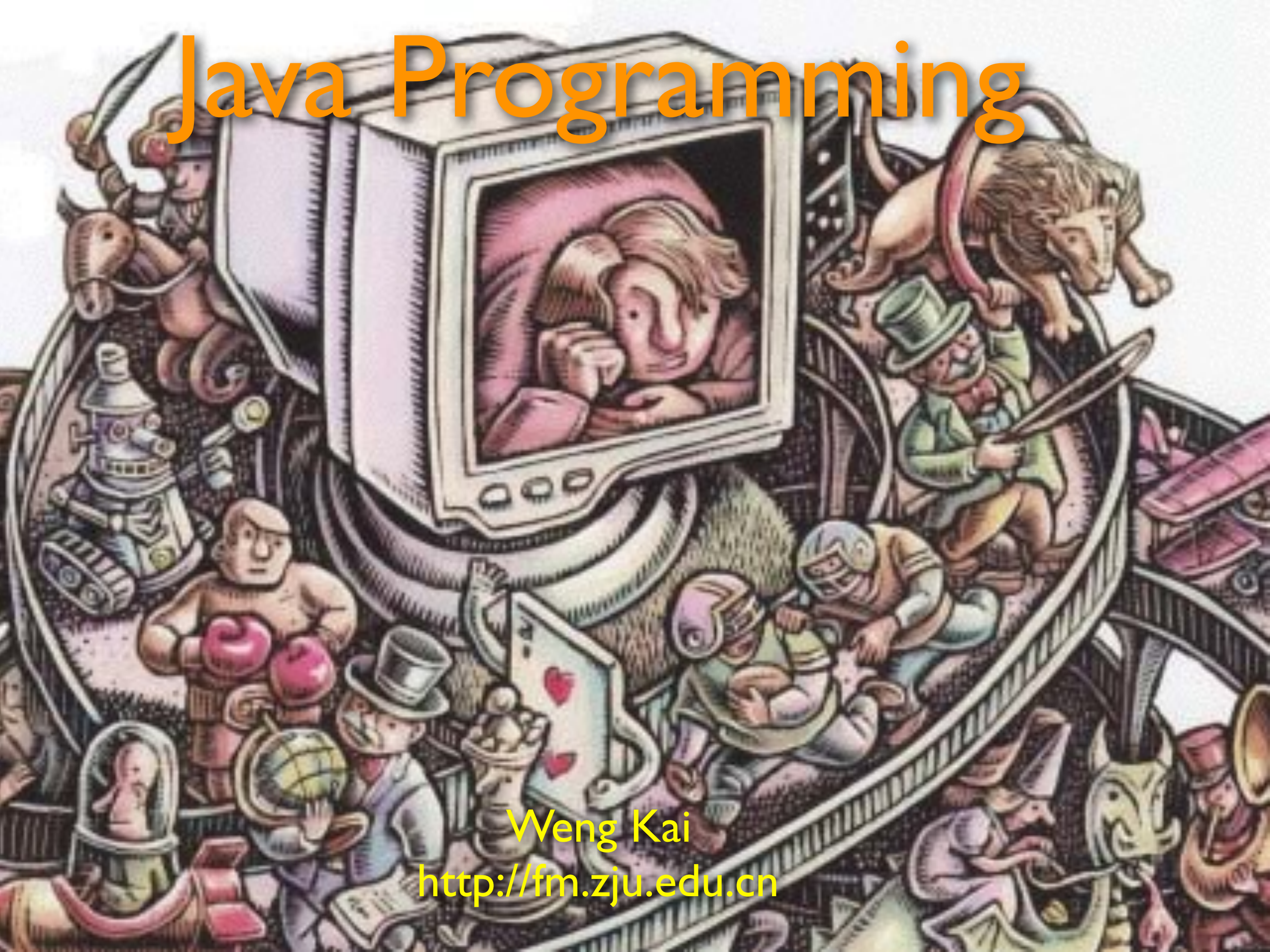
Java Programming



Weng Kai
http://fm.zju.edu.cn

Goals

- Focus on Java application programming
  - desktop or server
- Able to implement a small software system in Java

