《汇编语言程序设计》
课程介绍

余乐军

2018.9.1

课程介绍

- 课程性质：选修课

- 学分：3学分

- 课时：4课时（2理论+2实验）/每周

课程信息

- 上课方式：理论（32课时）+实验（30课时）
- 理论课
  - 时间：
    - 第1-9周，每周五1-2节
    - 第10-17周，每周二3-4节
  - 地点：电子楼105
- 实验课
  - 时间：第2-17周，每周四5-6节
  - 地点：电子楼304

课程介绍

- 教师信息:

姓　名: 余乐军

办公室: 电子楼411
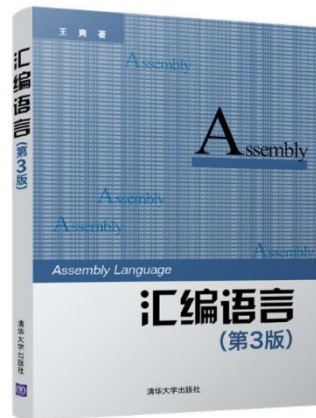
Email : yulejun@bnu.edu.cn

教材和参考书

- 教材信息：

书　　名：汇编语言（第3版）
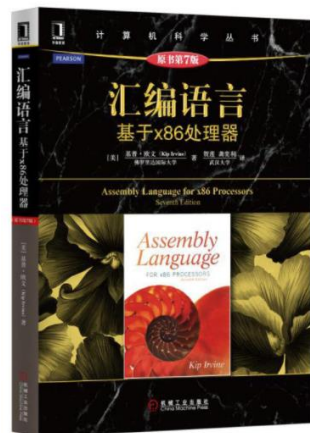
作　　者：王爽

出版社：清华大学出版社

- 参考资料：

书　　名：汇编语言基于x86处理器

作　　者：基普·欧文（Kip Irvine）
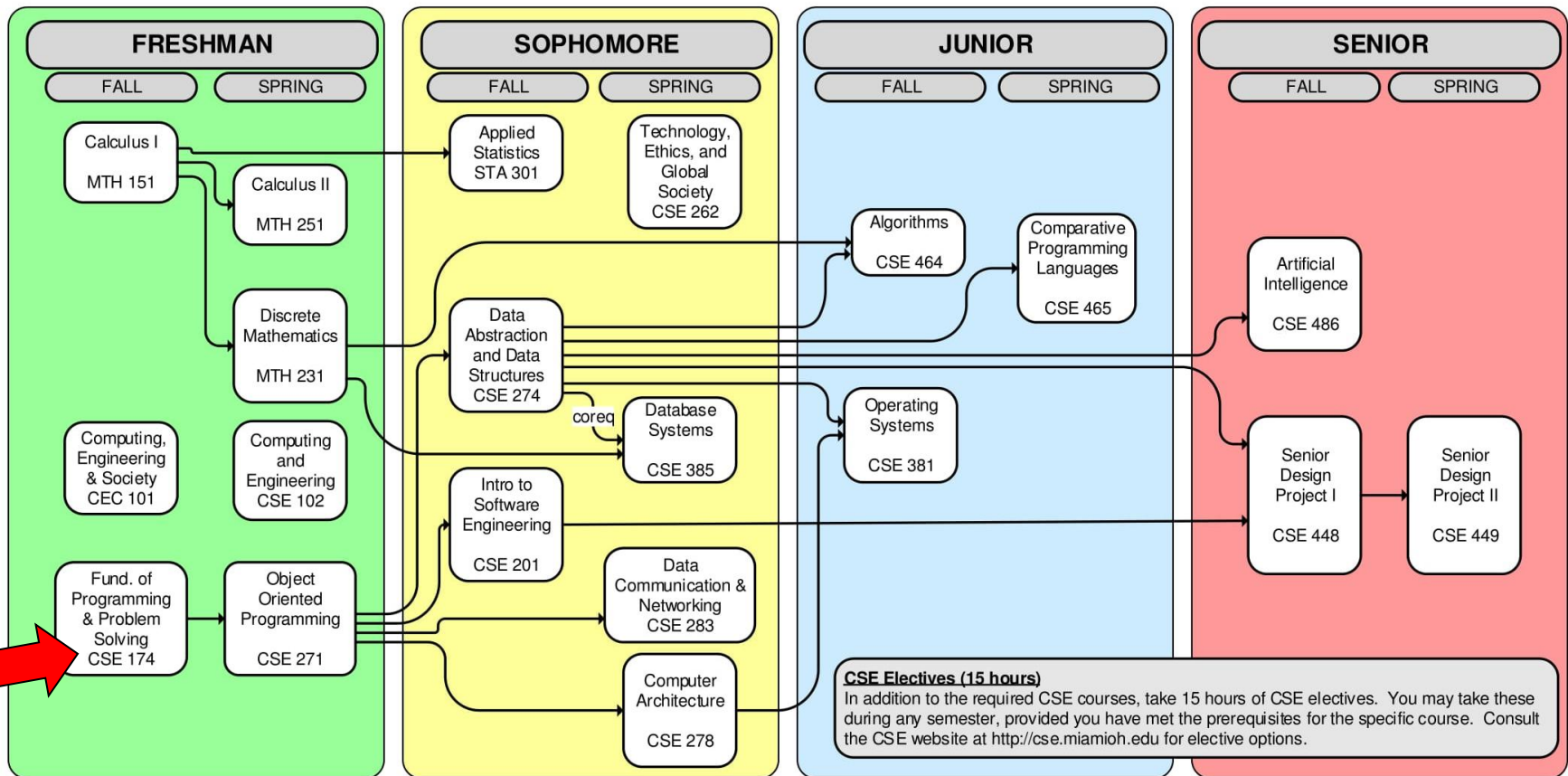
出版社：机械工业出版社

考核方式

无期末考试，按平时以下内容考核（100分制）：

- 考　　　　勤（ 5%）
  - 上课不迟到早退
- 随 堂 测 试（15%）
  - 随堂小测验和讨论
- 平时小实验（50%）
  - 实验过程交互、实验报告
- 期末大实验（30%）
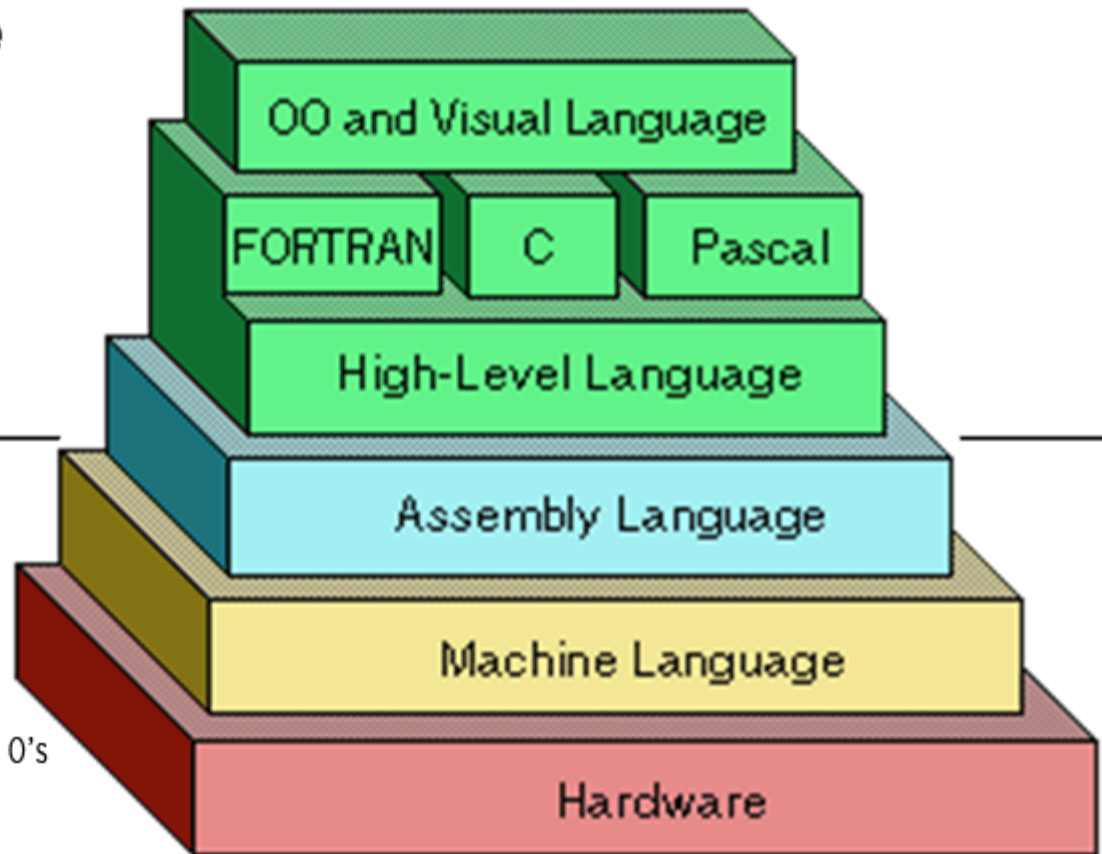 - 撰写选题报告和论文，并完成讨论

