

NERDS V. NINTENDO: VIDEO GAME DECOMPILATIONS VERSUS RIGHTS- HOLDER INTERESTS

Kirk A. Sigmon†

Video game “decompilations”—a potentially technically inaccurate term referring to fan efforts to entirely reprogram video games based on reverse engineering those games—present an interesting case study for evaluating the scope of video game copyrightability, fair use, and public expectations about content availability. Decompilations usually comprise entirely new code and do not comprise any assets of the original video game, suggesting that the decompilations, if viewed as mere code, do not apparently infringe any video game copyrights. That said, decompilations illustrate why copyright protects more than the discrete assets (e.g., art or music) of a video game, as decompilations are generally designed to capture the totality of creative labor in that video game. Decompilations also touch on a larger issue with intellectual property law and policy: the extent of the public’s right to expect that a creative work remains accessible (e.g., on modern hardware). While traditional concepts of fair use might not defend decompilation developers from copyright infringement suits, an analysis of fair use in view of this larger issue of accessibility and through the perspective of property interests presents a different conclusion, suggesting that fans have a right to preserve access to video games in certain circumstances. This Article leverages the modern scholarly interest in connecting the underlying justification for intellectual property with Locke’s theory of property to analyze decompilations, concluding that—while decompilations are copyright infringing—they should be protected as fair use in circumstances where they operate to protect video games from unavailability due to technological obsolescence.

† Partner, Banner & Witcoff, Ltd. The research and writing of this paper were supported by the Thomas Edison Innovation Law and Policy Fellowship, Center for Intellectual Property x Innovation Policy, George Mason University Law School. Special thanks to Professors Eric Claeys, John F. Duffy, Justin Hughes, Zorina Khan, Sean M. O’Connor, Michael Risch, and Mark F. Schultz for their helpful contributions as part of that fellowship, and to Valerie Yu for her research assistance. The opinions and mistakes herein are solely attributable to the author.

TABLE OF CONTENTS

INTRODUCTION.....	55
I. FROM VIDEO GAME EMULATION TO DECOMPILATIONS, AND HOW FANS’ PRESERVATION EFFORTS ARE INCREASINGLY SUPERIOR TO RIGHTS HOLDERS’ OWN OFFERINGS.....	60
A. Brief History of Emulation.....	61
B. From High-Level Emulation to Low-Level Emulation, Decompilations, and Field Programmable Gate Arrays.....	62
C. Emulation and Decompilations as a Solution to Increasingly Scarce Video Games.....	68
D. Why Rights Holders Are Not Satiating Fan Demand	70
1. The Benefits of Artificial Scarcity in Video Games	71
2. Fans Are Difficult to Please.....	73
3. Insufficient Demand for Certain Games.....	75
II. DECOMPILATIONS CALL INTO QUESTION EXISTING UNDERSTANDINGS OF THE COPYRIGHTABILITY OF VIDEO GAMES.....	76
A. Emulators: Generally, Not Infringing	76
B. Decompilations Present a More Interesting Question.....	82
C. The Case for Providing Copyright Protection to a Broader Spectrum of Video Game Creativity.....	91
D. The Consequences of Providing Copyright Protection to a Broader Spectrum of Video Game Creativity	97
III. DECOMPILATIONS AS FAIR USE FROM A PROPERTY INTEREST PERSPECTIVE.....	99
A. The Insufficiency of a Statutory Fair Use Analysis.....	100
B. Beyond Statutory Fair Use: Do Fans Have a Property Interest?	102
C. The Boundaries and Complexities of a Fair Use Defense for Video Game Preservation.....	113
D. An Alternative to Fair Use: Compulsory Licensing	118
CONCLUSION.....	120

INTRODUCTION

Video game fans have spent decades developing technologies that now allow them to preserve and play video games in a manner arguably superior to the methods offered by rights holders. For example, fans have long developed and used “emulators”—software that can emulate the operations of video game hardware—to (often unlawfully) play video games on their personal computers.¹ More recent preservation efforts are even more technologically impressive. For example, some fans have spent countless hours developing so-called “decompilations”—a possibly technically imprecise term² that fans use to refer to independently created code based on the reverse engineering of (e.g., analysis of the assembly code of) the compiled binaries³ of video games that, when appropriately compiled and executed in modern hardware along with the appropriate in-game assets (e.g., three-dimensional models or music), allows players to play those video games on virtually any modern computer.⁴ As another example, some fans have spent countless hours learning how to program Field Programmable Gate Arrays (FPGAs) to mimic now-antiquated video game processors, and those fan-developed FPGA “cores” allow retro video games to be played on modern hardware nearly identically to how they performed on their original hardware (and with many other benefits as well).⁵ These developments, all arguably examples of what Professor Eric von Hippel referred to as the democratization of innovation,⁶ can be far more technically advanced as compared to

¹ *History of Emulation*, EMULATION GEN. WIKI, https://emulation.gametechniki.com/index.php/History_of_emulation [<https://perma.cc/5BUF-D7KX>] (May 6, 2023, 8:43 PM).

² There might be debates over whether these are in fact true decompilations, or simply independently developed code programmed based on analysis of reverse engineering. Regardless, these projects are referred to as “decompilations” herein because that is how they are referred to by their developers and by the industry as a whole.

³ For a simple explanation of the differences between code and a compiled binary (an “executable”), see Carlos Barros, *Understanding Compilation*, MEDIUM (Feb. 5, 2020), <https://medium.com/@cbarros7/understanding-compilation-99a83ef1de61> [<https://perma.cc/LU8R-V5R2>].

⁴ See Kyle Orland, *Beyond Emulation: The Massive Effort to Reverse-Engineer N64 Source Code*, ARS TECHNICA (May 6, 2020, 12:33 PM), <https://arstechnica.com/gaming/2020/05/beyond-emulation-the-massive-effort-to-reverse-engineer-n64-source-code> [<https://perma.cc/QW9W-BGYM>]; see also *Beginners Guide to Reverse Engineering (Retro Games)*, RETRO REVERSING, <https://www.retroreversing.com/tutorials/introduction> [<https://perma.cc/S32J-2FAE>] (Mar. 29, 2020).

⁵ *FPGA*, EMULATION GEN. WIKI, <https://emulation.gametechniki.com/index.php/FPGA> [<https://perma.cc/BZ99-HGZJ>] (Aug. 18, 2022, 12:59 AM). See generally *Console Cores*, MISTER CORES & MORE (Jan. 14, 2019), <http://www.mistercores.com/console-cores> [<https://perma.cc/8TXM-CR8U>].

⁶ ERIC VON HIPPEL, *DEMOCRATIZING INNOVATION* 121–31 (2005).

offerings by rights holders, to the point where the free (but copyright-infringing) versions of video games and video game consoles found on the internet can provide an arguably superior experience compared to the commercially available (and legal) versions of those same games.⁷ For instance, Nintendo rereleased a copy of *Mario Kart 64* on its Switch video game console in 2021, but fans had already long since provided an arguably superior experience—for free—using emulators.⁸ In many cases, emulation is often the only way to acquire and enjoy certain older games,⁹ as game preservation can be quite difficult: for instance, representatives from the Library of Congress openly concede that they only have a relatively small number of video games in their collection.¹⁰

Decompilations present an interesting case study regarding the scope of copyright as it applies to video games, and in particular illustrate why copyright protection should extend to all forms of creative labor in video games, whether or not that labor is embodied in discrete assets (e.g., the graphics and audio files used during output of the game).¹¹ In *Micro Star v. FormGen Inc.*,¹² the Ninth Circuit considered whether third-party-distributed files for the game *Duke Nukem 3D* infringed copyrights associated with that game.¹³ The court alluded to the idea that video games were more than just their underlying assets, such that the aforementioned third-party-distributed files were derivative works of *Duke Nukem 3D* in a manner akin to how an unauthorized sequel might

⁷ See RJ Pierce, *Video Game Emulators: Is It Worth Using Them, or Should You Just Buy an Old Console?*, TECH TIMES (Oct. 22, 2021, 10:10 PM), <https://www.techtimes.com/articles/267032/20211022/video-game-emulators-heres-what-should-you-know.htm> [<https://perma.cc/9XP9-M5D9>].

⁸ Wes Fenlon, *Nintendo's Botched N64 Emulation Proves Just How Amazing Fan Emulators Are*, PC GAMER (Oct. 27, 2021), <https://www.pcgamer.com/nintendos-botched-n64-emulation-proves-just-how-amazing-fan-emulators-are> [<https://perma.cc/54FS-863Q>].

⁹ Will White, Note, *Would You Like to Save Your Game?: Establishing a Legal Framework for Long-Term Digital Game Preservation*, 81 OHIO ST. L.J. 567, 581 (2020); Noah Smith, *Academics Want to Preserve Video Games. Copyright Laws Make It Complicated.*, WASH. POST (Jan. 12, 2022, 4:34 PM), <https://www.washingtonpost.com/video-games/2022/01/12/video-game-preservation-emulation> [<https://perma.cc/6PJ3-PC3X>]; Yin Harn Lee, *Making Videogame History: Videogame Preservation and Copyright Law*, 1 INTERACTIVE ENT. L. REV. 103, 104 (2018).

¹⁰ Trevor Owens, *Yes, The Library of Congress Has Video Games: An Interview with David Gibson*, LIBR. OF CONG. BLOGS: THE SIGNAL (Sept. 26, 2012), <https://blogs.loc.gov/thesignal/2012/09/yes-the-library-of-congress-has-video-games-an-interview-with-david-gibson> [<https://perma.cc/3M2F-24QE>].

¹¹ The term “assets” refers to a broad set of data elements that might be used during game development. See *Game Development Terms*, UNITY, <https://unity.com/how-to/beginner/game-development-terms> [<https://perma.cc/JB82-MU2C>].

¹² 154 F.3d 1107 (9th Cir. 1998).

¹³ *Id.* at 1109.

be an infringing derivative work of a copyrighted book.¹⁴ Based on that logic, the court concluded¹⁵ that the third-party-distributed files were infringing derivative works, but that reasoning was arguably a stretch: after all, not all video games have stories, not all files at issue in that case related to the story of *Duke Nukem 3D*, and the third-party-distributed files could in fact have been used with other games.¹⁶ Regardless, the court's ruling seemed to suggest a bigger idea: that there might be some sort of aspect of video games worth protecting above and beyond the discrete assets of the game. Along those lines, a rights holder may be entitled to a right to the fruits of their creative labor in a video game, even if that creative labor is not necessarily reflected in assets such as a two- or three-dimensional model, an audio file, code, or the like. Such an argument would potentially render video game decompilations infringing despite the fact that those decompilations usually comprise nothing but entirely new code and, thus, typically do not comprise any assets of the original game.

Decompilations also touch on a larger issue with intellectual property law and policy: the extent of the public's right to expect that a creative work remains available for enjoyment in the future. Thanks in no small part to the affordability and availability of modern storage technology, a growing number of so-called "data hoarders" are interested in preserving content for future generations.¹⁷ In turn, while some copyrighted works might once have been lost due to the passage of time, modern technology allows ordinary consumers to preserve those works for future generations, and those ordinary consumers appear to increasingly expect that those works are, in fact, preserved.¹⁸ Decompilations are an excellent example of this trend: while older video game consoles are breaking down over time,¹⁹ and while game media is

¹⁴ See *id.* at 1112; see also *MDY Indus., LLC v. Blizzard Ent., Inc.*, 629 F.3d 928, 942–43 (9th Cir. 2010) (distinguishing "literal elements," "individual non-literal elements," and "dynamic non-literal elements" of video games); Dan L. Burk, *Owning E-Sports: Proprietary Rights in Professional Computer Gaming*, 161 U. PA. L. REV. 1535, 1546–47 (2013).

¹⁵ *Micro Star v. FormGen Inc.*, 154 F.3d 1107, 1109 (9th Cir. 1998).

¹⁶ See Ross Dannenberg & Josh Davenport, *Top 10 Video Game Cases (US): How Video Game Litigation in the US Has Evolved Since the Advent of Pong*, 1 INTERACTIVE ENT. L. REV. 89, 92 (2018).

¹⁷ David Rutland, *Digital Hoarders: "Our Terabytes Are Put to Use for the Betterment of Mankind,"* ARS TECHNICA (Apr. 12, 2020), <https://arstechnica.com/gaming/2020/04/digital-hoarders-our-terabytes-are-put-to-use-for-the-betterment-of-mankind> [https://perma.cc/DSV2-CS7T]; see also István Harkai, *Preservation of Video Games and Their Role as Cultural Heritage*, 17 J. INTELL. PROP. L. & PRAC. 844 (2022).

¹⁸ See Harkai, *supra* note 17.

¹⁹ See Fred Rojas, *Capacitors and Retro Game Consoles*, GAMING HISTORY 101 (Mar. 23, 2021, 11:00 AM), <https://gaminghistory101.com/2021/03/23/capacitors-and-retro-game-consoles> [https://perma.cc/9CGS-PPRC].

also degrading and becoming unusable,²⁰ decompilations act as a way for fans to ensure that video games are not lost to time due to technological obsolescence and/or breakdown.²¹ This trend suggests that, through activities like the development of decompilations, fans may be asserting a right to access copyrighted works, even when that right to access is (as posited above) inconsistent with the rights holders' copyright interests in those works.

A property rights–based understanding of fair use can help navigate the tension between the need to fully protect the creativity inherent in video games and the desire to allow passionate fans to preserve access to video games that might otherwise be lost to time. Recent legal scholarship has shown a renewed interest in connecting underlying justifications for intellectual property with Locke's theory of property (in particular, the natural rights to property and the fruits of one's own labor),²² and such a connection can be helpful in analyzing the conflict between the property rights of video game rights holders and the access-interested public. Along those lines, while a traditional, statutorily rooted understanding of fair use might not necessarily shield decompilation developers from copyright infringement actions,²³ Congress intended fair use to be a flexible doctrine,²⁴ and an analysis of fair use from the perspective of property and the commons provides a potentially different result. In fact, the very same property rights analysis that arguably supports copyright protection for the many forms of creative labor in video games also arguably supports a public right, rooted in the commons, to preserve access to those video games.

²⁰ Ernie Smith, *The Hidden Phenomenon that Could Ruin Your Old Discs*, VICE (Feb. 6, 2017, 11:52 AM), <https://www.vice.com/en/article/mg9pdv/the-hidden-phenomenon-that-could-ruin-your-old-discs> [<https://perma.cc/5Q39-E95W>].

²¹ See Daryl Baxter, *Decompilations Could Be the Solution to Ports and Remakes in the Future*, TECH RADAR (Dec. 28, 2022), <https://www.techradar.com/features/decompilations-could-be-the-solution-to-ports-and-remakes-in-the-future> [<https://perma.cc/MQ8E-BBTF>].

²² See, e.g., Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287 (1988); see also William W. Fisher III, *Reconstructing the Fair Use Doctrine*, 101 HARV. L. REV. 1659 (1988); Wendy J. Gordon, *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 YALE L.J. 1533, 1563 (1993); Lawrence C. Becker, *Deserving to Own Intellectual Property*, 68 CHL-KENT L. REV. 609 (1993); David McGowan, *Copyright Nonconsequentialism*, 69 MO. L. REV. 1 (2004); Adam D. Moore, *A Lockean Theory of Intellectual Property Revisited*, 49 SAN DIEGO L. REV. 1069 (2012); Eric R. Claeys, *Labor, Exclusion, and Flourishing in Property Law*, 95 N.C. L. REV. 413 (2017).

²³ Others have argued otherwise. See Joseph Godfrey, *Super Mario Decompiled*, 12 HASTINGS SCI. & TECH. L.J. 1, 2 (2020).

²⁴ Ned Snow, *Who Decides Fair Use—Judge or Jury?*, 94 WASH. L. REV. 275, 282 (2019). One's perspective on the degree of subjectivity in the fair use analysis might implicate how strong appellate oversight should be. See Justin Hughes, *The Respective Roles of Judges and Juries in Copyright Fair Use*, 58 HOUS. L. REV. 327, 352–53 (2020).

Professor Wendy Gordon has argued that, in view of Locke’s “enough, and as good left in common for others” proviso,²⁵ “creators should have property in their original works, only provided that such grant of property does no harm to other persons’ equal abilities to create or to draw upon the preexisting cultural matrix and scientific heritage.”²⁶ This Article starts with Professor Gordon’s argument and takes an even more aggressive position: fan engagement with a video game can provide that video game a larger cultural footprint than the original creative labor spent to make that video game (i.e., by the rights holder),²⁷ and such fan engagement can thereby create an intangible additional aspect of the video game that belongs not to the original rights holder but to the commons. In this manner, the video game has rooted itself in the cultural matrix, and the public may expect that video game to remain accessible and part of that cultural matrix. In turn, those fans arguably have a right to not merely create or draw upon that game in some general sense but also have the right to preserve access to that game (e.g., via modern hardware), particularly in circumstances where the original rights holder fails to provide sufficient access to that video game due to technological obsolescence and/or breakdown. This promotes creative engagement with existing works²⁸ and prevents a rights holder from “lock[ing] up”²⁹ culture by, through technological obsolescence and/or breakdown, withdrawing from the cultural matrix what already belongs to the cultural matrix. Stated more simply, once a video game has been released to the world and has transformed the world, even in some small way, this Article argues that it is fair use for a fan to keep that video game available to the public in circumstances where the original rights holder is unable or unwilling to do so.