- 课程介绍和Java入门
- Java内存模型
- Java的类
- 类库
- 容器
- 泛型
- 异常与RTTI
- 输入输出
- 线程与多线程
- GUI
- MVC模型
- 实用技术
- 设计模式
- 并发程序设计基础

Assessment

1. 每两周一次实验作业，完成一个小型编程任务，每个计3分，共24分；
2. 2次随堂测验10分；
3. 4个大型程序设计任务，每个16分，选择其中的一个独立完成；
4. 期末闭卷考试占50%。

Course web

- http://www.icourse163.org/spoc/learn/ZJU-1001760002?tid=1001847001#/learn/announce
- 用网易通行证登陆，设置用户名为
  - ZU<sid>的形式
- 课程密码fatmouse
- 在这个网站交作业和做平时的小测验

E-mail rule

- wengkai@zju.edu.cn
- Title starts with "[Java]"
- State your name and sid in the text
- Prefer plain text e-mail
  - NO background, music, color, font styles..

微信群

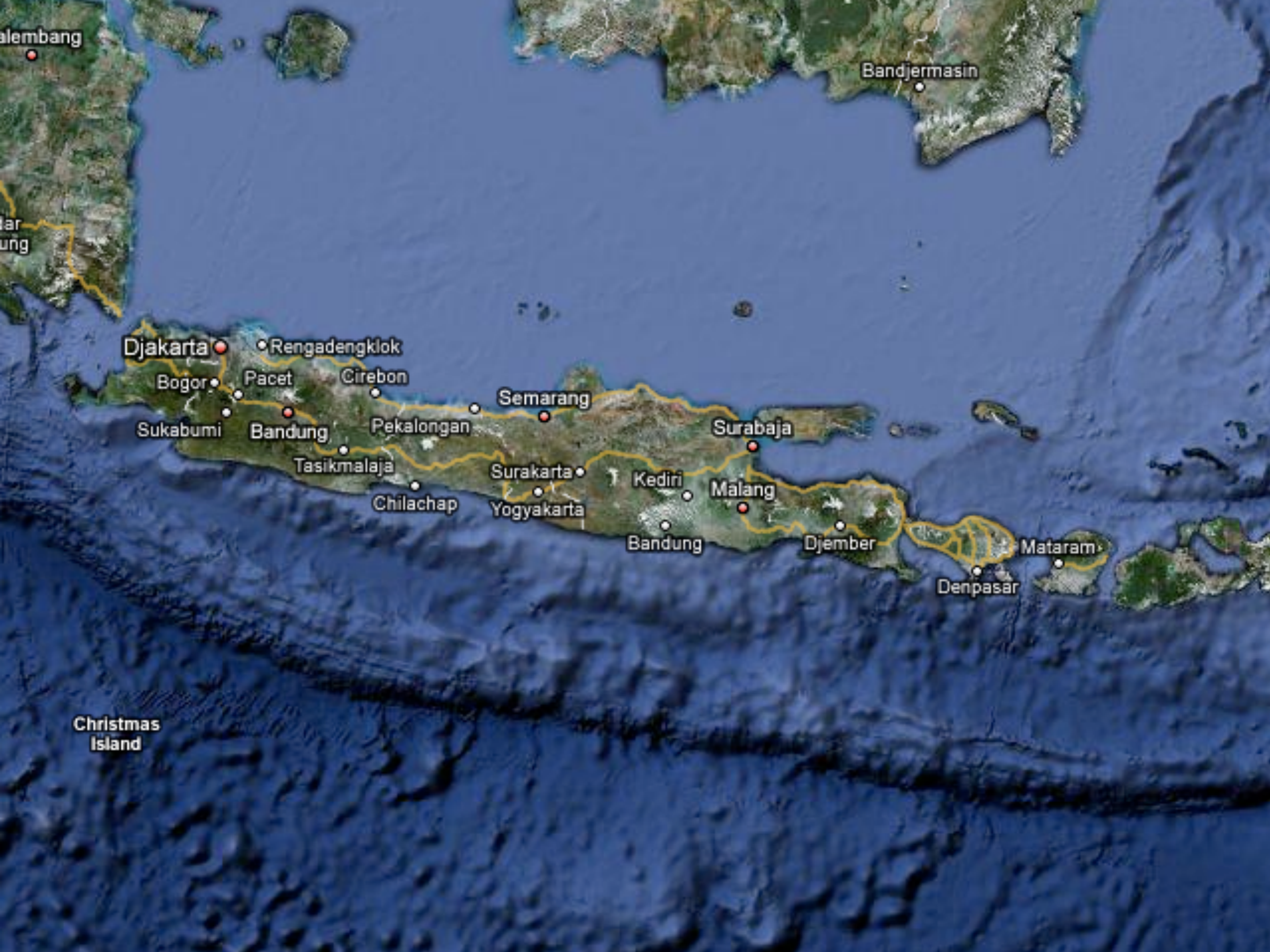
Software you need

- JRE 1.8
- Eclipse

The Java

拉萨市
重庆市
杭州市
南昌市
长沙市
Nepal
Bhutan
Barabanki
贵阳市
福州市
郑州
Gauhati
昆明市
Patna
Varanasi
Bangladesh
台湾
Taiwan
广州市
Kolkata
南宁市
Myanmar
(Burma)
Hà Nội
Hong Kong
香港
海口市
Macau
澳門
Hai Phòng
Laos
Viang
Chan
Yangon
ประเทศ
ไทย
Manila
Thailand
Vietnam
Chennai
กรุงเทพมหานคร
Cambodia
Philippines
Phnum
Pénh
Thành Phố
Hồ Chí Minh
Malaysia
Singapore
Indonesia
Djakarta
Bantaeng
Dili


Can Tho
Banda Aceh
Bireuen
Ipoh
Medan
Malaysia
Pematang Siantar
Kuala Lumpur
Singapore
