

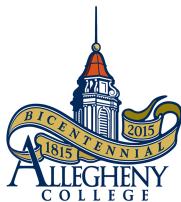
CS202 - Algorithm Analysis

An Introduction

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Allegheny College

February 23, 2021



Meeting Time

- Lecture Session:
 - Monday and Wednesday
9:20 AM - 10:20 AM, (remote)
- Lab Session:
 - Thursday 2:50 PM - 4:20 PM, (remote)
- Practical Session:
 - Friday 9:20 AM - 10:20 AM, (remote)

Professor's Office Hours

- Mondays, Tuesdays, Wednesdays, and Thursdays:
10:30 AM - 12:00 PM

Email/slack to schedule time outside office hours.

To schedule an office hours time slot, please visit my website [teaching page] and click on the **Schedule Meeting** link located on the top right-hand corner to schedule 15 mins slots.

Let us connect with each other and enjoy our time together...

- **Professor's Website:**

`https://www.cs.allegheeny.edu/sites/amohan/`

- **Course Website:**

`https://www.cs.allegheeny.edu/sites/amohan/course.php?cid=MTM=`

Administrative Stuff!

- No Lab this week.

First lab next week on Thu, 4th Mar 2021.

- No Class on March 10th, 2021 (college break)
- No Lab on March 25th, 2021 (midterm prep)
- Midterm Exam during lab time, on April 1st, 2021
- Finals at 2:00 PM, on May 17th, 2021 (exam code - A)
- Please verify if you are correctly registered for the course using Self Service.

More Administrative Stuff!

Lab Assignments	25%
Skill Tests	10%
Midterm Exam	10%
Final Exam	15%
Course Project	20%
Practicals	10%
Class Participation	10%

Please read the **Syllabus** to get an overview of the course.

Tips for Success

- Attentively listen to classes and try to participate in all class discussions.
- Bring a notebook with you and start making detailed notes during every class period.
- Clarify with the Professor, if a lesson is confusing.
- Complete all the reading assignments thoroughly.
- Do the in-class exercises efficiently.

Be ready to **think**, **process**, and **learn** visually in this course!

Interaction between us...

- Any question is a valid question. There is no question which is good and bad. So, questions are always welcome.
- Interaction is the best way to get rid of long lectures. So, let us try to interact more so that the communication is a two way process and the class is not boring.

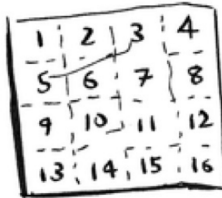
Let us work together to make sure we retain
Algorithmic Knowledge from this course.

What is an Algorithm?

- An algorithm is a finite set of instructions that if followed, accomplishes a particular task.
- Algorithm is written to make something **fast**, and/or **solve some interesting problems**.

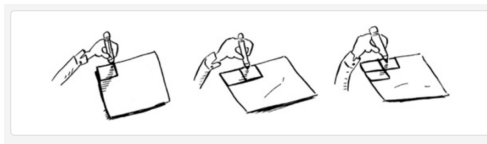
The word Algorithm comes from the name of a Persian author, **Abu Jafar Mohammed ibn Musa al Khowarizmi**.

A Practical Example



- Draw a grid of 16 boxes as shown in the figure above.
- Come up with an Algorithm to solve this problem?

A Practical Example



- **Algorithm 1:** One way to do this is to draw 16 boxes, one at a time.
- It takes **16** steps to complete this task.

A Practical Example



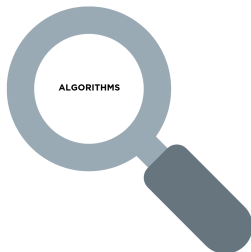
Can we solve this problem faster? **How?**

Sorting Algorithms



- **Sorting:** For example, sorting music playlist data and rank the songs based on user's interest.
- For example, sorting patient data and rank the patients based on their severity level.
- and more ...

What Algorithmic Problems do we learn?



- **Searching:** For example, searching a phone book and finding the phone number associated with a person.
- Searching for a patient's history and finding if the patient had any allergies to medications.
- and more . . .

What Algorithmic Problems do we learn?



- **Graph:** For example, finding the shortest distance between two locations (similar to GPS!)
- Recommend friends based on a person's connections in a friend's network. (similar to Facebook!)
- and more . . .

TEXT

- **String Algorithms:** For example, finding longest common subsequence in Strings.
- and more . . .

By end of this course, you'll in general

- Master a variety of algorithms.
- Be well equipped to learn advanced algorithms in the field of AI, Databases, Cloud Computing, and so on ...
- Be prepared to take on bigger challenges on your senior thesis and at work after graduation.

What do we do in Labs?

- Combination of individual and team-based labs.
- Solve algorithmic problems in a non-programmatic manner.
- Develop algorithms using Programming Languages.
- Compare the performance of algorithms using Charts.

Students may use Python or Java to implement the algorithms.

Getting to know each other!

Talk to your peers and brainstorm ideas to come up with at least one Algorithm to solve a problem?

- Sign up for course slack channel. (Link accessible at the course webpage!)
- Post your first Slack message. Individually summarize your Algorithmic idea and post a message.
- Read the Syllabus before next class.