This right-to-access fair use argument recognizes and rewards the significant labor of fans in preserving video games. Fans’ labor in preserving older video games through emulation, decompilation, and similar strategies is far from de minimis: for instance, the Super Nintendo emulator snes9x has been in development for over ten years, with thousands of different code modifications made per year by a wide variety

²⁵ JOHN LOCKE, *TWO TREATISES OF GOVERNMENT* 306 (Peter Laslett ed., 2d ed. 1967) (1690); see also Hughes, *supra* note 22, at 296–329.

²⁶ Gordon, *supra* note 22, at 1563–64.

²⁷ This trend is not limited to video games. See, e.g., *Lotus Dev. Corp. v. Borland Int’l, Inc.*, 49 F.3d 807, 819–21 (1st Cir. 1995) (Boudin, J., concurring).

²⁸ See Fisher, *supra* note 22.

²⁹ Trevor G. Reed, *Fair Use as Cultural Appropriation*, 109 CAL. L. REV. 1373, 1403 (2021) (citing LAWRENCE LESSIG, *FREE CULTURE: HOW BIG MEDIA USES TECHNOLOGY AND THE LAW TO LOCK DOWN CULTURE AND CONTROL CREATIVITY* xiv (2004)).

of different programmers.³⁰ This effort, often attributed to “a dedicated community of gamers looking to recapture childhood memories,”³¹ is significant, public, and generally uncompensated creative labor: it is a contribution, often dedicated to the public at large, that can preserve the ability of future generations to access and enjoy video games that, without those fans’ effort, might be lost to time. While one might understandably want to protect the full scope of a video game developer’s creative labor through copyright protection, one might simultaneously want to protect the significant labor invested by fans in preserving video games and hardware through decompilations, emulators, and the like.

This Article analyzes the development of video game decompilations, explores how decompilations provide a case study for why copyright law should protect aspects of video games beyond their discrete assets, and analyzes how property interest principles counsel for a fair use exception to decompilations to preserve the public’s access to video games that have rooted themselves in the cultural matrix. Part I provides a brief history of video game emulation, including the development of so-called video game decompilations, and overviews why rights holders might not be incentivized to preserve and/or commercially rerelease older video games in some circumstances. Part II analyzes how decompilations and similar innovations in video game emulation provide a case study for protecting the full scope of creative labor expended in creating video games and weighs the pros and cons of such protection. Part III recontextualizes fan preservation efforts from the perspective of fair use, arguing that—even if copyright protects aspects of video games beyond their individual assets—fan labor for such preservation merits defending through fair use. Part IV is a conclusion.

I. FROM VIDEO GAME EMULATION TO DECOMPILATIONS, AND HOW FANS’ PRESERVATION EFFORTS ARE INCREASINGLY SUPERIOR TO RIGHTS HOLDERS’ OWN OFFERINGS

For decades, video game fans have endeavored to preserve and enjoy video games even when those video games are no longer available commercially. With the advent of decompilations and similar strategies, those efforts have gotten so advanced that the methods with which those

³⁰ See *Code Frequency over the History of Snes9xgit/snes9x*, GITHUB, <https://github.com/snes9xgit/snes9x/graphs/code-frequency> [<https://perma.cc/7KFB-UHWH>].

³¹ Tola Onanuga, *All That’s Wrong with Nintendo’s Heavy-Handed ROM Crackdown*, WIRED (Aug. 18, 2018, 7:00 AM), <https://www.wired.co.uk/article/nintendo-roms-emulator-loveroms-loveretro-lawsuit> [<https://perma.cc/9LCK-5QMJ>].

video games are preserved arguably provide a better experience than that ever made available by original rights holders.

A. *Brief History of Emulation*

The story of how fans have quickly outpaced rights holders in making those rights holders' games available to the public via decompilations is largely the story of emulation: that is, a story about how fans developed tools to play video games on devices of their choice.

Emulators are “pieces of software that replicate the software and hardware of a console or old computer.”³² Emulator software essentially pretends to be the original hardware, such that—when provided a file representing video game media—the emulator software allows users to play the video game as if it were executing on original hardware.³³ While not their exclusive use, emulators are often used to pirate video games, as it is trivially easy to (typically illegally) download hundreds of older video games off the internet for free.³⁴

The earliest video game console emulators were developed in the early 1990s.³⁵ Such emulators were “often incomplete, only partially emulating a given system, and often riddled with defects.”³⁶ One stand-out emulator, “NESticle,”³⁷ was a “blazing fast and very easy to use” emulator that allowed anyone with a sufficiently powerful personal computer to emulate and play Nintendo Entertainment System games on their personal computer.³⁸ A variety of different competing emulators were available in the early 1990s, though some were limited in terms of the number of games they could play.³⁹ Over the last few decades, efforts have been made to emulate virtually every video game console ever made, and with better and better accuracy.⁴⁰ For example, emulator platform

³² Chris Newton, *How Do Emulators Work? A Beginner's Guide to Video Game Emulation*, BAGO GAMES, <https://bagogames.com/how-do-emulators-work-a-beginners-guide-to-video-game-emulation> [<https://perma.cc/BJX8-QT66>].

³³ *Id.*

³⁴ James Conley, Ed Andros, Priti Chinai, Elise Lipkowitz & David Perez, *Use of a Game Over: Emulation and the Video Game Industry, A White Paper*, 2 NW. J. TECH. & INTELL. PROP. 261 (2004).

³⁵ *History of Emulation*, *supra* note 1.

³⁶ *History of Console Emulators*, EMULATION NATION, <http://www.emulationnation.com/console-emulation/history-of-console-emulators> [<https://perma.cc/X33T-UFVG>].

³⁷ Its icon was exactly what you would expect.

³⁸ Ernie Smith, *The Story of NESticle, the Ambitious Emulator That Redefined Retro Gaming*, VICE (May 1, 2017, 8:00 AM), <https://www.vice.com/en/article/9a48z3/the-story-of-nesticle-the-ambitious-emulator-that-redefined-retro-gaming> [<https://perma.cc/3QGS-JYNH>].

³⁹ See *History of Emulation*, *supra* note 1.

⁴⁰ See *id.*

Libretro supports over one hundred different emulation cores, which allow players to emulate everything from the once-ubiquitous Nintendo 64 to the relatively obscure SAM Coupé.⁴¹

B. *From High-Level Emulation to Low-Level Emulation, Decompilations, and Field Programmable Gate Arrays*

As emulators became better and better over time, emulated games began to perform better than they ever performed on original hardware, and in some cases, emulated games began to perform significantly better than modern versions of the game sold by their rights holders. Decompilations provide even further advancement, decoupling older video games from the hardware limitations of their intended hardware.

The overall approach to video game emulation can be broken up into two categories: high-level emulation and low-level emulation.⁴² While a high-level emulator “abstracts the component with the goal of improving performance on the host, sacrificing the thorough measures needed to guarantee the correct behavior,” a low-level emulator tries “to replicate the original hardware chips down to the bugs and waits.”⁴³ Low-level emulation tends to require significantly more computational power,⁴⁴ but the computational intensity is often worth the effort: because low-level emulation emulates the hardware chips, it can handle instructions from games regardless of whether those instructions have been manually abstracted by a developer.⁴⁵ But, while low-level emulation might be considered more precise than high-level emulation, this does not mean that low-level emulation is without fault.⁴⁶

Emulator developers have spent significant time and effort improving emulators’ ability to emulate increasingly complicated video game hardware, and part of those efforts relates to emulation using low-level emulation techniques. There is perhaps no better example of such

⁴¹ *Core List*, LIBRETRO DOCS, <https://docs.libretro.com/meta/core-list> [<https://perma.cc/F2JY-YDFS>] (May 23, 2023).

⁴² *High/Low Level Emulation*, EMULATION GEN. WIKI, https://emulation.gametechniki.com/index.php/High/Low_level_emulation [<https://perma.cc/JV3U-J2E5>] (July 3, 2019, 12:31 AM).

⁴³ *Id.*

⁴⁴ *See id.* This computational power is generally available, at least when emulating older (and significantly slower) processors. *See id.*

⁴⁵ Gonetz, *A Word for HLE*, GLIDEN64 (Nov. 25, 2014, 12:48 AM), <http://gliden64.blogspot.com/2014/11/a-word-for-hle.html> [<https://perma.cc/V36F-2EYD>] (referring to this issue as the “unsupported microcode” problem); *see also* Alexandro Sanchez, *LLE vs HLE and Their Tradeoffs*, GITHUB (Apr. 18, 2018), <https://alexaltea.github.io/blog/posts/2018-04-18-lle-vs-hle> [<https://perma.cc/6KMY-762B>].

⁴⁶ *See id.*

efforts than the work to emulate the Nintendo 64 video game console, which was released in 1996.⁴⁷ The first Nintendo 64 emulator ever attempted is believed to be “Project Unreality,” a high-level emulator released in 1998 which could run only a limited number of Nintendo 64 demos as well as a limited set of logo screens.⁴⁸ Development on Nintendo 64 emulators stagnated for a long time, in no small part because of the unique eccentricities of the the console’s hardware.⁴⁹ For instance, one of the unique hurdles when developing these emulators was the Nintendo 64’s Reality Display Processor (RDP), a custom processor “that had to be fine-tuned to get more performance out of the system using microcode.”⁵⁰ To emulate this fine-tuned microcode, emulator developers had to identify ways to execute the microcode in the same way the RDP would execute that microcode, which was infeasible with older and/or slower computing devices.⁵¹ Development efforts, nonetheless, persisted, and the first arguably successful high-level Nintendo 64 emulator was UltraHLE, released in 1999, which was capable of running (albeit poorly) video games such as *Super Mario 64* and *The Legend of Zelda: Ocarina of Time*.⁵² Given that UltraHLE was (as suggested by its name) a high-level emulator, developers had to manually configure UltraHLE to work with particular games.⁵³ Low-level emulators were slowly developed ever since—though, even today, modern Nintendo 64 emulators still struggle with certain aspects of emulating the RDP, such as struggling with frame buffer/depth, buffer access, and how combine/blending modes are emulated.⁵⁴

Despite their imprecision and other limitations in emulating older hardware, both high-level and low-level emulators can provide arguably better experiences than would be available on original hardware. For example, technical limitations of Sony’s first video game console, the

⁴⁷ Peer Schneider et al., *Nintendo 64*, HIST. OF VIDEO GAME CONSOLES GUIDE, https://www.ign.com/wikis/history-of-video-game-consoles/Nintendo_64 [https://perma.cc/5959-F4LM] (Sept. 30, 2015).

⁴⁸ *Project Unreality*, ZOPHAR’S DOMAIN, <https://www.zophar.net/n64/project-unreality.html> [https://perma.cc/U79Q-DL8R].

⁴⁹ See *Nintendo 64 Emulators*, EMULATOR GEN. WIKI, https://emulation.gametechwiki.com/index.php/Nintendo_64_emulators [https://perma.cc/L7DF-4KEJ] (May 22, 2023, 4:40 PM); Novak, *The Challenges of Emulating the Nintendo 64*, NOVINT (Nov. 13, 2022), <https://www.novint.com/the-challenges-of-emulating-the-nintendo-64> [https://web.archive.org/web/20230316081634/https://www.novint.com/the-challenges-of-emulating-the-nintendo-64].

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *UltraHLE*, EMULATOR ZONE, <https://www.emulator-zone.com/doc.php/n64/ultrahle.html> [https://perma.cc/J6X2-7FNY].

⁵³ See *id.*

⁵⁴ *Nintendo 64 Emulators*, *supra* note 49.

PlayStation, rendered vertex coordinates using integers, even though polygons based on those vertices might occupy “a fraction of a pixel.”⁵⁵ This caused numerous issues with the manner in which the PlayStation drew three-dimensional graphics: “[e]xternal edges of models would make sudden jumps when moved slightly,” and triangles within a mesh would “fight[] to draw over the same pixels,” which could lead to “triangle intersections flickering or overlapping when moved slightly.”⁵⁶ These technical limitations resulted in a characteristic “wobble” effect to in-game graphics on the first PlayStation video game console.⁵⁷ Emulator developers fixed this issue.⁵⁸ Specifically, emulator developers were able to use modern technology to fix the manner in which PlayStation games were displayed by, among other things, introducing “subpixel precision to get rid of the wobbling polygon issues” and adding “perspective correct texturing to stop ‘textu[r]e warping/dancing’ issues.”⁵⁹

These significant fan efforts in surmounting hardware issues often resulted in significantly better experiences than those offered by rights holders. In 2021, Nintendo released a handful of Nintendo 64 games along with a Nintendo-developed emulator as part of the subscription-based “Switch Online Expansion Pack” for their Switch video game console, but those games were heavily criticized as being “messy.”⁶⁰ In contrast, fan-developed emulators—which had been around for decades at that point—were arguably superior.⁶¹ *PC Gamer’s* Wes Fenlon summarized the situation: “Nintendo’s emulator is convenient, but it awkwardly fails to be better than decades-old fan emulators when it comes to game preservation—representing games accurately as they ran on original hardware—or enhancing them to look significantly better on modern hardware.”⁶²

Decompilations are one of the latest tools deployed in fans’ continual effort to improve the way video games are preserved and made available to users. Continuing to seek ways to improve the process of emulating video games, some emulator developers are pursuing an

⁵⁵ Rodrigo Copetti, *PlayStation Architecture*, COPETTI.ORG, <https://www.copetti.org/writings/consoles/playstation> [<https://perma.cc/VV85-BLRH>]; see also Modern Vintage Gamer, *Why PlayStation 1 Graphics Warped and Wobbled So Much | MVG*, YOUTUBE (Mar. 23, 2020), <https://www.youtube.com/watch?v=x8TO-nrUtSI> [<https://perma.cc/SGC5-BV6Q>].

⁵⁶ Copetti, *supra* note 55.

⁵⁷ Robert Neal, *PlayStation 1 Graphics Wobble*, RETRORGB (Mar. 26, 2020), <https://www.retrorgb.com/playstation-1-graphics-wobble.html> [<https://perma.cc/GPX5-B9LF>].

⁵⁸ See *id.*

⁵⁹ *Mednafen/Beetle PSX-PGXP Arrives!*, LIBRETRO (Oct. 4, 2016), <https://www.libretro.com/index.php/mednafenbeetle-psx-pgxp-arrives> [<https://perma.cc/7WV6-AMZ5>].

⁶⁰ Fenlon, *supra* note 8.

⁶¹ See *id.*

⁶² *Id.*

entirely new tactic: completely reprogramming video games from scratch in a manner that arguably makes those games better than they ever were before.

These projects are referred to as decompilations because they generally begin with and rely on the reverse engineering of binaries of video games themselves, though the resultant code is often programmed by hand (and thus is not a formulaic copying of the original code).⁶³ As one example of such a project, a partially anonymous collection of developers recently released a “*Super Mario 64* decompilation,” which comprises code that—when compiled along with the artistic assets (music, graphics, sound effects, etc.) from a copy of the original game *Super Mario 64*⁶⁴—allows gamers to compile a version of *Super Mario 64* that runs on any desired hardware.⁶⁵ To achieve this feat, those developers engaged in a “years-long effort” to reverse engineer the raw binary code of *Super Mario 64* and, based on analysis of the results of that reverse engineering, programmed C code that, when executed along with the requisite art assets, can produce files that would allow *Super Mario 64* to run on modern personal computers (or any other target hardware).⁶⁶ This process provided more than just a copy of *Super Mario 64* that could function on modern hardware: the decompilation opened up a “new world of mods and hacks that would be difficult or impossible by just building on top of the binary ROM.”⁶⁷ For example, this version of *Super Mario 64* can be compiled into a file that, when executed on a personal computer, provides “native 4K” and “ultra-widescreen” modes.⁶⁸ While Nintendo has actively sought legal action against websites hosting the compiled version of this decompilation (likely because the compiled version(s) comprises all of the art and audio assets of the game, making the infringement easy to prove), Nintendo has thus far seemingly not

⁶³ Orland, *supra* note 4.

⁶⁴ The origin of these artistic assets as used in a decompilation can vary: the copyrighted assets are retrieved during compilation and from a “baseroom,” which could be the users’ own backed-up copies of the game, a version of the game unlawfully downloaded from the internet, or the like. See *N64decomp / sm64*, GITHUB [hereinafter *N64decomp*], <https://github.com/n64decomp/sm64> [<https://perma.cc/FXR3-XRQC>]. Perhaps needless to say, the latter activity is almost certainly copyright infringement of those artistic assets.