Pakanbaru
Padang
Palembang
Bangkahulu
Bandar Lampung
Djakarta
Pacet
Bandung
Semarang
Surabaja
Yogyakarta
Chilachap
Kediri
Malang
Djember
Denpasar
Christmas Island
Cocos
Brunei Darussalam
Sibu
Malaysia
Pontianak
Samarinda
Balikpapan
Palangkaraya
Bandjermasin
Palu
Zamboanga City
Limbung
Bantaeng
Indones


alembang
Bandjermasin
Djakarta
Rengadengklok
Bogor
Pacet
Cirebon
Semarang
Sukabumi
Bandung
Pekalongan
Surabaja
Tasikmalaja
Surakarta
Kediri
Malang
Chilachap
Yogyakarta
Bandung
Djember
Mataram
Denpasar
Christmas
Island

Programming Languages

- is a way to describe how to do a stuff
- compiled vs. interpreted
  - C
  - Python

Java

- A compiled language
- A productive OOP language
- A member of UNIX world
- Widely used in variety kinds of applications

Java在业界的地位

Sep 2015	Sep 2014	Change	Programming Language	Ratings	Change
1	2	↑	Java	19.565%	+5.43%
2	1	↓	C	15.621%	-1.10%
3	4	↑	C++	6.782%	+2.11%
4	5	↑	C#	4.909%	+0.56%
5	8	↑	Python	3.664%	+0.88%
6	7	↑	PHP	2.530%	-0.59%
7	9	↑	JavaScript	2.342%	-0.11%
8	11	↑	Visual Basic .NET	2.062%	+0.53%
9	12	↑	Perl	1.899%	+0.53%
10	3	⇊	Objective-C	1.821%	-8.11%

