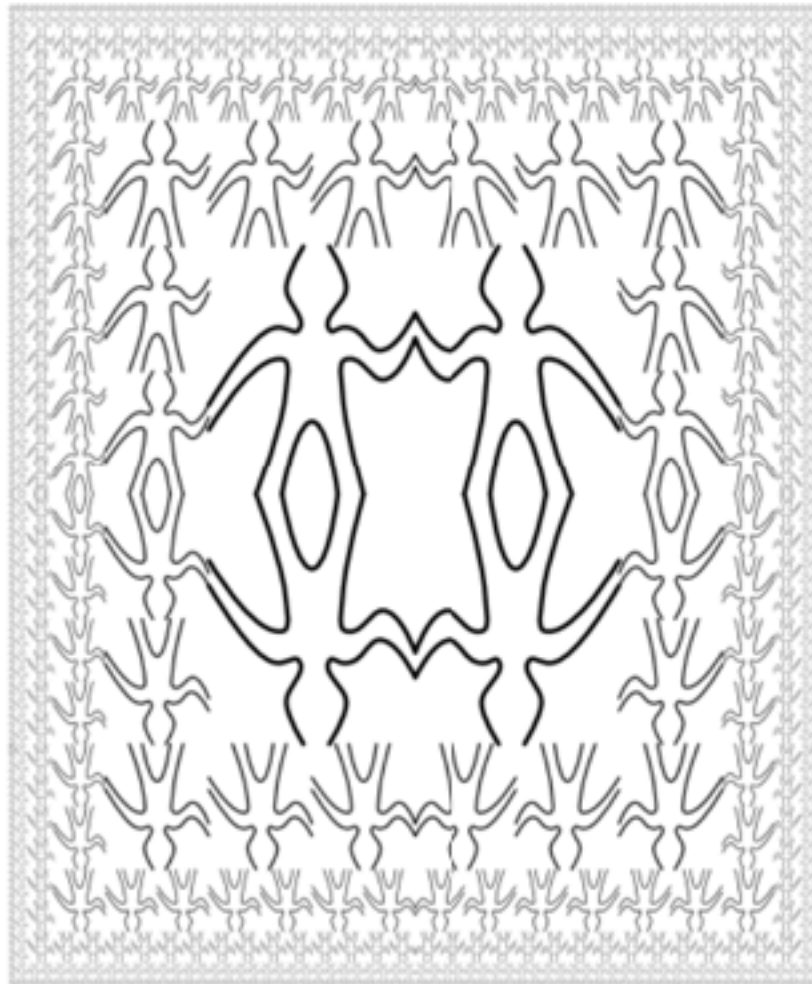


# 编程语言三要素

- 基本表达式 (language's primitives)
- 组合机制 (means of combination)
- 抽象机制 (means of abstraction)



# 图形语言



**Figure 2.9:** Designs generated with the picture language.



# 图形语言

- 基本表达式: painter (wave、rogers、einstein)
- 组合机制: beside/below/flip-vert/flip-horiz  
(Scheme's procedure)
- 抽象机制: 继承 Scheme's procedure 的抽象机制



