You can access these slides on the course Github:
https://github.com/natrask/ENM1050

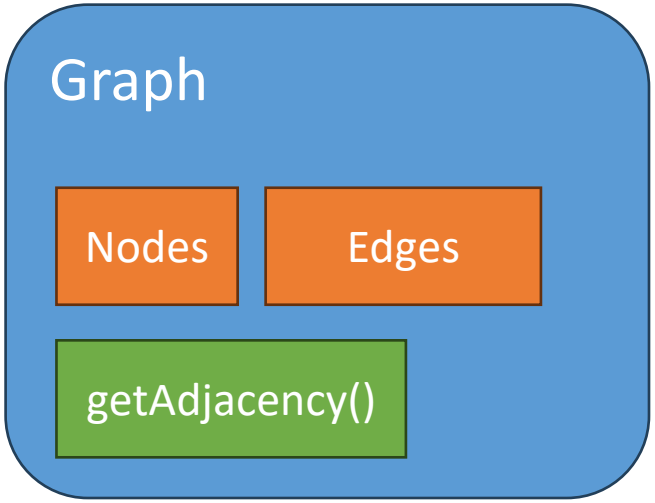
ENGR 1050
Intro to Scientific Computation

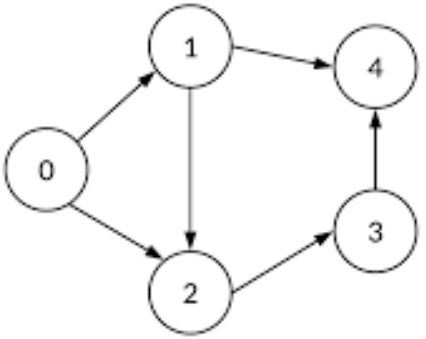
Lecture 07 – Writing code with AI and building animations

Prof. Nat Trask
Mechanical Engineering & Applied Mechanics
University of Pennsylvania

Last time: `classes and graphs`

- **We introduced classes and how they can be used to structure your code and generate specific instances of a generic archetype**
- **We introduced mathematical graphs as an object to describe a bunch of things that are connected**





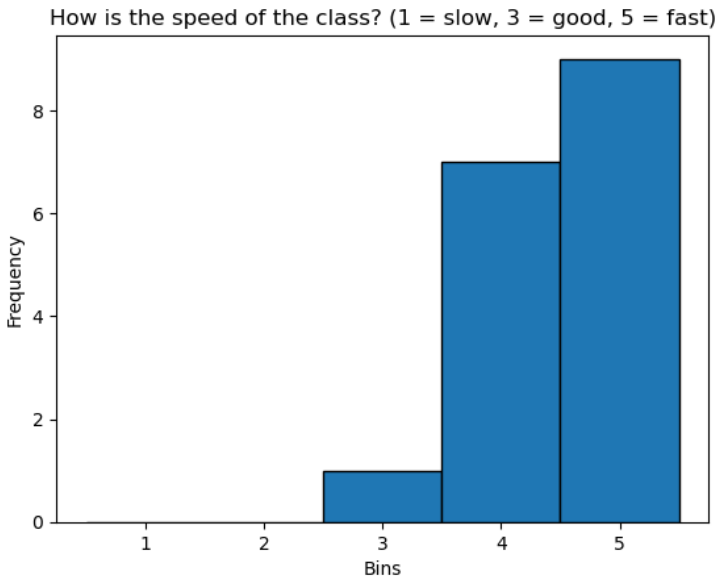
Adjacency Matrix

	0	1	2	3	4
0	0	1	1	0	0
1	0	0	1	0	1
2	0	0	0	1	0
3	0	0	0	0	1
4	0	0	0	0	0

https://docs.python.org/3/tutorial/classes.html

Processing feedback

- **Slowing down**
- **We'll skip HW for this week – enjoy the fall break**
- **We'll do some coding together today to reinforce what we've already covered**
- **We'll come back to the graph stuff from Monday later**



Today

Using AI and Making Animations

Using AI

- Today we'll show explicitly a healthy way to incorporate AI into your code writing
- Two flavors:
  - AI-enabled code completion
  - Interactive prompts with a large language model
- We'll use Gemini (Google's model embedded in G-suite)
- Chat-GPT is another free alternative. Paid include Claude and co-pilot.

