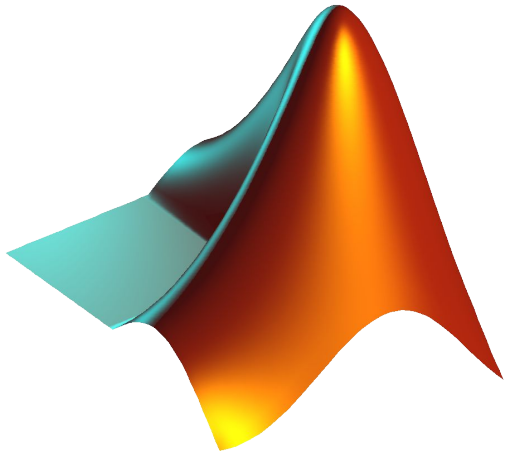
Welcome to CS 1112 Intro to Computing Using MATLAB!



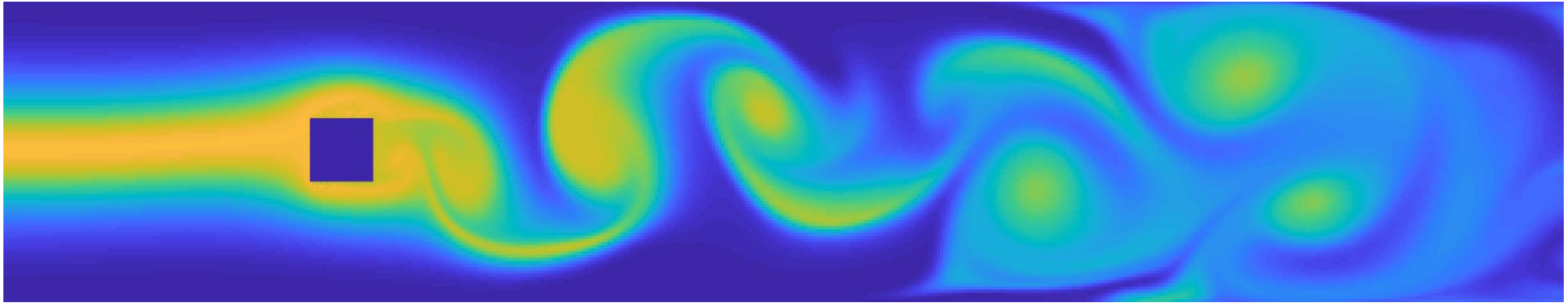
Instructor: Dominic Diaz

Announcements

- Check out the course website: https://www.cs.cornell.edu/courses/cs1112/2022fa/
  - Pay attention to Syllabus
  - Website is public–can read info even if not yet enrolled
- Discussion sections start TOMORROW
  - All sections are in computer labs

Who is Dominic?

PhD student in applied mathematics interested in fluids, machine learning, and birds!



About you… in CS 1112

- Undergraduates, graduates, researchers, and professionals who want (need) to learn computing
- No prior programming experience necessary but some “mathematical maturity”
- You will
  - Learn programming concepts and good programming habits
  - Practice problem analysis and decomposition

CS 1112 or CS 1110?

- Both courses are designed to prepare students for CS 2110 and future computer science courses
- Both teach you programming fundamentals that you use in any other programming language

CS 1112 (MATLAB)	CS 1110 (Python)
● Slight emphasis on scientific computation ● No too much math background required ● Coziness of being a smaller class	● Slight emphasis on software application development ● Stronger math background required ● Huge class

Today’s agenda

- Course syllabus, logistics, and policies (highlights)
- What is computer programming and what is MATLAB?
- An illuminating problem (first MATLAB code!)