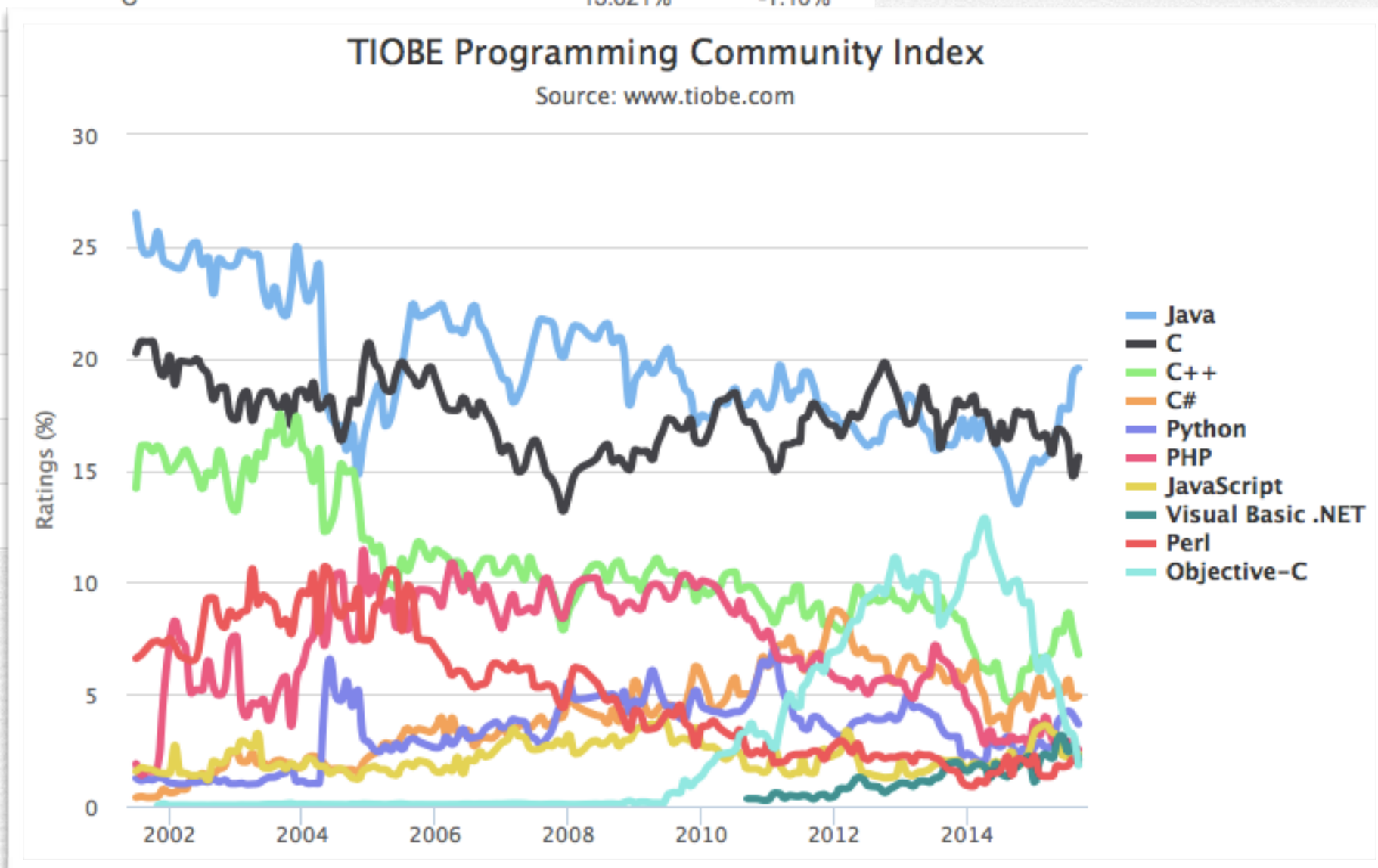
图片来源：http://www.tiobe.com/index.php/content/paperinfo/tpci/index.html

Java在业界的地位

Sep 2015	Sep 2014	Change
1	2	^
2	1	v
3	4	^
4	5	^
5	8	^
6	7	^
7	9	^
8	11	^
9	12	^
10	3	vv

