COURSE DESIGN & WRAP-UP

WHY IS THE COURSE THE WAY IT IS?

We are almost done with the semester. Let's look back at what we learned and why we learned them. There are many topics we could have covered in CIS 1100, and we change some of the topics out over time.

Choosing which topics to cover in CIS 1100 is *hard* because there are many types of students...

- People starting a CIS major/minor before they start more advanced courses
- People who are in related fields (Cognitive Science, ESE, etc.)
- Students who are curious and want to know more about data science/AI/etc.
- Students who just need a requirement satisfied
- etc.

OVERARCHING COURSE GOAL: BETTER PROBLEM SOLVERS

A large part of this course is learning to solve problems using computers.

You have:

- broken down problems into smaller steps
- seen how we can abstract data/problems into various representations
- learned how to write programs!

OVERARCHING COURSE GOAL: BETTER PROBLEM SOLVERS

These skills are useful in all contexts, not just "computer science" or "software engineering"

- Abstract away details for communication or problem solving.
- Parsing data in excel or other spreadsheets
- Writing/interacting with simulations for research
- Automating simple tasks (e.g. regular email reminders)

OVERARCHING COURSE GOAL: BETTER DIGITAL CITIZENS

Computers are involved in most aspects of daily life. Even if you never program again, you will work with computers in some shape or form.

We want to make you all better informed about how computers work, to be better informed digital citizens.

- How do big software companies shape the media you consume?
- How is information stored, displayed, and shared across the internet?
- How can you verify claims that are made to you by authority figures?

WHY PYTHON?

