

Lecture 2

CSE 331

Aug 30, 2017

Enroll on Piazza

University at Buffalo - Fall 2017

CSE 331: Introduction to Algorithm Analysis and Design

+ Add Syllabus

Course Information

Staff

Resources

Description

Edit

Add a Class Description
Click the Edit button to add a class description.

General Information

Edit

General Information

For your CSE 331 needs go to <http://www-student.cse.buffalo.edu/~atri/cse331/fall17/>

Announcements

+ Add

Recitations start from Monday at 8am!

Edit

Delete

8/23/17 11:39 PM

A reminder that we will have **ALL** recitation take place in first week of class. In particular, we will have recitations at 8am, 9am and noon on Monday even those are before the first lecture.

The first week of recitation will go over proof background.
[View on Piazza](#)

Welcome to CSE 331!

Edit

Delete

<https://piazza.com/buffalo/fall2017/cse331/>

Read the syllabus CAREFULLY!

No graded material will be handed back till you submit a signed form!

CSE 331

Introduction to Algorithm Analysis and Design

Fall 2017

University at Buffalo

Department of Computer Science & Engineering

CSE 331 — Introduction to Algorithm Analysis and Design

-
- Make sure you fill in form **with a pen**.
 - After you have filled in the form, scan it and upload it to Autolab.
-

I, _____ (PRINT name), acknowledge that I have read and understood the syllabus (and the homework policy document) for this course, CSE 331 *Introduction to Algorithm Analysis and Design*.

You can submit HW 0 + form now

Assignments

Homework 0

Q1 (Sorting)

Q2 (Perfect Matchings)

Syllabus Form

Upload form

Autolab FAQ

note ☆ 1 views Actions

Autolab FAQ

As I mentioned in [@11](#), the [Autolab](#) page will have details on various things related to Autolab. Unfortunately, the update of the page has been delayed: we now expect this to be done by Thursday.

In the meantime, this post will collect some relevant info:

- There is a walkthrough video on how to submit on Autolab: [@13](#)
- How to report issues on Autolab: [@23](#)
- If you get an error of the form

```
An error occurred while parsing the autoresult returned by the Autograder.
```

then the most likely result is that your code is taking more than 180s on all the 10 inputs. Look for the following line in the output:

```
Autodriver: Job timed out after 180 seconds
```

- If you do not see the timed out message, please show us a screenshot/copy of the Autolab output on piazza.

#pin

[logistics](#) [autolab](#)

Allowed Sources

Allowed sources

You can **ONLY** use the following sources for reference once you start working on the homework problems:

1. the Kleinberg-Tardos textbook,

Other textbooks are not allowed

While you can use other textbooks (e.g. those listed in the [syllabus](#)) to better understand the lecture material, you cannot use them once you start working on the homeworks.

2. any material linked from this webpage or the CSE 331 piazza page (including any discussion in the Q&A section),

One-click rule

When using webpages that are allowed as sources, you cannot click on link on that source. (Otherwise within a constant number of clicks one can reach any webpage one wants.)

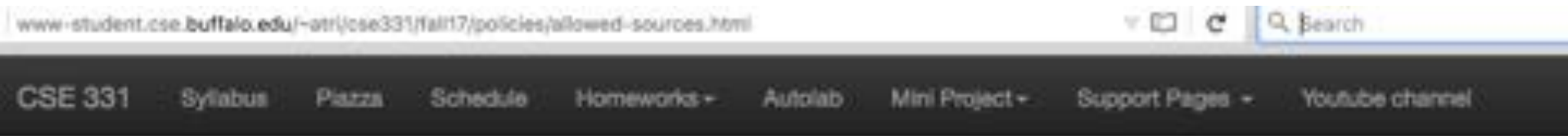
3. specific mathematical result from a previous course,
4. anything discussed in the lectures, recitations and/or office hours and
5. any notes that you might have taken during class or recitation.

