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< Computer Science

Algorithms, Part I

4.9 7,486 ratings | 98%

Kevin Wayne +1 more instructor

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PRINCETON UNIVERSITY

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Starts Aug 24

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About this Course

About this course

997,806 recent views

This course covers the essential information that every serious programmer needs to know about algorithms and data structures, with emphasis on applications and scientific performance analysis of Java implementations. Part I covers elementary data structures, sorting, and searching algorithms. Part II focuses on graph- and string-processing

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Learner Career Outcomes

32% started a new career after completing these courses

34% got a tangible career benefit from this course

17% got a pay increase or promotion

100% online

Start instantly and learn at your own schedule.

Flexible deadlines

Reset deadlines in accordance to your schedule.

Intermediate Level

Approx. 53 hours to complete

English

Subtitles: English, Korean, Russian

SKILLS YOU WILL GAIN

Data Structure | Algorithms | Java Programming

Instructors

Instructor rating 4.79/5 (569 Ratings)

Kevin Wayne

Phillip Y. Goldman '86 Senior Lecturer

Computer Science

783,995 Learners

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Robert Sedgewick

William O. Baker *39 Professor of Computer Science

Computer Science

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Princeton University

Princeton University is a private research university located in Princeton, New Jersey, United States. It is one of the eight universities of the Ivy League, and one of the nine Colonial Colleges founded before the American Revolution.

Coursera's rigorous

assignments and broad range of subjects encourage me to keep up with my courses. The quality of the teachers keeps me coming back.

— *Sandra O.*

People interested in this course also viewed

Algorithms, Part II

Princeton University

1 COURSE

Syllabus - What you will learn from this course

Content Rating 98% (52,206 ratings)

WEEK 1

Course Introduction

Welcome to Algorithms, Part I.

10 minutes to complete

1 video (Total 9 min), 2 readings SEE ALL

Union–Find

We illustrate our basic approach to developing and analyzing algorithms

by considering the dynamic connectivity problem. We introduce the union-find data type and consider several implementations (quick find

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9 hours to complete

5 videos (Total 51 min), 2 readings, 2 quizzes SEE ALL

Analysis of Algorithms

The basis of our approach for analyzing the performance of algorithms is the scientific method. We begin by performing computational experiments to measure the running times of our programs. We use

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1 hour to complete

6 videos (Total 66 min), 1 reading, 1 quiz SEE ALL

WEEK 2

Stacks and Queues

We consider two fundamental data types for storing collections of objects: the stack and the queue. We implement each using either a singly linked list or a resizing array. We introduce two advanced Java

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9 hours to complete

6 videos (Total 61 min), 2 readings, 2 quizzes SEE ALL

Elementary Sorts

We introduce the sorting problem and Java's Comparable interface. We study two elementary sorting methods (selection sort and insertion sort) and a variation of one of them (shellsort). We also consider two

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1 hour to complete

6 videos (Total 63 min), 1 reading, 1 quiz SEE ALL

WEEK 3

Mergesort

We study the mergesort algorithm and show that it guarantees to sort any array of n items with at most n lg n compares. We also consider a nonrecursive, bottom-up version. We prove that any compare-based

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9 hours to complete

5 videos (Total 49 min), 2 readings, 2 quizzes SEE ALL

Quicksort

We introduce and implement the randomized quicksort algorithm and analyze its performance. We also consider randomized quickselect, a quicksort variant which finds the kth smallest item in linear time. Finally

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1 hour to complete

4 videos (Total 50 min), 1 reading, 1 quiz SEE ALL

WEEK 4

Priority Queues

We introduce the priority queue data type and an efficient implementation using the binary heap data structure. This implementation also leads to an efficient sorting algorithm known as

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9 hours to complete

4 videos (Total 74 min), 2 readings, 2 quizzes SEE ALL

Elementary Symbol Tables

We define an API for symbol tables (also known as associative arrays, maps, or dictionaries) and describe two elementary implementations using a sorted array (binary search) and an unordered list (sequential

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1 hour to complete

6 videos (Total 77 min), 1 reading, 1 quiz SEE ALL

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Reviews

4.9 ★★★★★
1561 reviews

5 stars		91.86%
4 stars		6.85%
3 stars		0.74%

3 stars	0.74%
2 stars	0.17%
1 star	0.36%

TOP REVIEWS FROM ALGORITHMS, PART I

★★★★★

by RM Jun 1, 2017

This is a great class. I learned / re-learned a ton. The assignments were challenge and left a definite feel of accomplishment. The programming environment and automated grading system were excellent.

★★★★☆

by RB Jun 1, 2020

The course focuses on Java specific implementations of algorithms, so if you're not from a Java background, you would have a little difficulty with the assignments.The course content however is great.

★★★★★

by BJ Jun 3, 2018

Good contents and the logic of the whole course structure is very clear for a novice like me. The weekly homework is also awesome. Would recommend to anyone who wants to learn about computer science.

★★★★★

by RP Jun 11, 2017

Incredible learning experience. Every programmer in industry should take this course if only to dispel the idea that with the advent of cloud computing exponential algorithms can still ruin your day!

View all reviews

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Frequently Asked Questions

- When will I have access to the lectures and assignments?
- Do I need to pay for this course?
- Can I earn a certificate in this course?
- I have no familiarity with Java programming. Can I still take this course?
- Which algorithms and data structures are covered in this course?
- Which kinds of assessments are available in this course?
- I am/was not a Computer Science major. Is this course for me?
- How does this course differ from Design and Analysis of Algorithms?

More questions? Visit the **Learner Help Center**.

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Data Analysis with Python

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