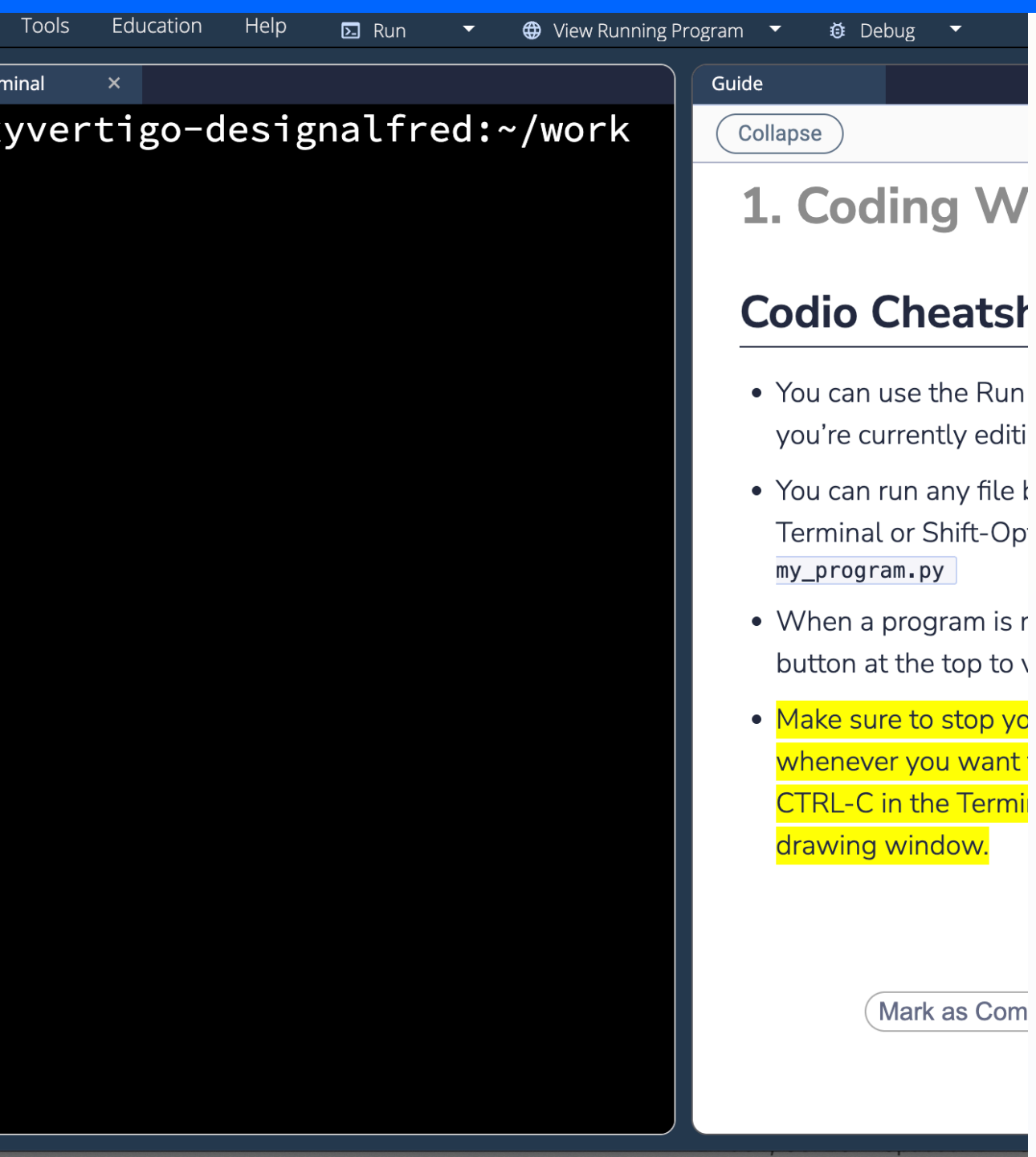
One of the most popular intro languages

- A very widely used programming language with many applications
  - especially popular for Data Science and Machine Learning
- Many features suitable for first time programmers
  - Syntax is usually more less verbose, easier to read
  - Memory management is handled for you
  - Object Oriented
  - lots of libraries that are available for you to use

WHY NOT PYTHON?

- You may have noticed that types are confusing to keep track of without automatic enforcement
- Lack of compilation (pre-execution processing) means that your program can be valid at the start but then turn "wrong" in the middle
- Maybe you don't like the looks & vibe!

AN ASIDE: YOUR IDE



CODIO

Perfectly good! But mostly so that **I don't have to debug 82 different Python installations.**

WHAT I USE: VS CODE

1. Good for many languages
2. Features many extensions
3. Prettier :)

slide_project

Update

ng_II.md 1, M | wrapup.md M | Preview wrapup.md

py_slides > wrapup.md > abc > abc ## What I Use: VS CODE

```
92  ---
93
94  <!-- _class: lead -->
95
96  # An Aside: your IDE
97
98  ---
99
100 ## Codio
101
102 Perfectly good! But mostly so that **I don't
    have to debug 82 different Python installations.
    **
103
104 ![bg left](image-183.png)
105
106
107 ---
108
109 ## What I Use: VS CODE
110
111 1. Good for many languages
112 2. Features many extensions
113 3. Prettier :)
114
115
116 ---
117
118 ## Core Topics
119
120 There are some core topics that show up in
    almost every programming language:
121 - Variables, Types, Strings
```

AN ASIDE

yvertigo-designalfred:~/work

WHAT I USE: VS CO

1. Good for many languages
2. Features many extensions
3. Prettier :)

ve Share | Ln 113, Col 16 | Spaces: 2 | UTF-8 | LF | Markdown

INSTALLING PYTHON ON YOUR MACHINE

Use **this tool.**

(Python is actually preinstalled—to some extent—on both MacOS and Windows, but it's a disaster.)

INSTALLING PYTHON PACKAGES ON YOUR MACHINE

Run this command from the terminal, and you're all set.

```
pip install your-desired-library
```

```
harrysmith in ~/Documents/tmp λ mkdir sketch
harrysmith in ~/Documents/tmp λ cd sketch
harrysmith in ~/Documents/tmp/sketch λ claude
```

Claude Code v2.1.109

Welcome back!

Sonnet 4.6 · Claude API
~/Documents/tmp/sketch

Tips for getting started
Ask Claude to create a new app or clone a repository

Recent activity
No recent activity

> Write a PennDraw script in python that has an exploding particle effect that emanates from the current position of the mouse cursor.

”1200 USES OCAML AND JAVA. AM I DONE FOR?”

No. A person's first two weeks with Java have to come at some point anyways, and that will never be easy. But in terms of OCaml prep, you have some advantages.