# 图形语言

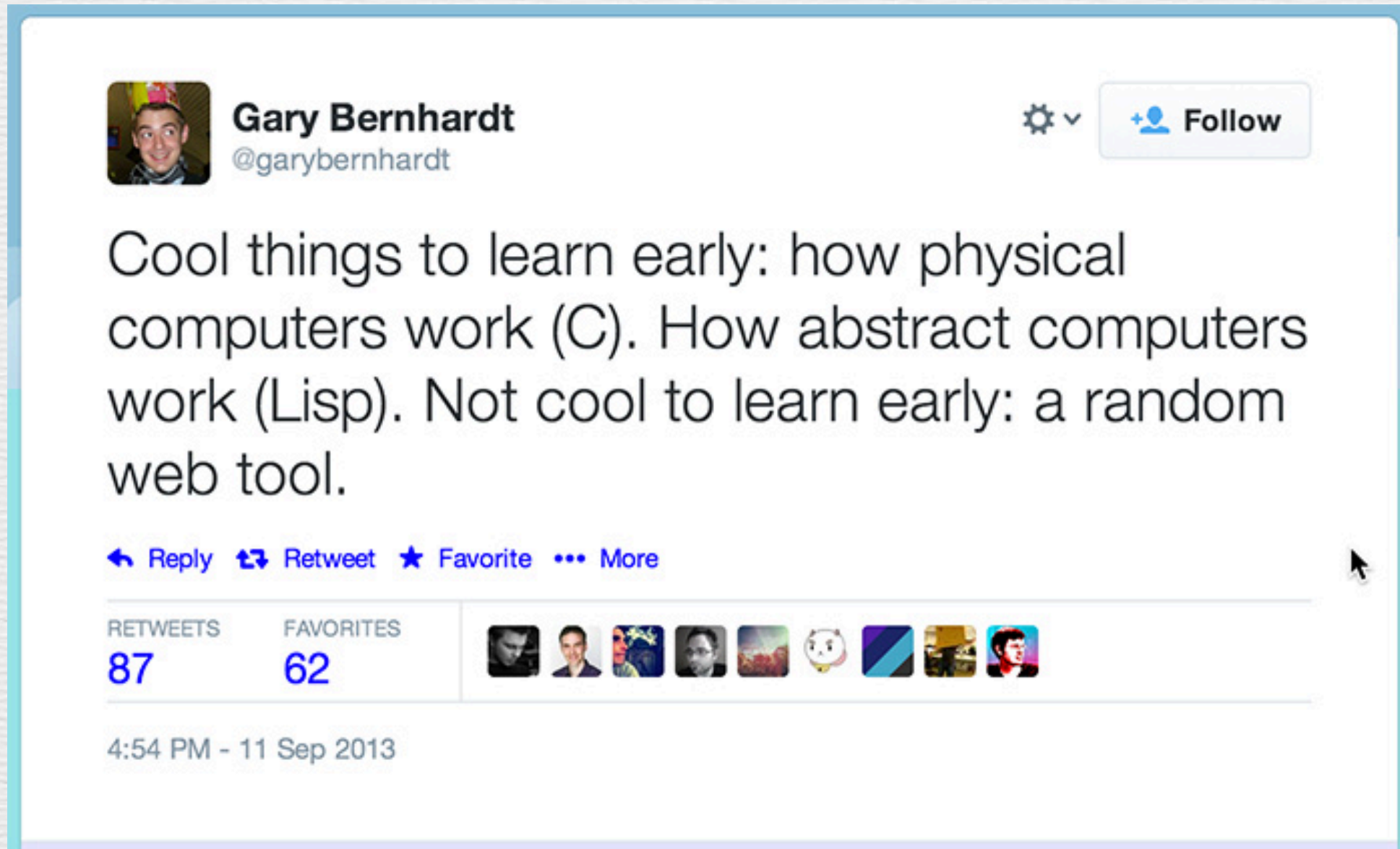
```
(define (flipped-pairs painter)  
  (let ((painter2 (beside painter  
                           (flip-vert painter))))  
    (below painter2 painter2)))
```

- 蓝色表示组合机制
- 红色表示用 `define` 形成的新的抽象方法





# Why Lisp



来源: Learn C & Clojure in 2014



# Where language matter

- As a rule, the more demanding the application, the more leverage you get from using a powerful language.
- But mostly little glue programs



# Advantage of Lisp

- Bottom-up programming. Instead of writing in the base language, build on top of the base language a language designed for your programs.
- A bottom-up program should be easier to modify as well, because in many cases the language layer won't have to change at all.



# Buttom up

## 一个笔记类应用

```
(defnote "直播分享"  
  :creator "刘家财"  
  :createdAt "2017-08-13"  
  :tags ["share" "sicp"]  
  :content "Welcome to Lisp World")
```



# (Dis)advantages

- Might not work well with programs written in other language
- Libraries
- Hire



# Tips for Reading SICP

- 不要被某些习题困扰太久，思考时间最长一周
- 每次阅读预留至少一个小时
- 不要间断！否则需要卷土重来！
- 保持好奇心，不感兴趣的章节跳过去



We toast the Lisp programmer who pens his  
thoughts within nests of parentheses.

— «SICP's foreword» *Alan J. Perlis*



Thank You

Happy Lispping 🙌