Everything else is not allowed

Note that the above list covers all the allowed sources and **everything else is not allowed**. In particular, **YOU ARE NOT SUPPOSED TO SEARCH FOR SOLUTIONS ON THE**

... even for programming Q

<http://www-student.cse.buffalo.edu/~atri/cse331/fall17/policies/allowed-sources.html>



Basic programming references

C++ Sources

- [cppreference.com](#)

Java Sources

- [Oracle Java Documentation](#)

Python Sources

- [Python 3.5.2 documentation](#)

Asymptotic Analysis

- [Big-O cheat sheet](#)

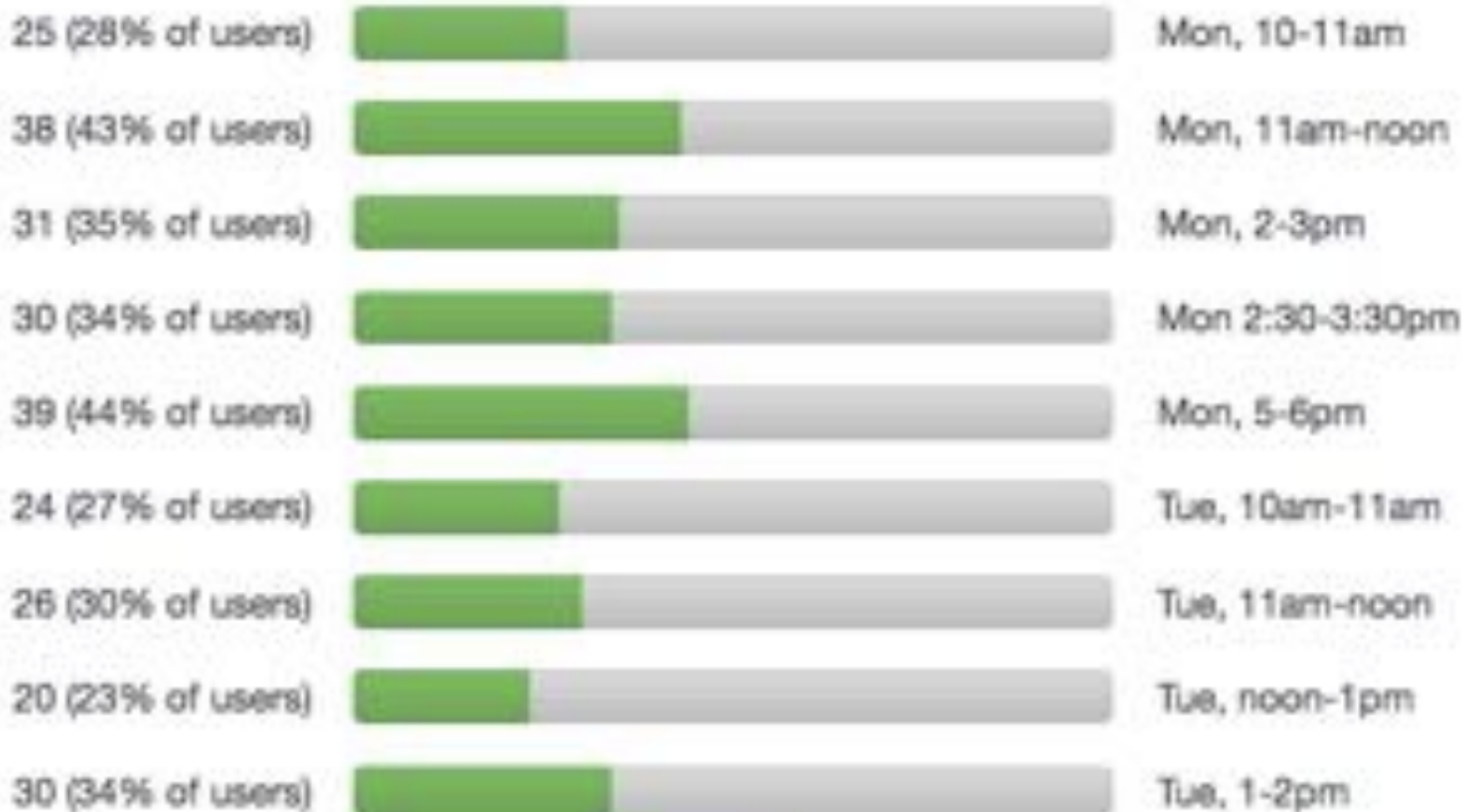
Wikipedia Pages

Below are some approved Wikipedia pages (in addition to those that are already linked to in other pages in the CSE 331 Fall 2017 web page.