Warning

All LLMs are **frequently** wrong

We will use them to help us understand other peoples code and to get basic syntax for common tasks

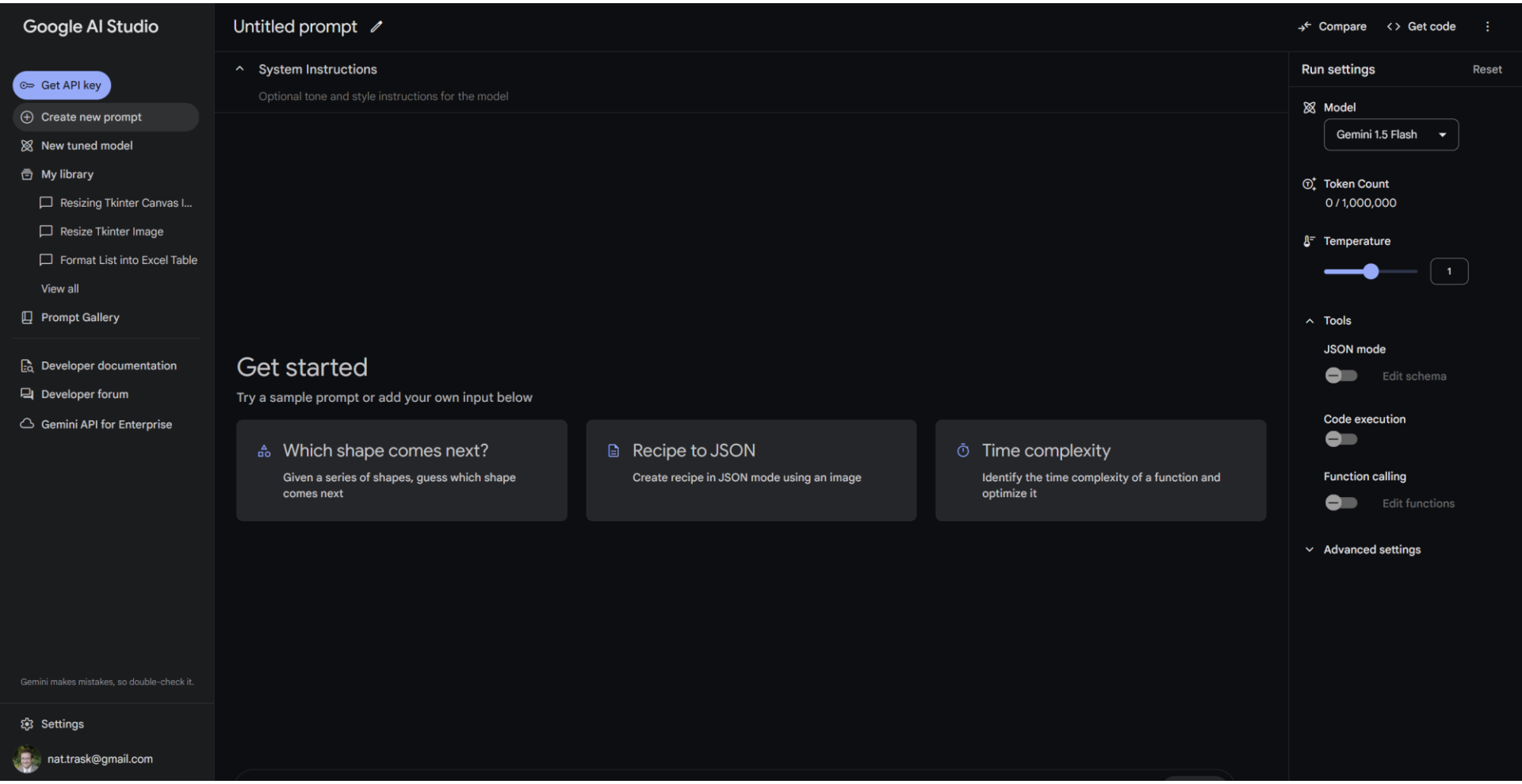
Flavor one: code completion

Link to Collab

Things to keep in mind

- Gemini heavily uses context to determine what you want to be doing. It is reading in the rest of your code to try to infer your desired behavior
- For a blank notebook, there is no context
- LLMs will look to your comments for context in plain english