CS 1112 Requirements

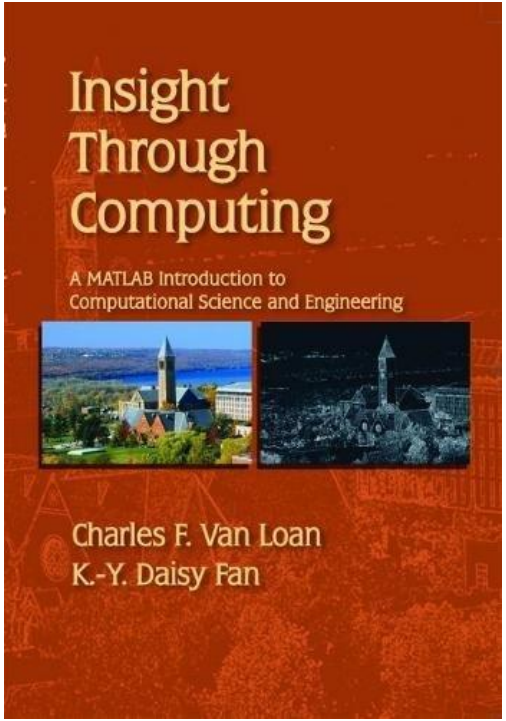
- Attend lecture and answer Poll Everywhere questions
- Attend discussion - complete weekly exercises and get help from course staff
- Do homework: 6 programming projects
- Take 2 preliminary exams and 1 final

How to do well in this class

- Do the *highly recommended* reading
- Find a buddy in the course
- Think about what you've learned after leaving this lecture hall

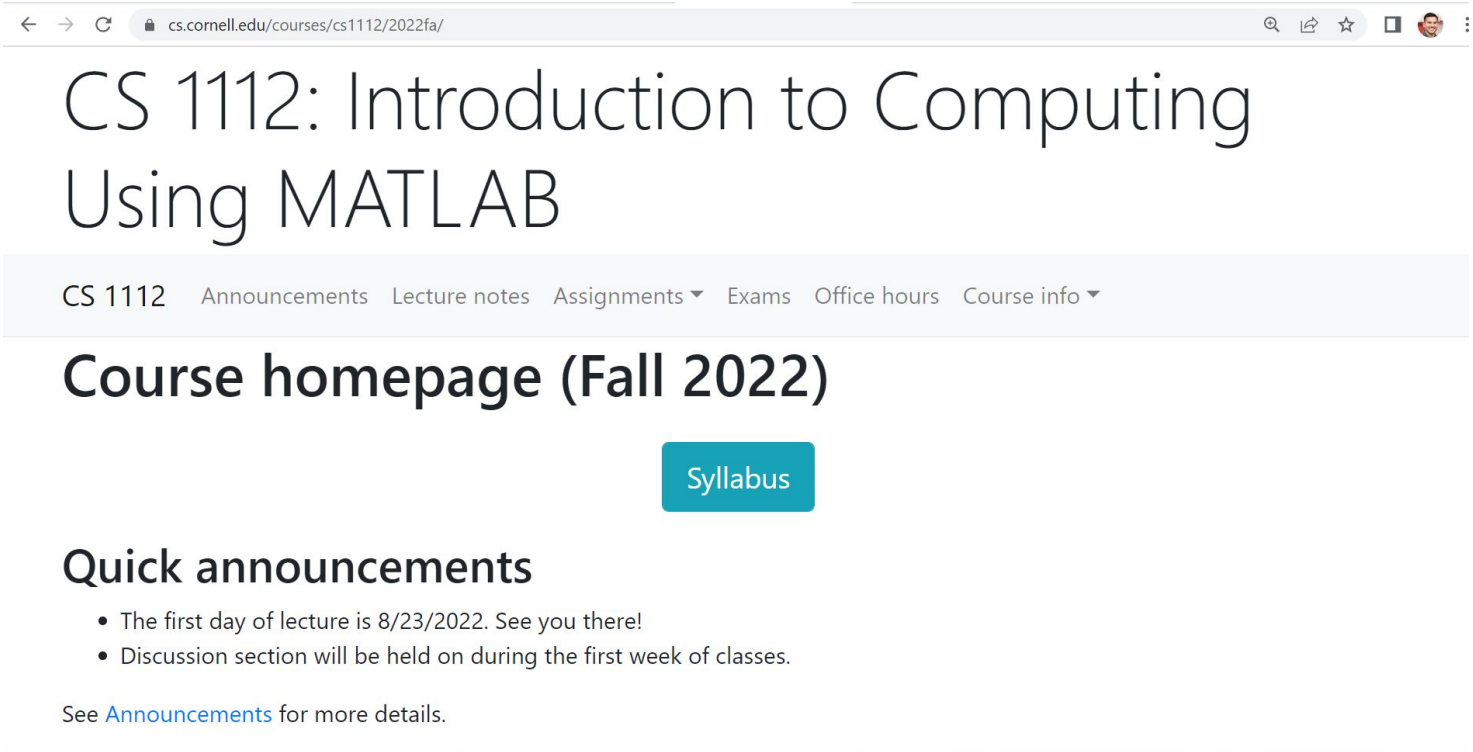
Course Materials

- Insight through Computing: A MATLAB Introduction to Computational Science and Engineering
- MATLAB Student Version
  - Use MATLAB Online or download MATLAB onto your own computer–it's free for students!
  - Tomorrow's discussion section will help you with this



