

# The World of Programming

## Programming Languages, Methods and Tools

Gang Chen  
[chengang@genomics.cn](mailto:chengang@genomics.cn)

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# Outline

- 1 The World of Programming Languages
- 2 The World of Programming Methods
- 3 The World of Programming Tools

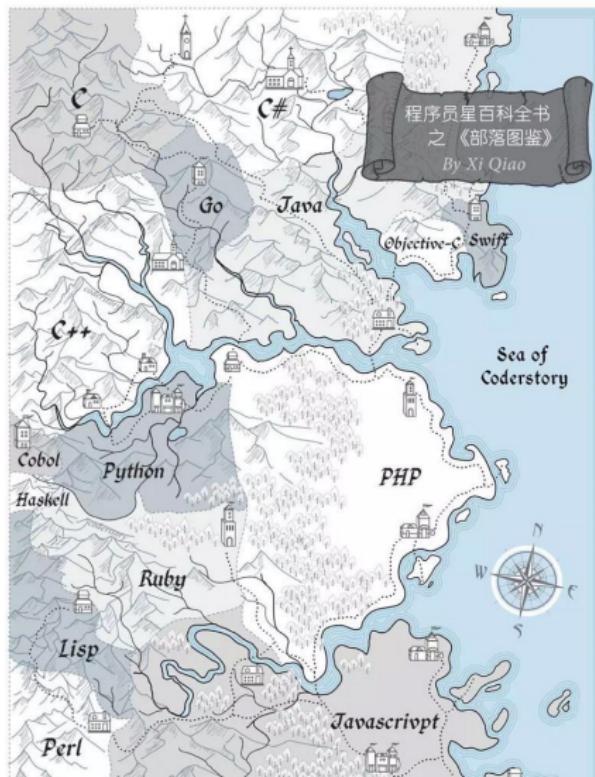
# Next

1 The World of Programming Languages

2 The World of Programming Methods

3 The World of Programming Tools

# The World of Programming Languages



# Why do we need five programming languages?

## Why do we have to learn languages?

- 廣東話
- 普通话
- 客家话
- 上海话
- English
  - England, Scotland, Wales, North Ireland
  - United States
  - Hong Kong
- Hinglish
- ...

# Programming Languages

- C: Embedded device, high performance system software
- C++: Embedded device, large-scale software, GUI applications
- Java: Large-scale system, Enterprise systems, cross-platform applications
- Perl: Text processing, biological sequence processing, CGI-programming
- Python: System administration, desktop applications, web development, data analysis
- R: Data analysis and visualization
- Objective-C: applications on iOS and Mac OS
- Swift: a future programming languages for Apple products
- Go: Google's system programming language
- Haskell: Functional Programming language
- Ruby, Scala, Julia, JavaScript, LaTeX ...

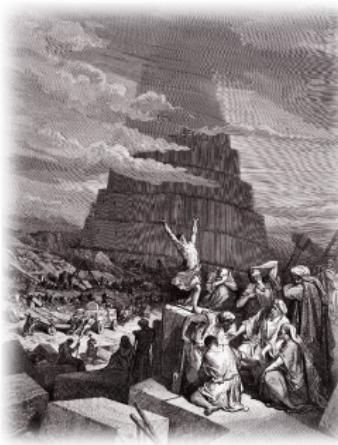
The  
Pragmatic  
Programmers

# Seven Languages in Seven Weeks

A Pragmatic  
Guide to  
Learning  
Programming  
Languages

Bruce A. Tate

*Edited by Jacquelyn Carter*



香港中文大學

The Chinese University of Hong Kong

# Seven More Languages in Seven Weeks

Languages That Are  
Shaping the Future



Bruce A. Tate, Fred Daoud,  
Ian Dees, and Jack Moffitt

Foreword by José Valim

*Edited by Jacquelyn Carter*



香港中文大學

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### Seven Databases in Seven Weeks

A Guide to Modern Databases  
and the NoSQL Movement



Eric Redmond  
and Jim R. Wilson

Series editor: Bruce A. Tate  
Development editor: Jacquelyn Carter



### Seven Concurrency Models in Seven Weeks

When Threads Unravel



Paul Butcher

Series editor: Bruce A. Tate  
Development editor: Jacquelyn Carter



### Seven Web Frameworks in Seven Weeks

Adventures in Better Web Apps



Jack Moffitt  
and Fred Daoud

Series editor: Bruce A. Tate  
Development editor: Jacquelyn Carter

# Interaction between Programming Languages

- C-based: C, C++, Go, R, Perl, Python ...
- Virtual Machine based:
  - JVM: Java, Scalar, JPython, Perl 6 ...
  - CLI: C++/CLI, C#, IronPython, F#, VB.NET, PowerShell ...
- Interface: web service, file, database, container ...

