CIS 1100

Course Design & Wrap-up

Why is the course the way it is?

We are almost done with the semester, lets 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…

There are a lot of 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 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 more popular as Data Science and Machine Learning increase in popularity.
- 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
- Though, there are good reasons to use other languages as well

Core Topics

There are some core topics that show up in almost every programming language:

- Variables, Types, Strings

- Conditionals

- Loops

- Functions

- Objects
  - References

  - Data Structures

If you do any programming outside of this course, you will use some (if not all) of these.

"I Took 1100.py and Now I Want to Take 1200. Am I Done for?"

No.

- 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

- Comprehensions

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`


```
pip install -U scikit-learn
```
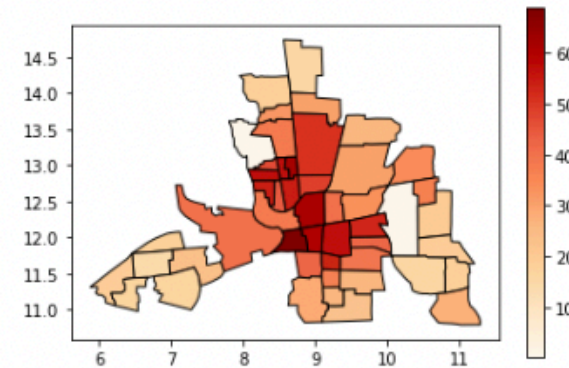
Like Maps?
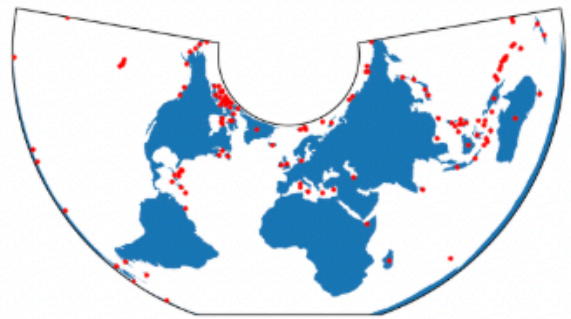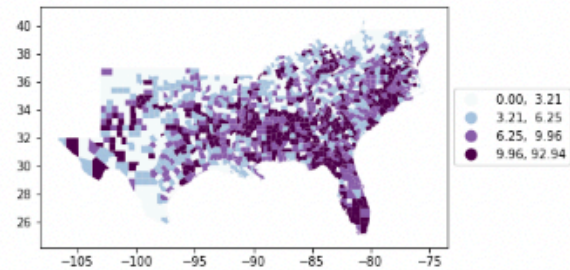
geopandas

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

3D Modeling

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

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 "
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 everyone else: Blender!

- features Python support for scripting

(Including web apps…)
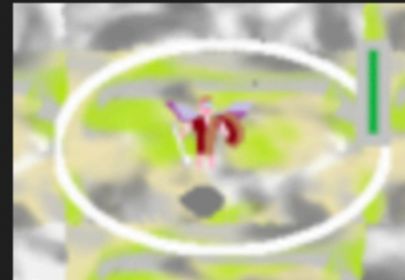
Building a Little Game: pygame
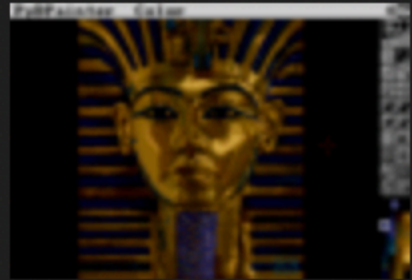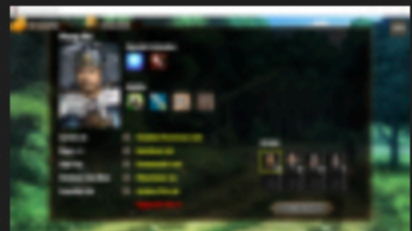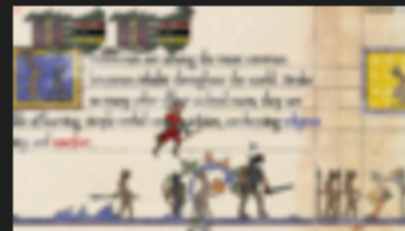
PYDPAINTER
A usable pixel art program written in Python

CAMPAIGNS OF FANTASY
Real-time strategy game set in a fantasy world.

IMPERIAL AMBITIONS – THREE KINGDOMS
【Imperial Ambitions 3K】 is a Three-Kingdoms-themed, turn-based strategy game written in Python.
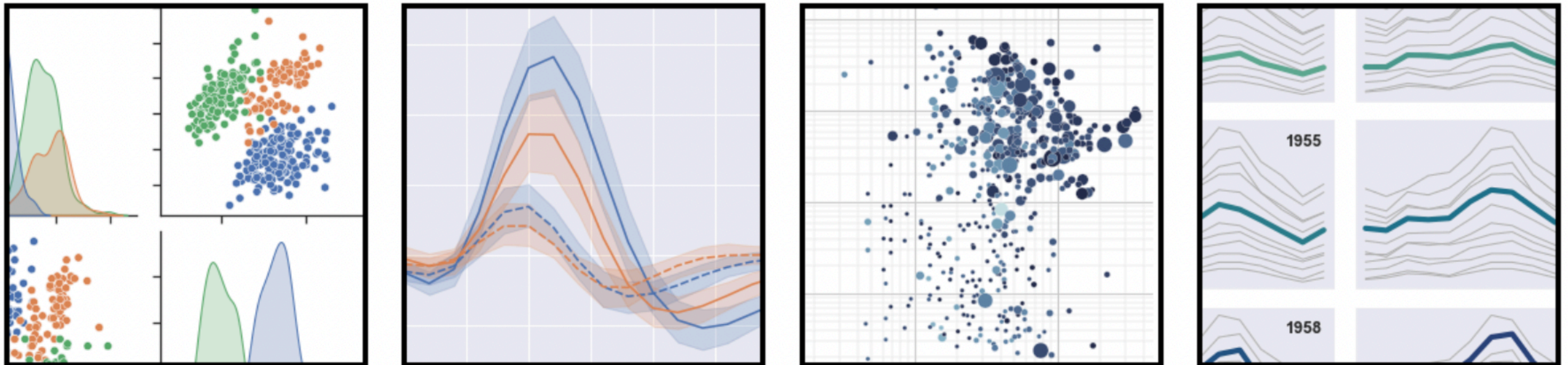
ROYAL ORDAINS
Side-scrolling medieval fantasy action game in the art style inspired by Medieval art from various period and regions (with a sprinkle of education elements

It's like PennDraw but Good!

Making Nice Data Viz: `seaborn` (or `matplotlib`)

seaborn: statistical data visualization

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)

- Digitial Humanities Courses

- CIS 3990 Introduction to Artificial Intelligence
  - 3990 is the course number as it is the first offering of the course
  - only pre-req is CIS 1100

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 Us Anything!!!

Office Hours in a minute, please feel free to ask us about anything!