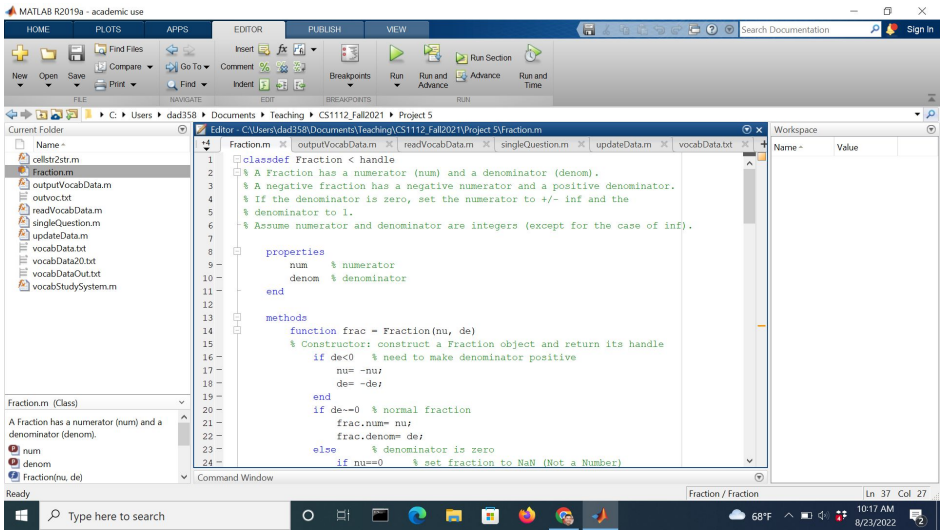
Let’s check out the course website quickly…

https://www.cs.cornell.edu/courses/cs1112/2022fa/



What is computer programming?

- A tool used by computer scientists, engineers, and other professionals
- The process of writing instructions for computing devices and systems.
    - These instructions are written in different languages (for example, MATLAB, Python, …)



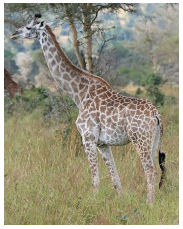
Computer programming in MATLAB

Using MATLAB, you can easily:

- Develop computer programs
- Display results and ideas graphically
- Interact with large data sets (process text, image, other files)

MATLAB has extensive libraries of mathematical, statistical, simulation, and other tools. It is heavily used in engineering and sciences, both in industry and academia.





