

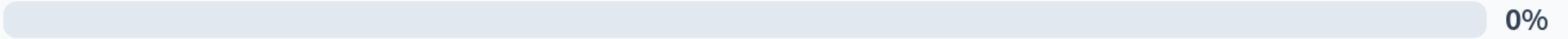
Intellectual Property for Software Engineers

All software should be free to use

Strongly agree



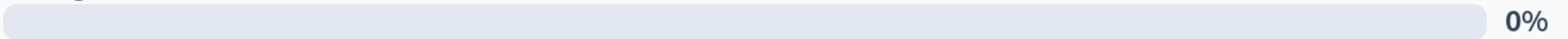
Agree



Neither agree nor disagree



Disagree



Strongly disagree

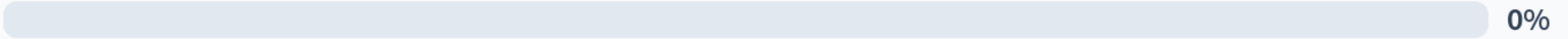


A company should be able to profit by selling open source software

Strongly agree



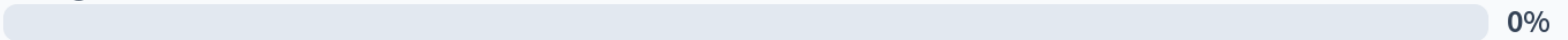
Agree



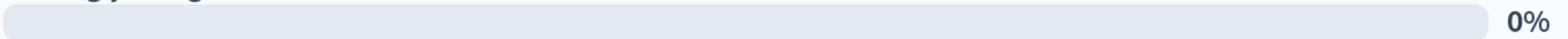
Neither agree nor disagree



Disagree



Strongly disagree



Today

- Software engineering requires understanding basic principles of intellectual property
 - You will likely need to select and interpret software licenses
- Disclaimer: I am not a lawyer!
- Info today may be US-centric
- Brief interlude for course evaluation

Basic Terms

- **Trademark:** protecting terms from misuse
- **Patents:** protecting inventions (ideas)
- **Copyright:** protecting work from copying
 - Software licensing: restricting what you can do with a copy

Trademark (Source: US PTO)

- "A trademark can be any word, phrase, symbol, design, or a combination of these things that identifies your goods or services. It's how customers recognize you in the marketplace and distinguish you from your competitors."
- "A trademark:
 - Identifies the source of your goods or services.
 - Provides legal protection for your brand.
 - Helps you guard against counterfeiting and fraud."

Trademark Examples



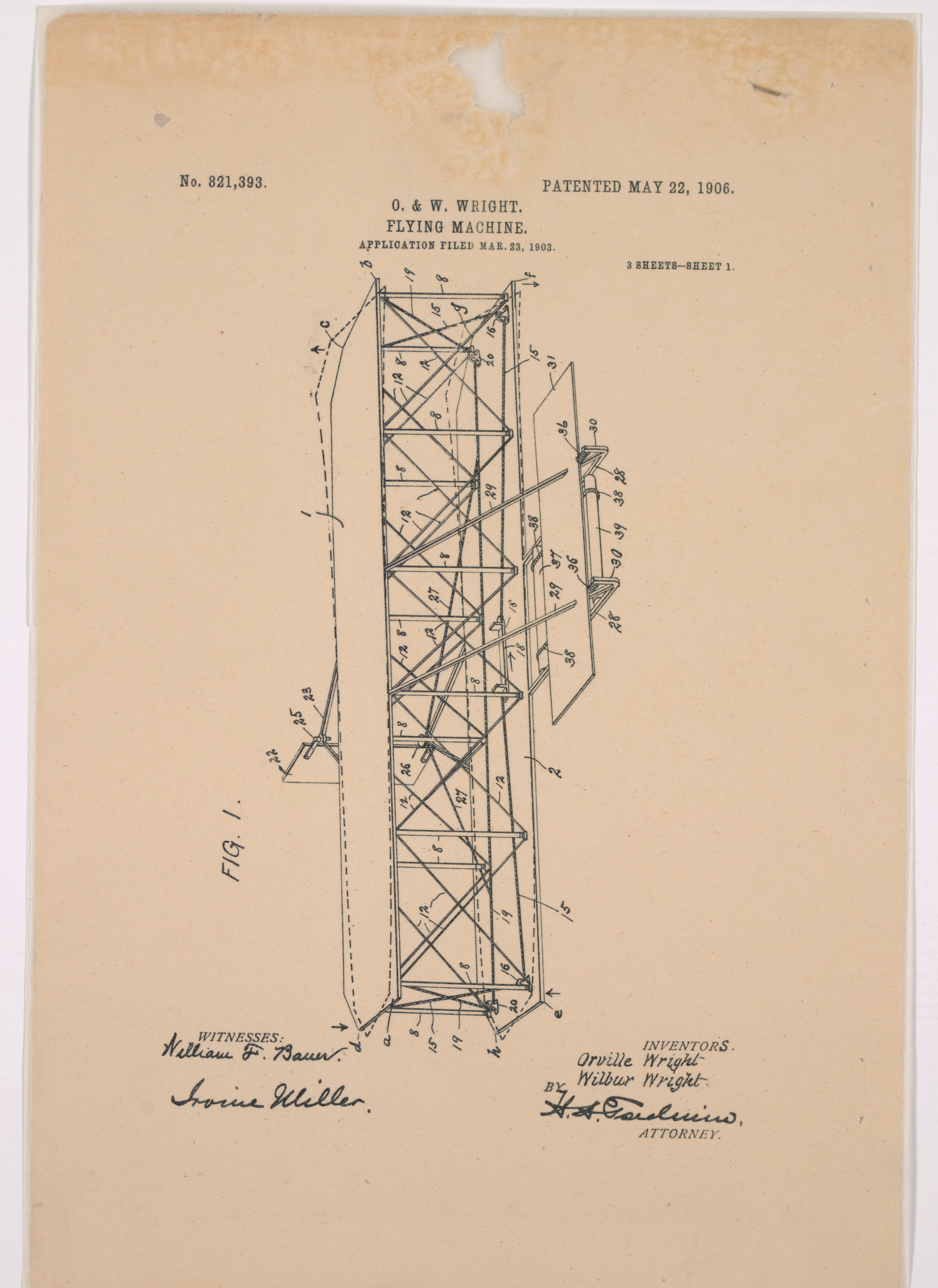
- "Domino's" is a trademark of a pizza company
- You can make and sell children's toys, "dominoes," and not get sued
 - Trademarks are connected to specific goods or services
 - Domino's pizza trademark pertains to food, not toys