- Recursion
  - Shows us an alternative way to think about programs: how we can break complex tasks into smaller steps.
- Higher Order Functions
  - Yet another way to think about problems: how must problems can be broken down into some combination of filter/map/reduce
  - Relevant for functional programming languages

OTHER TOPICS: GOOD FOR SOFTWARE ENGINEERING

- Testing
  - Useful for debugging & practice with problem solving
- Understanding file formats & information represenation

OTHER TOPICS: GOOD FOR ALGORITHMIC THINKING

- Searching & Sorting
  - Introduction to thinking about algorithms & code efficiency
  - "If there are multiple solutions, can I think about which one is better?"

OTHER TOPICS: WORKING WITH DATA

You can use these stuff to run your own investigations and answer the questions about the world that are interesting to you.

- Working with data & pandas
- Complex Nested Structures
  - parsing JSON or XML or HTML
- Scraping

WHAT'S NEXT?

This is likely not the end of your computing journey. Even if you don't take another computer course, you will still interact with computers.

There are a lot of ways to be involved with "computing", we aren't all the same and there is a lot of variety to computing

- Web Development
- Computer Systems & Hardware Engineering
- Artificial Intelligence
- Algorithms & Theory of Computation
- Networks
- Security

AND...

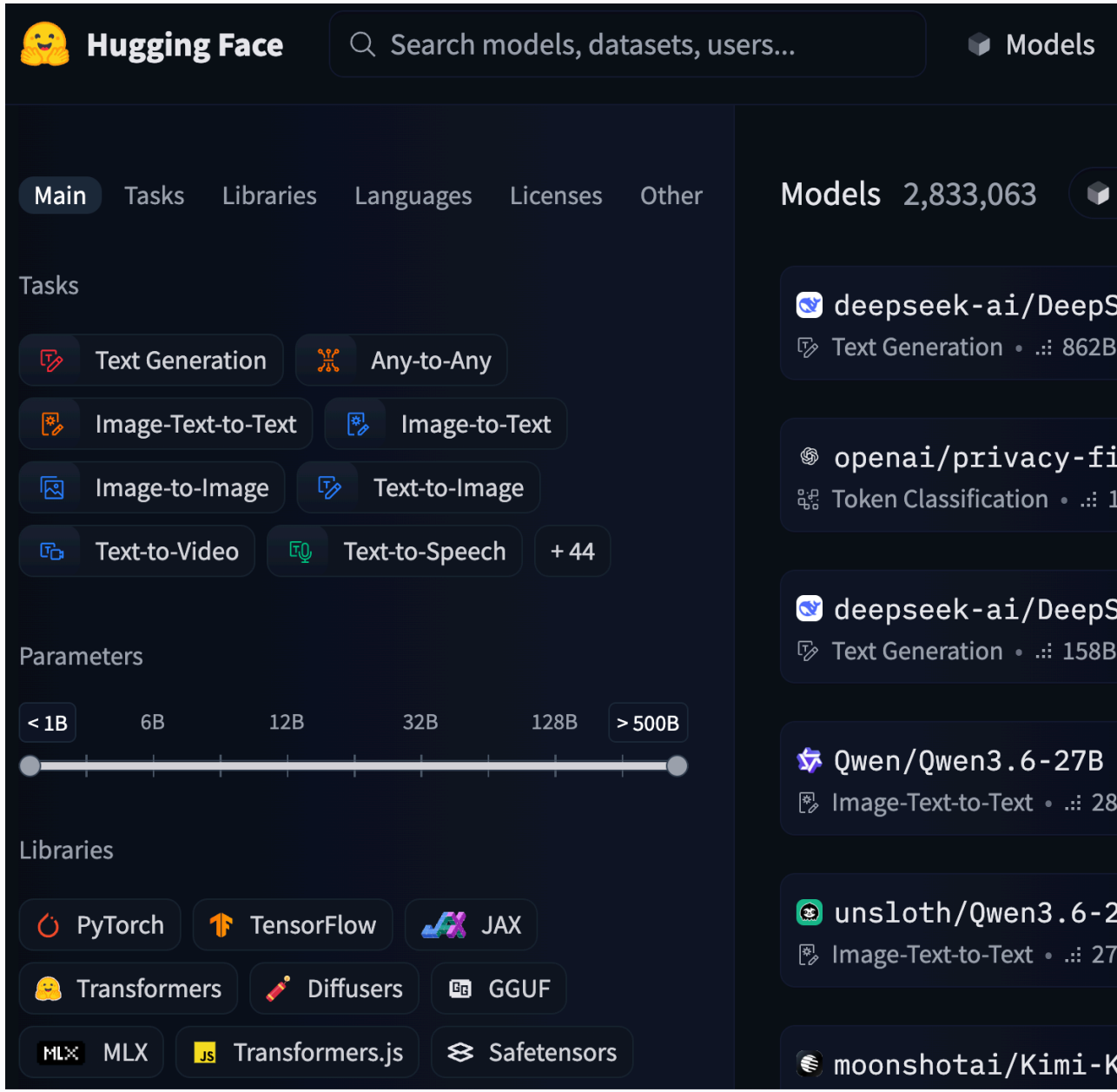
- Human Computer Interaction
- Information Scientists
- Bio-informatics
- Cognitive Science
- Network Administrators
- Social Dynamics/Systems
- Digital Media Artists
- CS Education
- Researchers generally
-