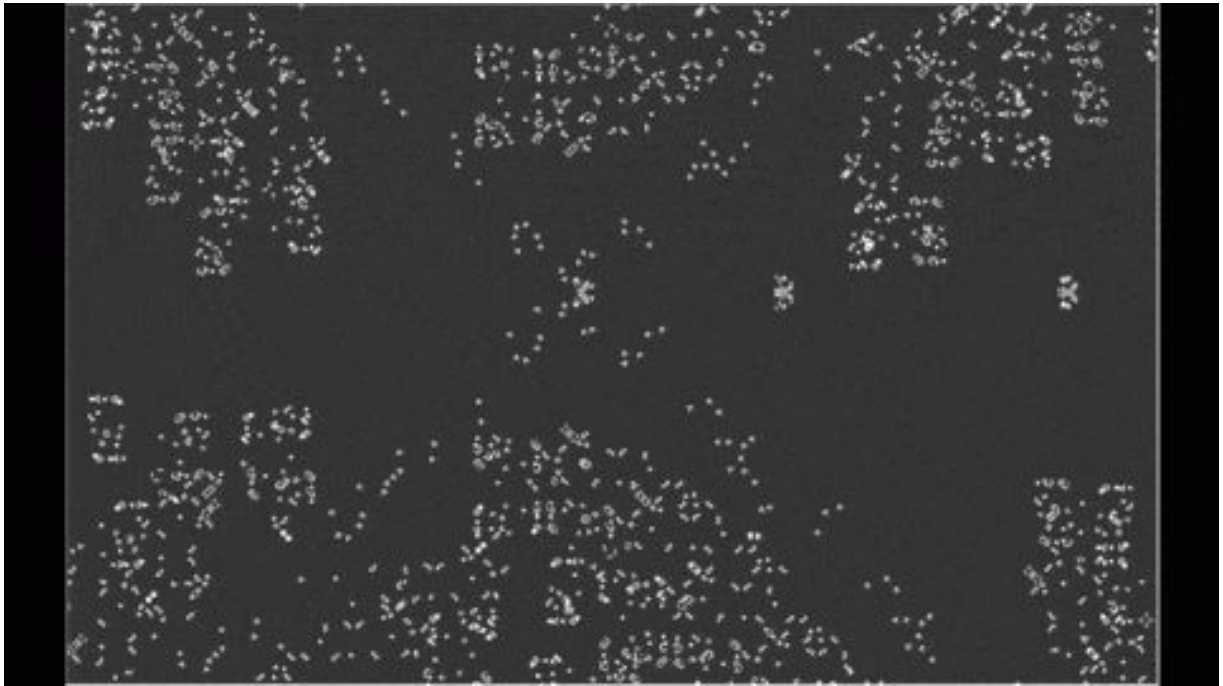
Computer program

Which image shows a lion?

