CS5102: Design and Analysis of Algorithms

Fall 2020 Course Overview

Instructor: 霍红卫 http://faculty.xidian.edu.cn/hwhuo/zh_CN/index.htm
Course Assistants: 郭立渌　纪志鹏　蒋宏博　程哲
Office: Computing Center Building - 201　*Office Hours*: Friday 2:30 – 4:30 PM　**QQ: 185209177**

Course Description: This course is an introduction to the design and analysis of algorithms, including sorting, graph algorithms, searching, string algorithms, and data compression. The course concentrates on the algorithms' developing implementations, understanding their performance characteristics, and estimating their potential effectiveness in applications.

Lecture slides come from Robert Sedgewick and Kevin Wayne of Princeton. Only for teaching and learning.

Prerequisites: A strong understanding of programming in JAVA and a solid background in discrete mathematics are necessary prerequisites to this course.

Class Schedule: 1-4, 6-11 Thursday (**1 – 2**, **3 – 4**) **信远 I-415**.

Credits: 2.5

Textbook: Robert Sedgewick and Kevin Wayne, ***Algorithms*** 4th Edition, Posts &Telecom Press (人民邮电出版社), 2012, which surveys the most important algorithms and data structures in use on computers today, and emphasizes impacts of algorithms on applications to science, engineering, and industry. There are comprehensive resources, available for free at http://algs4.cs.princeton.edu/home/. The book, ***Introduction to Algorithms.*** 2nd Edition, Cambridge, MA: MIT Press, 2001. ISBN: 9780262032933, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein (CLRS) is a great reference book and is available at http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-introduction-to-algorithms-sma-5503-fall-2005/video-lectures/.

Topics Covered:
Roughly, we will cover the following topics (some of them may be skipped depending on the time available).
Case study: Union-Find (1.5), Analysis of Algorithms (1.4).
Mergesort (2.2), Quicksort (2.3), Priority Queues (2.4).
Symbol Tables (3.1), Binary Search Trees (3.2).
Graph Algorithms (4.1, 4.2), Minimum Spanning Trees (4.3), Shortest Paths (4.4).
String Sorts (5.1), Tries (5.2), Data Compression (5.5).

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Grading:
Homework Assignments (many): 20%
Programming Assignments (4): 30%
Final Exam (Comprehensive): 50%
In-class presentation: 5%

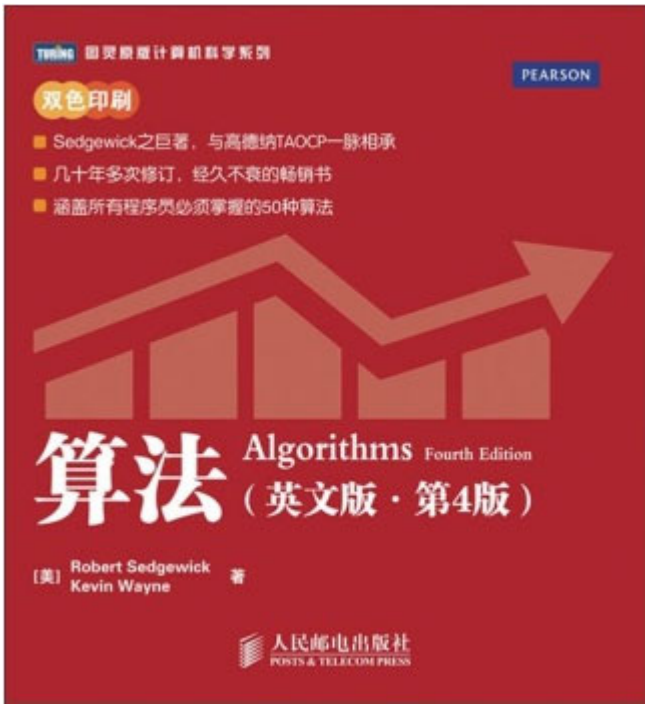
Course Goals: The two main goals of this course are to gain fundamentals knowledge in algorithms. This is achieved by learning a set of classical algorithms to for abstract problem solving, containing sorting, searching, graph algorithms and string algorithms, understanding the underlying math, other properties of these algorithms,

time and space complexity analysis, and understanding how well an algorithm is performing in practice, and to adapt and combine algorithms creatively to solve problems that may arise in practice.

Homework: There will be regularly scheduled homework sets due at TBA time on the due date. Homework will be assigned the day of the class, and will be due the following week (unless stated otherwise). Each given problem set must be written on **a separate, one-sided A4-like sheet of paper**, with the student's name and number, homework number and problem number on top.

Late Policy: Please remember to submit your homework before the deadline. If you require an extension, we will need to know in advance and you must have a good reason for needing it.

Academic Integrity: Students are expected to submit their own original homework. For programming, standard and publicly available code libraries may be used in a restricted way in your programming assignments. Copying another student's homework or code is considered cheating.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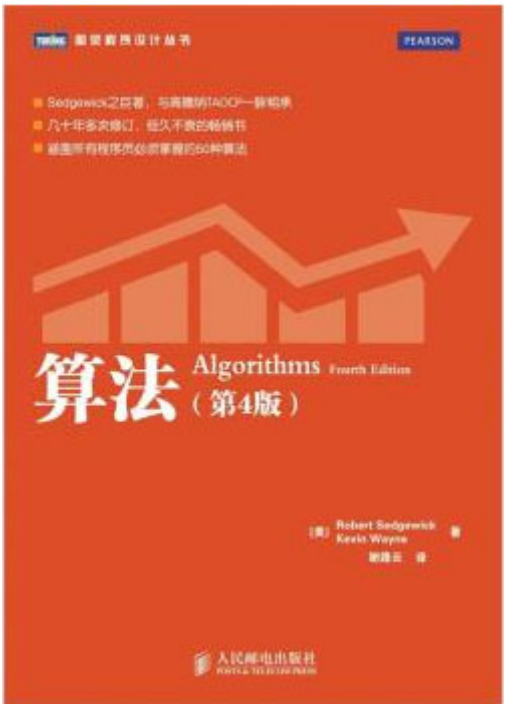
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Algorithms
FOURTH EDITION
ROBERT SEDGEWICK | KEVIN WAYNE