⁶⁵ *See id.*

⁶⁶ Orland, *supra* note 4.

⁶⁷ *Id.*

⁶⁸ Ryan Craddock, *Super Mario 64 PC Port Shows the Game Running at 4K and with Ultra Widescreen Support*, NINTENDO LIFE (May 4, 2020), https://www.nintendolife.com/news/2020/05/super_mario_64_pc_port_shows_the_game_running_at_4k_and_with_ultra_widescreen_support [<https://perma.cc/7QR3-7UC6>].

brought action against websites hosting the “*Super Mario 64* decompilation” code itself.⁶⁹

Video game console FPGA cores are another example of fan efforts to escape limitations of the original hardware. FPGAs are “semiconductor devices that are based around a matrix of configurable logic blocks (CLBs) connected via programmable interconnects” that “can be reprogrammed to desired application or functionality requirements after manufacturing.”⁷⁰ The advantage of FPGAs is that they can be dynamically reprogrammed using “cores” to mimic gaming hardware (e.g., the processors of old video game consoles) “without having to resort to any kind of binary translation to a computer platform’s native code.”⁷¹ For example, the “MiSTer” system is a FPGA-enabled project that enables the emulation of a variety of different retro gaming consoles⁷² by using cores to replicate the real processor functionality of those consoles on an FPGA, albeit in a manner which provides modern video output and other modern creature comforts.⁷³ As another example, the Analogue Pocket is a “multi-video-game-system portable handheld” that uses two FPGAs to accurately reproduce the processors of Nintendo’s Game Boy, Game Boy Color, and Game Boy Advance handheld consoles.⁷⁴ These FPGA-based systems often still maintain a number of advantages over the original consoles they reproduce: for example, the Analogue Pocket uses a screen ten times the resolution of the original Game Boy and has the ability to act as a music synthesizer and sequencer.⁷⁵ In this way, like the decompilation strategies referenced above, these FPGA core-based strategies often produce results arguably superior to the original hardware.

There is certainly a question as to whether the act of emulating, using decompilations, and/or using FPGA cores to play retro video games is objectively better than playing those games on original hardware. For example, emulators are often “better” than original hardware in the sense that emulators can implement certain technologies (e.g., “netcode,” code used for online multiplayer functionality) that might have never existed

⁶⁹ See Andy Maxwell, *Nintendo Lawyers File Copyright Complaints Against Super Mario 64 PC Port*, TORRENTFREAK (May 7, 2020), <https://torrentfreak.com/nintendo-lawyers-file-copyright-complaints-against-super-mario-64-pc-port-200508> [<https://perma.cc/NPR3-ATCD>].

⁷⁰ *What Is an FPGA?*, AMD XILINX, <https://www.xilinx.com/products/silicon-devices/fpga/what-is-an-fpga.html> [<https://perma.cc/X4K9-6Q4L>].

⁷¹ *FPGA*, *supra* note 5.

⁷² See *Console Cores*, *supra* note 5.

⁷³ *Introduction*, MiSTer FPGA BIBLE, https://boogermann.github.io/Bible_MiSTer/getting-started/introduction [<https://perma.cc/FPX5-Z7PX>].

⁷⁴ ANALOGUE POCKET, <https://www.analogue.co/pocket> [<https://perma.cc/3TQZ-TPAA>].

⁷⁵ *Id.*

on the original hardware.⁷⁶ But those improvements might not be viewed as necessarily being improvements by all users, especially since they deviate from how the original hardware ran the original software. After all, some modifications to older video games are little more than artistic decisions that only debatably improve those games. For instance, some modifications to the *Super Mario 64* PC decompilation are designed to replace the protagonist Mario with different characters or to depict Mario with significantly more polygons.⁷⁷ Whether such modifications make *Super Mario 64* better or worse is thus a point of personal taste: after all, replacing Mario with an “HD version” of Mario arguably clashes with the remaining non-high-definition assets in the game.⁷⁸ Indeed, consumer modifications of commercial video games are often hilariously (and, often, intentionally) bad, such as one modification to *Doom* that turned everything (walls, weapons, etc.) into images of actor Tim Allen.⁷⁹ Some critics have argued that mods can be “incongruous and incomprehensible,” pushing video games “into the kind of insane territory that’d make David Lynch choke on his coffee in bewilderment.”⁸⁰ This aversion to the modification of video games, in some ways, mirrors the so-called “colorization controversy” of the 1980s, where critics rallied against the colorization of famous black-and-white movies like the film *It’s a Wonderful Life*.⁸¹ While both approaches might in some sense create a new copyrighted work, that work might not necessarily be aesthetically appealing.

In any event, the above trends in emulator development arguably represent what Professor von Hippel would refer to as the democratization of innovation: that is, the process whereby “users of products and services—both firms and individual consumers—are increasingly able to innovate for themselves.”⁸² Particularly talented programmers with a passion for video games, arguably analogous to

⁷⁶ Fenlon, *supra* note 8; Ben Stegner, *The Pros and Cons of Playing Video Games on an Emulator*, MAKEUSEOF (May 31, 2021), <https://www.makeuseof.com/pros-cons-playing-video-games-emulator> [https://perma.cc/27UU-87SU].

⁷⁷ SUPER MARIO PC PORT CENTRAL, <https://sm64pc.info> [https://perma.cc/N9HF-Y6A3].

⁷⁸ *Id.*

⁷⁹ Dan MacRae, *Experience the Magic of ‘Doom’ with Everything Replaced with Tim Allen*, UPROXX (Sept. 2, 2016), <https://uproxx.com/viral/doom-tim-allen> [https://perma.cc/J4N8-44N2].

⁸⁰ Matt McDermott, *The Good, the Bad and the Ugly of PC Game Mods*, BITSCREED (Aug. 19, 2011), <https://web.archive.org/web/20190621105808/http://bitscreed.com/the-good-the-bad-and-the-ugly-of-pc-game-mods>.

⁸¹ Gary R. Edgerton, “*The Germans Wore Gray, You Wore Blue*”: Frank Capra, Casablanca, and the *Colorization Controversy of the 1980s*, 27 J. POPULAR FILM & TELEVISION 24 (2000).

⁸² VON HIPPEL, *supra* note 6, at 1.

Professor von Hippel's so-called "lead users,"⁸³ have identified failures of video game rights holders (e.g., the lack of availability of certain video games and weaknesses in original game hardware) and have developed powerful tools for remediating those failures, even where those tools are developed without the permission of the rights holders.

C. *Emulation and Decompilations as a Solution to Increasingly Scarce Video Games*

Fans turn to emulation, decompilation, FPGAs, and other solutions for many reasons, both innocent and nefarious, but one preeminent reason is that all such solutions allow fans to continue to enjoy video games long after those video games are no longer commercially available.

It is no secret that emulators, decompilations, and FPGAs can be used to pirate video games.⁸⁴ There are "countless ROM sites distributing games" that, when downloaded, can be used with an emulator and/or FPGA to play those games for free, even if those games are currently for sale by the rights holder.⁸⁵ This has long been the case, and some emulator developers openly concede that emulation enables piracy.⁸⁶ It, therefore, might be presumed that at least some of the growth of the emulation world (including the subsequent developments with decompilations and FPGAs) might be attributable to the fact that emulators might allow users to unlawfully play games for free. That does not necessarily mean that game developers lose money from such piracy: for instance, a European Union report recently suggested that illegal consumption of video games actually led to increased legal consumption.⁸⁷ This is because, as speculated by the report authors, the "positive effect of illegal downloads and streams on the sales of games may be explained by the industry being successful in converting illegal users to paying users."⁸⁸

But emulators, decompilations, FPGAs, and similar solutions are used for far more than piracy: they also act as a valuable tool for video game preservation. David Gibson, an archivist for the Library of

⁸³ *Id.* at 22–23.

⁸⁴ Conley, Andros, Chinai, Lipkowitz & Perez, *supra* note 34, at 271.

⁸⁵ Wes Fenlon, *The Ethics of Emulation: How Creators, the Community, and the Law View Console Emulators*, PC GAMER (Mar. 28, 2017), <https://www.pcgamer.com/the-ethics-of-emulation-how-creators-the-community-and-the-law-view-console-emulators> [<https://perma.cc/B5S5-2ZCH>].

⁸⁶ *Id.*

⁸⁷ Martin van der Ende et al., Directorate-Gen. for the Internal Mkt. & Servs., Eur. Comm'n, *Estimating Displacement Rates of Copyrighted Content in the EU*, at 15 (May 2015), <https://data.europa.eu/doi/10.2780/26736> [<https://perma.cc/LF8Y-CXML>].

⁸⁸ *Id.*

Congress, has noted that “[v]ideo games represent one of the most difficult challenges for digital preservationists,” given that those games are made for a “diverse array of hardware and software platforms, rife with rights issues.”⁸⁹ Seemingly proving this point, the Library of Congress has a “lot of gaps” in its collection of video games, “including the entire 1980s and most of the ‘90s.”⁹⁰ Given such scarcity, there are a staggering number of video games that, absent emulation and fan preservation efforts, would be essentially unavailable to modern audiences.⁹¹ Frank Cifaldi of the Video Game History Foundation⁹² summarized the issue in a tweet, stating that there is “no alternative BUT piracy for, like, 99% of video game history” due to “the completely abysmal job the video game industry has done keeping its games available.”⁹³ In fact, some commentators, recognizing this growing concern, have advocated for a federally-funded video games preservation board.⁹⁴

There are many reasons why video games, despite being a relatively young form of entertainment, are quickly becoming unavailable to consumers.⁹⁵ On one hand, old video games are rarely still available from mainstream retailers. For example, most modern American retailers do not stock or sell Sega Dreamcast games, as Sega discontinued the console back in 2001 and made the last game for the console in 2004.⁹⁶ While online shopping retailer Amazon maintains a “Dreamcast” subcategory under the “Legacy Systems” category on its website, the items for sale appear to largely comprise used consoles or games (with the occasional higher-priced new game or controller available for sale at a substantial markup).⁹⁷ On the other hand, game companies routinely stop selling even relatively modern video games for a variety of reasons. For example, the James Bond game *Quantum of Solace* is no longer sold due to

⁸⁹ Owens, *supra* note 10.

⁹⁰ Smith, *supra* note 9.

⁹¹ See Filipe Coutinho, *Unplayable History: The State of Video Game Preservation*, EVERCAST (Dec. 16, 2021), <https://www.evercast.us/blog/unplayable-history-the-state-of-video-game-preservation> [<https://perma.cc/2EJC-BKNT>].

⁹² VIDEO GAME HIST. FOUND., <https://gamehistory.org> [<https://perma.cc/9LL5-UCJH>].

⁹³ Frank Cifaldi (@frankcifaldi), X (Aug. 8, 2018, 5:06 PM), <https://twitter.com/frankcifaldi/status/1027300086022254592> [<https://perma.cc/VH6Z-SCZY>].

⁹⁴ *E.g.*, White, *supra* note 9, at 591–604.

⁹⁵ See *generally* Lee, *supra* note 9.

⁹⁶ Jonathan Watts, *Sega to End Production of Dreamcast Console*, THE GUARDIAN (Jan. 31, 2021, 9:28 PM), <https://www.theguardian.com/business/2001/feb/01/4> [<https://perma.cc/B98A-P69K>]; Puyo Pop Fever, SEGA RETRO, https://segaretro.org/Puyo_Pop_Fever [<https://perma.cc/BRX9-6QE6>].

⁹⁷ *Sega Dreamcast Games, Consoles & Accessories*, AMAZON, https://www.amazon.com/b?node=229793&ref=lp_23563591011_nr_n_1 [<https://perma.cc/F84K-9Q3W>].

Activision's license to the James Bond franchise expiring, and the 2009 shooter game *Wolfenstein* is allegedly no longer being sold because its enemies are associated with Nazi iconography.⁹⁸ It can also sometimes be hard to identify who actually owns the rights to a video game: the "question of who controls the [*No One Lives Forever*] intellectual property has proved famously difficult to answer," and as a result the game is no longer commercially available.⁹⁹

A more worrying trend is that, even for gamers who have purchased legal copies of video games, those games are themselves becoming unplayable due to the passage of time. Video game consoles routinely break over time: for instance, capacitors can be veritable "ticking time bombs of certain retro consoles," as they can leak and thereby release "corrosive material all over the board and destroy[] leads or other components."¹⁰⁰ Game media is also falling apart: so-called "disc rot" is increasingly ruining CDs and DVDs.¹⁰¹ This problem is far from unique to the world of video games: digital media is "dying in such numbers and in such variety that it is impossible for anyone to keep up."¹⁰² As such, while even legally purchased consoles and games eventually break, emulation provides consumers the ability to play virtually any game on any piece of hardware, escaping from the shackles of slowly degrading hardware and/or game media.

In short, while video game emulators, decompilations, and FPGAs might enable illegal piracy, they also free video games from hardware and software limitations; they allow fans to enjoy video games even if those video games are no longer available commercially and even if those video games are becoming unplayable due to technological obsolescence and/or breakdown. In fact, as already suggested above, such approaches might allow fans to enjoy those video games in a way that is arguably better than originally available to those fans.

D. *Why Rights Holders Are Not Satiating Fan Demand*

As detailed above, video game fans are finding ways to enjoy and improve video games using modern hardware, even if those games are no

⁹⁸ Jason Tyler Van Duine, *13 Games That Were Removed from Steam (& Why)*, GAMERANT (Feb. 3, 2022), <https://gamerant.com/games-removed-steam-why> [<https://perma.cc/TCA6-PZKA>].

⁹⁹ Kirk Hamilton, *The Sad Story Behind a Dead PC Game That Can't Come Back*, KOTAKU (Feb. 27, 2015), <https://kotaku.com/the-sad-story-behind-a-dead-pc-game-that-cant-come-back-1688358811> [<https://perma.cc/CC2A-6QJY>].

¹⁰⁰ Rojas, *supra* note 19.

¹⁰¹ Smith, *supra* note 20.

¹⁰² BRUCE STERLING, *BOOK OF IMAGINARY MEDIA* 58 (Eric Kluitenberg ed., 2007).

longer made available (e.g., sold) by their rights holder. But this trend raises an interesting question: Given such significant fan interest in preserving and improving video games, why have rights holders not tried to fully satisfy fan demand by producing more games and/or making those games available on newer hardware? The answer, in short, is that rights holders are arguably acting rationally and in view of very clear incentive structures that are not necessarily unique to the video game industry.

1. The Benefits of Artificial Scarcity in Video Games

One reason why rights holders might not fully satiate fan demand is that, in certain circumstances, it may economically benefit those rights holders to induce artificial scarcity of their own intellectual property.

Prior to the emergence of its online streaming platform, Disney induced artificial scarcity of its own movies through the so-called “Disney Vault,” a strategy whereby Disney would provide “limited-time releases of its films on DVD and Blu-ray to encourage sales.”¹⁰³ On first glance, this strategy has a clear marketing advantage: it provided an impetus for Disney fans to buy Disney movies upon their release, lest they lose the opportunity to do so later.¹⁰⁴ But the strategy was also designed to make Disney’s animated films fresh for entirely new audiences.¹⁰⁵ The idea, in short: a Disney animated film would “make its usual run of theatrical to video and then go into the vault for seven years to be released again when a new generation of two to seven year-olds emerge[d].”¹⁰⁶

Video game companies like Nintendo are no strangers to Disney Vault-type strategies. Peter Main, former Executive Vice President of Sales and Marketing at Nintendo, was open about this strategy as early as the 1990s: he stated that Nintendo’s video games would be treated like Disney’s movies, “released cautiously, rationed so that demand outpaced availability, and then withdrawn from circulation as soon as interest began to wane.”¹⁰⁷ Along those lines, Nintendo has long been accused of inducing artificial scarcity of its own video game consoles upon their

¹⁰³ Sarah Perez, *Disney’s Forthcoming Streaming Service Will Kill the Disney Vault*, TECHCRUNCH (Mar. 8, 2019, 11:25 AM), <https://techcrunch.com/2019/03/08/disneys-forthcoming-streaming-service-will-kill-the-disney-vault> [<https://perma.cc/A6CD-2QUA>].

¹⁰⁴ Ilene Hoffman, *Buena Vista Home Entertainment: A Very Lucky Accident Indeed*, ANIMATION WORLD NETWORK (Nov. 1, 1997, 12:00 AM), <https://www.awn.com/animationworld/buena-vista-home-entertainment-very-lucky-accident-indeed> [<https://perma.cc/7MS9-Z7QV>].