汇编语言在CS课程中的位置

高级语言 vs 低级语言

- C++，python，java

High Level Language

- Easy for Programmers to understand
- Contains Engilish Words

Low Level Langugae

- The computer's own Language
- Binary numbers, in 1's and 0's

OO and Visual Language

FORTRAN   C   Pascal

High-Level Language

Assembly Language

Machine Language

Hardware

justcode.me

高级语言 vs 低级语言

- **high-level programming language** is a <u>programming language</u> with strong <u>abstraction</u> from the details of the <u>computer</u>.

- **high-level programming language** deals with abstract computer science concepts
  - variables , arrays, <u>objects</u>
  - complex arithmetic or boolean expressions
  - subroutines and functions, loops, <u>threads</u>, locks, and other,

高级语言 vs 低级语言

- **low-level programming language** is a <u>programming language</u> that provides little or no <u>abstraction</u> from a computer's <u>instruction set architecture</u>—commands or functions in the language map closely to processor instructions.

- **low-level programming language** deals with
  - registers
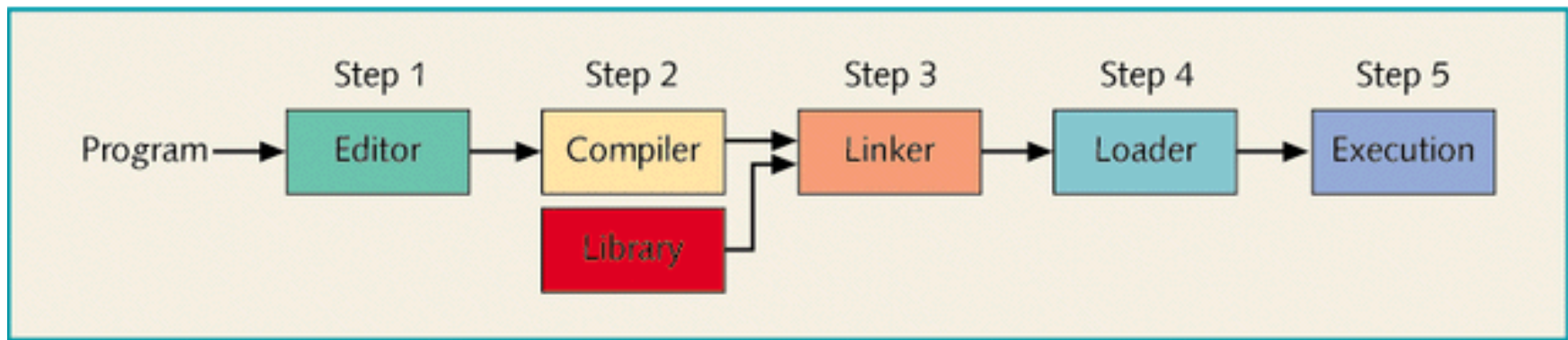 - memory addresses
  - call stacks,

高级语言 vs 低级语言

- *Abstraction penalty* of High-level programming
  - far more operations than necessary,
  - higher memory consumption,
  - larger binary program size.