C 15.621% -1.10%

计算机专业不教Java是不可想像的



图片来源：http://www.tiobe.com/index.php/content/paperinfo/tpci/index.html

为什么Java

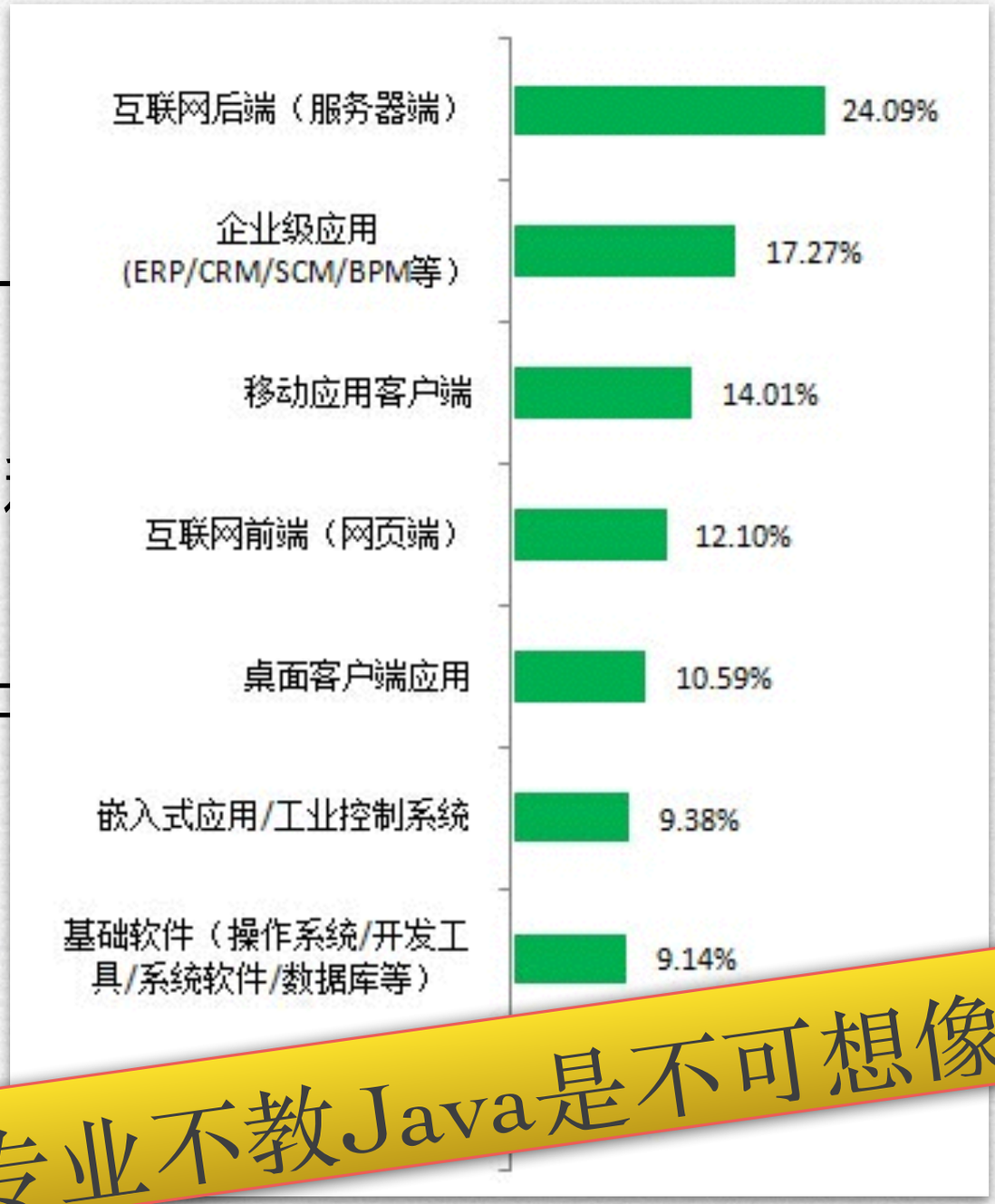
- Java＝C++- -
- 有适合各种应用的库

正向反馈

- 人们因为Java很好用而开发自己可以用的库
- 人们要开发应用的时候发现Java有合用的库

软件在哪里?

