CS 111: Program Design I
Lecture 14: Supreme Court Concluded, pandas, dot notation, pandas

Robert H. Sloan & Richard Warner

University of Illinois at Chicago

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SUPREME COURT (CONT.)

A Place for Social/Political Views?

- Some object that Kavanaugh is too committed to conservative social political views to be an acceptable Justice.
- Should social and political views guide judicial decisions?
- To answer, start with the role of rules.

The Law's Focus on Rules

- On his deathbed, Franz Kafka made his friend Max Brod a promise to burn all of Kafka's manuscripts.

- Brod broke the promise.

    - On the very plausible ground that the good achieved outweighed the promissory obligation.

- Imagine Kafka had a will with Brod as executor, and the will said to burn the manuscripts .

The Need To Cite A Rule

- The will creates a legal obligation to burn the manuscripts.
- To avoid burning the manuscripts, Brod cannot just appeal to the good achieved.
- He has to cite a legal rule.
- Why?
    - "The rule of law, not of persons."

Democratic Theory

- *Democratic theory*: you have an obligation to obey the state only when the state is appropriately responsive to its citizens' will.

  - Responsiveness requires citizens elect decision makers who represent the views of their electorate.

- *Apparent* consequence: *Only* **representative** decision makers can impose obligations on citizens.

Consequences for Courts

- ## The judiciary is *not* representative.

  - ❏ Judges are *impartial* decision makers.

  - ❏ **They do not favor the views and preferences of any distinct group.**

- ## *So apparently*:

  - ❏ judges may *only* impose obligations that have been encoded in laws through prior representative processes.

Judicial Legitimacy

- Judicial decisions are legitimate provided the courts issuing these decisions do so under constraints that ensure that they do not decide open questions any more than "necessary."

Law At Its Best

- Legal reasoning yields a life-like portrait of the intricate moral boundaries that define the relations that we ought to have with each other

US v. Escamilla

- The case involves an accidental killing at a research station on an island of Arctic ice.
  - As you hear about case, remember *you know enough about islands of Arctic ice and firearms to understand and evaluate the case.*
    - What do the Justices know about current technology?
- Escamilla killed Bernie Lightsey, his coworker at a research station located on T-3, a floating island of ice in the Arctic Ocean.
- The trial court held that Escamilla was criminally negligent in killing Lightsey and convicted him of involuntary manslaughter.

Why was the *Escamilla* T-3 case in Federal Court?

A. Homicide is generally a federal crime heard in federal court

B. Escamilla and Lightsey were citizens of two different states

C. T-3 was outside of all 50 states and the District of Columbia

The Rule

- "A person acts [criminally] negligently when he should be aware of a substantial and unjustifiable risk that ... will result from his conduct. The risk must be of such a nature and degree that the actor's failure to perceive it, considering the nature and purpose of his conduct and the circumstances known to him, involves a gross deviation from the standard of care that a reasonable person would observe in the actor's situation."
    - Model Penal Code, §2.02(2)(d).
    - The generality and lack of guidance is typical.

Difficult Moral Balancing

- Deciding *Escamilla* requires balancing protecting yourself and your property against the respect for the life of others.

- Such balancing is characteristic of US Supreme Court cases.

- Technology cases also involve balancing issues, as we have seen in our discussions.

Balancing in *Escamilla*

- Reasonable to get the rifle?
  - Escamilla had reason to think Porky and Lightsey might attack with deadly force,
  - Arming himself could deter an attack through a display of superior force, and meet force with force.
  - But: have avoided an attack by simply giving up the wine.
  - But: no law enforcement on T-3
    - So no recovery of property or compensation, no protection against continued demands.

Balancing in *Escamilla*

- Was it reasonable to point a loaded rifle with at Lightsey?
  - Pointing the rifle made the threat to use it more credible and so contributed more effectively to deterrence through a show of superior force.
  - Should he have unloaded it?