¹⁰⁵ See *id.*

¹⁰⁶ *Id.*

¹⁰⁷ DAVID SHEFF, *GAME OVER: HOW NINTENDO CONQUERED THE WORLD* 193 (1994).

launch.¹⁰⁸ For example, in the 2006 holiday season, Nintendo was accused of inducing artificial scarcity of its Wii video game console.¹⁰⁹ That said, some commentators believe that Nintendo simply struggles with producing its own hardware, arguing that Nintendo's alleged artificial scarcity is little more than a supply chain issue.¹¹⁰ Seemingly supporting those commentators, some have estimated that Nintendo missed out on \$1.3 billion in sales by failing to meet customer demand for the Wii video game console.¹¹¹ This is far from a new issue in the video games industry: as of the writing of this Article, Sony, Microsoft, and Nintendo are still grappling with significant shortcomings in the semiconductor industry and supply chain disruptions that limit their ability to manufacture and sell their video game consoles.¹¹² In any event, Nintendo sometimes induces artificial scarcity quite explicitly: for instance, Nintendo's game *Super Mario 3D All-Stars* was intentionally sold by Nintendo for a limited period (that is, before March 31, 2021), despite the fact that the game was available digitally (and thus was not limited in the sense that only a discrete quantity of copies of the game were produced).¹¹³

Relatedly, rights holders often are incentivized to release video games only on certain video game hardware. The vast majority of video game consoles are sold at a loss, with profits being recognized through "games, subscriptions, and accessories."¹¹⁴ Those profits include rereleases of old video games: for example, Nintendo is estimated to have made at least five million dollars selling *Super Mario Brothers 3*,

¹⁰⁸ E.g., Jon Irwin, *Nintendo Makes Kids Cry, and That's a Good Thing*, INVERSE (Dec. 20, 2021), <https://www.inverse.com/gaming/nintendo-artificial-scarcity-restock> [https://perma.cc/ZYZ2-93DQ].

¹⁰⁹ *Id.*

¹¹⁰ Paul Tassi, *Nintendo's 'Artificial Scarcity' Is a Myth, but Supply Is Now Its Greatest Challenge*, FORBES (July 27, 2017, 10:54 AM), <https://www.forbes.com/sites/insertcoin/2017/07/27/nintendos-artificial-scarcity-is-a-myth-but-supply-is-now-its-greatest-challenge> [https://perma.cc/V33D-8QG8]; see also Kyle Orland, *Nintendo: Switch Shortages Are "Definitely Not Intentional"*, ARS TECHNICA (June 22, 2017, 1:54 PM), <https://arstechnica.com/gaming/2017/06/nintendo-switch-shortages-are-definitely-not-intentional> [https://perma.cc/52SA-E8AE].

¹¹¹ Rhys Blakely, *Wii Shortage to Cost \$1.3bn to Nintendo in Short Term*, SUNDAY TIMES (Dec. 17, 2007, 12:43 PM), <https://www.thetimes.co.uk/article/wii-shortage-to-cost-dollar13bn-to-nintendo-in-short-term-535l2sz9sbr> (last visited Aug. 11, 2023).

¹¹² Nile Bowie, *PS5, Switch and Xbox All Short-Circuited by Scarce Chips*, ASIA TIMES (Jan. 29, 2022), <https://asiatimes.com/2022/01/ps5-switch-and-xbox-all-short-circuited-by-scarce-chips> [https://perma.cc/2NEA-WCCZ].

¹¹³ Dave Johnson, *Get Super Mario 3D All-Stars on Nintendo Switch Before It's Gone Forever*, CNET (Mar. 19, 2021, 1:07 PM), <https://www.cnet.com/tech/gaming/get-super-mario-3d-all-stars-on-nintendo-switch-before-its-gone-forever> [https://perma.cc/7QBM-RMGE].

¹¹⁴ Michael Harman, *All Games Consoles Are Sold at a Loss. Here's Why...*, MAKEUSEOF (May 25, 2021), <https://www.makeuseof.com/games-consoles-sold-at-loss> [https://perma.cc/RAT4-UJ4M].

originally released in 1990,¹¹⁵ on its Wii console, which was released over a decade later.¹¹⁶ Along those lines, even if fans did want to play games on their personal computers, video game console manufacturers have significant incentives to sell their video games only on their hardware (if they sell such hardware in the first place).¹¹⁷ Moreover, video game developers are often financially incentivized to publish their games only on certain hardware,¹¹⁸ and might be discouraged from publishing games unless the marketing of those games can be synergized with other commercialization mechanisms, such as accompanying toys.¹¹⁹

There are thus instances where it is strategically beneficial for rights holders to intentionally make video games slightly difficult to acquire and enjoy. While the strategy might frustrate fans, it can make video games fresh for old fans and new audiences, rather than allowing those same video games to languish on physical (and/or virtual) shelves and be subject to endless sales.

2. Fans Are Difficult to Please

Another reason why rights holders might not satiate fan demand for their intellectual property is that those fans are arguably difficult to please.

There is no such thing as a universally accepted correct approach for emulating retro video games. Take, for example, the Super Nintendo video game console. Even on the relatively straightforward RetroArch emulation platform, there are an “overwhelm[ing]” number of Super Nintendo emulation options available, including a number of different cores that differently balance accuracy and speed.¹²⁰ For instance, one

¹¹⁵ *Super Mario Bros. 3*, MarioWiki, https://www.mariowiki.com/Super_Mario_Bros_3 [<https://perma.cc/JC7R-2ZQM>].

¹¹⁶ Daemon Hatfield, *WiiWare, Virtual Console Sales Exposed*, IGN (June 14, 2012, 5:05 PM), <https://www.ign.com/articles/2010/02/23/wiiware-virtual-console-sales-exposed> [<https://perma.cc/3VMT-DZR7>].

¹¹⁷ See Randal C. Picker, *The Razors-and-Blades Myth(s)*, 78 U. CHI. L. REV. 225, 240 (2011) (discussing video game console switching costs).

¹¹⁸ See Karthik Balasubramanian, *The Decline of Platform Exclusivity*, GAMEOPEDIA (June 30, 2022), <https://www.gameopedia.com/decline-of-platform-exclusivity> [<https://perma.cc/N2GB-4BJC>].

¹¹⁹ See Cameron Swan, *The Death of Toys-to-Life*, GAMERANT (Dec. 22, 2021), <https://gamerant.com/toys-to-life-games-history-rise-fall-death> [<https://perma.cc/FT3P-Q6U2>]. As a simple example, it might not make sense to sell a “toys-to-life” video game if the accompanying toys are unavailable. See *id.*

¹²⁰ Robert Zak, *Ultimate Guide to SNES Emulation on Retroarch*, MAKE TECH EASIER, <https://www.maketecheasier.com/snes-emulation-retroarch-ultimate-guid> [<https://perma.cc/JW7Q-2KW7>] (Mar. 6, 2022).

Super Nintendo core allows users to enable a “Reduce Slowdown” mode that fixes known slowdown issues and a “Reduce Flickering” mode that fixes known sprite flickering issues, thereby making the user experience arguably better while technically deviating from the real functionality of the Super Nintendo hardware.¹²¹ Perhaps predictably, fan forums are replete with impassioned discussions regarding which Super Nintendo cores are correct.¹²² The same fan forums often lambast rights holders’ rereleases of older video games, particularly when those rereleases feature modifications to the original game.¹²³

Considering that the fan community itself is so fragmented regarding “correct” emulation, rights holders might not ever be able to completely please that fan community. While one segment of the fan base might want perfect accuracy (including the flickering and slowdown of the original hardware), another segment might want a better user experience (including the aforementioned modifications to remove the flickering and slowdown). The task of appeasing an endless number of subsegments of fans with idiosyncratic emulation expectations seems like a Herculean task.

The aforementioned Herculean task is made even more onerous when practical considerations, such as development costs, are considered. Assume, for example, that Japanese developer Irem sought to rerelease its 1991 Super Nintendo title *Super R-Type*.¹²⁴ A fan of the game, programmer Vitor Vilela, spent over seventy hours developing a hack for *Super R-Type* to reduce its slowdown.¹²⁵ In other words, if Irem wanted to satisfy the fan community in rereleasing *Super R-Type* in the same way Vilela did, it would potentially have to devote over seventy person-hours to fix in-game slowdown—and there is no guarantee that even the majority of the *R-Type* fanbase would find such a fix desirable. Irem would thus likely find itself in a conundrum: it could either spend significant time and money trying to fix an issue that only a portion of the fan community would want (a strategy that might impact the profitability of the rereleased game), or it could rerelease *Super R-Type*

¹²¹ *Nintendo—SNES / Famicom (Snes9x)*, LIBRETRO DOCS, <https://docs.libretro.com/library/snes9x> [<https://perma.cc/7YKK-Y3N9>].

¹²² See, e.g., Lordmonkus, *Video Discussion: What Retroarch SNES Core Is Right for You?*, LAUNCHBOX CMTY. FORUMS (Aug. 18, 2016), <https://forums.launchbox-app.com/topic/32934-video-discussion-what-retroarch-snes-core-is-right-for-you> [<https://perma.cc/T4XT-E33Q>].

¹²³ See David S. Heineman, *Public Memory and Gamer Identity: Retrogaming as Nostalgia*, 1 J. GAMES CRITICISM 1, 9–11 (2014).

¹²⁴ *Super R-Type*, R-TYPEWIKI, https://rtype.fandom.com/wiki/Super_R-Type [<https://perma.cc/TZ4M-EE6F>].

¹²⁵ Damien McFerran, *How One Man Is Fixing the SNES’ Biggest Weakness*, NINTENDO LIFE (Jan. 5, 2021), https://www.nintendolife.com/news/2021/01/how_one_man_is_fixing_the_snes_biggest_weakness [<https://perma.cc/UT3M-ZV8A>].

without the fix such that the same portion of the fan community would find the game unpalatable (which would also impact the profitability of the rereleased game).

3. Insufficient Demand for Certain Games

Yet another reason why rights holders might not unyieldingly cave to fan demand is that there simply might not be enough fan demand to rerelease certain games. While a small group of fans online might desperately want to play an old and otherwise unavailable video game once again, that group might not be large enough for the rights holder to be financially incentivized to bother.

The fact that there is a fan effort in emulating and/or otherwise modernizing a game is not, standing alone, an indication that rerelease of that title would be profitable for a rights holder. Take, for example, the proselytizing 1999 Christian-themed, *DOOM*-like¹²⁶ first-person shooter, *Saints of Virtue*.¹²⁷ Despite the relative lack of popularity of the title, a small group of fans are currently developing a “fan patch and alternate runtime” for the game which allows the game to be run on modern hardware.¹²⁸ As of the writing of this Article, the Discord chat server for the development efforts comprises fewer than thirty members, suggesting a somewhat low demand for remastering of the game.¹²⁹ As such, despite the small fan effort to remaster the game, the likelihood that developer Shine Studios would ever find themselves profiting from a rerelease of *Saints of Virtue* seems low.

In turn, the question of whether to rerelease an older video game is often a fundamentally demand-driven question. Nielsen analyst Carter Rodgers has argued that there is a veritable “grave train” for game developers willing to remake and remaster their older video games, in no small part due to the fact that adult gamers can be convinced “to open up their wallets to reexperience cherished moments from their

¹²⁶ Amusingly, one of *DOOM*'s developers, Sandy Petersen, is a member of the Church of Jesus Christ of Latter-Day Saints and has stated that, in his view, aspects of *DOOM* already have a “Christian orientation.” David Craddock, *Stairway to Badass: The Making and Remaking of DOOM*, SHACKNEWS (Mar. 16, 2020, 2:00 PM), <https://www.shacknews.com/article/99662/stairway-to-badass-the-making-and-remaking-of-doom?page=8> [https://perma.cc/ZY33-RVKK].

¹²⁷ SAINTS OF VIRTUE, <http://www.saintsofvirtue.com/index.html> [https://perma.cc/S6UB-YY4Q].

¹²⁸ SAINTS OF VIRTUE X, <https://saintsofvirtuex.com> [https://perma.cc/HVH4-H2Y5].

¹²⁹ See *id.*

childhood.”¹³⁰ But a key word used by Rodgers is “cherished”: if a video game was bad and/or unpopular when it was originally released, it is unlikely to be financially profitable to rerelease in the future. And there might be circumstances where formerly beloved video games are not worth rerelease because their popularity has waned over time. For example, it seems unlikely that a rerelease of *Madden NFL 2001* for the Game Boy Color would ever be profitably rereleased because the in-game rosters are decades old, because the game was available on a variety of different (and significantly more powerful) video game systems like the PlayStation 2, and because the game was critically panned even when it was released in 2000.¹³¹

II. DECOMPILATIONS CALL INTO QUESTION EXISTING UNDERSTANDINGS OF THE COPYRIGHTABILITY OF VIDEO GAMES

Recent developments in the world of video game preservation, particularly on the decompilation front, introduce interesting questions regarding the scope of copyright with respect to video games. While emulation might be said to infringe the copyright of a rights holder insofar as the emulation uses copies of the original copyrighted work, decompilations are on more unclear ground since their codebases are purported to be entirely original and they (typically) do not come packaged with copyrighted assets.¹³² Decompilations thus present an interesting case study regarding how far copyright should go in protecting video games.

A. *Emulators: Generally, Not Infringing*

Standing alone, the development of video game emulators (and any reverse engineering in the service of emulator development) is generally legal, though the act of copying games often remains infringing. Two main cases are often cited as rendering emulator development legal under the copyright laws: *Sega Enterprises Ltd. v. Accolade, Inc.*,¹³³ which

¹³⁰ Carter Rogers, *Game Makers Need to Plan for the End of the Remake and Remaster Gravy Train*, NIELSEN (July 2020), <https://www.nielsen.com/us/en/insights/article/2020/game-makers-need-to-plan-for-the-end-of-the-remake-and-remaster-gravy-train> [https://perma.cc/PSH4-TP5N].

¹³¹ *Madden NFL 2001*, GAMERANKINGS.COM, <https://web.archive.org/web/20191206004728/https://www.gamerankings.com/gbc/915851-madden-nfl-2001/index.html>.

¹³² Users are typically required to provide these assets during compilation of the decompilation code. See, e.g., *N64decomp*, *supra* note 64.

¹³³ 977 F.2d 1510 (9th Cir. 1992).

generally relates to the legality of reverse engineering in the world of video games, and *Sony Computer Entertainment, Inc. v. Connectix Corp.*,¹³⁴ which generally relates to the legality of emulator development based on analysis of a copyrighted basic input/output system (BIOS).

In *Accolade*, the Ninth Circuit was tasked with determining whether “the Copyright Act permits persons who are neither copyright holders nor licensees to disassemble a copyrighted computer program in order to gain an understanding of the unprotected functional elements of the program.”¹³⁵ *Accolade* was, at the time, a developer of video game cartridges that were compatible with Sega hardware (e.g., the Sega Genesis video game console), but *Accolade* made these cartridges without entering into any license agreements with Sega.¹³⁶ To be able to make those cartridges without such a license, *Accolade* purchased a Sega Genesis console and three games, and then “wired a decompiler into the console circuitry, and generated printouts of the resulting source code.”¹³⁷ *Accolade* engineers then studied those printouts, identified areas common to the three games, and ultimately experimented with computer code to “discover the interface specifications for the Genesis console.”¹³⁸ Based on this analysis, *Accolade* created its own games for the Genesis without entering into any licensing agreements with Sega.¹³⁹ Sega ultimately developed a new version of the Genesis (the Genesis III) that was incompatible with *Accolade*’s games by, for example, requiring a four-byte string of data (“S-E-G-A,” an initialization code) to be inserted into a game program at a particular location.¹⁴⁰ *Accolade*, after a second round of reverse engineering, inserted a standard header file into its cartridges to address this development.¹⁴¹ Sega ultimately sued *Accolade*, alleging trademark infringement, false designation of origin, and (after amending its complaint) copyright infringement.¹⁴²

When addressing whether *Accolade*’s decompilation of Sega’s games was copyright infringement, the court noted that:

[A]lthough *Accolade*’s ultimate purpose was the release of Genesis-compatible games for sale, its direct purpose in copying Sega’s code, and thus its direct use of the copyrighted material, was simply to study the functional requirements for Genesis

¹³⁴ 203 F.3d 596 (9th Cir. 2000).

¹³⁵ 977 F.2d at 1514.

¹³⁶ *Id.*

¹³⁷ *Id.* at 1514–15.

¹³⁸ *Id.* at 1515.

¹³⁹ *Id.* at 1514–15.

¹⁴⁰ *Id.* at 1515.

¹⁴¹ *Id.* at 1516.