- 桌面上：C#、C-
- 服务器中：Java
  - 也包括浏览器中
- 设备里：C



计算机专业不教Java是不可想像的

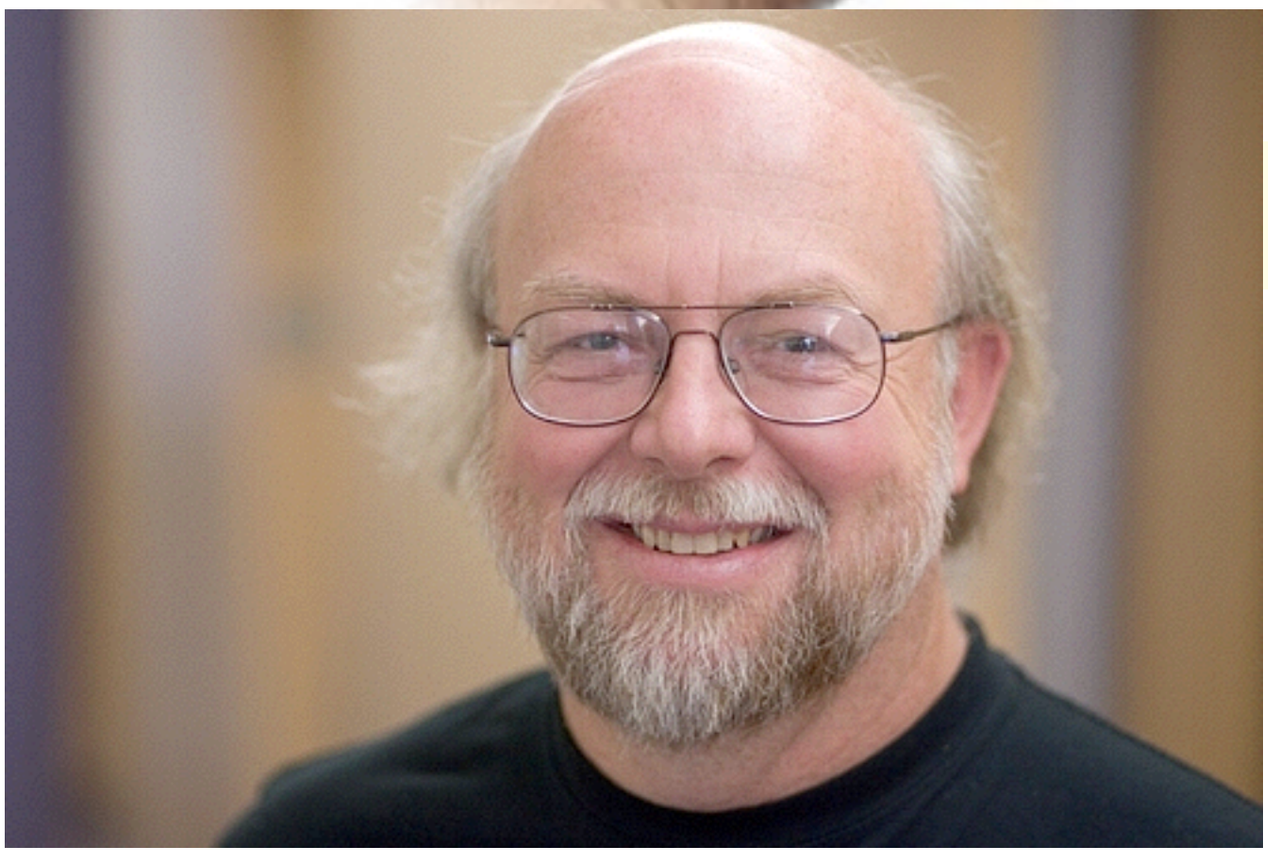
http://www.csdn.net/article/2014-06-06/2820116

为什么不是Java?

- 企业招聘看什么?
  - 大企业着重在基本素质和能力
  - 小企业看中“即招即用”
    - 中国的小软件企业通常是MS的坚定用户，因为他们的用户一般只知道MS
- 情况在改变，因为
  - 听说Java很流行（用户和小企业都在听说）
  - B/S已经成为MIS的主流架构

History of Java

- Birthday: May 23, 1995
- 1991: Set-Top box： James Gosling
- 1994: OAK and FirstPerson
- 1995: Java and HotJava – Internet play