- Java and R: rJava
- Perl and R: RSPerl
- Python and R: rpy2
- C/C++ and R: Rcpp
- C and Perl: perl.h
- Java and C/C++: JNI

# Next

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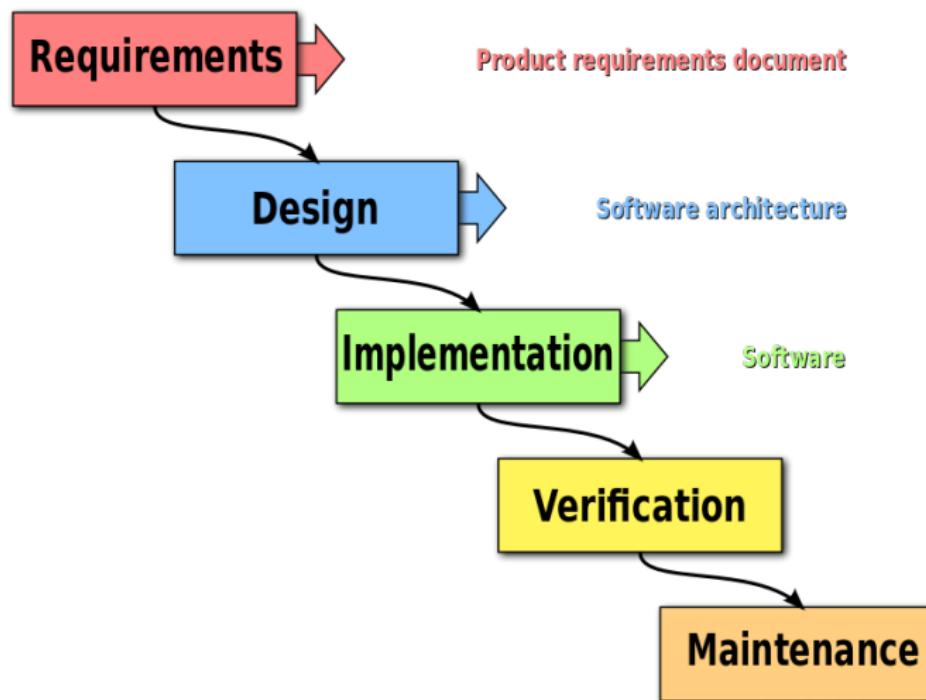
- Agile Software Development

3 The World of Programming Tools

## subsectionWaterfall



# Waterfall



# Case: Fibonacci Sequence Generator

- Requirements: What is the input? Web based or Command line application?
- Design: technology stack, architecture, user experience ...
- Implementation: only coding? Construction
- Verification: testing, alpha, beta
- Maintenance:

# Next

## 1 The World of Programming Languages

## 2 The World of Programming Methods

- Agile Software Development

## 3 The World of Programming Tools

- Source Version Control
- Teamwork
- Documentation
- Hardwares

# Agile Software Development

## Agile Software Development

Agile software development is a group of software development methods in which requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development, early delivery, continuous improvement and encourages rapid and flexible response to change.

# 12 principles of agile software development

- Customer satisfaction by rapid delivery of useful software
- Welcome changing requirements, even late in development
- Working software is delivered frequently (weeks rather than months)
- Close, daily cooperation between business people and developers
- Projects are built around motivated individuals, who should be trusted
- Face-to-face conversation is the best form of communication (co-location)
- Working software is the principal measure of progress
- Sustainable development, able to maintain a constant pace
- Continuous attention to technical excellence and good design
- Simplicity—the art of maximizing the amount of work not done—is essential
- Self-organizing teams
- Regular adaptation to changing circumstances

# Why do we need agile software development?

- Stock trading system, military, bank ...
- Desktop softwares ship as floppy disk, CD or DVD ...
- Internet helps us update our software every minutes ...

## Agile Methods

- Extreme Programming
- Test Driven Programming
- Scrum
- ...

## Agile Practices

- Pair programming
- test-driven
- story-driven modeling
- Iterative and incremental development
- Cross-functional team
- Refactoring
- ...

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# Revision Control

## Revision Control

In computer software engineering, revision control is any kind of practice that tracks and provides control over changes to source code.

Software developers sometimes use revision control software to maintain documentation and configuration files as well as source code.

# Subversion

## Subversion

- <http://subversion.apache.org/>

# git

## GIT

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

# Hosted SVC

- github
- bitbucket
- coding.net

# Next

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# Communication

- QQ, MSN
- WeChat, WhatsApp
- HipChat, Slack ...

# Project Management

- Trello
- Tower.im
- Worktile

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# Documentation

- Markdown
- README
- CHANGELOG
- Language-specific

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# Computing Device

- Macbook, Macbook Air, Macbook Pro
- Surface, iPad Pro
- iphone?

# Keyboard

- Filco
- HHKB
- Cherry
- ...



# Thanks!