CS 1112 has a focus on computational science and engineering

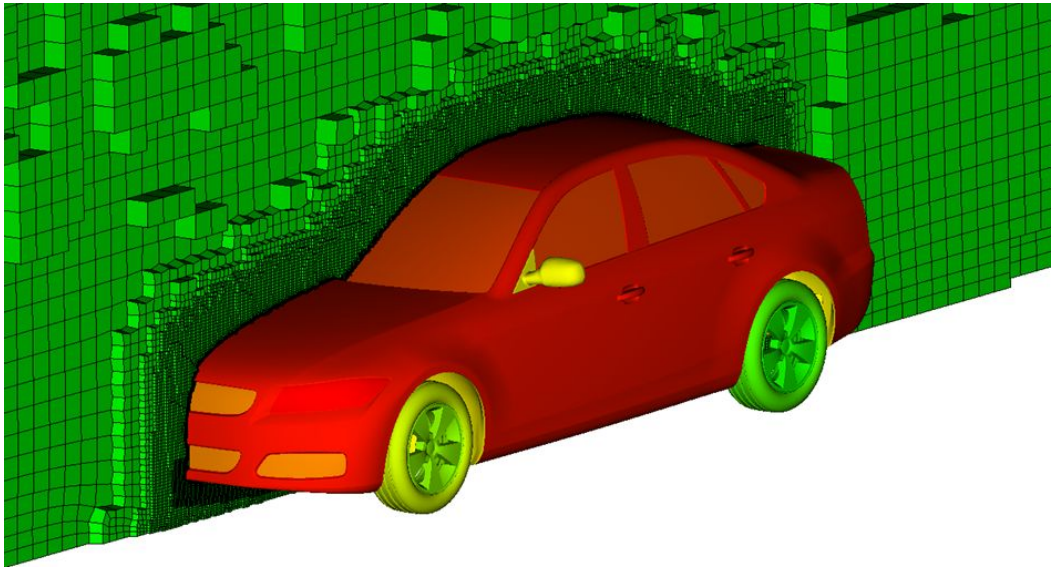
Approximation, randomness,

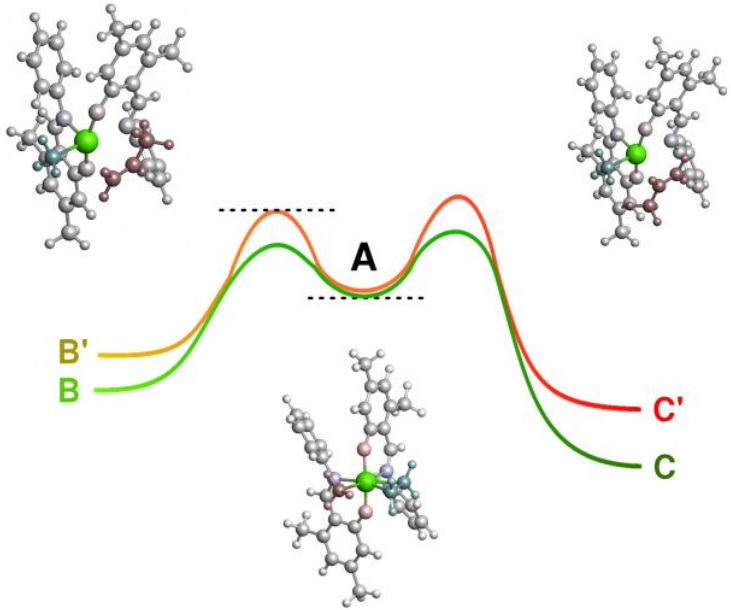
model building, sensitivity of models



By learning the fundamentals in this course you can…

Approximate complex systems with less complex systems





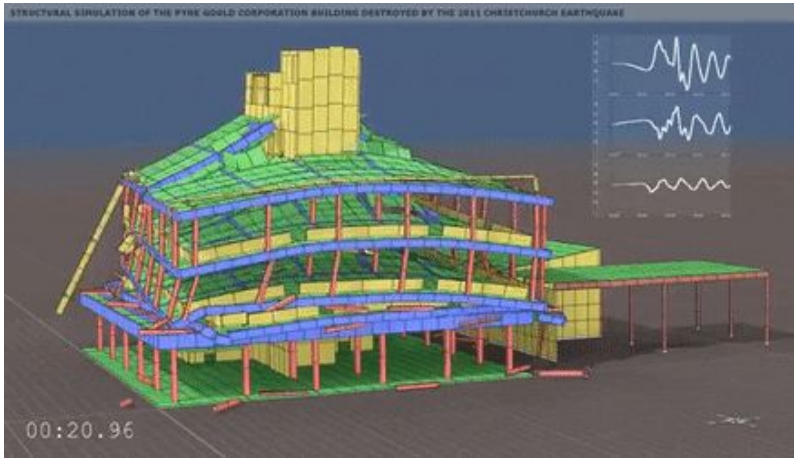
By learning the fundamentals in this course you can…

Analyze the randomness of a system

Gif courtesy of
https://www.presentermedia.com/powerpoint-animation/businessman-shoot-arrows-pid-22888