TA Office hours finalized today

Vote for TA office hours closes in 3 day(s)

A total of 88 vote(s) in 74 hours



Questions/Comments?



Let the fun begin!



Who is Algorithm named after?

Abū ‘Abd Allāh Muhammad ibn Mūsā al-Khwārizmī

9th century Persian astronomer/mathematician

825 AD: “On Calculation with Arabic Numerals”



Latin translation 12th century

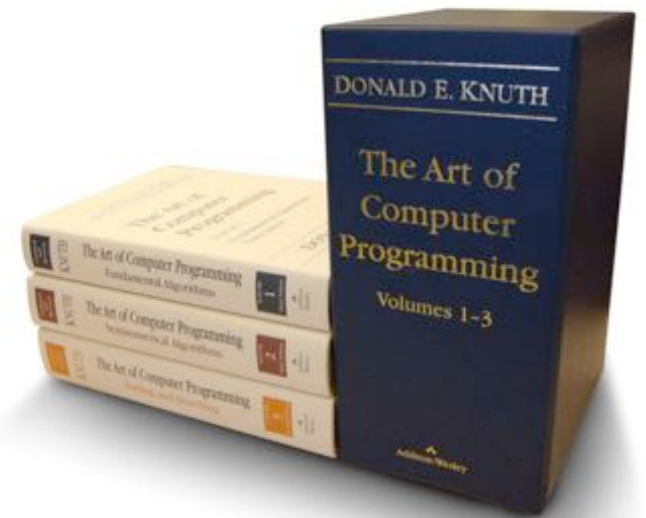
“Algorithmi de numero Indorum”




What are Algorithms?



Don Knuth





Don Knuth Reward Checks


 DONALD E. KNUTH
COMPUTER SCIENCE DEPARTMENT
STANFORD UNIVERSITY
STANFORD, CA 94305-9043

432

DATE 29 Oct 2008

DEPOSIT TO THE ACCOUNT OF Tony Lu 0x\$ 1.00

One and  100/256 HEXADECIMAL DOLLARS 

 BANK OF SAN SERRIFFE
Thirty Points, Calissa Inferiorum
<http://www-cs-faculty.stanford.edu/~knuth/boss.html>