- For this reason, code which needs to run particularly quickly and efficiently may require the use of a lower-level language
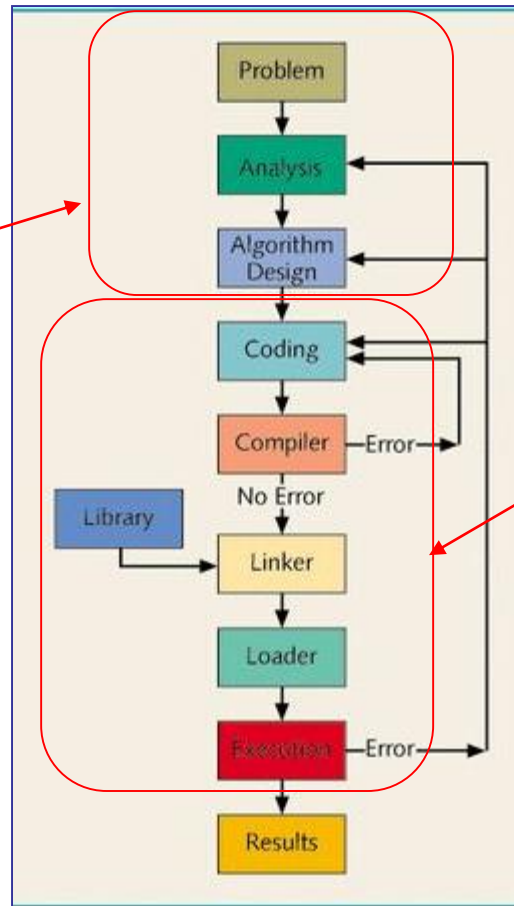 - critical portions of a program mostly in a high-level language can be hand-coded in <u>assembly language</u>,

高级语言编程

设计-编码-执行

Analysis and algorithm design done apart from any specific programming language
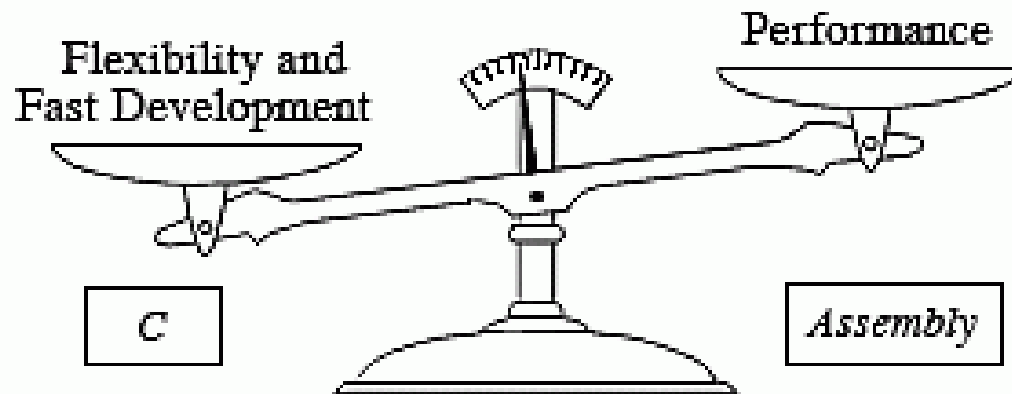
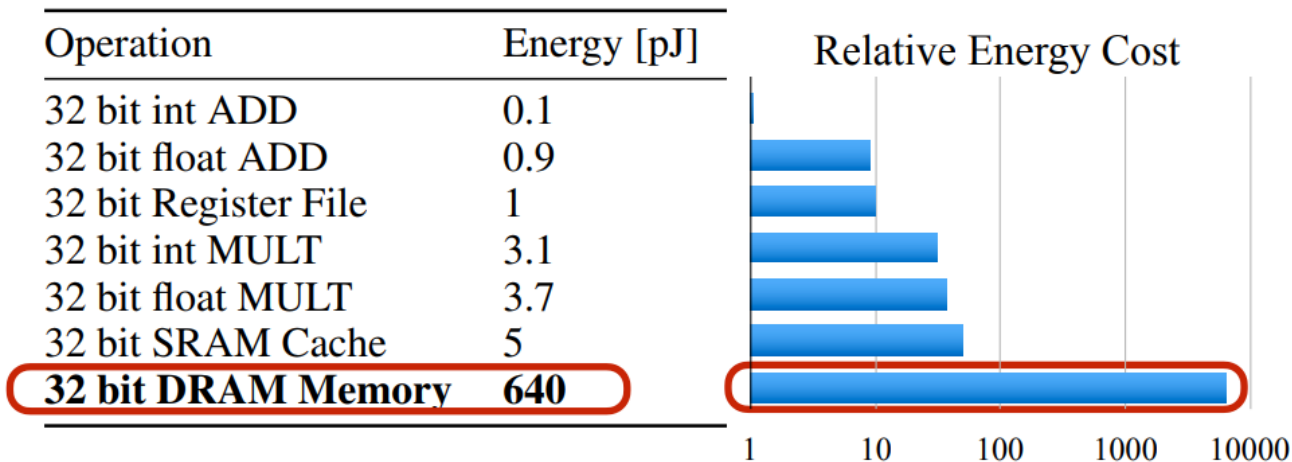Processing of the high-level language programming language

