The Jurisprudence of Software

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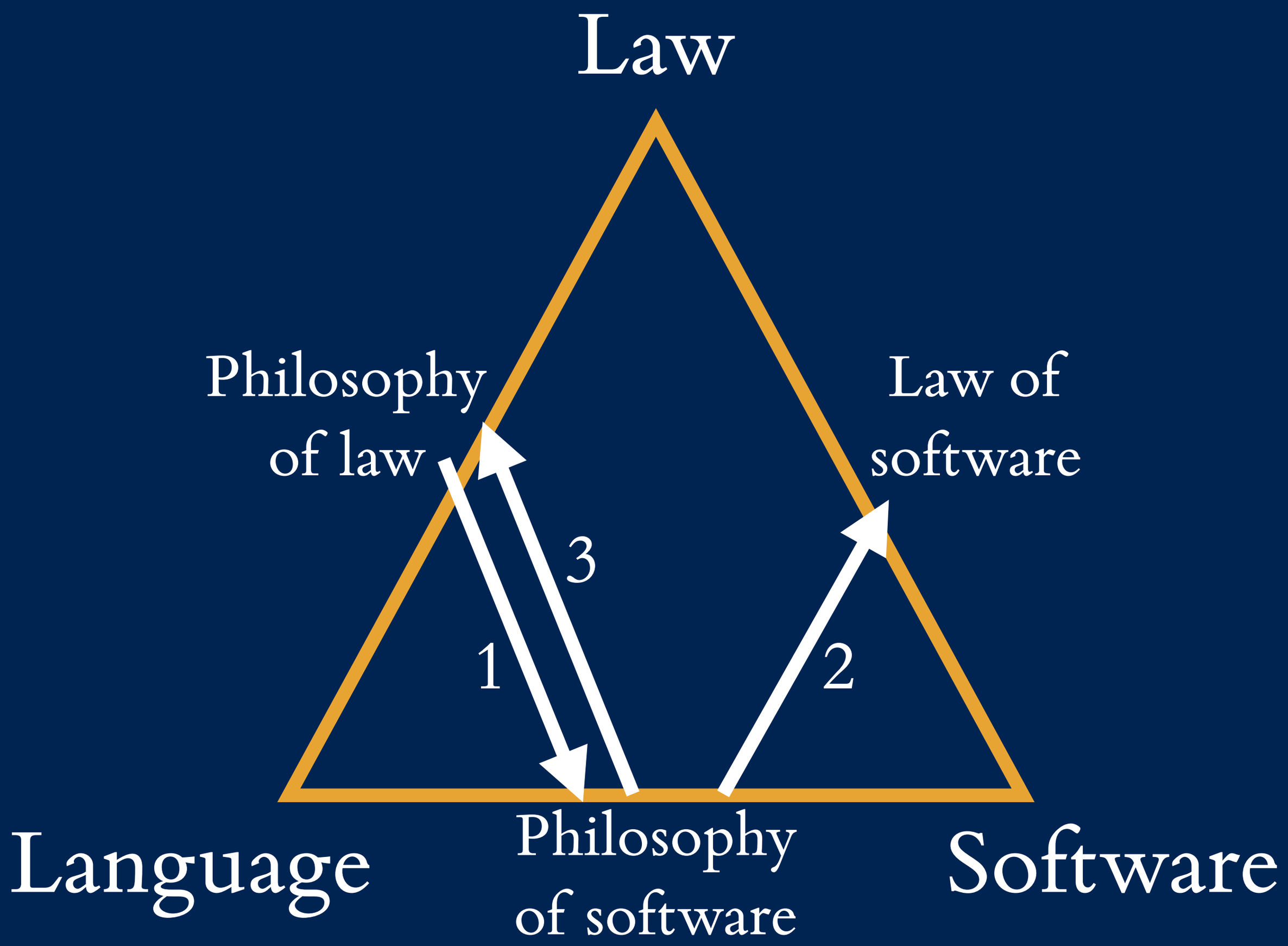
The big idea

Compare and contrast

- How lawyers interpret legal texts
- How computers interpret software


Law
Philosophy of law
Law of software
3
1
2
Language
Philosophy of software
Software

More specifically

1. Use concepts from the philosophy of law — speech acts, interpretation, etc. — to give a rigorous account of how software works
2. Use that account to illuminate questions in *legal doctrine*: e.g., how should judges interpret smart contracts?
3. Use that account to illuminate questions in *legal theory*: e.g., is the ideal judge a computer?

Software speech acts

Legal speech acts

- "Be it hereby enacted that …" is a *speech act*
  - It has the *illocutionary force* of changing the law (and possibly also of commanding subjects to comply and officials to act.)
- Other legal speech acts: contracts, wills, ToS
  - They have their own illocutionary forces

Software speech acts

- `print(2+2)` is also a kind of speech act
  - When uttered to a Python interpreter, it causes the computer to display `4`
  - We could talk about this mechanistically, deny that the computer understands anything, and deny that communication is taking place
    - But this overlooks the ways in which `print(2+2)` is *linguistically* meaningful

Law thinks that software is speech

- *E.g., Bernstein v. DoJ*: software can be First-Amendment-covered speech
- *E.g., Computer Associates v. Altai*: software can be copyrightable
- Neither of these cases is intelligible if software is inherently only a functional artifact
- For better or for worse, we program computers with words that have meaning to humans

Who is the interpreter?

- Legal texts are addressed to *people*: citizens, counterparties, guests, and especially judges
  - They mean what they mean to people
- Programs are addressed to *computers*: they consists of a series of commands to execute
  - Do they mean (only) what they cause computers to do?

Types of meaning

- *Program meaning*: what a program causes a computer to do
- *Programmer meaning*: what a bug-free version of the program would do
- *Incidental meaning*: what else a program's text conveys to other programmers who read it
- *User meaning*: what a program communicates to a user

```
from itertools import repeat
for feet in [3,3,2,2,3]:
      print " ".join("DA-DA-DUM"
      for dummy in [None]
for foot in repeat(metric", feet))
```

```
DA-DA-DUM DA-DA-DUM DA-DA-DUM
DA-DA-DUM DA-DA-DUM DA-DA-DUM
DA-DA-DUM DA-DA-DUM
DA-DA-DUM DA-DA-DUM
DA-DA-DUM DA-DA-DUM DA-DA-DUM
```

Types of meaning

- *Program meaning*: (syntax error)
- *Programmer meaning*: print “DA-DA-DUM…”
- *Incidental meaning*: the source is a limerick
- *User meaning*: the output is a limerick

Applications, e.g.

Unauthorized access

- Many programs implicitly communicate to users the scope of permission to use them
  - *United States v. Morris*: what is the "intended function" of Sendmail?
- What would a reasonable user understand as the programmer meaning of this program?

Ideal interpreters

- Is the ideal of a judge *another programmer* who helps the legislature test and debug its code?
- Or is the ideal of a judge *a reliable computer* who correctly executes the legislature's code?
- Program meaning shows that nearly discretionless interpretation is possible
- But not even the most rigid versions of textualism go that far

Legal drafting and software development

- Can effective software development techniques be pulled back into law?
- Textual aspects: type-safe languages, modular designs
- Toolchains: editors, version control, etc.
- Program analysis and debugging

Questions

Questions for you

- What should I call it?
  - "The Jurisprudence of Software" is boring
- What should I read?
  - Philosophy of language, law, and CS
  - Tech-law theory: "code is law," algorithmic decision-making, computable law

Questions for me