MEMO f2b.135 Donald Knuth

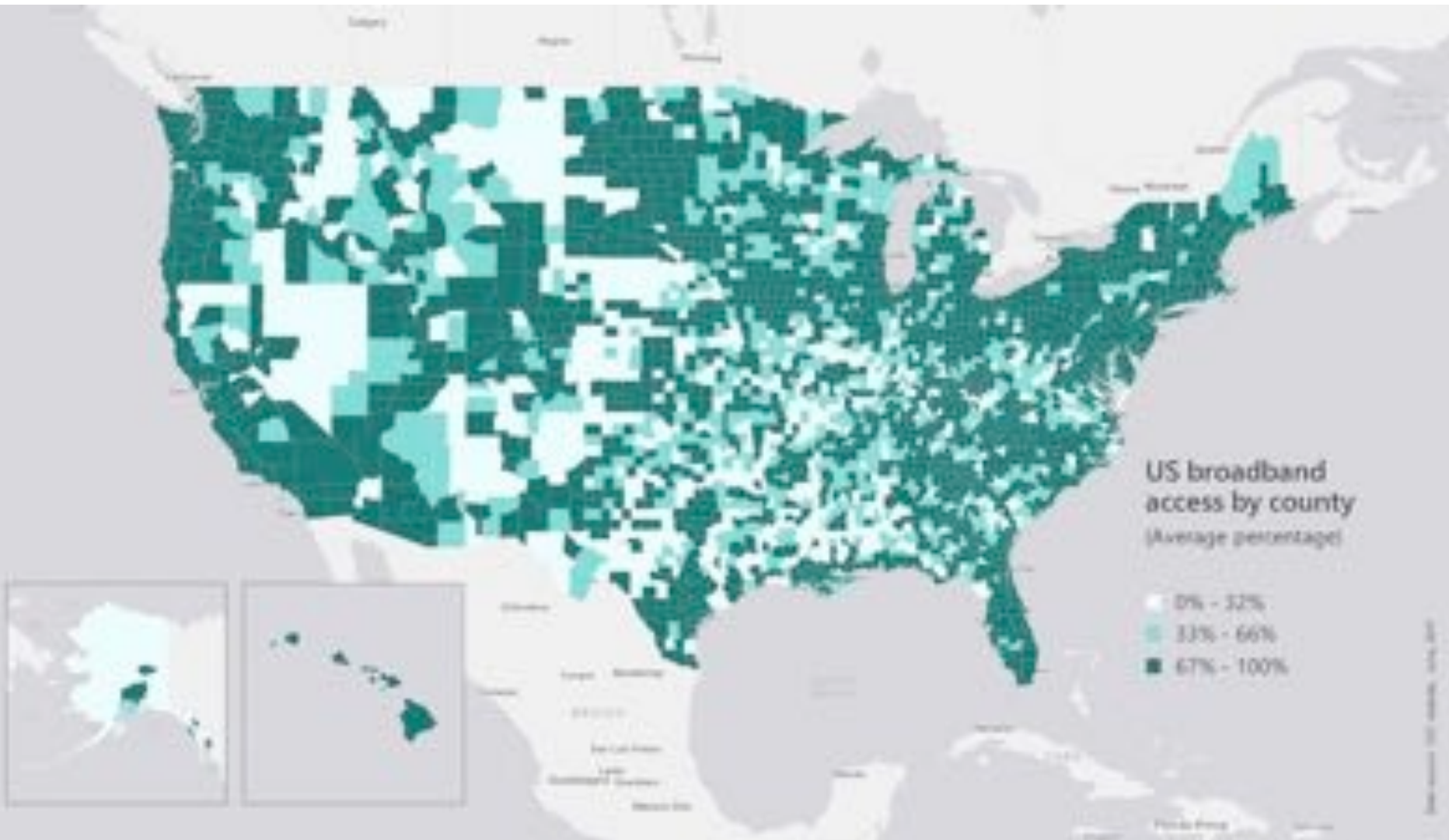
Knuth's Definition

An algorithm is a finite, definitive, effective procedure with some input and some output