OTHER PROJECTS / LIBRARIES YOU CAN USE

YEARNING FOR (MACHINE) LEARNING? SCIKIT-LEARN

YEARNING FOR MORE (MACHINE) LEARNING?

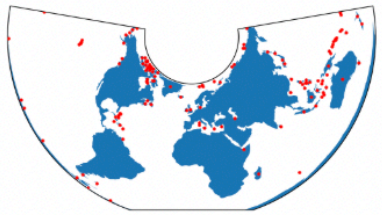
Hugging Face is a platform that hosts open source ML models. Of particular note are the neural & large language models.



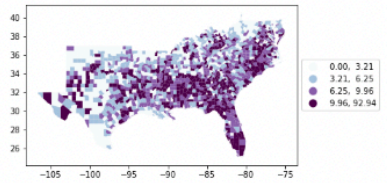

```
pip install transformers
```

Examples Gallery

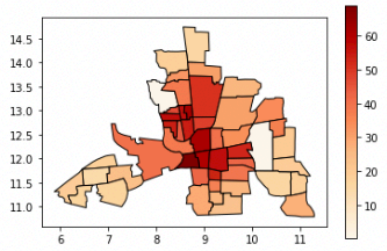
The following examples show off the functionality in GeoPandas. They highl
you can do with this package, and show off some best-practices.



Plotting with CartoPy and GeoPandas



Choro legends



Choropleth classification schemes from PySAL for use with GeoPandas

LIKE MAPS? GEOPANDAS

```
pip install 'geopandas[all]'
```

Your First Python Script in Rhino

by Scott Davidson (Last updated: Wednesday, December 5, 2018)

You will learn how to display a message box in Rhino that says "I
editing, loading, and running scripts.

The Complete Script

```
import rhinoscriptsyntax as rs

rs.MessageBox ("Hello World")
```

To test the Script:

- Start Rhino
- At the command prompt, type Scripteditor and press Enter.

3D MODELING

For architects & designers (apparently...): Rhino3D in Python

3D MODELING

For everyone else: Blender!

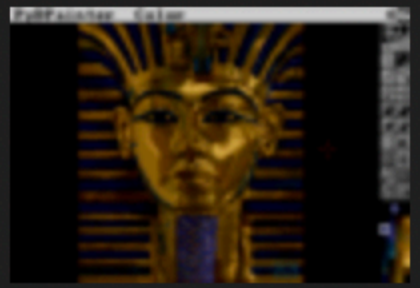
- features Python support for scripting

BUILDING A WEBSITE: FLASK

(Including web apps...)

Flask

BUILDING A LITTLE GAME: PYGAME

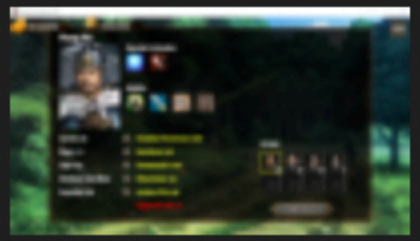


PYDPAINTER

A usable pixel art program written in Python

CAMPAIGNS OF FANTASY

Real-time strategy game set in a fantasy world.