Problem

Analysis

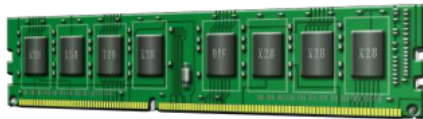Algorithm Design

Coding

Compiler —Error

No Error

Library

Linker

Loader

Execution —Error

Results

汇编语言的历史地位

为什么还需要汇编语言？
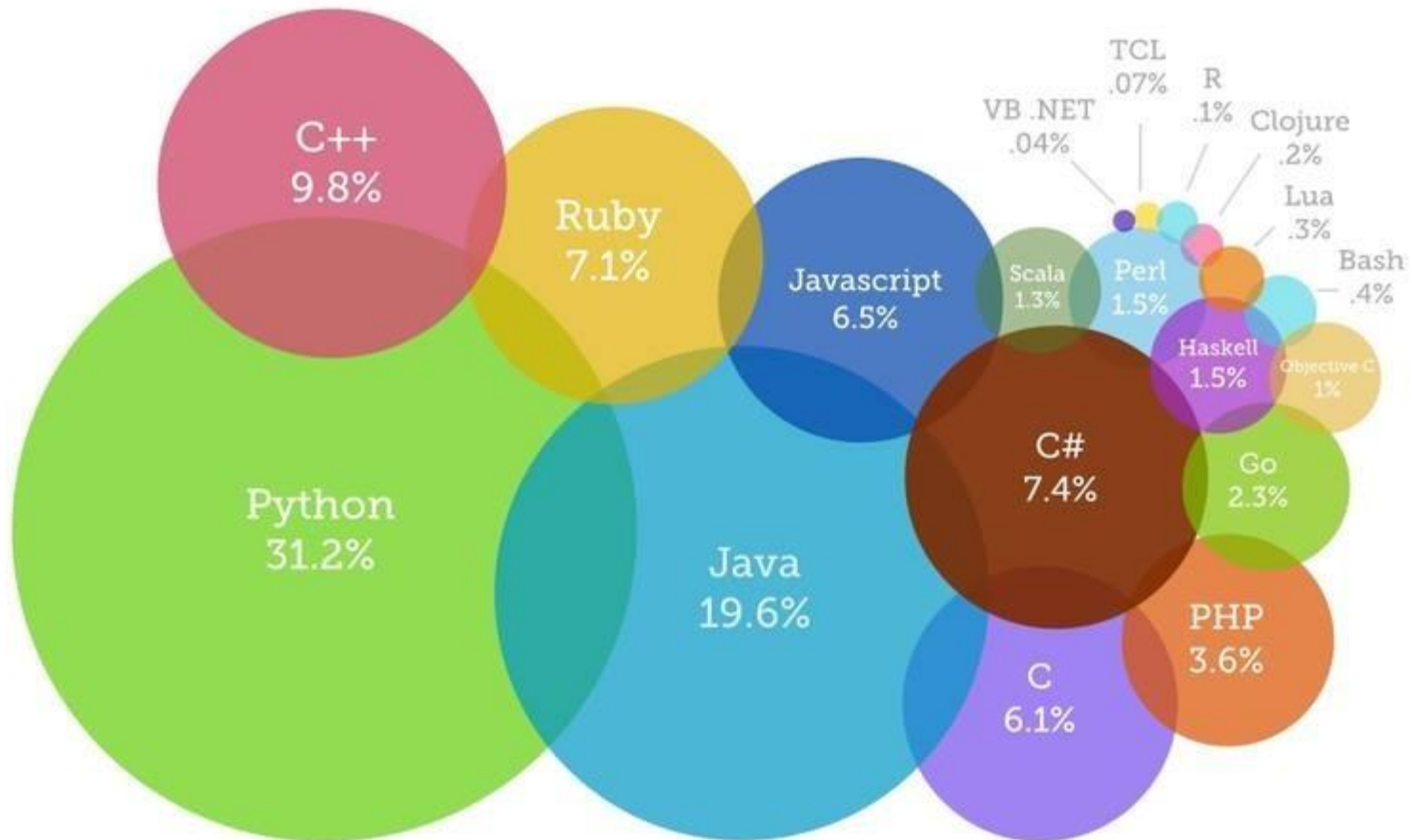
性能仅仅是指运行速度吗？

Where is the Energy Consumed?