Remember: Stick with your group

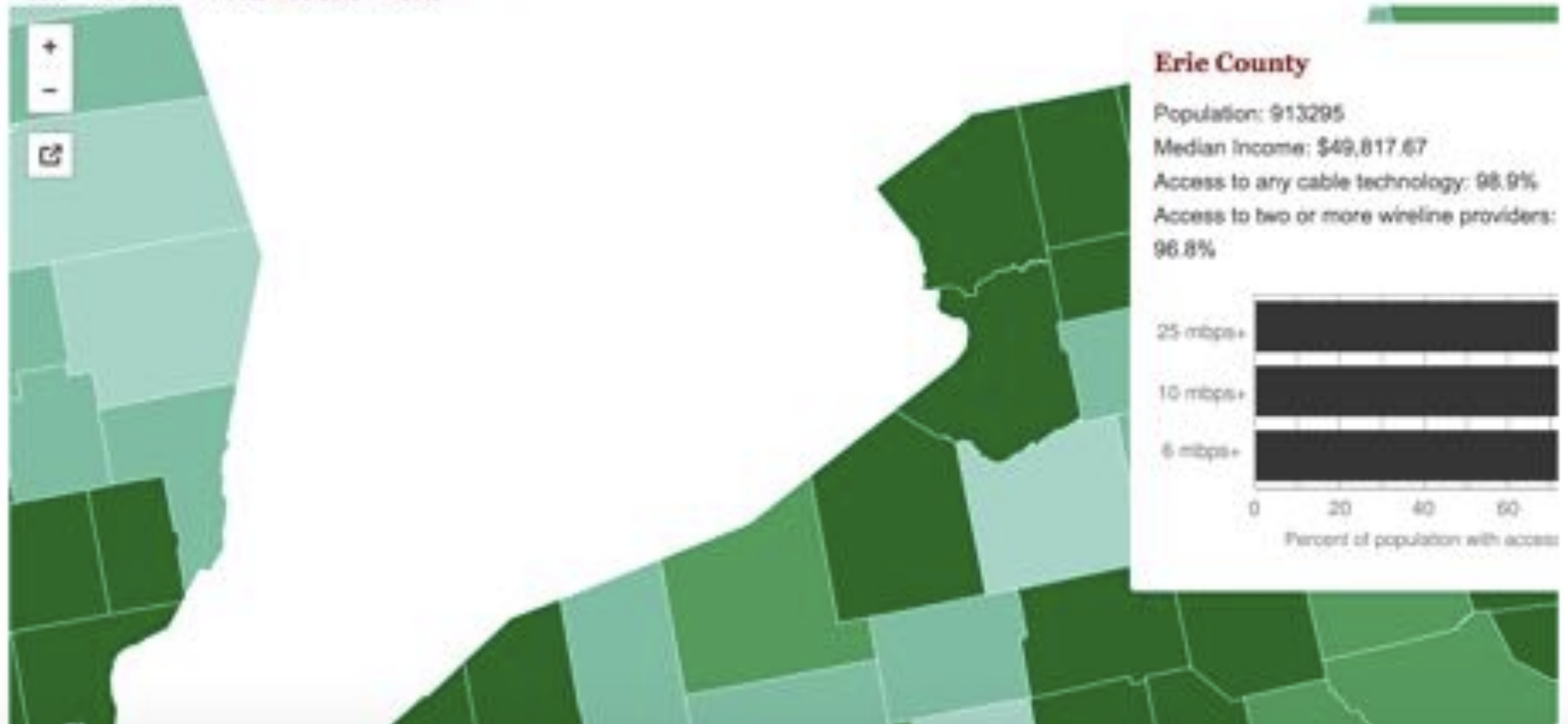


Broadband access



Erie county is reasonably good

Population with access to advertised download speeds at least 6mbps



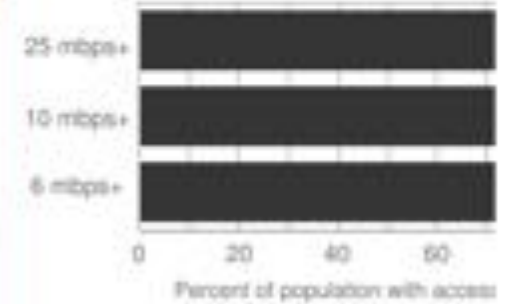
Erie County

Population: 913295

Median Income: \$49,817.67

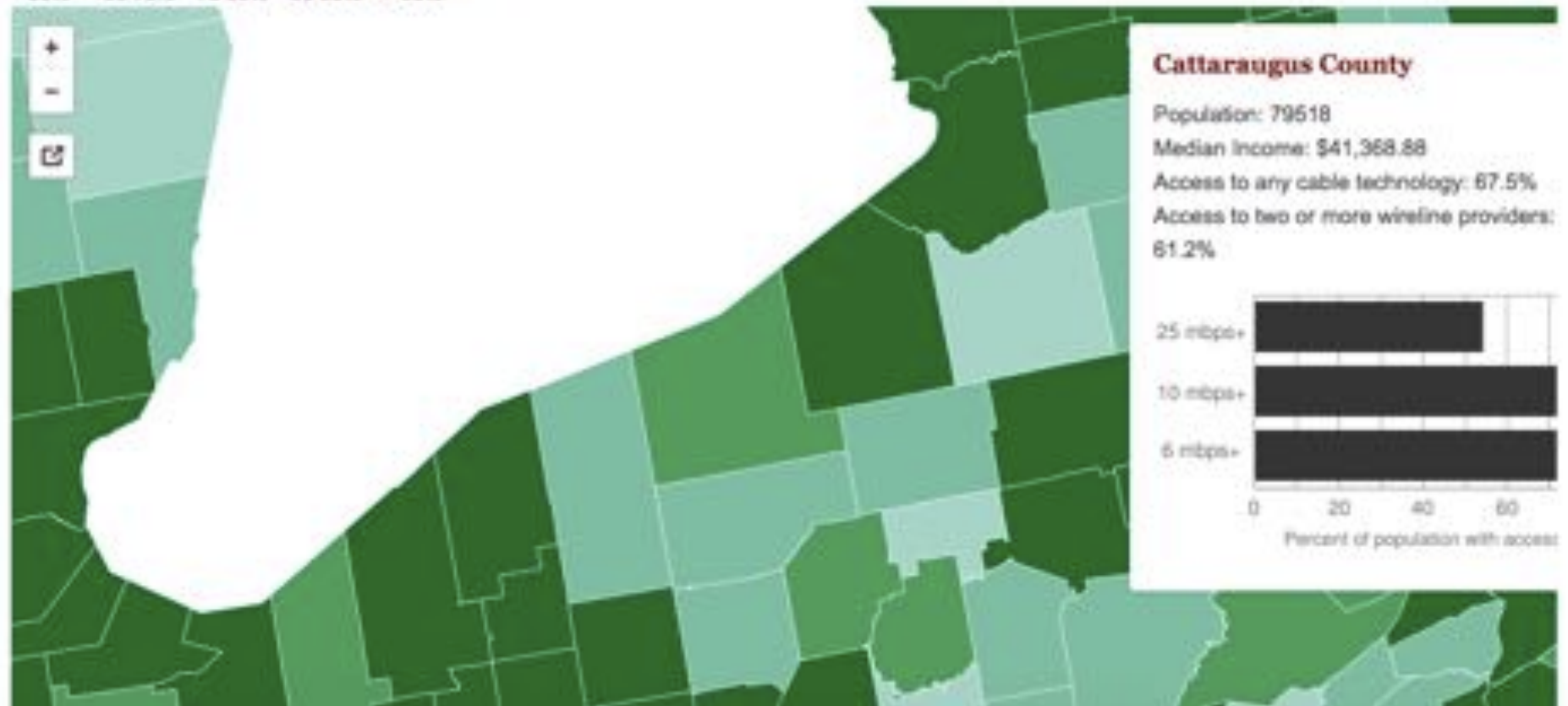
Access to any cable technology: 98.9%