By learning the fundamentals in this course you can…

Build models to approximate what is happening in the real world

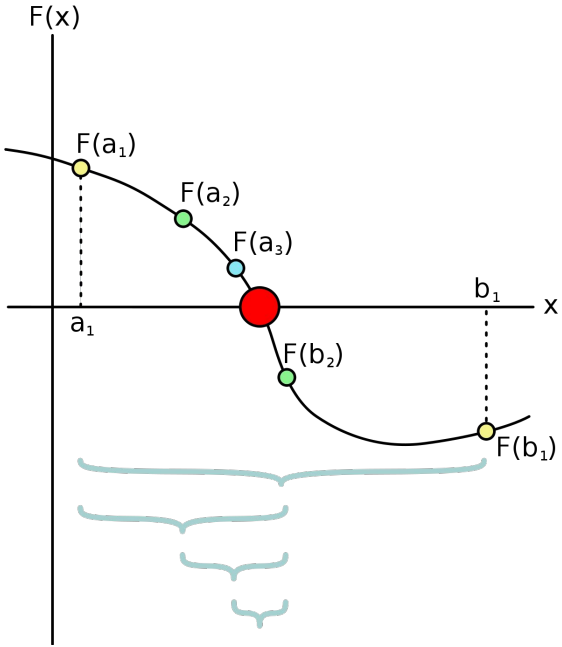


Gif courtesy of https://gfycat.com/deafeningflimsyheterodontosaurus

Some past programming projects in this course

Pointilizing images

Draw the Betsy Ross flag

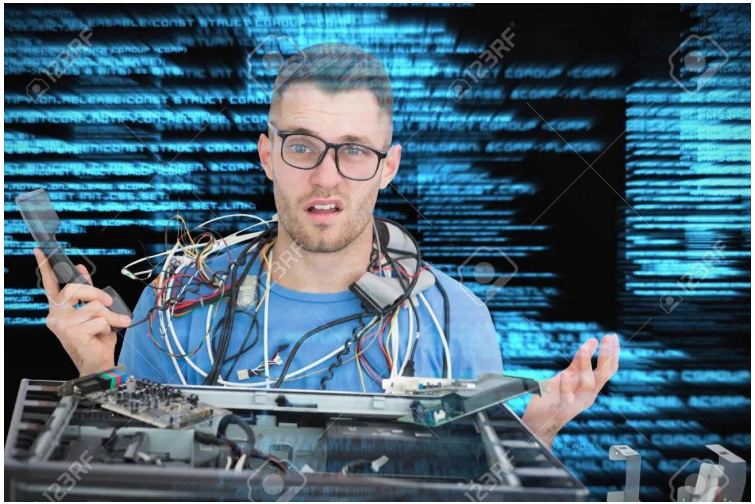


Root finding

Course goals

- Develop your “computational senses”, senses that you need in computer problem-solving
- Develop a facility with the MATLAB programming environment

Help you go from this…



To this!

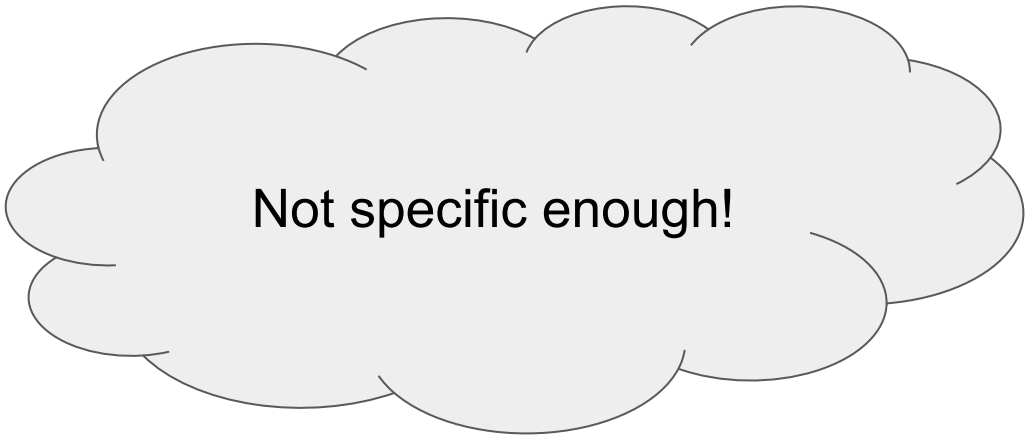
If you were not in lecture, check out the gif here: https://tenor.com/search/ears-hair-gifs

Algorithms and programs?

- Algorithm: A step-by-step procedure that takes you from a prescribed set of inputs to a prescribes set of outputs
- Program: The algorithm expressed in a specific coding language (for example, MATLAB)

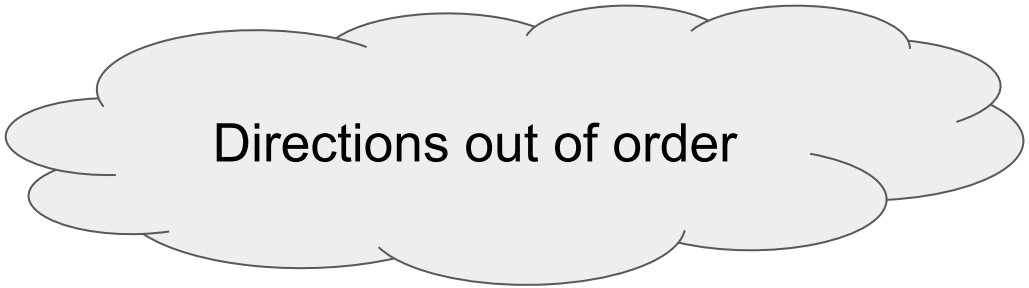
Example: downloading Bad Bunny's new album to apple music

1. Open the app
2. Type "Bad Bunny"
3. Click on the new album
4. Add the album to your library



Example: downloading Bad Bunny's new album to apple music

1. Click "Add to library"
2. Click on "Un Verano Sin Ti"
3. Open Apple Music
4. Click on Search in the bottom right corner
5. Type "Bad Bunny" into the search bar
6. Click on the three dots button on the top right of the screen



