

# **CONSOLE EMULATION AND SOFTWARE ENGINEERING**

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# Outline

- “Emulation” in the video game context
- Reasons for Emulation
- Stakeholders
- Is this legal?
- E&E: Ethics and Emulation (Oxymoron?)
- When Emulation Attacks: UltraHLE / Neo\*Geo
- What about Software Engineering?
- Beyond Emulation: The bigger picture

# Emulation and Video Games

- Replication of game consoles on:
  - Computers
  - Different consoles
- Two main software elements:
  - Emulators
  - ROMS

# Reasons for Emulation

- Preservation of games / Nostalgia
- Additional features or improvements
- “Free” Culture / Piracy
- Technical Curiosity<sup>1</sup>

# The Main Stakeholders

- Emulator Developers
- Emulator Users
- Video Game Companies
- Video Game Industry

# Is This Legal?

- Video Games are protected by copyright (©) in U.S.<sup>2</sup> and Canada<sup>3</sup>
- Can make copies of games if and only if have copyright holder's permission, OR
  - You own an original copy AND
  - The copy is for backup purposes AND
  - The copy is for your own use
- Distributing unauthorized copies is a violation of copyright law

# What About Emulators?

- Court Cases to consider:
  - Sony v. Bleem LLC
  - Sony v. Connectix
- Both emulators designed to work with actual copies of games (not ROMS)
- **Results:** If emulator does not use intellectual property from original console, then it is legal<sup>4</sup>

# Emulation and Ethics

## **“The Bottom Line:**

Emulation is against the law, but everyone does it anyway and it's very unlikely to get you in trouble.”<sup>5</sup>

“For every game (e.g. ‘Pac-Man’) that is still supported by it's owners...there are hundreds of games that would likely never see the light of day again if it weren't for ROM distribution.”<sup>6</sup>



# Ethical Dilemmas

- We have seen that:
  - **Most** ROMS are illegal
  - **Most** emulators themselves are legal
  - **Some** game companies don't like emulation that much
- The only way to make a “truly” legal emulator is in a vacuum!
- Should emulators be developed if they will never be used?

# Applicable Codes of Ethics

- From **AAES**: “Engineers act in accordance with all applicable laws...and lend support to others who strive to do likewise.”<sup>7</sup>
- From **NSPE**: “Engineers shall not use association with a nonengineer, a corporation, or partnership as a “cloak” for unethical acts.”<sup>8</sup>
- From **PEO**: “A practitioner shall...regard the practitioner's duty to public welfare as paramount.”<sup>9</sup>

# When Emulation Attacks

- **UltraHLE (High Level Emulator):**
  - Nintendo 64 emulator released in January, 1999, 3 years after release of console itself
  - Authors claimed it was an experiment to prove the Nintendo 64 could be emulated
  - Compatible with approx. 40 games
  - Within hours of release, requests for ROMS began
  - Authors withdrew release shortly after, but it was too late...<sup>10</sup>

# When Emulation Attacks Again!

- **The Neo\*Geo:**

- High – End console released by SNK (now Playmore) in 1990
- Rise of internet, age of hardware lead to increased sharing and development of emulators in late 90s
- New games still being made, yet are dumped into ROM format shortly after (or even before) being released
- Shows what might happen if / when emulation “catches up” with console production

# What About Software Engineering?

- Popularity of emulation indicates demand for old games still exists
- Software Engineers can assist in arriving at a mutually – beneficial solution
- Some legal solutions:
  - Re-released compilations of older games on new consoles
  - Backward compatibility through several generations
  - Stand – alone products

# Beyond Emulation – The Big Picture

- When designing a product, consider whether it has unethical applications – will these applications be the predominant use of your product?
- Recall NSPE guideline à If one is an Engineer, one is an Engineer **all the time!**
- For Software Engineering to be accepted as a “real” field of Engineering, Software Engineers must act like Engineers!

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