Access to two or more wireline providers: 96.8%



One county over

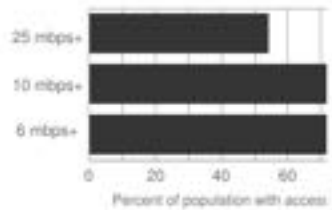
Population with access to advertised download speeds at least 6mbps



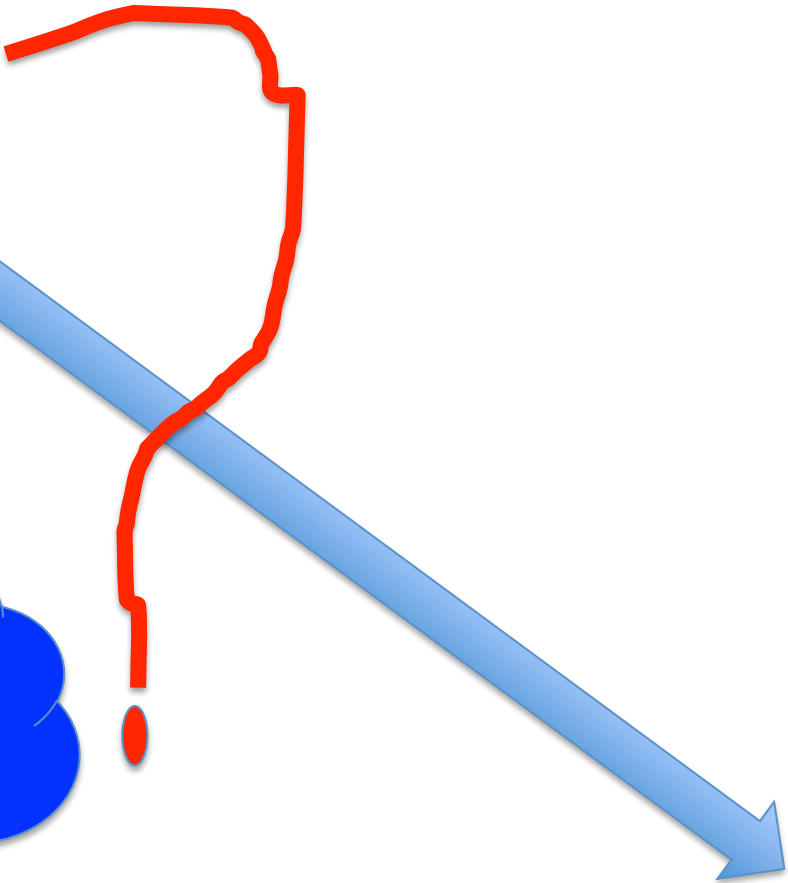
Make broadband more available

Cattaraugus County

Population: 79518
Median Income: \$41,368.88
Access to any cable technology: 67.5%
Access to two or more wireline providers: 61.2%