Scott McNealy
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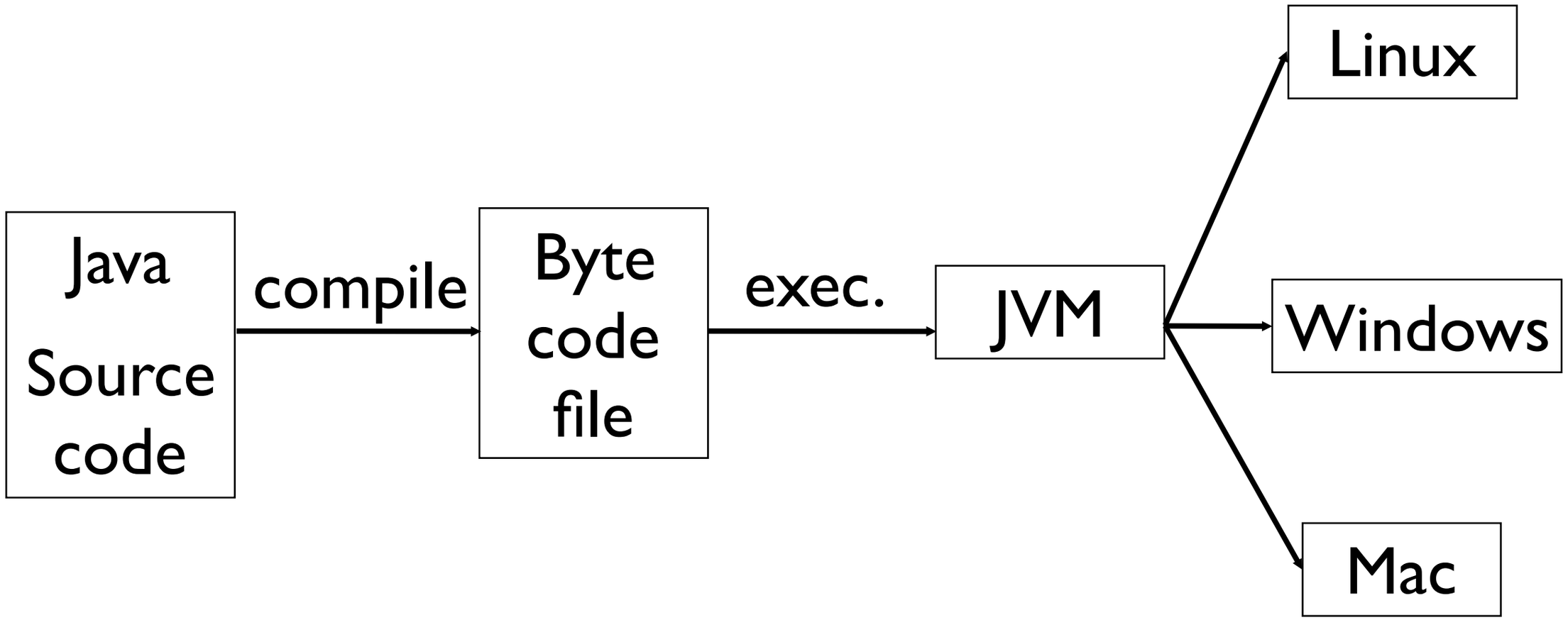
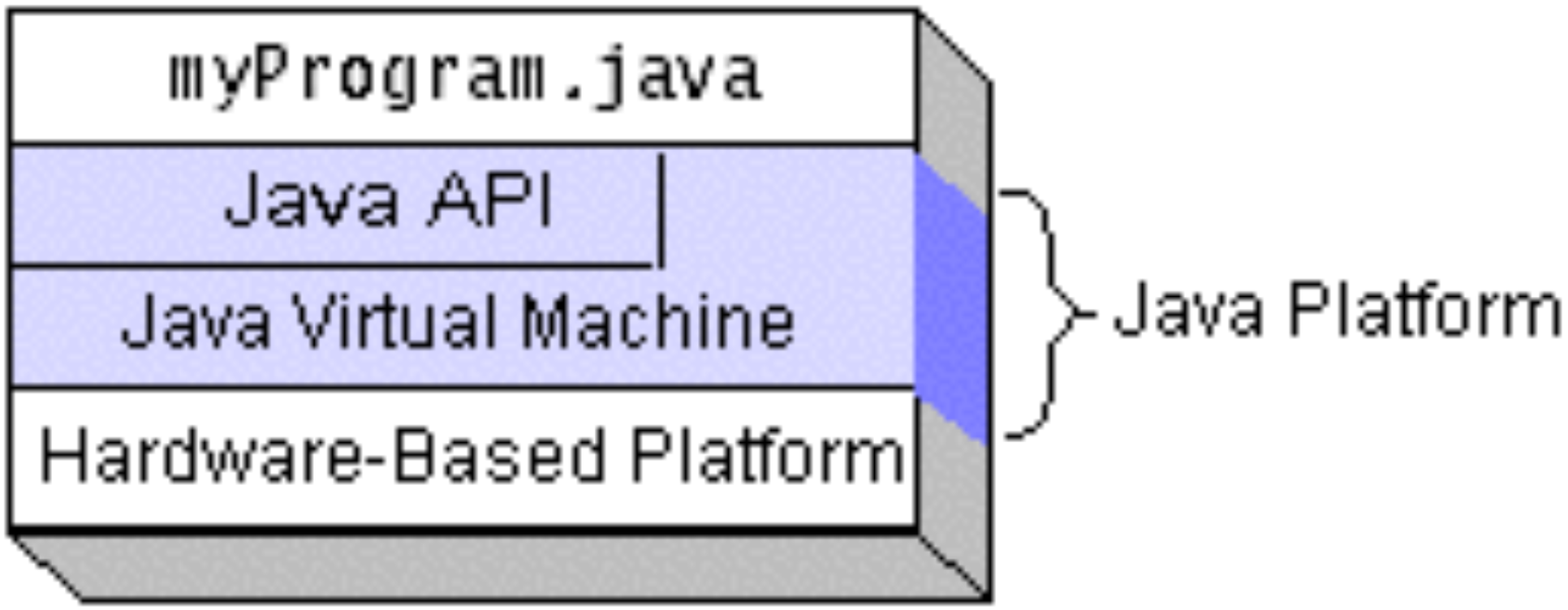
USA