Balancing in *Escamilla*

- Releasing the safety ensured that deadly force was immediately available to repel deadly force.

- But was the threat that serious?

The Court's Decision

- "It would seem plain that what is negligent or grossly negligent conduct in the Eastern District of Virginia may not be negligent or grossly negligent on T-3 when it is remembered that T-3 has no governing authority, no police force, is relatively inaccessible from the rest of the world, lacks medical facilities and the dwellings thereon lack locks -- in short, that absent self-restraint on the part of those stationed on T-3 and effectiveness of the group leader, T-3 is a place where no recognized means of law enforcement exist and each man looks to himself for the immediate enforcement of his rights."

Factual Detail

- Notice the factual detail.

- You need to know—and realize the relevance of—a number of details about rifles and Artic ice research stations.

- The same is true of cases involving technology.

- But the necessary background knowledge is not widespread.

Finding Patterns in Cases

- The analysis of large databases of court decisions is an increasingly popular and important way to investigate how the court balances moral issues.

- You can find revealing patterns.

You See the Portrait in the Patterns

"This case goes here."
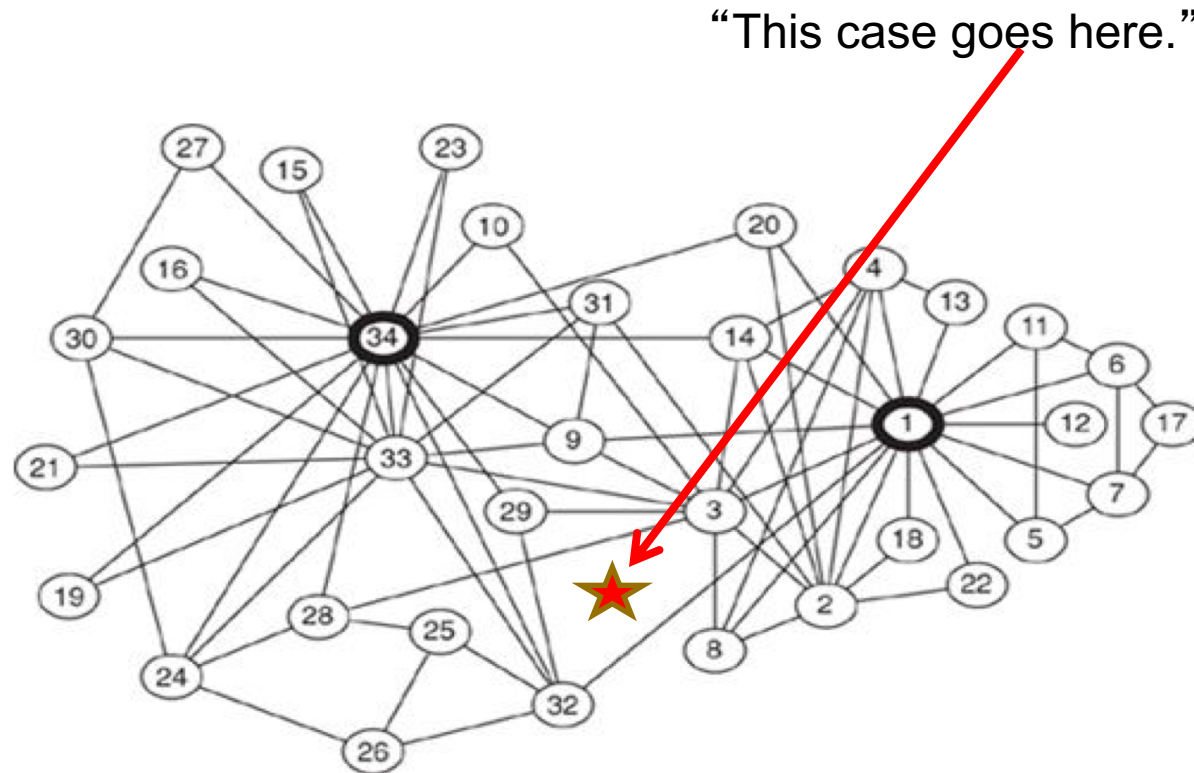
Actually, a graph of friendships in a karate club, but makes the point.