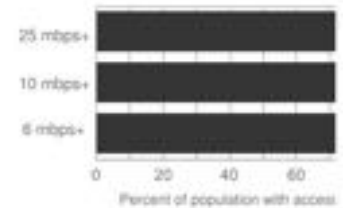


Say you are tasked to come up with the infrastructure

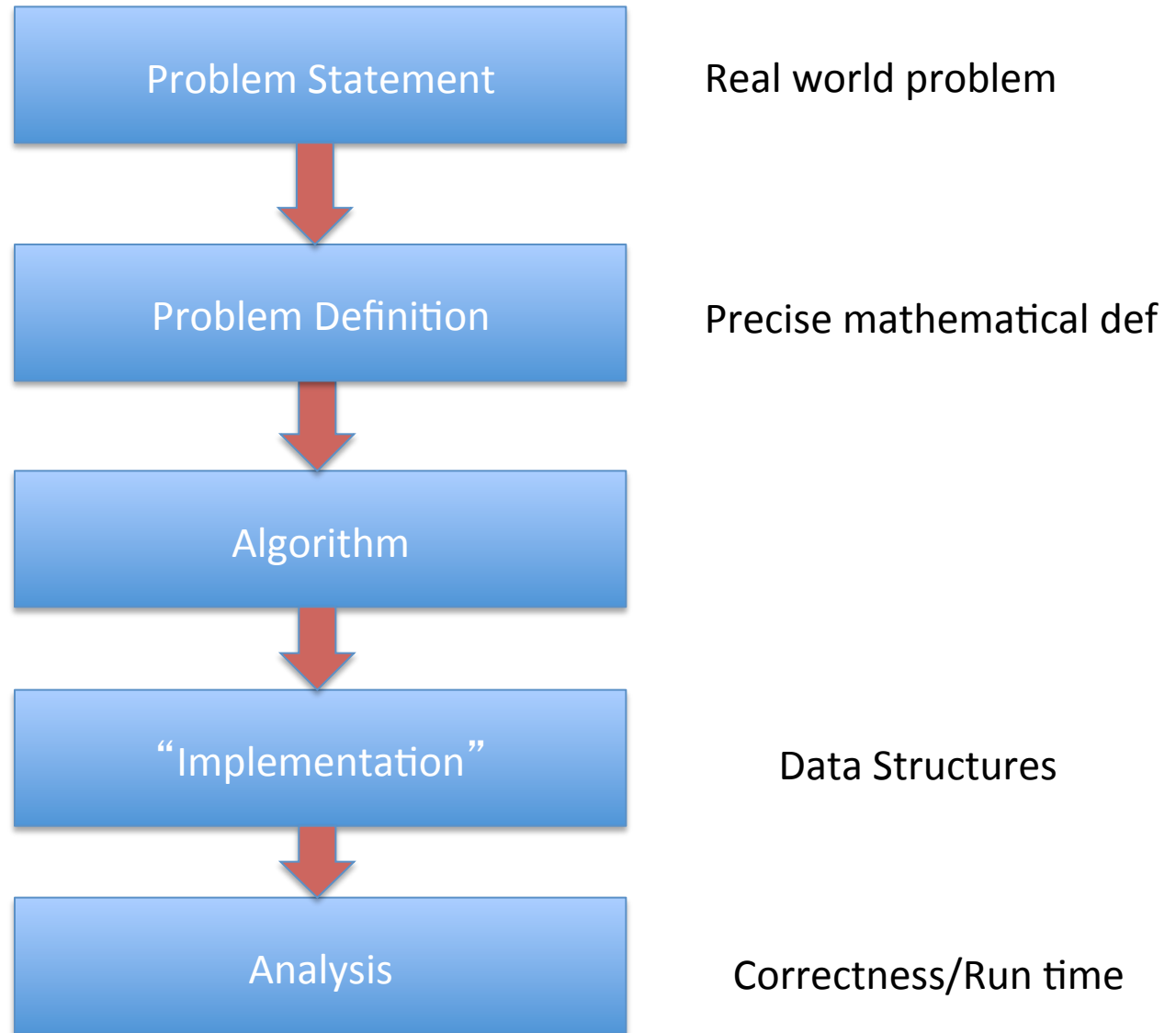


Erie County

Population: 913296
Median Income: \$49,817.67
Access to any cable technology: 98.9%
Access to two or more wireline providers: 96.8%



Main Steps in Algorithm Design



Worst-case analysis

Correctness should hold for every valid input



Why worst-case?