How Java runs



Java platform

- The *Java Virtual Machine* (Java VM)
- The *Java Application Programming Interface* (Java API)



Cross platform/portable

- Portable: a dream from UNIX and C to Java
  - JVM
- Unique data type
  - int: 32-bit
  - char: Unicode

Capacity: high or low?

- Low:
  - Interpreted
  - Code check
  - Stack machine
- High
  - JIT
  - Multi-threads
  - Byte code simple design

Stable and KISS

- No point
- Index check
- Auto memory management
- C++ like

Pure OOP

- Java = C++ --
  - Multi-inheritance
  - Virtual inheritance
  - Template
  - Operator overloading

Dynamic

- Java has no such idea of program
- Java believes all classes and objects in the world are in one space
- The compilation result of your program is one part of the space
- To “run a program” is to start a thread from one method of one class in the space

Storage of objects

- For C, efficiency is the most important, so programmers can make decision by their own.
- For Java, all objects should be constructed in runtime and be stored in ***heap***.

Create and destroy objects

- You must create your objects
- But can not destroy them by yourself
- There is a recycle mechanism to help clean up objects that will never be used again.

root

- Every class in Java is a descendant of one class: **Object**
  - So all objects in Java is objects of the class Object.
  - In this way, container is an object that can hold objects.

First Java Program

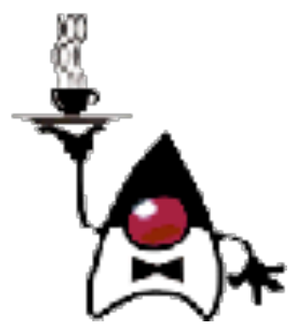
```
class HelloWorld {

    public static void main(String[] args) {

        System.out.print(“Hello World!”);

    }

}
```



read in

- Scanner scaner = new Scanner(System.in);
- int i = scaner.nextInt();

阅读材料

- Orcale网站： Java历史回顾； http://www.oracle.com/technetwork/java/javase/overview/javahistory-index-198355.html

- 《Java编程思想》（英文版）（第4版），[美]Bruce Eckel著，机械工业出版社，2007：1.13，p72-76；

- 《Java语言程序设计：基础篇》（英文版）（第6版），[美]Y. Daniel Liang著，《机械工业出版社》，2008：1.5-1.8，p8-15

- 《Java程序设计与问题解决——基础篇》，[美]Walter Savitch著，陈涓等译，人民邮电出版社，2007：1.1，p1-7；1.3，p14-20；
- 斯坦福大学公开课：编程方法学，第4集，计算机科学发展史，http://v.163.com/movie/2010/1/5/8/M6LDTAPTU_M6LFQ7S58.html；
- 网易云课堂：Java语言基础教程，课时1到课时7，http://study.163.com/course/introduction.htm?courseId=251001。