¹⁴² *Id.*

compatibility so that it could modify existing games and make them usable with the Genesis console.¹⁴³

The court also seemed to conclude that Accolade's activity was prosocial:

Accolade's identification of the functional requirements for Genesis compatibility has led to an increase in the number of independently designed video game programs offered for use with the Genesis console. It is precisely this growth in creative expression, based on the dissemination of other creative works and the unprotected ideas contained in those works, that the Copyright Act was intended to promote.¹⁴⁴

The court also noted that Accolade's activity was not intended to "scoop" Sega's release of any particular game" but rather was intended to "become a legitimate competitor in the field of Genesis-compatible video games."¹⁴⁵ The court also noted that, although Accolade's "disassembly of Sega's software undoubtedly 'affected' the market for Genesis-compatible games in an indirect fashion," it was something of a net positive, as players often buy multiple video games.¹⁴⁶

In *Atari Games Corp. v. Nintendo of America Inc.*, the Federal Circuit similarly indicated that reverse engineering could be fair use in certain circumstances.¹⁴⁷ In that case, Atari made copies of Nintendo's "10NES program" (a program used to verify the authenticity of video games) to reverse engineer the program.¹⁴⁸ The Federal Circuit expressly permitted such activity, stating: "[R]everse engineering object code to discern the unprotectable ideas in a computer program is a fair use."¹⁴⁹ This ruling is, in many ways, a video game-flavored version of the ruling in *Computer Associates International, Inc. v. Altai, Inc.*,¹⁵⁰ which held, *inter alia*, that "elements of a computer program that are necessarily incidental to its function are similarly unprotectable."¹⁵¹

A few years after *Accolade* and *Atari*, in *Connectix*, the Ninth Circuit was tasked with determining whether an emulator developer committed copyright infringement when it used (e.g., copied) a copyrighted BIOS in its development of an emulator.¹⁵² More specifically,

¹⁴³ *Id.* at 1522.

¹⁴⁴ *Id.* at 1523.

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ 975 F.2d 832 (Fed. Cir. 1992).

¹⁴⁸ *Id.* at 842.

¹⁴⁹ *Id.* at 843.

¹⁵⁰ 982 F.2d 693 (2d Cir. 1992).

¹⁵¹ *Id.* at 705.

¹⁵² *Sony Comput. Ent., Inc. v. Connectix Corp.*, 203 F.3d 596, 598 (9th Cir. 2000).

Sony, which was then selling the first PlayStation video game console, sued Connectix, the developer of a commercial emulator for the PlayStation, for copyright infringement.¹⁵³ Sony argued that Connectix's "Virtual Game Station" software program, which allowed users to play PlayStation games on then-modern computers, infringed its copyright in, *inter alia*, Sony's BIOS.¹⁵⁴ To develop this software program, Connectix had copied versions of Sony's BIOS and at one point integrated the copied BIOS into the Virtual Game Station program, but later replaced the copied BIOS with its own custom software that was developed, in part, based on observations made during its use of the copied Sony BIOS.¹⁵⁵ Sony ultimately sued Connectix for copyright infringement.¹⁵⁶ During the lower court proceedings, Sony was granted injunctive relief against Connectix.¹⁵⁷ Connectix appealed that injunctive relief up to the Ninth Circuit, arguing (among other things) that its use of the Sony BIOS was fair use.¹⁵⁸ The Ninth Circuit, analyzing the statutory fair use factors, reached a number of conclusions that were extremely favorable to emulator developers. Among other conclusions, the Ninth Circuit argued that "the fair use doctrine preserves public access to the ideas and functional elements embedded in copyrighted computer software programs"¹⁵⁹ and concluded that there was "no question that the Sony BIOS contains unprotected functional elements";¹⁶⁰ that "Connectix could not gain access to these unprotected functional elements without copying the Sony BIOS" and without "reverse engineering" that copied Sony BIOS;¹⁶¹ that Connectix's emulator afforded "opportunities for game play in new environments, specifically anywhere a Sony PlayStation console and television are not available";¹⁶² and that Connectix's drafting of entirely new code for the Virtual Game Station was transformative because it was a "wholly new product," at least insofar as the emulator's code was unique in both "organization and structure."¹⁶³ The Ninth Circuit also gently criticized what it perceived as Sony's efforts in "seek[ing] control over the market for devices that play games Sony

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ *Id.* at 601.

¹⁵⁶ *Id.*

¹⁵⁷ *Id.* at 601–02.

¹⁵⁸ *Id.* at 602.

¹⁵⁹ *Id.* at 603.

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *Id.* at 606.

¹⁶³ *Id.*

produces or licenses,” stating that the “copyright law . . . does not confer such a monopoly.”¹⁶⁴

Perhaps predictably given the quotes above, the Ninth Circuit in *Connectix* found in favor of Connectix, holding that “Connectix’s reverse engineering of the Sony BIOS extracted from a Sony PlayStation console purchased by Connectix engineers is protected as fair use.”¹⁶⁵ Per the court, there was “no question that the Sony BIOS contain[ed] unprotected functional elements,” and it was not disputed that “Connectix could not gain access to these unprotected functional elements without copying the Sony BIOS.”¹⁶⁶ Analyzing the various ways in which Connectix tested the Sony BIOS in the development of its emulator, the court found that “the methods by which Connectix reverse-engineered the Sony BIOS were necessary to gain access to the unprotected functional elements within the program.”¹⁶⁷ The Ninth Circuit also penned what amounted to a strong defense of emulators as a whole:

We find that Connectix’s Virtual Game Station is modestly transformative. The product creates a new platform, the personal computer, on which consumers can play games designed for the Sony PlayStation. This innovation affords opportunities for game play in new environments, specifically anywhere a Sony PlayStation console and television are not available, but a computer with a CD-ROM drive is. More important, the Virtual Game Station itself is a wholly new product, notwithstanding the similarity of uses and functions between the Sony PlayStation and the Virtual Game Station. The expressive element of software lies as much in the organization and structure of the object code that runs the computer as it does in the visual expression of that code that appears on a computer screen. . . . Sony does not claim that the Virtual Game Station itself contains object code that infringes Sony’s copyright. We are therefore at a loss to see how Connectix’s drafting of entirely new object code for its VGS program could not be transformative, despite the similarities in function and screen output.¹⁶⁸

The Ninth Circuit ultimately reversed the lower court’s grant of an injunction on the ground of copyright infringement.¹⁶⁹

¹⁶⁴ *Id.* at 607.

¹⁶⁵ *Id.* at 609–10.

¹⁶⁶ *Id.* at 603.

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* at 606–07 (citing 17 U.S.C. § 102(a)).

¹⁶⁹ *Id.* at 608.

Today, the *Connectix* case is routinely cited as explicitly permitting the development of emulators, even where such emulators might be based on the analysis of (e.g., the reverse engineering of) commercial game consoles.¹⁷⁰ All the same, emulator developers seem to be very careful to not test the boundaries of the *Connectix* ruling. For example, some PlayStation emulators (such as PCSX2, which is designed to emulate PlayStation 2 games) do not contain any copies of the Sony BIOS; instead, developers of those emulators tell users that “both a legitimate BIOS and copies of games must be obtained from [their] own PlayStation 2 console[s] and original PlayStation 2 discs respectively.”¹⁷¹ It should, accordingly, not be much of a surprise that some guides for PCSX2 recommend that users use “the magic of the internet” to download already-dumped BIOS files to simplify this process.¹⁷²

Though favorable to emulator developers, the *Accolade*, *Atari*, and *Connectix* cases do not permit game piracy (e.g., the copying of games without paying for those games). Along those lines, game companies are no stranger to suing distributors of games for the purposes of emulation-implemented piracy. For example, Nintendo recently won \$2.1 million in damages after suing the pirated-game seller RomUniverse.¹⁷³ That said, this general principle does not mean that all digital copies of games are inherently unlawful, such that users are required to use the original media upon which they purchased a game for emulation. 17 U.S.C. § 117 permits “the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program” where either “such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner,” or where “such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.”¹⁷⁴

¹⁷⁰ See, e.g., *Case Analysis: Sony v. Connectix*, PATENT ARCADE (July 26, 2010), <http://patentarcade.com/2010/07/case-analysis-sega-v-connectix.html> [https://perma.cc/DFG3-UT5J].

¹⁷¹ *Setup Guide*, PCSX2, <https://pcsx2.net/guides/basic-setup> [https://perma.cc/J9RE-K36K].

¹⁷² E.g., Stephen Pelzel, *How to: Emulate PS2 Games on Your Computer Using PCSX2* (2021), MEDIUM (May 7, 2021), <https://medium.com/upskilling/how-to-emulate-ps2-games-on-your-computer-using-pcsx2-2021-66b1bd4c0f18> [https://perma.cc/S4M8-YK3C].

¹⁷³ Nicole Carpenter, *Nintendo Awarded \$2.1M in Pirated Games Lawsuit*, POLYGON (June 1, 2021, 9:57 AM), <https://www.polygon.com/22462914/nintendo-lawsuit-2-million-damages-rom-universe-pirated-games> [https://perma.cc/3A2Y-F6GM].

¹⁷⁴ 17 U.S.C. § 117(a).

B. *Decompilations Present a More Interesting Question*

At least on first blush, both FPGA core developers and decompilation developers appear potentially defended by the logic of the *Accolade*, *Atari*, and *Connectix* cases; however, the differences between FPGA cores and decompilations underscore why the latter presents a more complicated copyright infringement question.

To analyze how copyright protects new forms of creativity such as FPGA cores and decompilations, it is first important to recall that direct, verbatim copying is not required for the purposes of copyright infringement.¹⁷⁵ Rather, a defendant's work that is substantially similar to a plaintiff's copyrighted work can infringe the plaintiff's copyright in that work.¹⁷⁶ As explained by Judge Henry Goddard in *Nichols v. Universal Pictures Corp.*,¹⁷⁷ when evaluating whether the motion picture *The Cohens and Kellys* infringed the copyright of the play *Abie's Irish Rose*:

The law relating to infringement and plagiarism is quite well settled. But in some instances, the practical application of it is not simple, because of the difficulty of determining what the precise points of similarity or dissimilarity between two dramatic or other compositions are. Mere ideas are not protected, but the manner of expressing the same ideas may be secured, and the line differentiating the idea from the expression of the idea is not always clearly defined.

...

That the same emotions are found in plays would not alone be sufficient to prove infringement, but, if similar emotions are portrayed by a sequence of events presented in like manner, expression, and form, then infringement would be apparent. Also, for instance, no one has an exclusive right to an idea or statement of the law—that a mere idea or fact may not be copyrighted, but that the manner of expressing or illustrating the idea or fact may be protected by copyright.¹⁷⁸

In that case, Judge Goddard found no infringement, in no small part because the works differed “quite substantially in [their] themes, scenes, episodes, and expression of ideas, although both make use of common property, such as Jewish and Irish characters, marriage meeting with

¹⁷⁵ For an excellent primer on substantial similarity, see Clark D. Asay, *An Empirical Study of Copyright's Substantial Similarity Test*, 13 U.C. IRVINE L. REV. 35, 41–50 (2022).

¹⁷⁶ See *id.* at 43.

¹⁷⁷ 34 F.2d 145 (S.D.N.Y. 1929).

¹⁷⁸ *Id.* at 145, 147.

strong parental opposition, and final reconciliation.”¹⁷⁹ In contrast, consider *Sheldon v. Metro-Goldwyn Pictures Corp.*,¹⁸⁰ a Learned Hand case involving a dispute over whether Metro-Goldwyn-Mayer’s film *Letty Lynton* infringed the copyrighted play *Dishonored Lady* despite various differences between the two works.¹⁸¹ There, Judge Hand found infringement due to substantial similarity:

[T]he dramatic significance of the scenes we have recited is the same, almost to the letter. True, much of the picture owes nothing to the play; some of it is plainly drawn from the novel; but that is entirely immaterial; it is enough that substantial parts were lifted; no plagiarist can excuse the wrong by showing how much of his work he did not pirate. We cannot avoid the conviction that, if the picture was not an infringement of the play, there can be none short of taking the dialogue.¹⁸²

Jumping forward over forty years, in *Sid & Marty Krofft Television Productions, Inc. v. McDonald’s Corp.*,¹⁸³ plaintiffs alleged that McDonald’s characters were copies of characters from their television show *H. R. Pufnstuf*.¹⁸⁴ In that case, the Ninth Circuit established a two-step test for the substantial similarity of different works.¹⁸⁵ The first step, the so-called “extrinsic” test, focuses on “specific criteria which can be listed and analyzed.”¹⁸⁶ That criteria might involve, for example, “the type of artwork involved, the materials used, the subject matter, and the setting for the subject.”¹⁸⁷ The second step, the “intrinsic test,” depends on the “response of the ordinary reasonable person” and “does not depend on the type of external criteria and analysis which marks the extrinsic test.”¹⁸⁸ The net effect of the Ninth Circuit’s test was to provide a framework for determining substantial similarity in circumstances where direct copying might not exist—that is, where the allegedly infringing work is not a one-for-one reproduction of the copyrighted work.

The Ninth Circuit’s approach to substantial similarity has been used to find works infringing where those works mimicked and/or were inspired by a copyrighted work. For example, in *Metro-Goldwyn-Mayer*,

¹⁷⁹ *Id.* at 148–49.

¹⁸⁰ 81 F.2d 49 (2d Cir. 1936).

¹⁸¹ *Id.* at 49.

¹⁸² *Id.* at 56.

¹⁸³ 562 F.2d 1157 (9th Cir. 1977).

¹⁸⁴ *See id.* at 1160–62.

¹⁸⁵ *See id.* at 1164.

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

¹⁸⁸ *Id.*

Inc. v. American Honda Motor Co., Inc.,¹⁸⁹ the court evaluated whether defendant Honda infringed Metro-Goldwyn-Mayer's copyrights to the James Bond films (and the character James Bond) by airing commercials for the Honda del Sol automobile, which allegedly copied portions of James Bond films.¹⁹⁰ As part of its analysis of whether there was a substantial similarity between the commercial and the James Bond films, the court considered possible similarities in, among other extrinsic factors, the "theme, plot, and sequence" of both works, the "settings" of both works, the "mood and pace" of both works, the "dialogues" of both works, and the "characters" of both works.¹⁹¹ The court also noted that it appeared "likely that the average viewer would immediately think of James Bond when viewing the Honda commercial, even with the subtle changes in accent and music."¹⁹²

A similar¹⁹³ substantial similarity approach is used in derivative works cases. Derivative works are defined as "work[s] based upon one or more preexisting works,"¹⁹⁴ such that they need not necessarily identically copy the original work to be derivative. In *Gaiman v. McFarlane*,¹⁹⁵ the court wrestled with the question of whether McFarlane's characters, such as "Dark Ages Spawn," were derivative of Gaiman's characters, such as "Medieval Spawn."¹⁹⁶ The court analyzed the various similarities between the characters using an approach similar to the extrinsic approach proposed by the Ninth Circuit:

Both Medieval (Gaiman) Spawn and Dark Ages (McFarlane) Spawn committed bad deeds in the past for which they want to make amends, both have sisters whom they loved who married men who were or became the Hellspawn's enemies; both made a deal with the devil to let them return to Earth; and both use their powers to help the defenseless. The two characters are visually similar: both wear metal helmets and face masks with rivets; both ride horses and carry oversized swords and battle shields; both have armor shoulder pads with spikes. Both have aspects of the first Al Simmons Spawn: a "neural parasite cloak," a particularly shaped face mask, green eyes and a red "M" on the chest.¹⁹⁷

¹⁸⁹ 900 F. Supp. 1287 (C.D. Cal. 1995).

¹⁹⁰ *Id.* at 1291.

¹⁹¹ *Id.* at 1298.

¹⁹² *Id.* at 1299.

¹⁹³ Pun intended.

¹⁹⁴ 17 U.S.C. § 101.

¹⁹⁵ No. 02-cv-48, 2010 WL 11684928 (W.D. Wis. July 29, 2010).

¹⁹⁶ *Id.* at *1.

¹⁹⁷ *Id.* at *2.

Using this approach, the court concluded that McFarlane's character was derivative, noting that the "small differences" in the two characters did not undermine a finding of derivation.¹⁹⁸ That said, this case might be in some ways limited to its facts: the case involved a rather lengthy and contentious battle over ownership of the Spawn comic book character.¹⁹⁹

It should be noted that substantial similarity cases in the world of reverse engineering are somewhat less helpful when analyzing which aspects of video games are protected by copyright. In the context of copyright infringement cases involving substantial similarity, courts often purport to "break down" a program into its constituent parts—removing functional aspects of the program along the way²⁰⁰—and consider whether the remaining "protectable expression" has been copied.²⁰¹ This analysis process does not, standing alone, answer the question of what the protectable expression of the code of a video game actually is, particularly when all readily copyrightable assets (e.g., two- and three-dimensional graphics, sound effects, and music) are intentionally not included with that code.²⁰²

Given the above substantial similarity and derivative works case law, neither FPGA cores nor decompilations need to exactly copy their source material to be infringing. But the differences between these two approaches to video game preservation have significantly different copyright ramifications, illustrating why the copyrightability question with regard to decompilations is so pernicious.