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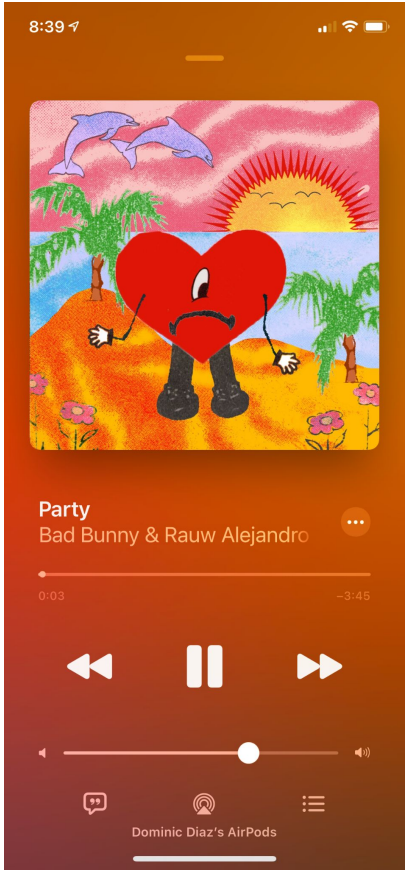
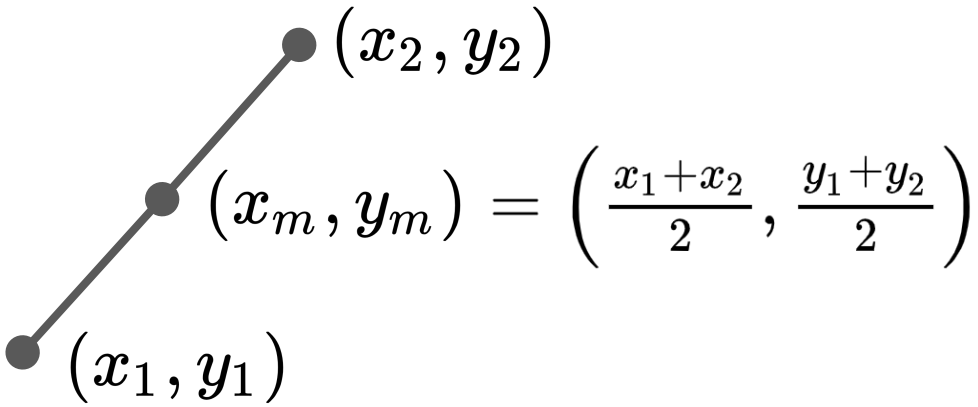
Steps here are good!



Easy example: compute the midpoint of a line



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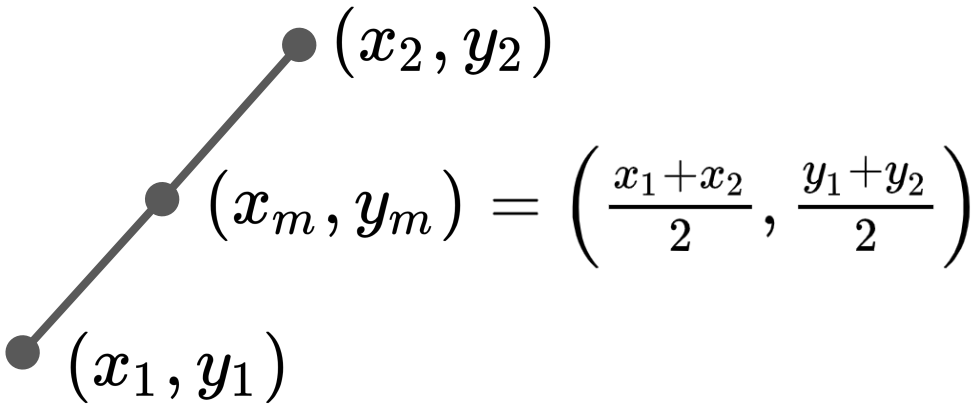


```
% the first point
x1 = 1;
y1 = 1;

% the second point
x2 = 10;
y2 = 3;

% the midpoint
xm = (x1 + x2)/2;
ym = ???
```

What to do now?

- Consider optional Academic Excellence Workshop (AEW)
- Check out course website
- Do the *highly recommended* pre-lecture reading!
- Attend the discussion section in which you are enrolled TOMORROW!