Operation	Energy [pJ]
32 bit int ADD	0.1
32 bit float ADD	0.9
32 bit Register File	1
32 bit int MULT	3.1
32 bit float MULT	3.7
32 bit SRAM Cache	5
32 bit DRAM Memory	**640**

Relative Energy Cost

1   10   100   1000   10000

1 = 1000 ✖➕

This image is in the public domain

编程语言流行排行榜

Most Popular Coding Languages of 2016

- C++ 9.8%
- Ruby 7.1%
- Javascript 6.5%
- Scala 1.3%
- Perl 1.5%
- TCL .07%
- VB .NET .04%
- R .1%
- Clojure .2%
- Lua .3%
- Bash .4%
- Haskell 1.5%
- Objective C 1%
- Python 31.2%
- Java 19.6%
- C# 7.4%
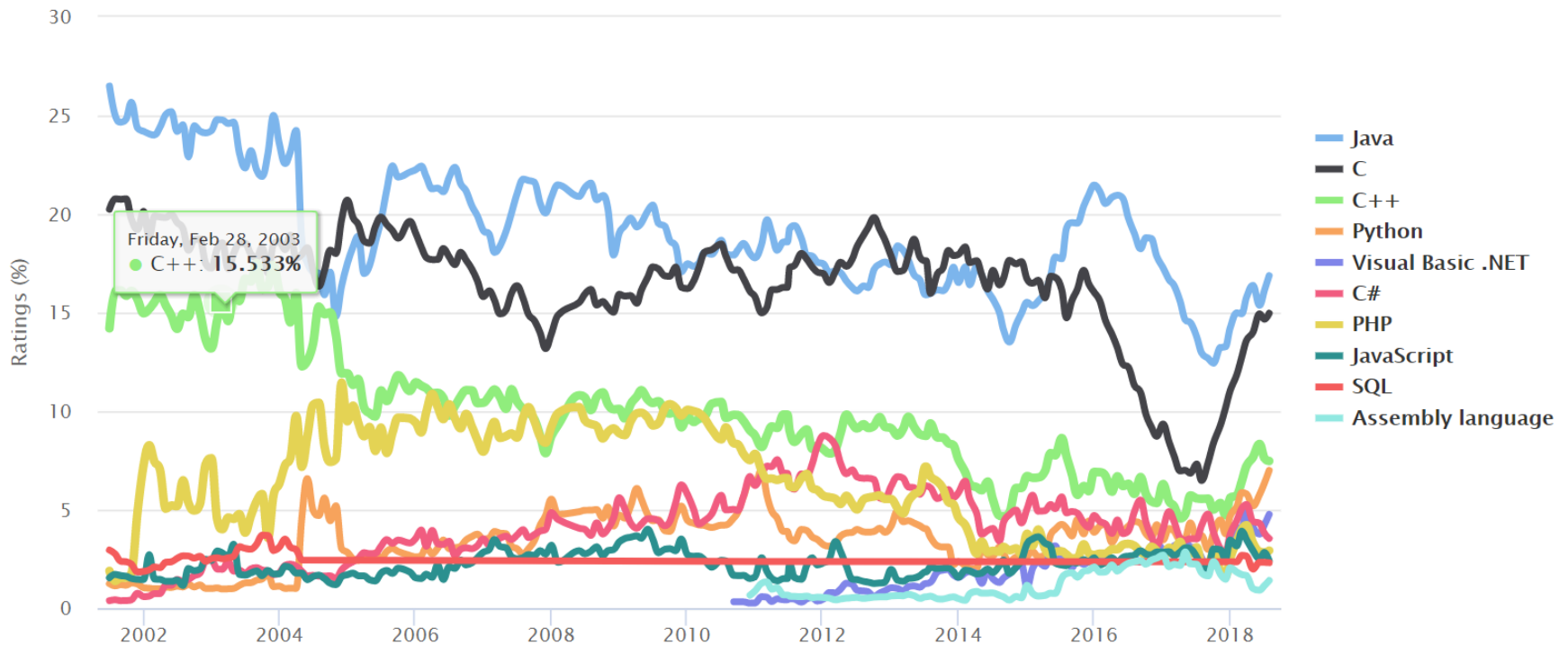- Go 2.3%
- C 6.1%
- PHP 3.6%

编程语言流行排行榜

TIOBE Programming Community Index
Source: www.tiobe.com

课程介绍

- 为什么选修本课程？
- 加入课程QQ群