Google AI Studio

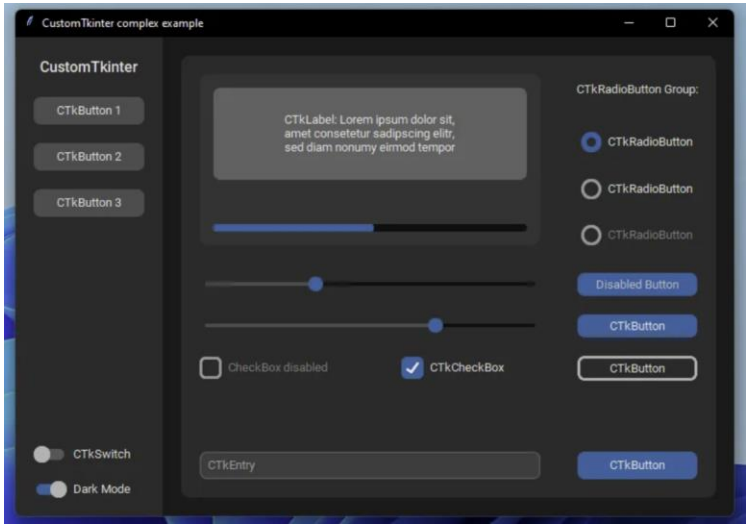


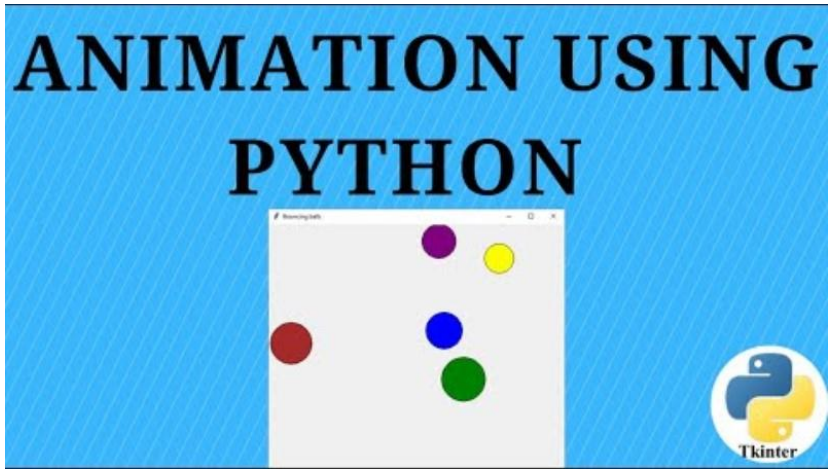
Requires a personal gmail account
More interactive. We will step through how to engage with prompts.

[Link to AI Studio]

Exercise: building up an interactive graphical app

- AI is particularly good for **non-technical/scientific** code generation – automating plots, file i/o, using standard libraries where the task is very well defined w/ plenty of examples



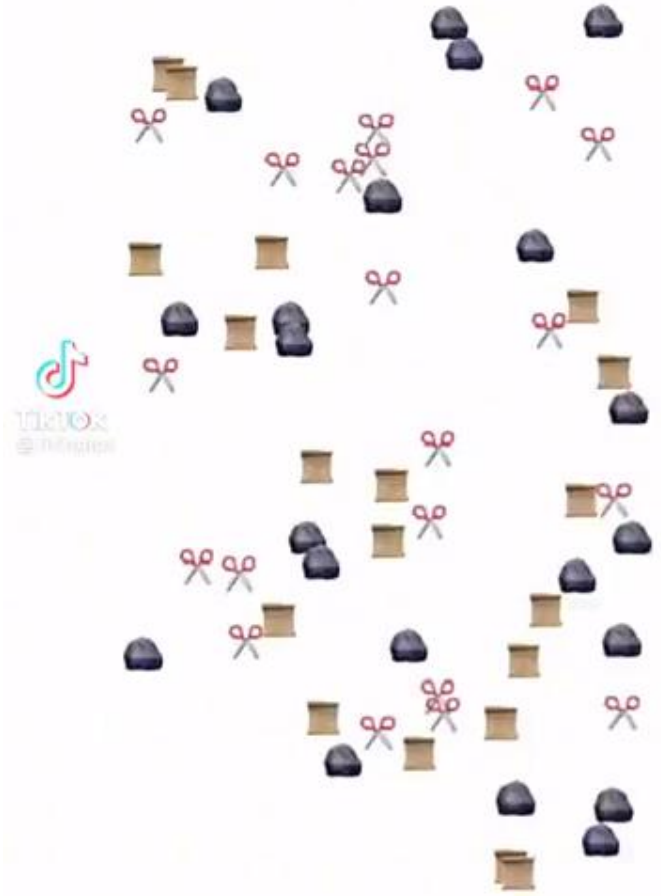


https://medium.com/@fareedkhandev/modern-gui-using-tkinter-12da0b983e22

https://docs.python.org/3/library/tkinter.html#tkinter-life-preserver

https://docs.python.org/3/library/tkinter.html

Today’s exercise



In-Class 10: Graphics and animations

Follow along with Dr. Trask.

Code will be provided on git for you to play with.

We will use this code base in the coming week.

At-Home: No assignments. Enjoy the fall break!