Patents

- Patents cover inventions
- Today: focus on *utility* patents (vs. design, plant patents)
 - "These may be granted to anyone who invents or discovers a new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvements of these." (USPTO)
 - Patents are supposed to cover "non-obvious" inventions

Patents

- At right: diagram from patent for Wright brothers' flying machine (1906)
- Principle: promote invention by allowing inventors to profit from their inventions
 - Others making a flying machine with the same design would invite a lawsuit by the Wright brothers (patent holder is responsible for enforcement)
- Patents *expire* (usually after 20 years)
 - Allows others to leverage invention for free
 - Example: generic drugs (cheaper than brand name)



Software Patents

- Controversial
- Can't patent math (e.g. algorithms). Can patent machines. Where is the boundary?
- My system is composed of a zillion components. How do I tell whether any of them are patented?
- Does patenting encourage or discourage innovation?

Software Patent History

- Gottschalk v. Benson, 1972: allowing patents on software might actually patent an algorithm, but math is abstract and therefore not patentable
- 1981: Diamond v. Diehr: An invention that included software was ruled patentable (but invention included steps related to heating rubber): this was a *process* for molding rubber
- Question: when is an invention "merely" mathematical?

- 1998: Federal Circuit court upheld a patent about business methods (relating to running mutual funds): software that yields a useful, concrete, and tangible result are patentable
- In re Bilski, 2008: a process is patentable if "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing."
- Supreme Court, 2010s: actually, the 2008 test is only a clue, not a test! (collection of different cases)

Copyright

- Protects **original works of authorship** as soon as an author **fixes the work** in a **tangible form of expression.**
- "The Supreme Court has said that, to be creative, a work must have a "spark" and "modicum" of creativity."
- Can't copyright this blue square:



Fixing

- If I sing a new song, but no one records it, it is **not copyrighted**
- ...but it is copyrighted as soon as it is recorded!
- These lecture slides are copyright 2024, Michael Coblenz
 - Though usually an employer owns an employee's works

Rights of Copyright Holders

- Reproduce the work in copies.
- Prepare derivative works based upon the work.
- Distribute copies of the work to the public by sale or other transfer of ownership or by rental, lease, or lending.
- Perform the work publicly if it is a literary, musical, dramatic, or choreographic work; a pantomime; or a motion picture or other audiovisual work.
- Display the work publicly if it is a literary, musical, dramatic, or choreographic work; a pantomime; or a pictorial, graphic, or sculptural work. This right also applies to the individual images of a motion picture or other audiovisual work.
- Perform the work publicly by means of a digital audio transmission if the work is a sound recording.

Copyright vs. Patents

- Key contrast with patents:
 - If I independently replicate your invention, I infringe a patent anyway
 - If I independently reproduce your copyrighted work, no problem; I didn't copy

Licensing

- What if you want to allow others to use your copyrighted works?
- I want you to be able to execute my code
 - Optionally: you have to pay me first
 - Optionally: but you can't share the code with anyone else
 - Optionally: also, you can create derivative works

Public Domain

- Copyright lasts up to 120 years from creation (works made for hire)
 - Or 70 years after your death (works not made for hire)

A Case for Open Source

- Many eyes make bugs easier to find
- End users can improve and customize software
- Code reuse improves productivity

A Case Against Open Source

- Who will create software if no one will pay for it?
- Open source code may be easier to attack
- Innovation may be stifled if software can just be copied

Copyleft

- What constitutes free software?
- Key question: can I make proprietary changes to your free software?
- Copyleft says: no, all derivative works must remain copyable and changeable
- Alternative: derivative works may have additional restrictions
- Generally: copyleft software can't be used in proprietary products
 - since otherwise the company would have to make their code open source

Free Software Philosophy ("Free as in Speech, Not As in Beer")

- Freedom 0: The freedom to run the program as you wish, for any purpose.
- Freedom 1: The freedom to study how the program works, and change it so it does your computing as you wish.
- Freedom 2: The freedom to redistribute copies so you can help your neighbor.
- Freedom 3: The freedom to distribute copies of your modified versions to others

Activity

- Form groups of 3
- Read:
 - BSD, 3-clause
 - GPL v3
 - MIT
- For each:
 - Proprietary use?
 - Modify?
 - Give away patent rights?
 - Must include copyright notice?
 - Share source of derivative works?
 - Warranty provided?