Consider FPGA cores, which are developed to make an FPGA mimic game console hardware. Such cores are developed through reverse engineering, and such reverse engineering is, almost by design, largely directed to the unprotectable functional elements of processors and their associated hardware elements, suggesting that the development of such cores is akin to the hardware-focused reverse engineering of the *Accolade*, *Atari*, and *Connectix* cases. In other words, while FPGA cores might be intentionally designed to be substantially similar to the hardware that they mimic, such mimicry is specifically directed to the

¹⁹⁸ *Id.* at *5.

¹⁹⁹ See Eriq Gardner, *Decades-Long Legal Feud over 'Spawn' Comic Book Finally Ends* HOLLYWOOD REP. (Jan. 31, 2012, 3:02 PM), <https://www.hollywoodreporter.com/business/business-news/spawn-comic-book-todd-mcfarlane-neil-gaiman-286071> [<https://perma.cc/3X6K-JBHQ>].

²⁰⁰ *E.g.*, *Comput. Assocs. Int'l, Inc. v. Altai, Inc.*, 982 F.2d 693, 706 (2d Cir. 1992).

²⁰¹ *E.g.*, *id.* at 710; see also *E.F. Johnson Co. v. Uniden Corp. of Am.*, 623 F. Supp. 1485, 1500 (D. Minn. 1985).

²⁰² Along these lines, some have argued that "courts applying *Computer Associates* still do not know how much reuse of each of the program element to allow." See Michael Risch, *How Can Whelan v. Jaslow and Lotus v. Borland Both Be Right? Reexamining the Economics of Computer Software Reuse*, 17 J. MARSHALL J. COMPUT. & INFO. L. 511, 515 (1999).

unprotectable elements of that hardware. As such, FPGA core development is unlikely to infringe any copyright (as it does not appear to copy anything copyright eligible in the first place), and in any event might be fair use (per reverse engineering cases, like *Atari*).

Consider, in contrast, decompilations, which involve creating code that—when combined with the appropriate assets—generally permit the enjoyment of a video game on various computer hardware.²⁰³ As part of the overall process of programming a decompilation, programmers often reverse engineer the original binaries of video games, then hand program code based on that analysis.²⁰⁴ This might initially lead one to conclude that the *Accolade*, *Atari*, and *Connectix* cases are applicable, but this is a myopic view of decompilations. Recall that a decompilation is designed to, when paired with the appropriate assets, completely reproduce a copyrighted creative work (e.g., a video game). The question of substantial similarity thus becomes a bit easier: the decompilation is, presumably, designed to be as substantially similar as possible, albeit with the occasional technical improvements along the way. In turn, even though the ultimate methodology used to create a decompilation might involve reverse engineering, the net effect of such efforts is to create what is purposefully designed to be substantially similar to a past video game, all the way down to the controls, story elements, overall presentation, and more. Such activity results in a substantially similar (if not almost identical) creative output. And, one might argue, it does not matter whether one copies someone else's poem using a typewriter or a laptop—the ultimate result (the copying of the poem) is the same.

That said, recall that *Nichols* and *Sheldon* suggested that, to infringe a copyrighted work under the substantial similarity doctrine, an infringing work must be substantially similar to the *copyright-protected* aspects of that work. This invites a critical question: What aspects of video games are protected by copyright in the first place?

The question of the scope of copyright as it applies to video games is almost as old as video games themselves. In *Midway Manufacturing Co. v. Artic International, Inc.*,²⁰⁵ the Seventh Circuit evaluated “questions regarding the scope of protection video games enjoy under the 1976 Copyright Act.”²⁰⁶ Midway argued that its arcade games, such as *Pac-Man* and *Galaxian*, were audiovisual works protected by the 1976 Copyright Act.²⁰⁷ That position enabled Midway to argue, in part, that Artic

²⁰³ Orland, *supra* note 4.

²⁰⁴ *Id.*

²⁰⁵ 704 F.2d 1009 (7th Cir. 1983).

²⁰⁶ *Id.* at 1010 (citing Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (codified as amended in scattered sections of 17 U.S.C.)).

²⁰⁷ *Id.* at 1011.

infringed its copyrights by selling circuit boards that sped up the rate of play of *Galaxian*.²⁰⁸ While the court noted that it might be hard to define a video game as a “series of related images,” it concluded that video games were audiovisual works by virtue of being “any set of images displayed as some kind of unit.”²⁰⁹ The court openly wrestled with the unique issues posed by video games when they were considered audiovisual works:

Strictly speaking, the particular sequence of images that appears on the screen of a video game machine when the game is played is not the same work as the set of images stored in the machine’s circuit boards. The person playing the game can vary the order in which the stored images appear on the screen by moving the machine’s control lever. That makes playing a video game a little like arranging words in a dictionary into sentences or paints on a palette into a painting. The question is whether the creative effort in playing a video game is enough like writing or painting to make each performance of a video game the work of the player and not the game’s inventor.

We think it is not. Television viewers may vary the order of images transmitted on the same signal but broadcast on different channels by pressing a button that changes the channel on their television. . . . The player of a video game does not have control over the sequence of images that appears on the video game screen. He cannot create any sequence he wants out of the images stored on the game’s circuit boards. The most he can do is choose one of the limited number of sequences the game allows him to choose. He is unlike a writer or a painter because the video game in effect writes the sentences and paints the painting for him; he merely chooses one of the sentences stored in its memory, one of the paintings stored in its collection.²¹⁰

The Seventh Circuit ultimately concluded that “video games are copyrightable as audiovisual works under the 1976 Copyright Act and . . . note[d] that every other federal court (including [its] own) that has confronted this issue has reached the same conclusion.”²¹¹

About a decade later, the Ninth Circuit would consider the extent with which copyright protection would extend to modifications of the way video games operated. In *Lewis Galoob Toys, Inc. v. Nintendo of*

²⁰⁸ *Id.* at 1010–11.

²⁰⁹ *Id.* at 1011.

²¹⁰ *Id.* at 1011–12.

²¹¹ *Id.* at 1012 (first citing *Williams Elecs., Inc. v. Artic Int’l, Inc.*, 685 F.2d 870 (3d Cir. 1982); then citing *Atari, Inc. v. N. Am. Philips Consumer Elecs. Corp.*, 672 F.2d 607, 617 (7th Cir. 1982); then citing *Stern Elecs., Inc. v. Kaufman*, 669 F.2d 852 (2d Cir. 1982); and then citing *Midway Mfg. Co. v. Dirkschneider*, 543 F. Supp. 466 (D. Neb. 1981)).

America, Inc.,²¹² the Ninth Circuit considered whether Galoob's "Game Genie" game-modification (i.e., cheating) device infringed Nintendo's copyrights in its video games.²¹³ The Game Genie device functioned by "blocking the value for a single data byte sent by the game cartridge to the central processing unit in the Nintendo Entertainment System and replacing it with a new value."²¹⁴ As such, "[i]f that value controls the character's strength, for example, then the character [could] be made invincible by increasing the value sufficiently."²¹⁵ But, critically, the Game Genie did not "alter the data that is stored in the game cartridge," as its effects were temporary.²¹⁶ The Ninth Circuit held in *Galoob* that the Game Genie did not produce derivative works, in part because the Game Genie was "useless by itself" as it could "only enhance" and could not "duplicate or recast[] a Nintendo game's output."²¹⁷ The Ninth Circuit ultimately concluded that Galoob did not violate the Copyright Act.²¹⁸

A few years later, in *Micro Star v. FormGen Inc.*,²¹⁹ the Ninth Circuit would explore the scope of copyright protection afforded to video games beyond mere images and audio. In *Micro Star*, the Ninth Circuit was faced with a complicated question: whether files that, when input into a video game, modified the operation of that video game, infringed the copyright(s) of that video game.²²⁰ In that case, *Micro Star* sought a declaratory judgment that its commercial product—a compact disc, titled "Nuke It," full of largely user-created *Duke Nukem 3D* levels—did not infringe any of FormGen's copyrights.²²¹ Those level files, called "MAP files," could be provided as input to the *Duke Nukem 3D* application to generate new playable in-game levels, albeit often using existing *Duke Nukem 3D* assets (e.g., textures, enemies, and sound effects).²²² The lower court held that the compact disc itself was not a derivative work (and thus did not infringe FormGen's copyright) but did find that the compact disc's packaging (which included various images of *Duke Nukem 3D* characters without a license) was infringing.²²³ Both sides appealed their losses, with FormGen arguing that *Micro Star* infringed its copyright

²¹² 964 F.2d 965 (9th Cir. 1992).

²¹³ *Id.* at 967.

²¹⁴ *Id.*

²¹⁵ *Id.*

²¹⁶ *Id.*

²¹⁷ *Id.* at 969.

²¹⁸ *Id.* at 972.

²¹⁹ 154 F.3d 1107 (9th Cir. 1998).

²²⁰ *Id.*

²²¹ *Id.* at 1109.

²²² *See id.* at 1110.

²²³ *Id.* at 1109.

through the distribution of files containing the game levels; that is, the distribution of files that contained “a series of instructions that tell the game engine (and, through it, the computer) what to put where.”²²⁴ The Ninth Circuit largely agreed with FormGen, finding that it had shown a likelihood of success that Micro Star was infringing FormGen’s copyrights.²²⁵ The Ninth Circuit explained that “FormGen will doubtless succeed in making these showings since the audiovisual displays generated when the player chooses the [Nuke It] levels come entirely out of [*Duke Nukem 3D*]’s source art library”;²²⁶ that the distributed level files infringed the *Duke Nukem 3D* “story itself”;²²⁷ and that Micro Star’s distribution of the level files was likely not to be found to constitute fair use in part because “Micro Star’s use of FormGen’s protected expression was made purely for financial gain,” despite the fact that FormGen told users that any new levels made for *Duke Nukem 3D* must be “offered [to others] solely for free.”²²⁸

On one hand, the *Micro Star* case is quite simple: the lower court found direct copying (in at least, for example, the packaging of the compact disc), and the Ninth Circuit affirmed. But there is more to *Micro Star* than meets the eye. An interesting aside in the Ninth Circuit’s ruling suggests that, even though some files distributed by Micro Star were in and of themselves not copyright infringing, Micro Star could have nonetheless infringed by copying something beyond the art and music of *Duke Nukem 3D*:

Micro Star makes much of the fact that the [Nuke It] MAP files reference the source art library, but do not actually contain any art files themselves. Therefore, it claims, nothing of [*Duke Nukem 3D*]’s is reproduced in the MAP files. In making this argument, Micro Star misconstrues the protected work. The work that Micro Star infringes is the [*Duke Nukem 3D*] story itself — a beefy commando type named Duke who wanders around post-Apocalypse Los Angeles, shooting Pig Cops with a gun, lobbing hand grenades, searching for medkits and steroids, using a jetpack to leap over obstacles, blowing up gas tanks, avoiding radioactive slime. A copyright owner holds the right to create sequels, and the stories told in the [Nuke It] MAP files are surely sequels, telling new (though somewhat repetitive) tales of

²²⁴ *Id.* at 1109–10.

²²⁵ *Id.* at 1114.

²²⁶ *Id.* at 1112.

²²⁷ *Id.*; see also Burk, *supra* note 14, at 1547.

²²⁸ *Micro Star*, 154 F.3d at 1113–14 (alteration in original) (quoting a user license that appears on screen when a user access *Duke Nukem 3D*’s build editor).

Duke's fabulous adventures. A book about Duke Nukem would infringe for the same reason, even if it contained no pictures.²²⁹

This analysis seems to suggest that *Duke Nukem 3D* was more than a mere collection of images and audio, such that one could infringe some aspect of *Duke Nukem 3D* by distributing sequel-like content for the game.

While the court might have reached an equitable result (particularly given the evidence of direct copying indicated in the record), the court's suggestions quoted above regarding the scope of copyright protection as applied to video games have some significant flaws. It might seem intuitively unfair that Micro Star downloaded *Duke Nukem 3D* level files off the internet—that is, others' work available for free on the internet—and redistributed those files commercially without the permission of the creators of those files (much less the permission of the creators of *Duke Nukem 3D*).²³⁰ That said, it is not particularly clear that all level files distributed by Micro Star acted like sequels to the overall story of *Duke Nukem 3D*. For example, the "Nuke It" compact disc included fifty-five multiplayer maps designed for arguably story-irrelevant multiplayer matches, rather than any sort of single-player story experience.²³¹ That compact disc also included various level files that were included as "map editing examples."²³² As such, while the 336 single-player level files on the original "Nuke It" compact disc might have infringed the underlying story of *Duke Nukem 3D*, this does not mean that all level files inherently infringed that story. The *Micro Star* court appeared to indicate that this very fact might change its conclusion, as it expressly stated in a footnote that its conclusions might have been different if the level files allowed for a different story to be told.²³³ Additionally, it is not particularly clear that the files on the "Nuke It" compact disc were only usable with *Duke Nukem 3D*—as noted by two commentators:

[A]ny video game could be programmed to use the MAP files to generate a level using the artwork, sounds, textures, skins, and creative expression of that game. The MAP files do not themselves dictate that the *Duke Nukem 3D* engine be used for rendering. Imagine, if you would, that a MAP file distributed by Micro Star was used to generate a level in *Quake*, *Doom*, or

²²⁹ *Id.* at 1112 (citation omitted) (citing *Trust Co. Bank v. MGA/UA Ent. Co.*, 772 F.2d 740 (11th Cir. 1985)).

²³⁰ *Id.* at 1109.

²³¹ *Nuke It*, DUKE NUKEM WIKI, https://dukenukem.fandom.com/wiki/Nuke_It [<https://perma.cc/29Z4-DKMW>].

²³² *Id.*

²³³ See *Micro Star*, 154 F.3d at 1112 n.5.

Unreal. Would that rendering be an infringement of FormGen’s IP in *Duke Nukem 3D*? No.²³⁴

One way of understanding the court’s decision is that the court might have been wrestling with a problem of permanence. Statutorily, derivative works need not be fixed in a tangible medium of expression; however, some case law contradictorily indicates that derivative works need to be embodied in some “concrete or permanent form.”²³⁵ To address this issue, the court in the *Micro Star* decision might have targeted the MAP files (permanent vis-à-vis being on a compact disc)²³⁶ rather than the potentially more infringing electronic representations of those MAP files once executed in *Duke Nukem 3D* (which would, arguably, be impermanent).

More broadly, the court’s reasoning regarding the copyright infringement of the story of *Duke Nukem 3D* might have worked for that particular game²³⁷ but does not seem to apply to all video games. Take, for example, popular sports games, such as the *Madden NFL* game series developed by Electronic Arts.²³⁸ Would an individual infringe the story of any of the *Madden NFL* games by creating unique stadium map files? Such a result seems somewhat unlikely, in no small part because the *Madden NFL* series purports to accurately replicate a real-world game (football) for which there is arguably no underlying story.²³⁹

C. The Case for Providing Copyright Protection to a Broader Spectrum of Video Game Creativity

As suggested by the above analysis, the Ninth Circuit’s reasoning in *Micro Star* has flaws and does not fully address the full scope of the copyrightability of video games, particularly in the context of

²³⁴ Dannenberg & Davenport, *supra* note 16, at 92.

²³⁵ Tyler T. Ochoa, *Copyright, Derivative Works and Fixation: Is Galoob a Mirage, or Does the Form(Gen) of the Alleged Derivative Work Matter?*, 20 SANTA CLARA COMPUT. & HIGH TECH. L.J. 991, 991 (2004).

²³⁶ Along those lines, the court analogized the level files to sheet music, pantomimes, and dances. See *Micro Star*, 154 F.3d at 1111–12.

²³⁷ Even this is a debatable position. The story of *Duke Nukem 3D* is “sparse,” involving little more than Duke being angry about an alien invasion and enacting revenge with guns, while occasionally being distracted by interactive pool tables and adult dancers. *Duke Nukem 3D*, DUKE NUKEM WIKI, https://dukenukem.fandom.com/wiki/Duke_Nukem_3D#Storyline [<https://perma.cc/5NBJ-PT9M>].

²³⁸ *Madden NFL*, ENCYCLOPAEDIA BRITANNICA, <https://www.britannica.com/topic/Madden-NFL> [<https://perma.cc/3H9M-ESGG>] (Mar. 27, 2023).