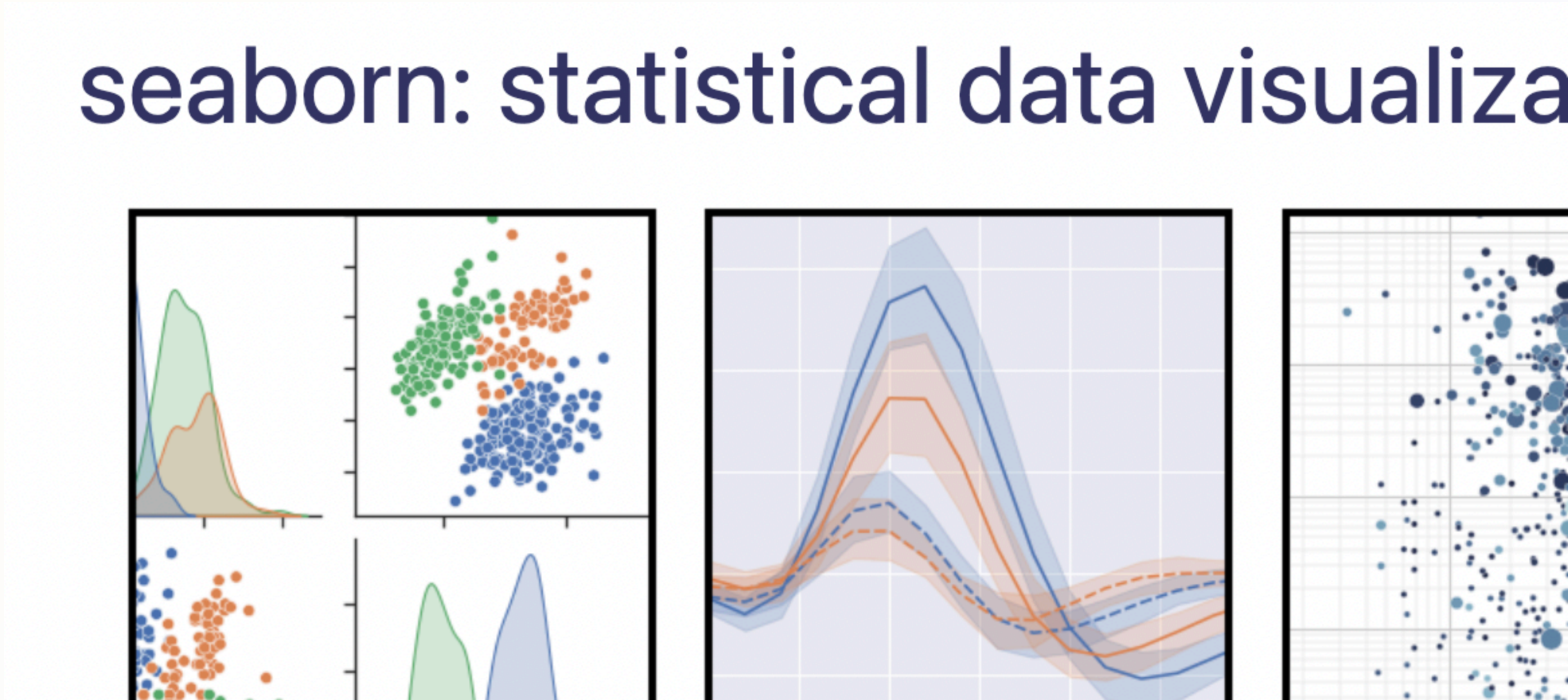
IMPERIAL AMBITIONS – THREE KINGDOMS

【Imperial Ambitions 3K】is a Three-

ROYAL ORDAINS

Side-scrolling medieval fantasy action game in the art style inspired by Medieval art from

MAKING NICE DATA VIZ: SEABORN (OR MATPLOTLIB)



OTHER COURSES YOU CAN TAKE

- CIS 1200 (Prog. Lang. and Techniques)
- CIS 1600 (Math. Foundations of CS)
- NETS 1500 (Market and Social Systems on the Internet)
  - Spring only, sorry
- **Digitial Humanities Courses**
- CIS 2120 Introduction to Artificial Intelligence
  - only pre-req is CIS 1100
  - Spring only, sorry

POSSIBLE MAJORS / MINORS

- CIS Major or Minor
- Artificial Intelligence Major
- CMPE (Computer Engineering) Major
- Digital Media & Design Major or Minor
- Cognitive Science Major
- Digital Humanities Minor
- Data Science and Analytics Minor
- Communications Major with a Data & Network Science concentration

ASK ME ANYTHING!!!