Resource usage by the worst-possible input



What
resources?

Questions/Comments?



National Resident Matching

THE MATCH
NATIONAL RESIDENT MATCHING PROGRAM

RESIDENCY

FELLOWSHIP

POLICIES

DATA AND REPORTS

ABOUT

Search

MATCH CALENDARS

LOGIN/REGISTER

Preparing for #Match2018?

Frequently
Asked
Question

An NRMP ID is
NOT Required for
Submitting Your
Applications

[>> Learn more](#)

WHAT'S HAPPENING

- Check the Eligibility of Applicants
- Registration Open for Adolescent Medicine, Medical Toxicology, and Headache Medicine
- Timely Residency Applicant Resources
- Registration Open for Colon & Rectal Surgery, Medical Genetics, Sleep Medicine, and Spinal Cord Injury

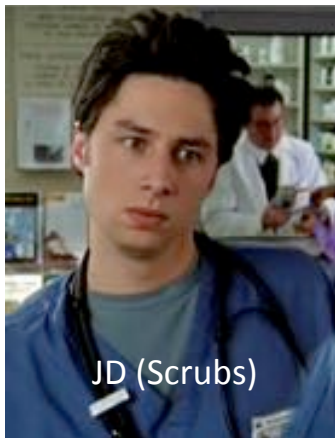
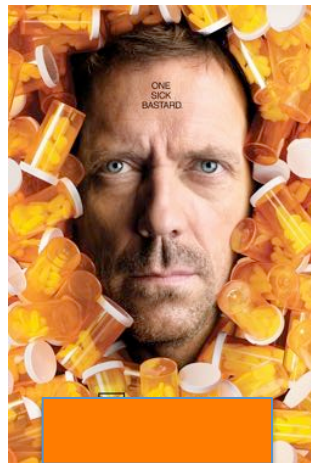
[READ MORE](#)



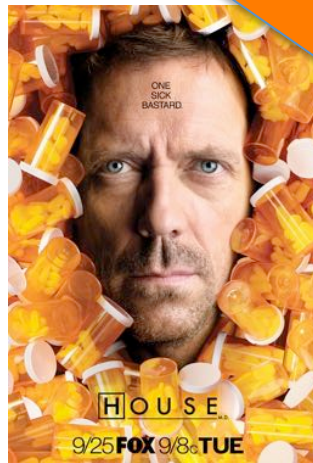
VIDEO: The Match Process for Applicants



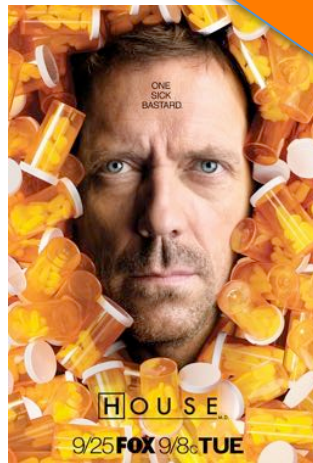
(Screen) Docs are coming to BUF



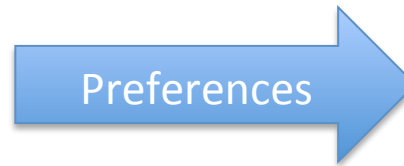
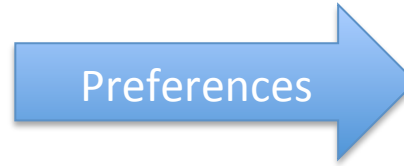
What can go wrong?



The situation is unstable!



What happens in real life



NRMP plays matchmaker



Stable Matching Problem



David Gale



Lloyd Shapley