Who Am I?

- I join CSE@MSU in 2016.
- I am working on Algorithms and the applications in real world.
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• I am working on Algorithms and the applications in real world.

• I am NOT a harsh teacher.
What Is Algorithm?

- Algorithm is a set of operations in a step-by-step fashion.

- What we care about an algorithm:
  1. Time: how many steps?
  2. Space: how much memory space needed?
  3. Quality: how far is it between the output and the objective?

- Example: GPS.
  1. Data: map, starting point and destination.
  2. Objective: a "shortest" path.
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Data → Objective

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Diagram:

Data → Algorithm → Objective

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**Algorithm**

Data → Objective

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**Example**: GPS.

- **Data**: map, starting point and destination.
- **Objective**: a "shortest" path.
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- What we care about an algorithm:
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![Diagram showing Algorithm, Data, and Objective](image_url)
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Why Study Algorithms?
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• Useful:
  1. GPS
  2. Search engine: Google
  3. Recommendation: Amazon, Netflix, Facebook
  4. Prediction: weather, stock, ...
  5. Many other...
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• Probably the most important course for your job interview.
This is not a “programming” course

We will study much deeper:

- How to design an algorithm (a program is an implementation of an algorithm).
- How to analyze an algorithm: the correctness proof, time and space complexities.
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It is more challenging and interesting!
• **Content:** sorting, tree, heap, hashing, graph, greedy algorithm, dynamic programing, approximation algorithms, complexity, etc.
**Syllabus**

- **Content:** sorting, tree, heap, hashing, graph, greedy algorithm, dynamic programing, approximation algorithms, complexity, etc.

- **Grading:**
  - homework $56\% = 7 \times 8\%$ (I will enter the grades into D2L)
  - midterm exam 20%
  - final exam 20%
  - class participation 4%
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• All the homeworks are **paperwork** including algorithms design in pseudo code, analyses, and math proofs.

• Several **optional coding tasks** may be released but not required; the purpose is to help students to understand the algorithms better and get more coding exercise
Office Hours

- Me: 1:30-3:30pm Mon at 2140 EB, huding@msu.edu
- TA (Manni Liu): 3-5pm Wed at 3100 EB, liumanni@msu.edu
- Please feel free to drop by our offices during the office hours or directly email us!

Note: please send a photocopy of your homework to TA's email address each time before the deadline, just for archive.
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About the Slides

- I will post each slides before the class.
- In class, I may use slides or blackboard (if more mathematics/analyses need to be demonstrated).
- You can watch the slides during my lecture, when I use blackboard.