

Lecture 29

CSE 331

Nov 8, 2017

Mini project video due Mon

note ☆ stop following 118 views Actions

Video submission now open on Autolab

Sorry, forgot to do this earlier: you can now submit your video (note still PDF with the link in it) on Autolab.

YOU WILL NEED TO FORM YOUR GROUP ON AUTOLAB AGAIN BEFORE SUBMITTING.

See the mini project page for the details:

<http://www-student.cse.buffalo.edu/~atri/cse331/fall17/mini-project/index.html>

mini_project

edit · good note | 0 Updated 16 hours ago by Atri Rudra

Anonymous feedback

note ☆ stop following 166 views

331 Feedback

If you have the time, please do fill in this feedback form:

https://docs.google.com/forms/d/e/1FAIpQLSeZlDd6oBwjXeH3YBR6f6cxCVgOph1ialwtj47LGBLT-aSpOw/viewform?usp=sf_link

Filling in the form is optional and is anonymous. But your feedback would be very helpful. If you have limited time, I would encourage you to at least fill in the questions on the initiatives that are new to this Fall.

In a few weeks I will summarize some of the feedback and try and respond to the common comments/questions.

#pin

feedback

edit · good note | 0 Updated 6 days ago by Atri Rudra

Some links

note ☆

stop following

3 views

The promised links

I have promised quite a few links to y'all over the last few lectures, so for your reading pleasure, here is a list:

- Some folks have formally defined what a "greedy algorithm" is and then proved its limitations. Here is one paper that talks about [greedy algorithms for graph problems](#).
- There are sorting algorithms known that adapt to how sorted the input is-- i.e. if the input is closer to being sorted, then it'll run faster. Here is a [survey](#) on such algorithms.
- As promised in class yesterday, here is a [support page that tries to demystify how one could come up with the identity that was used in the integer multiplication algorithm](#).

#pin

lectures

algorithms

edit

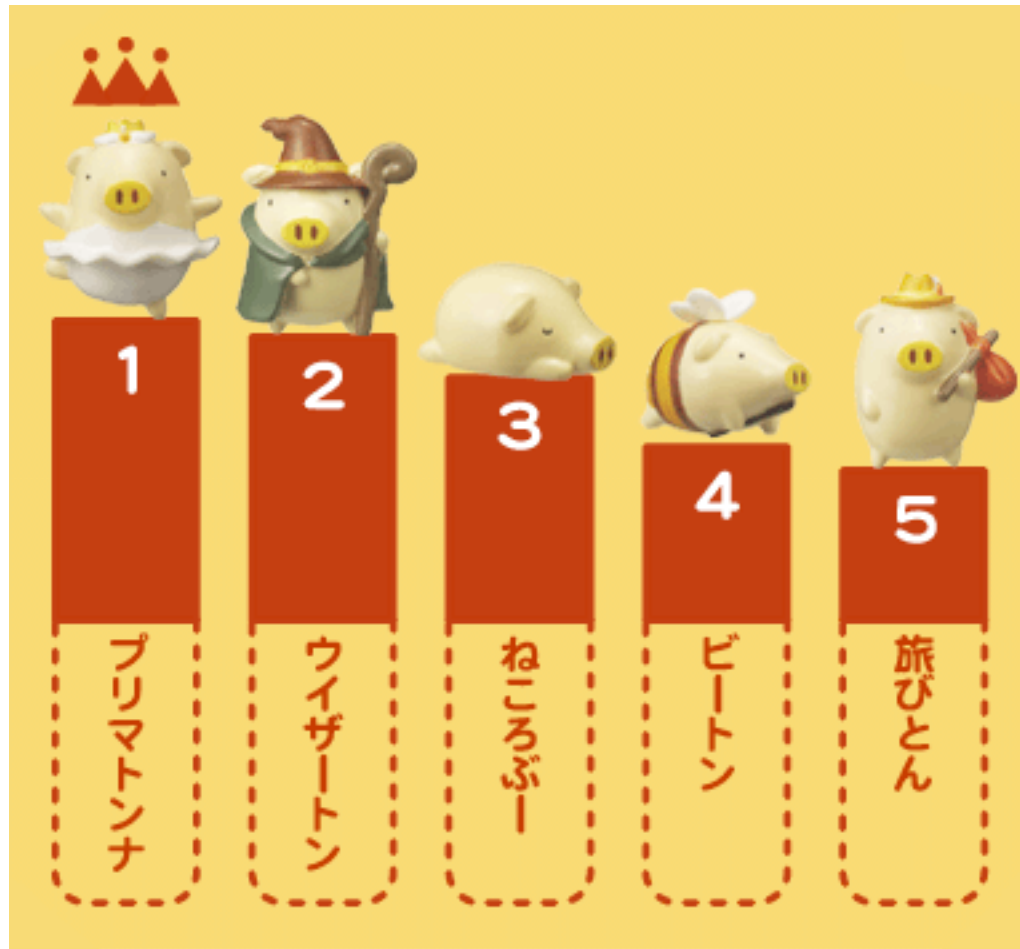
· good note | 0

Updated 13 minutes ago by Atri Rudra

HW 5 grading

Should be done by today

Rankings



How close are two rankings?

Google [Advanced Search](#)

Web [Show options...](#) Results 1 - 10 of about 23,700,000 for compare rankings. (0.30 seconds)

Comparison Reviews Sponsored Link
[Angleslist.com](#) Your neighbors' ratings on local service companies. Award-winning.

