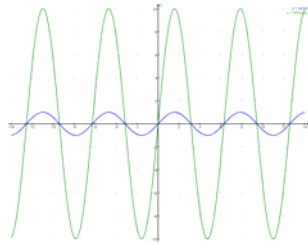


# What is digital?

What's the difference between

- Rolex and Timex?
- VCR tape and DVD?



Sampling analog music for CD's

- $44,100 \text{ samples/channel/second} * 2 \text{ channels} * 2 \text{ bytes/sample} * 74 \text{ minutes} * 60 \text{ seconds/minute} = 783 \text{ million bytes}$

How does MP3 help?

Why do digital media present new challenges from analog media?

CPS 001

Copyright 2

# Copyright

US Constitution (Article I, Section 8, Clause 8):

“To promote the Progress of Science and useful Arts”

- What can you copyright?
  - Fixed, tangible medium of expression with a modicum of originality
- How do you copyright?
  - Don't need anything. Registration necessary for copyright infringement suits
- Authors given limited monopoly so they will disclose to public
- Concessions
  1. Fair use
  2. First sale
  3. Limited Time
- Evolving Bargain: Copyright holder may profit from works and public has access and can build upon them
- What would happen if information could only be shared if the owner provided permission?

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Copyright 3

# Fair use

Use copyrighted works without permission if the use does not unduly interfere with the copyright owner's market for a work

Include personal, noncommercial uses

4 prong test

1. Purpose and character of use (commercial vs. non-profit or educational)
2. Nature of copyrighted work
3. Amount and substantiality of the portion used
4. Effect of the copying upon market

Example: using a VCR to time-shift a broadcast program

Reverse engineering

- OK when extracting unprotected elements
- Connectix Virtual PlayStation

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Copyright 4

# Digital rights management

Idea: copying is hard to control, so make the copying process itself difficult

- Restrict the use of digital files in order to protect interest of copyright holders
- Control file access
- Implemented in operating system, program software, or in the actual hardware of a device

Digital watermarking

- Make information so that unauthorized copying can be detected

Serial Copy Management System (Audio Home Recording Act 92)

Dystopian and utopian results?

Privacy issues?

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Copyright 5

# Important papers

## National Information Infrastructure White Paper 1995

1. Copyright owners given exclusive rights over “transmission” of information not just copying
  2. Eliminate first-sale doctrine for digital works
  3. Criminalize tampering with copyright protection or identification mechanisms
- Controversial and bills to implement recommendations were not passed, until...

## World Intellectual Property Organization Treaty 1996

### Digital Millennium Copyright Act 1998

- Encourages use of technological protections to facilitate a pay-per-view/use system
- Copyright used to regulate multiplication and distribution of works but how about consumption?
- Civil and criminal penalties for circumventing copyright protection systems

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Copyright 6

# Copyrights

## Copyright Term Extension Act 1998

- Free Mickey Mouse! (challenged in Supreme Court 2003)
- Retroactive copyright extension of 20 years
- Breyer: “effect ... is to make the copyright term not limited, but virtually perpetual”
  - Over the last 40 years, Congress has lengthened copyright durations 11 times
  - Copyright term length
    - 95 years for corporations
    - 70 years after death for individuals

## Other forms of exclusive rights in information

- Patents: inventions that others cannot use
- Trademark: differentiates between different sources of products
- Trade secret: pseudo-property right to penalize those who disclose information to unauthorized persons

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Copyright 7

# Questions

What are the differences between writing code and writing books in terms of licensing?

Discuss the legality of peer-to-peer sharing with respect to the four prongs of determining fair use

Eben Moglen:

- If you could feed everyone by pressing a button to create lambchops (for free), is there a moral reason to have starving people?
- If everything has zero marginal cost and can be given to everyone everywhere why is it ever moral to exclude anyone from anything?

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Copyright 8

# Consequences

## Scientific research

- Secure Digital Music Initiative & Prof. Edward Felton
- Adobe & Dmitry Sklyarov

## Fair Use

- Copy-protected CDs
- DeCSS and DVD Copy Plus

## Innovation and competition

- Sony vs. Connectix and “Mod Chip” makers
- Apple & Other World Computing

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Copyright 9

# Patents

## Why patents are powerful?

- Right to exclude others from “practicing the invention”

## Currently operating under Patent Act of 1975

- 20 year term

## Patent and Trademark Office looks at 4 criteria

1. Is proposed invention patentable?
2. Utility
3. Novelty
4. Non-obviousness

## Software patents

- Only recently have patents been granted for software or business methods
- Controversial patent: Amazon.com’s One-Click

# Types of software

## Software Licenses

- Public domain
- Free
- Open Source
- Copylefted
- Semi-free
- Commercial

## Proprietary (closed) software

- Freeware
- Shareware
- Adware
- Spyware

## Commercial

Academic licenses

## Specific licenses

- GNU Public License
- Mozilla Public License
- Lots more...

Say you buy software using (steep) student discounts that are available at the Duke Computer Store?

Can you use it when you leave Duke and are no longer a student?

*What do you buy when you purchase software?*

# Open source

## Commercial software license schemes

- Microsoft’s Embrace and Extend
- What’s a EULA?

## Rights

- Make copies of the program and distribute them
- Access to the software’s source code
- Make improvements to the program

## Results

- All contributors at same relative level
- Lots of competition in distribution or support
- *Why does it work?*

## Free Software Foundation formed in 1984

- GNU General Public License (Copyleft)
- Seminal work produced (emacs, gnu compiler)
- Spawned different licenses like the Open Source Definition

# Sources of material

## Organizations

- The Electronic Frontier Foundation
- Center for Democracy and Technology

## Media and discussion

- Wired Magazine
- Slashdot

## Databases of information and laws

- Lexis/Nexis
- Thomas

## Social issues in Computer Science

- Computer Professionals for Social Responsibility