²³⁹ This is particularly the case given the *scènes à faire* doctrine. See discussion *infra* Section II.D.

decompilations. For instance, the Ninth Circuit's analysis suggested that decompilations might infringe video games' copyright insofar as those decompilations are designed to infringe the underlying story of those games;²⁴⁰ however, as already discussed, this story-focused logic does not apply to all video games²⁴¹ and might have been used to address the problem of derivative work permanence. Recognizing some of these weaknesses, commentators have expressed a need for better legal guidance.²⁴²

Relatedly, some commentators have argued that some video games are essentially already treated under U.S. law as collective works,²⁴³ but this treatment is also insufficient to resolve the issue of whether decompilations infringe some copyright interest in video games. The Copyright Act of 1976 defines a collective work as "a work, such as a periodical issue, anthology, or encyclopedia, in which a number of contributions, constituting separate and independent works in themselves, are assembled into a collective whole."²⁴⁴ This seems to describe how video games are a collection of assets (e.g., independently copyrightable visual assets, audio assets, code, and the like). But merely indicating that a video game is a collection of independently copyrightable assets ignores many significant creative aspects of video games, in effect reducing those games down to easily identified discrete parts like art assets and music assets. There is simply more creative labor involved in video games than is embodied by their discrete assets, as less tangible aspects of a video game can be just as important to the creative process of creating it. For instance, one reviewer of the game *Cruelty Squad* conceded that just looking at the game "can make you queasy" and described how the game's art and music was intentionally unpleasant but, nonetheless, acknowledged that the game in its entirety was excellent in no small part due to its overall experience.²⁴⁵ *Breaking Cruelty Squad*

²⁴⁰ *Micro Star*, 154 F.3d at 1112.

²⁴¹ Dannenberg & Davenport, *supra* note 16, at 92; see also discussion *supra* Section II.B.

²⁴² See John Baldrice, Note, *Mod as Heck: Frameworks for Examining Ownership Rights in User-Contributed Content to Videogames, and a More Principled Evaluation of Expressive Appropriation in User-Modified Videogame Projects*, 8 MINN. J.L. SCI. & TECH. 681, 691–92 (2007); see also Dannenberg & Davenport, *supra* note 16, at 92. For a different approach, see Drew S. Dean, Comment, *Hitting Reset: Devising a New Video Game Copyright Regime*, 164 U. PA. L. REV. 1239 (2016).

²⁴³ See, e.g., ANDY RAMOS, LAURA LÓPEZ, ANXO RODRÍGUEZ, TIM MENG & STAN ABRAMS, WORLD INTELL. PROP. ORG., THE LEGAL STATUS OF VIDEO GAMES 92 (2013), https://www.wipo.int/export/sites/www/copyright/en/creative_industries/pdf/video_games.pdf [https://perma.cc/E5EY-PCFC].

²⁴⁴ 17 U.S.C. § 101.

²⁴⁵ James Davenport, *Cruelty Squad Review*, PC GAMER (July 2, 2021), <https://www.pcgamer.com/cruelty-squad-review> [https://perma.cc/E3K5-U8JZ].

down into discrete art, music, and code assets would arguably lose the overall context with which the game operates, akin to reducing a painted masterpiece (or, in the case of *Cruelty Squad*, an intentionally offensive painting) down to a series of discrete color values.

A better way to address the recent efforts in decompilations, particularly in view of the Ninth Circuit's analysis in *Micro Star*, is to recognize that video games involve far more creative labor than is reflected in their discrete visual assets, audio assets, and story. There is inherent creativity in the way video games' parts are interrelated in an interactive environment, such that there is creativity in the way in which input is handled, how art assets and audio assets are combined in various two- and three-dimensional scenes, and the like. Put more bluntly, video games are more than the sum of their discrete assets, suggesting that more than the discrete assets are amenable to protection by copyright. This understanding acknowledges the independent creative judgment of developers when choosing how and why to present video games in a certain way: for example, the selection of how three-dimensional models move and interact within a three-dimensional environment, decisions regarding how user input is recognized in-game, and the like, even though such decisions are generally implemented by code (and thus, currently, arguably only protected as embodied in the exact lines of that code). Such an interpretation would remain wholly consistent with the Ninth Circuit's analysis in *Micro Star*, particularly insofar as the MAP files still relied on the independent creative judgment of the original creators of *Duke Nukem 3D* in terms of the way the titular Duke Nukem traverses through levels, interacts with certain objects, and the like.

This approach to understanding video games is similar to the approach adopted by both the district court and the Ninth Circuit in *MDY Industries, LLC v. Blizzard Entertainment, Inc.*²⁴⁶ In that case, Blizzard Entertainment, manufacturer of the smash hit massively multiplayer online role-playing game *World of Warcraft*, sued the developer of a software program that “automatically plays the early levels of [*World of Warcraft*] for players.”²⁴⁷ In that case, the court explicitly drew distinctions between “literal elements” (such as “the source code stored on players' hard drives”), “individual non-literal elements” (such as “the 400,000+ discrete visual and audible components of the game, such as a visual image of a monster or its audible roar”), and “dynamic non-literal elements” (such as “the real-time experience of traveling through different worlds, hearing their sounds, viewing their structures, encountering their inhabitants and monsters, and encountering other

²⁴⁶ 629 F.3d 982 (9th Cir. 2010).

²⁴⁷ *Id.* at 934–35.

players.”)²⁴⁸ While the court in *MDY* seemed to focus more on the experience of the player rather than the creative labor of Blizzard Entertainment’s employees, the net result is roughly the same: a recognition that the creativity of video games is more than the data stored on a hard drive.

In turn, the substantial similarity and derivative work cases discussed above, such as *Nichols* and *Sheldon*, provide a helpful example of how decompilations may be said to infringe video games’ copyrights, even when those decompilations do not necessarily contain any assets from those video games. Decompilations are generally created to mimic all aspects of a video game, though they are not necessarily packaged with the original assets from those games. But much like how Honda’s commercial likely did not use a single frame of a James Bond movie, it is arguably not necessary for a decompilation to outright copy the assets of a video game for that decompilation to infringe the copyright(s) of that video game. After all, once combined with the appropriate assets; the theme, plot, and sequence of the decompilation; the setting of the decompilation; the mood and pace of the decompilation; the dialogue of the decompilation; and the characters of the decompilation are (typically) intended to be identical to that of the original video game, even if such aspects are implemented through entirely different codebases.

Recognizing decompilations as derivative works could potentially protect the property interests of decompilation developers as well. Assume, *arguendo*, that decompilations are derivative works. A derivative work “extends only to the material contributed by the author of such work, as distinguished from the preexisting material employed in the work, and does not imply any exclusive right in the preexisting material.”²⁴⁹ This suggests that, to any extent a decompilation is a derivative work of a video game, the programmers of that decompilation maintain a property right in their independent creative judgments in making that work—that is, the new programming code that enables the decompilation to be compiled and to execute on modern hardware. This could protect the decompilation developers from having their own creative efforts pilfered by the rights holder of a video game. For example, providing a decompilation developer a property right in their new code would provide that decompilation developer a remedy if an original video game’s rights holder attempted to sell the decompilation commercially.²⁵⁰

More broadly, a significant benefit to understanding video games as greater than the sum of their discrete assets (whether or not they are

²⁴⁸ *Id.* at 942–43.

²⁴⁹ 17 U.S.C. § 103(b).

²⁵⁰ *But see Anderson v. Stallone*, No. 87-0592, 1989 WL 206431, at *11 (C.D. Cal. Apr. 25, 1989) (holding that there is no copyright protection for any part of an unauthorized derivative work).

considered derivative works) is that such an understanding recognizes the property interest of creative laborers²⁵¹ (e.g., game developers) in video game development. Video game developers invest substantial time and work in developing visual and audio assets for a video game, but such efforts can be but a fraction of the creative labor involved in developing a video game: video game development teams regularly include programmers, system designers, producers, quality assurance team members, and more.²⁵² To reduce video games down to discrete visual, audio, code, and story assets ignores the substantial creative labor of such team members (and the importance of such efforts in producing an actually enjoyable video game). For example, reducing *Super Mario 64* down to discrete assets (e.g., the three-dimensional model of Mario, various textures, music, and code) would ignore the laborious creative effort made by Nintendo to perfect the way playing Mario feels, which was a significant early focus during the development of the game.²⁵³ In contrast, recognizing video games as an independent creative effort above and beyond the assets portrayed in the game would recognize the efforts made by those team members, rather than relegate their efforts to protection only vis-à-vis the program code those efforts are embodied in. After all, if “[s]acrificial days devoted to . . . creative activities deserve rewards commensurate with the services rendered,”²⁵⁴ then those rewards should not be apportioned only to the visual artists and musicians on staff at a video game developer.

Understanding video games as more than their discrete assets would potentially mean that decompilations infringe the copyright(s) of video game rights holders, even when those decompilations are independently programmed (whether or not based on reverse engineering), and even when those decompilations lack in-game assets. Take, for example, the aforementioned decompilation of *Super Mario 64*. That decompilation comprises new code based on the reverse engineering of the binary code of *Super Mario 64* and does not contain any of the art and/or music assets of the game. That said, despite the newness of the code itself (and the possible creativity in assembling that code), the code of the decompilation is executable, along with various art and music assets, to completely recreate the overall experience of *Super Mario 64*, suggesting that the code contains some sort of inherent spirit of the original video game. Stated differently, the *Super Mario 64* decompilation code captures a sort

²⁵¹ See LOCKE, *supra* note 25, at 306.

²⁵² RICK DAVIDSON, THE BIG LIST OF: VIDEO GAME DEVELOPMENT TEAM ROLES (2017), <https://cdn.fs.teachablecdn.com/N4tk2YwxTHaM6neBSVqV> [https://perma.cc/4HE3-G39J].

²⁵³ Reece Goodall, *Concept to Console: A History of 'Super Mario 64,'* BOAR (Jan. 18, 2021), <https://theboar.org/2021/01/concept-to-console-super-mario-64> [https://perma.cc/88EP-LBHC].

²⁵⁴ Mazer v. Stein, 347 U.S. 201, 219 (1954).

of *je ne sais quoi* of the original creative labor inherent in the original game—it reflects the independent creative efforts of the original creators in terms of how Mario traverses a three-dimensional environment, the particular ordering of in-game levels, the conditions upon which certain art and music is output, and the like. And the ostensible intent of the decompilation developer is to create a product that is intentionally substantially similar to the original game, albeit once combined with the appropriate assets. In turn, the decompilation is arguably substantially similar to *Super Mario 64* and infringes Nintendo's copyrights in the game.

The positions presented herein recognize that video games such as *Super Mario 64* are more than the sum of their individual assets. For example, the recognition of video games as more than the sum of their discrete assets recognizes the inherent creativity in how *Super Mario 64* is presented to the user: that is, not just the design of Mario, but also the way in which Mario responds to input, the way in which levels are accessed by jumping into certain paintings, the nonlinear arrangement of various levels and in-game challenges, and the like. After all, these concepts—whether characterized as the “feel” of the game, the extrinsic and intrinsic qualities of the game, the *je ne sais quoi* of the game, the “interactivity” of the game, or the like—are arguably just as creative as the art and music in the game, and arguably deserve just as much protection through copyright law.

Admittedly, the concept of substantial similarity as applied to decompilations does not provide an easy bright-line test for defining what does and does not infringe a video game. Such vagueness is not particularly new in the world of copyright. For example, in *Litchfield v. Spielberg*, a case comparing the motion picture *E.T. the Extra-Terrestrial* to the musical play *Lokey from Maldemar*, the Ninth Circuit stated that, to prove substantial similarity, a plaintiff “must show that the works are substantially similar in both *ideas and expression*,” relying on tests such as the “ordinary reasonable person” test and considering “extrinsic” factors such as “plot, theme, dialogue, mood, setting, pace and sequence.”²⁵⁵ As such, courts have long grappled with comparing the “mood” and “pace” of movies and plays, and those courts are likely equally proficient in doing so with video games.

²⁵⁵ 736 F.2d 1352, 1356 (9th Cir. 1984).

D. *The Consequences of Providing Copyright Protection to a Broader Spectrum of Video Game Creativity*

While providing copyright protection to the multitudinous forms of creativity inherent in video games—whether or not embodied in assets such as art or music files—might recognize the full scope of the labor of video game developers, such an expansion also has caveats. It might be argued that the last thing the video game world needs is more copyright protection for rights holders, especially where fan efforts (e.g., emulation projects and decompilation projects) can satiate difficult-to-appease fan demand²⁵⁶ and can operate to preserve video games even when preservation of those video games is not commercially worthwhile.²⁵⁷ That is, in a world where fan efforts to preserve and improve video games are rapidly outpacing rights holders' efforts involving those same games, providing those rights holders additional bases to pursue copyright infringement actions might invite more lawsuits and ultimately stifle video game innovation.

Assume, for instance, that video game rights holders were able to sue individuals for the infringement of their video games because those individuals developed decompilations of those video games, even where the individuals were not directly copying the assets or code of those games. This is potentially an undesirable result, particularly when fans are putting in significant (and generally unpaid) labor to preserve games that, absent their efforts, would be lost to time.²⁵⁸ After all, while it might be true that fans might be difficult (if not impossible) to please,²⁵⁹ those fans (like Vitor Vilela, who developed the aforementioned hack for *Super R-Type* to reduce its slowdown)²⁶⁰ seem to be willing to put in the substantial unpaid labor to satisfy their own (perhaps idiosyncratic) needs when it comes to preserving and enjoying video games. Providing rights holders a mechanism for stifling these innovations might help focus consumer attention on newer content available for purchase, but could also frustrate fans' efforts to enjoy video games on their own terms and would arguably unfairly enable rights holders to, through technological obsolescence and/or breakdown, make it difficult for the public to enjoy creative works that they previously enjoyed. A similar logic applies even when the relatively low demand for certain video games

²⁵⁶ See *supra* Section I.D.2.

²⁵⁷ See *supra* Section I.D.3.

²⁵⁸ See *supra* Section II.C.

²⁵⁹ See *supra* Section I.D.2.

²⁶⁰ McFerran, *supra* note 125 and accompanying text.

is considered²⁶¹; fans are seemingly willing to put in the effort to preserve, modify, and enjoy even relatively unpopular games; providing rights holders additional ways to stifle such efforts would seemingly do little more than further risk those video games becoming unavailable to modern audiences over time.

This approach might also encourage suits between game developers, as many video games can be remarkably the same (even to the point of potential substantial similarity). For example, it was once common for game developers to feature so called “bald space marines” in their games (in no small part because the technology at the time was “good at showing off armour” and “not that good at doing hair”).²⁶² Along those lines, video game website *Giant Bomb* identifies twelve different first-person-shooter video games involving bald space marines.²⁶³ Providing any one of those game developers the ability to sue others as allegedly developing a substantially similar bald space marine game might result in a myriad of complex (albeit questionable) copyright lawsuits, all stemming from what was more or less a technological limitation. A similar issue could originate in platformer games (for example, a whole genre of games exists that essentially mirrors the gameplay and feel of the *Metroid* and *Castlevania* game series, to the point where the entire genre is referred to as “Metroidvania”²⁶⁴) and role-playing games (for example, dozens of different role-playing games involve protagonists’ hometowns being destroyed early in the game).²⁶⁵

That said, there is a practical limitation to the copyrightability of video games that might impede some suits between developers: the *scènes à faire* doctrine. In *Incredible Technologies, Inc. v. Virtual Technologies, Inc.*,²⁶⁶ the Seventh Circuit rejected Incredible Technologies’ arguments that various aspects of their game *Golden Tee*, including the trackball which was used as a controller to simulate movement of a golf ball, was copyrighted.²⁶⁷ More particularly, the court concluded that the use of the trackball was functional, with the remaining creative parts of *Golden Tee* (e.g., the depiction of a golf course, the use of golf clubs and golf balls, and

²⁶¹ See *supra* Section I.D.3.

²⁶² Draisey, *Cliffy B Explains the “Bald Space Marines” Phenomenon*, PLAYSTATION LIFESTYLE (July 3, 2009), <https://www.playstationlifestyle.net/2009/07/03/cliffy-b-explains-the-bald-space-marines-phenomenon> [https://perma.cc/KP84-EGVL].

²⁶³ *Bald Space Marine*, GIANT BOMB, <https://www.giantbomb.com/bald-space-marine/3015-3504/games> [https://perma.cc/C574-RWSW].

²⁶⁴ *Metroidvania Games: 5 Characteristics of Metroidvania Games*, MASTERCLASS, <https://www.masterclass.com/articles/metroidvania-definition> (July 20, 2021).

²⁶⁵ See *Doomed Hometown / Video Games*, TV TROPES, <https://tvtropes.org/pmwiki/pmwiki.php/DoomedHometown/VideoGames> [https://perma.cc/E49A-ZZWB].

²⁶⁶ 400 F.3d 1007 (7th Cir. 2005).

²⁶⁷ *Id.* at 1009–12.

the like) being little more than *scènes à faire* (that is, “incidents, characters or settings which are as a practical matter indispensable, or at least standard, in the treatment of a given topic”²⁶⁸). Such a limitation would still apply even under this understanding of the copyrightability of video games, preventing game developers from purporting to broaden the protection of their games far beyond their creative involvement to aspects of their game that are necessary to depict certain concepts.