Ranking - Wikipedia, the free encyclopedia
In competition **ranking**, items that **compare** equal receive the same **ranking** number, and then a gap is left in the **ranking** numbers. The number of **ranking** ...
[en.wikipedia.org/wiki/Ranking](#) - [Cached](#) - [Similar](#) - [Print](#) - [Share](#)

A Comparison of Ranking Methods for Classification Algorithm Selection
is based on Spearman's rank correlation coefficient. To **compare ranking** methods, a combination of Friedman's test and Dunn's multiple com- ...
[www.springerlink.com/ndex/mh87p44744x7Q258.pdf](#) - [Similar](#) - [Print](#) - [Share](#)
by PB Brazdil - 2000 - [Cited by 46](#) - [Related articles](#)

College Football Ranking Comparison
College Football **Ranking** Comparison. Sunday, November 8, 2009 (127 **Rankings**). | Last Week | Archived | FBS | FCS | Summary | CSV Data | ...
[www.masseyratings.com/cf/compare.htm](#) - [Cached](#) - [Similar](#) - [Print](#) - [Share](#)

College Basketball Ranking Comparison
Monday, April 6, 2009 (36 **Rankings**) Cor 923 810 923 898 819 868 888 777 839 899 880
243 246 245 248 241 251 247 249 248 244 **Ranking** Violation % 254 ...
[www.masseyratings.com/cb/compare.htm](#) - [Cached](#) - [Print](#) - [Share](#)

FIFA.com - Compare Teams
With FIFA.com you can **compare** the progress of up to four teams in the FIFA/Coca-Cola World **Ranking**. See how teams have risen and fallen since August 1993 ...
[www.fifa.com/.../ranking/compare/compareteams.html](#) - [Cached](#) - [Similar](#) - [Print](#) - [Share](#)

GetEducated.com | Rate, Rank & Compare Online Colleges & Degrees
GetEducated.com's directory of online degrees provides **rankings**, ratings, and comparison tools to help you choose the best online degrees from the best ...
[www.geteducated.com/](#) - [Cached](#) - [Similar](#) - [Print](#) - [Share](#)

Compare your website rankings in Google Caffeine « Advanced Web ...
Aug 18, 2009 ... To help you **compare** your website **rankings** from Google with the **rankings** from Google Caffeine we have created a quick step-by-step tutorial

Web Images Videos Shopping News Maps More MSN Hotmail

bing

ALL RESULTS ALL RESULTS 1-10 of 8,810,000 results · [Advanced](#)

FIFA.com - Compare Teams
With FIFA.com you can **compare** the progress of up to four teams in the FIFA/Coca-Cola World **Ranking**. See how teams have risen and fallen since August 1993 and pinpoint their ...
[www.fifa.com/worldfootball/ranking/compare/compareteams.html](#) · [Cached page](#)

How to Compare Graduate School Rankings | eHow.com
Choosing a graduate school can be a stressful and confusing process for any student. By comparing graduate schools and their **rankings** a student can choose which one fits her ...
By eHow Education Editor · Difficulty: Moderate · 0 posts
[www.ehow.com/how_2051516_compare-graduate-school-rankings.html](#) · [Cached page](#)

Ranking - Wikipedia, the free encyclopedia
Items that **compare** equal receive the same **ranking** number, which is the mean of what they would have under ordinal **rankings**. Equivalently, the **ranking** number of 1 plus the number of ...
[en.wikipedia.org/wiki/Ranking](#) · [Enhanced view](#)

Ranking Compare
Ask Google Yahoo Search | Web browser tool – Shows search results for a given keyword or phrase on the top three engines, Google, Yahoo and Msn.
[tools.essential-seo.com/ranking-compare](#) · [Cached page](#)

SchoolDigger.com - School Rankings, Reviews and More - Public and ...
Find the best elementary, middle, and high schools. Search for schools near any address, **compare** test scores, sort by school **ranking**, class sizes, and more using SchoolDigger.
[www.schooldigger.com](#) · [Cached page](#)

College and university rankings - Wikipedia, the free encyclopedia
The College and university **rankings** are a lists of universities and liberal arts colleges in higher education, an order determined by any combination of factors.
International ... · Regional and national ... · Criticism (North America)
[en.wikipedia.org/wiki/College_and_university_rankings](#) · [Enhanced view](#)

www.hospitalcompare.hhs.gov
[www.hospitalcompare.hhs.gov/Hospital/Search/SearchCriteria.asp?version=default&browser=IE...](#)

Rest of today's agenda

Formal problem: Counting inversions

Divide and Conquer algorithm

Divide and Conquer

Divide up the problem into at least two sub-problems

Recursively solve the sub-problems

Solve all sub-problems: Mergesort

Solve some sub-problems: Multiplication

Solve stronger sub-problems: Inversions

“Patch up” the solutions to the sub-problems for the final solution

Mergesort-Count algorithm

Input: a_1, a_2, \dots, a_n

Output: Numbers in sorted order+ #inversion

MergeSortCount(a, n)

If $n = 1$ return (0 , a_1)

If $n = 2$ return ($a_1 > a_2$, $\min(a_1, a_2)$; $\max(a_1, a_2)$)

$a_L = a_1, \dots, a_{n/2}$ $a_R = a_{n/2+1}, \dots, a_n$

(c_L, a_L) = MergeSortCount($a_L, n/2$)

(c_R, a_R) = MergeSortCount($a_R, n/2$)

(c, a) = MERGE-COUNT(a_L, a_R)

return ($c+c_L+c_R, a$)

$$T(2) = c$$

$$T(n) = 2T(n/2) + cn$$

$O(n \log n)$ time

$O(n)$

Counts #crossing-inversions+
MERGE