Conflicts of Values

- John Rawls: "reasoned and uncoerced agreement are not to be expected . . . Our individual and associative points of view, intellectual affinities and affective attachments, are too diverse . . . to allow of lasting and reasoned agreement. . . [The appropriate view of social organization] takes deep and unresolvable differences on matters of fundamental significance as a permanent condition of human life."

Value Conflicts and the Law

- What is the role of the law when confronted with "deep and unresolvable differences on matters of fundamental significance"?

- Whatever the answer, it helps to see what the patterns in the decisions actually are.

- That is where data analysis helps.

Finding the Pattern

- The database does not look at all like that.
- To find the pattern, you have to reorganize the data.

FINISH PANDAS (PART 1) NOW

Structured text files: CSV

- In 2018, often want to communicate between all sorts of different electronic tools
- CSV (comma-separated values) is format used by Excel, and very common for exchanging large collections of data
  - E.g., SCDB, City of Chicago Data Portal
- Python has a csv module and it has csv.writer() and csv.reader() functions that could help you
  - We *won't* cover those in this course

Files and programming with them in Spyder
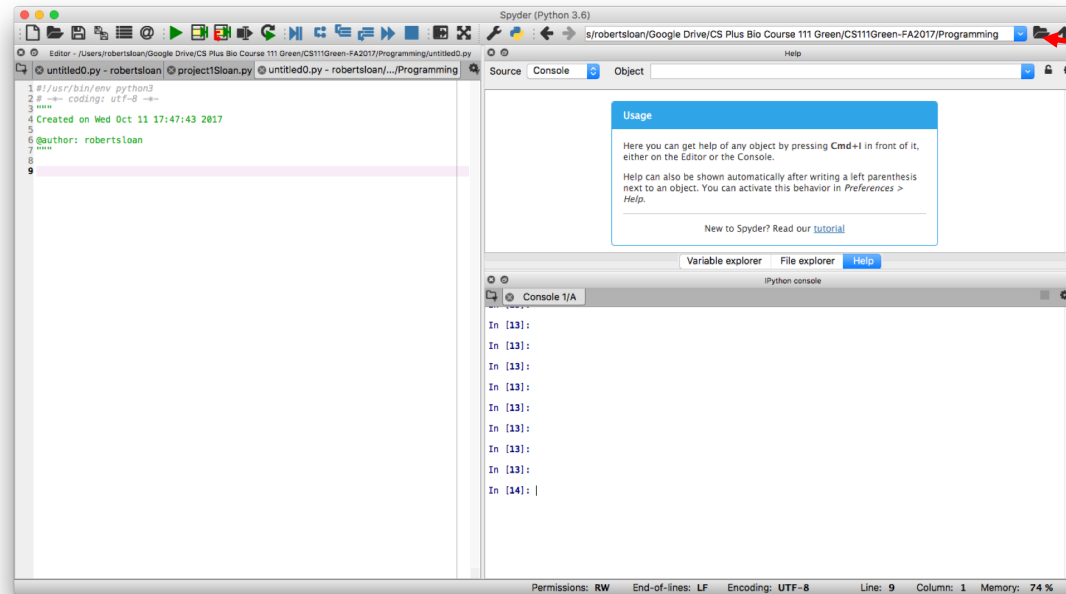
- You need your execution environment, i.e., console, i.e., lower right panel of Spyder, to be working in directory you with file you want to open

- Working directory button upper right corner

Modules: One more thing

- We all can make modules for ourselves
- Modules used to group functions
  - Both standard library or matplotlib and *modules we write ourselves*
  - *Very* useful for clarity and reuse as overall project sizes get larger
  - Not so much need for your own modules in CS 111
- Any file ending in .py can act as module

OBJECTS … AND DOT NOTATION

Objects

- (Implicit in Chapter 2, Variables & Expressions, 3.2, Lists basics, & 7.3 String methods of Zybook, but not explicit anywhere: So pay attention!)

- Everything in Python is an object

- Object combines

  - data (e.g., number, string, list) with

  - methods that can act on that object

Methods

- Methods: like (or actually special case of) functions but *not globally accessible*
- Cannot call method just by giving its name, the way we call `print(), open(), abs(), type(), range(),` etc.
- Method: function that can only be accessed *through* an object
  - Using dot notation

Dot notation

- To call method, use dot notation:
  - `object_name.method()`

- String example:

```
In [1]: test = 'This is my test string'
In [2]: test.upper()
Out[2]: 'THIS IS MY TEST STRING'
```

If o is object of type having method do_it where do_it needs an input in addition to o, and x is defined, what is the proper way to call do_it on input x?

A. do_it(x)

B. do_it(o, x)

C. o.do_it(x)

D. o.do_it(o, x)

methods continued

```
In [3]: test.find('my')
Out[3]: 8
In [4]: 42.upper()
Syntax Error: invalid syntax
In [5]: upper(test)
barf
```

Methods depend on type of object

- scdb.head() prints out 5 rows because head() is a method of objects of type Pandas dataframe, which is the type of the scdb object

- 'test string'.head() triggers error because head is *not* a method of strings

Methods' importance

- Understanding key data types depends on understanding their methods
- We saw many methods for strings
- We have used the append method for lists, and will come back to more list methods
- file reference methods write(), read(), readline(), readlines()
- Pandas dataframe methods head(), tail(), etc.

When you get to CS 341 & 342

- Or if you know Java or C++ now

- methods are an Object Oriented (OO) concept

- In our CS 111

  - We *do* need to know the basics of dot notation and methods

  - We will otherwise be ignoring OO, and taking primarily a procedural approach

PANDAS
(FROM ANOTHER ANGLE)

Pandas: What and Why

- High performance way to work with large *dataframes*

- *Dataframe:* The 2-d data structure most familiar from Excel spreadsheets, often with a header row

- Pandas built to play nicely with matplotlib for plotting (and incidentally NumPy and Scikit-Learn for machine learning and works for preprocessing for tensorflow for deep learning)

Why Pandas and not Excel

- Excel not designed for working with large datasets
- Large-ish: Previous Chicago Crimes 2008 to mid-2016 file:
  - 1.04 million rows, 18 columns
  - Open file in Python: Instantaneous
  - pandas.read_csv(): 8 secs (Sloan's old 2013 laptop)
  - Open file in Excel: several *minutes*
    - Just resize one column for better viewing: 5-30 sec

Why Pandas and not Excel (reason 1, cont.)

- ## Large: Chicago Crimes 2001 to present file:
  - 7–10 million rows, ~22 columns
  - Open file in Python: Instantaneous
  - pandas.read_csv(): ~1 min (Sloan's 2013 laptop)
  - Open file in Excel:
    - Surely you gest!

Chicago, City of Data!

- Marvelous data portal
- https://data.cityofchicago.org/
    - Crime: https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present-Dashboard/5cd6-ry5g

Why Pandas and not Excel (2)

- Excel allows you to say/do/compute only functions built into Excel

- Python is general purpose programming language: Can say/do/compute *anything want,* not limited to the functions Microsoft provides in Excel

  - Geeky fine point: Anything that can be done with a computer. There are "uncomputable problems" (theory of computation CS 301, maybe special lecture in this class if time at end. Not really issue in data analytics)

Pandas data types

- Most important: dataframe, which we are getting from pandas.read_csv()
  - 2-d array, with column headers
- Series: 1-d array, e.g., one column of a dataframe, second most important

Resource

- Python for Data Science Pandas Cheat Sheet
- https://www.datacamp.com/community/blog/python-pandas-cheat-sheet