From a more practical perspective, discouraging fan preservation efforts by protecting a broader spectrum of the creativity inherent in video games might result in some video games being lost forever. Rights holders might reasonably argue that they have the right to not sell their copyrighted works (that is, Nintendo’s aforementioned “Disney Vault” strategy).²⁶⁹ But, practically speaking, many legitimate game preservation efforts are performed essentially unlawfully and—absent those efforts—many copyrighted works might be lost to time.²⁷⁰ Those preservation efforts generally operate for free, circumventing the problem that video game fans are difficult to please²⁷¹ and the problem that it might not be financially worthwhile to try to preserve some video games.²⁷² It thus seems like a bad idea from a public policy standpoint to strengthen aspects of the copyright system when that very system already seems to hinder legitimate preservation efforts and when those efforts can act as a veritable release valve for satiating idiosyncratic fan demand.

III. DECOMPILATIONS AS FAIR USE FROM A PROPERTY INTEREST PERSPECTIVE

As posited above, decompilations provide an interesting case study that illustrates why copyright extends to more aspects of video games than their mere assets. But that copyrightability analysis is not the end of the story. Even assuming that decompilations are copyright infringing, a fair use argument can be made with respect to decompilations, particularly when those decompilations can preserve the public’s access to games that might become otherwise unavailable. This fair use argument is not rooted in a typical statutorily based fair use analysis: rather, it is based in the public’s expectations regarding the ongoing availability of creative works and an understanding of how fans’ arguable

²⁶⁸ *Id.* at 1012; *Atari, Inc. v. N. Am. Philips Consumer Elecs. Corp.*, 672 F.2d 607, 616 (7th Cir. 1982) (quoting *Alexander v. Haley*, 460 F. Supp. 40, 45 (S.D.N.Y. 1978)).

²⁶⁹ See *supra* Section I.D.1; see also SHEFF, *supra* note 107, at 193.

²⁷⁰ Smith, *supra* note 9.

²⁷¹ See *supra* Section I.D.2.

²⁷² See *supra* Section I.D.3.

property interest in video games balances against rights holders' own property interest in those games.

A. *The Insufficiency of a Statutory Fair Use Analysis*

Assuming that decompilations infringe video games' copyright, a statutorily rooted fair use analysis does not appear to provide a defense to such infringement.²⁷³ As will be discussed below, however, this is not necessarily the end of the fair use inquiry.

Fair use is statutorily defined by four factors.²⁷⁴ The first factor, "the purpose and character of the use," includes "whether such use is of a commercial nature or is for nonprofit educational purposes" and often hinges on factors such as commerciality, "transformativeness" (e.g., addition of new information, aesthetics, or the like), bad faith (e.g., whether the work was accessed improperly), and preambular purposes (e.g., use for criticism, scholarship, comment, or the like).²⁷⁵ The second factor, the "nature of the copyrighted work," similarly often hinges on whether a work is factual or creative and whether the infringed work is unpublished or published.²⁷⁶ The third factor, the "amount and substantiality of the portion used in relation to the copyrighted work as a whole," often hinges on whether the entirety of the work was taken and whether the so-called "heart" of the work was taken.²⁷⁷ Last, the fourth factor focuses on "the effect of the use upon the potential market for or value of the copyrighted work."²⁷⁸

Unfortunately for the developers of decompilations, none of these four factors appear to support the idea that the creation of a video game decompilation is fair use.

Consider the first factor, the purpose and character of the use. Decompilation development is arguably somewhere between use "of a commercial nature" and use "for nonprofit educational purposes." Emulators and decompilations are generally free, though some emulator development teams do earn substantial sums through online donations.²⁷⁹ That said, the mere fact that the use is noncommercial is far

²⁷³ Another commentator has argued differently, concluding that "reconstructing and publicly releasing source code would be considered a fair use." See Godfrey, *supra* note 23, at 11.

²⁷⁴ 17 U.S.C. § 107.

²⁷⁵ Barton Beebe, *An Empirical Study of U.S. Copyright Fair Use Opinions, 1978–2005*, 156 U. PA. L. REV. 549, 595, 597–610 (2008).

²⁷⁶ *Id.* at 610–15.

²⁷⁷ *Id.* at 615–16.

²⁷⁸ *Id.* at 616–21.

²⁷⁹ See, e.g., *Team Cemu*, PATREON, <https://www.patreon.com/cemu> [<https://perma.cc/J6MM-3UA8>].

from dispositive—after all, as Laurence Tribe noted, stealing jewelry to wear is also arguably noncommercial.²⁸⁰ The enjoyment of a video game via an emulator and/or via a decompilation of that video game is hardly educational or scholarly, even if it might be a nonprofit endeavor. Decompilations might be said to be transformative insofar as they constitute a new creation (in code) made to preserve and make available an older video game; however, given that decompilations are generally attempts to accurately reproduce a video game (albeit with new code), the amount of transformativeness might be imperceptible to those enjoying the game. And the question of whether decompilation development is performed in good faith is, in some sense, subjective: while rights holders might certainly bristle at the re-creation of their games because it threatens the possibility that they might profit from selling those games themselves, the mere creation of a decompilation is not necessarily a bad faith attempt to cause harm to that rights holder.

The second factor, though “not . . . terribly significant in the overall fair use balancing,”²⁸¹ also does not appear to favor decompilations. The phrase “nature of the copyrighted work” reflects, in some ways, the idea that certain types of work require “more . . . diligence than . . . originality or inventiveness.”²⁸² In this sense, a creative novel may deserve more copyright protection than a news report, as the latter is, at least in some sense, an informational work partially based in fact.²⁸³ This factor also seems to weigh against finding fair use insofar as video games are generally more analogous to novels than factually based news reports or the like. The fact that video games might have been originally published does not change this conclusion much: even though “the author’s right to control the first public appearance of his undissemated expression will outweigh a claim of fair use,”²⁸⁴ the mere existence of publication does not render all subsequent uses fair use.²⁸⁵

The third factor, the amount and substantiality of the portion used, might invite a weak debate with respect to decompilations. As explained above, decompilations exist as reproductions of past works, although these reproductions often comprise entirely new code.²⁸⁶ As such, while

²⁸⁰ *Home Recording of Copyrighted Works: Hearing on H.R. 4783, H.R. 4794, H.R. 4808, H.R. 5250, H.R. 5488, and H.R. 5705 Before the Subcomm. on Cts., C.L. & the Admin. of Just. of the H. Comm. on the Judiciary*, 97th Cong. 1250 (1982) (memorandum of Laurence H. Tribe, Professor of Constitutional Law, Harvard Univ.).

²⁸¹ *Dr. Seuss Enters., L.P. v. Penguin Books USA, Inc.*, 109 F.3d 1394, 1402 (9th Cir. 1997).

²⁸² *N.Y. Times Co. v. Roxbury Data Interface, Inc.*, 434 F. Supp. 217, 221 (D.N.J. 1977).

²⁸³ *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 496–97 (1984) (Blackmun, J., dissenting).

²⁸⁴ *Harper & Row, Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 555 (1985).

²⁸⁵ See Beebe, *supra* note 275, at 613–14.

²⁸⁶ See *supra* Section II.B.

there might not be copying of code per se, there is arguably nonetheless creation of something approximating a “substitute for the copyrighted original.”²⁸⁷ After all, a consumer might enjoy a decompilation where the original game is difficult or impossible to acquire, suggesting that the former is a substitute for the latter.

The fourth factor, relating to the effect of the use upon the potential market for or value of the copyrighted work, is perhaps the most devastating for developers of decompilations. Decompilations (and emulators) can act as superior substitutes for rights holders’ own offerings.²⁸⁸ Recall that Nintendo’s own rerelease of *Super Mario 64* was compared by some journalists with the free (and infringing) emulated offerings provided by fans.²⁸⁹ To the extent that decompilations exist to preserve (and improve upon) past video games, such efforts are arguably directly competitive with rights holders own attempts to do the same (or to intentionally withhold the game from the public as in the so-called Disney Vault strategy).²⁹⁰

Accordingly, insofar as they are found copyright infringing, decompilations are unlikely to be considered fair use, at least as that defense is statutorily defined. But this raises interesting questions about the very scope of fair use itself, and whether such a narrow understanding of fair use possibly harms the legitimate interest of fans of video games.

B. *Beyond Statutory Fair Use: Do Fans Have a Property Interest?*

The originally promulgated fair use doctrine focused on competition—that is, the doctrine was “designed to enable a rival author or publisher to use a copyrighted work in preparing another publication.”²⁹¹ The 1909 Copyright Revision Act broadened this concept to encompass consumer conduct as well, though perhaps in an illusory fashion.²⁹² The 1976 Copyright Act was also something of a double-edged sword: while it included ordinary consumer use as fair use, such a definition arguably expanded the definition of infringement “at the expense of the individual consumer’s right to copy the work for the purposes of learning.”²⁹³ And, despite such statutory codification, fair use law remains nebulous and ill-defined: an empirical study of the doctrine

²⁸⁷ *Sony Corp. of Am.*, 464 U.S. at 497 (Blackmun, J., dissenting).

²⁸⁸ See *supra* Sections I.A–I.B.

²⁸⁹ *Id.*

²⁹⁰ See *supra* Section I.D.1.

²⁹¹ L. Ray Patterson, *Free Speech, Copyright, and Fair Use*, 40 VAND. L. REV. 1, 37 (1987).

²⁹² *Id.*

²⁹³ *Id.* at 47.

revealed that even Supreme Court and renowned circuit court opinions had little impact on the “mass of our fair use case law.”²⁹⁴

Congress intended the four-factor fair use test to be a “flexible doctrine,” and the “Supreme Court has repeatedly taught that the test should be applied on a case-by-case basis, without rigid application of bright-line rules.”²⁹⁵ In turn, rather than focusing merely on the four corners of the fair use statute, consider the concept of fair use from the perspective of property interests. Take, for instance, the conflict between the creator’s “claim to deserve property” and the public’s entitlement to the commons.²⁹⁶ Laborers (such as video game developers) arguably have a right to the fruits of their labor when they create a video game. After all, even from a rudimentary utilitarian perspective, if video game developers are not rewarded for their efforts in some way, most will probably not bother putting in the substantial effort of making video games in the first place. That said, Locke posited that the public has a justified liberty to use and profit from the commons.²⁹⁷ It follows that, insofar as some aspect of a video game becomes part of the commons, the public might have a property entitlement to that aspect of that video game. Moreover, it might also be argued that, insofar as some individual or group of individuals contributes to a video game (and thereby provides some sort of labor, even long after the game has already been published), that individual or group of individuals might have some entitlement at least to their incremental labor in the video game, and further might have the right to dedicate that incremental labor to the commons.

This potential tension between the laborer (e.g., the video game developer) and others (the public who might be entitled to the commons and/or individuals who might provide their own labor to the commons) is only partially resolved by Locke’s so-called proviso: “[E]nough, and as good left in common for others.”²⁹⁸ Locke’s proviso merely indicates that the public is entitled to the commons however it is defined, and does not necessarily resolve a conflict between an original creator of a creative work and fans who, through their passion and/or preservation efforts, might have effectuated their own labor in view of that creative work and might have intended to dedicate that labor to the public.

Professor Wendy Gordon has argued that “creators should have property in their original works, only provided that such grant of property does no harm to other persons’ equal abilities to create or to

²⁹⁴ Beebe, *supra* note 275, at 622, 622 n.239.

²⁹⁵ Snow, *supra* note 24, at 282–83. Some even argue that it should be algorithmically automated. See Peter K. Yu, *Can Algorithms Promote Fair Use?*, 14 FIU L. REV. 329 (2020).

²⁹⁶ Gordon, *supra* note 22, at 1560.

²⁹⁷ *Id.*

²⁹⁸ LOCKE, *supra* note 25.

draw upon the preexisting cultural matrix and scientific heritage.”²⁹⁹ Professor Gordon’s term “cultural matrix” has interesting implications in view of the world of decompilations. Fan interest and passion for video games may be viewed as a form of labor: that is, an investment not merely in terms of purchases, but also in terms of how those fans’ actions make video games into something more culturally meaningful and, thus, more firmly insert the games into the cultural matrix.³⁰⁰ This labor is more than mere ethereal good feelings about a particular video game: it might be viewed as the collective gestalt of fan chatter, such as forum posts, fan art, fan music, impassioned game convention recommendations, and the like, all the way up to the development of a decompilation to preserve the video game for the future. This fan labor can make a creative work, such as a video game, far bigger than the boundaries of the media upon which it is stored. That additive contribution might be intended to inure not to the benefit of the original rights holder, but to the commons.

This cultural matrix argument is perhaps at its strongest when particularly popular creative works are considered. Take, for instance, the video game *Super Mario 64*. Thanks in no small part due to fan passion over decades, *Super Mario 64* is arguably more than a video game cartridge with memory containing code and various in-game assets (that is, the original creative labor of the video game developer): it is a cultural phenomenon. Even though theft of the physical game cartridge containing the compiled form of *Super Mario 64* is certainly still theft, there may be some aspect of the game’s expanded footprint—some intangible aspect of *Super Mario 64*, supported by decades of fan passion, fan discussion, fan art, emulation efforts, decompilation efforts, and the like—that belongs to the cultural matrix. One might then argue that there is some intangible additive aspect to the game that is in the commons and thus is arguably the property of fans and the public at-large.

That said, Professor Gordon’s cultural matrix need not be a popularity contest, and the cultural matrix argument is equally viable for smaller titles. Consider the incredibly niche and intentionally disturbing *Fear and Hunger* game series, featuring games described as an “exercise

²⁹⁹ Gordon, *supra* note 22, at 1563–64.

³⁰⁰ See, e.g., Mel Stanfill & Megan Condis, *Fandom and/as Labor*, 15 TRANSFORMATIVE WORKS & CULTURES, Mar. 15, 2014, <https://journal.transformativeworks.org/index.php/twc/article/view/593/421> [<https://perma.cc/8B9W-UYB2>]; CHENG LU WANG, HANDBOOK OF RESEARCH ON THE IMPACT OF FANDOM IN SOCIETY AND CONSUMERISM (2020); Iain Simons & James Newman, *All Your Base Are Belong to Us: Videogame Culture and Textual Production Online*, in 2 DIGRA ’03—PROCEEDINGS OF THE 2003 DIGRA INTERNATIONAL CONFERENCE: LEVEL UP (2003), <http://www.digra.org/wp-content/uploads/digital-library/05150.26124.pdf> [<https://perma.cc/944R-M5F7>].

in misery.”³⁰¹ While estimates as of September 2023 suggest that the latest game in the series only sold somewhere around ninety thousand copies,³⁰² *Fear and Hunger*’s small fan community is active with fan art, rampant story speculation, and impassioned debates.³⁰³ Though *Super Mario 64* sold almost one thousand times more copies than the estimated number of sales of the latest *Fear and Hunger* game,³⁰⁴ both can very well contribute to the cultural matrix, albeit perhaps to different degrees. Put differently, the “culture” in “cultural matrix” need not be a particular size.

It can therefore be argued that, when fans invest their passion in a creative work such as a video game in some way, that additional fan investment can add to the cultural footprint of the creative work, and that additive, intangible contribution by the fans inures to the benefit of the commons, not the rights holder. In turn, when fans preserve access to a video game on modern hardware through a decompilation, fans might be said to contribute to that video game through further labor and in a way that leverages their right, rooted in the commons, to that intangible contribution. Decompilations may therefore be viewed as an admittedly copyright-infringing attempt, by fans, to assert their right to preserve a work that has become particularly important to them and the public at large.

This argument—that consumers of a copyrighted work contribute to and thereby expand a creative work beyond the parameters of its original copyright, placing some intangible additive value associated with that work in the commons—is similar to the circumstances identified by Judge Michael Boudin in a concurrence in *Lotus Development Corp. v. Borland International, Inc.*,³⁰⁵ which involved the question of “whether a computer menu command hierarchy is copyrightable subject matter.”³⁰⁶ As noted by Judge Boudin, a “new menu may be a creative work, but over time its importance may come to reside more in the investment that has been made by *users* in learning the menu and in building their own mini-

³⁰¹ Augusto A., *Niche Spotlight – Fear & Hunger 2: Termina*, NICHE GAMER (Jan. 2, 2023, 12:01 PM), <https://nichegamer.com/niche-spotlight-fear-hunger-2-termina> [https://perma.cc/A859-LA7D].

³⁰² *Fear & Hunger 2: Termina*, STEAMDB, <https://steamdb.info/app/2171440/charts> (last visited Sept. 23, 2023).

³⁰³ See generally *r/FearAndHunger*, REDDIT, <https://www.reddit.com/r/FearAndHunger> [https://perma.cc/9HZD-SM8Q].

³⁰⁴ See William D’Angelo, *Nintendo 64 Turns 25—Top 10 Best-Selling Nintendo 64 Games—Sales*, VGCHARTZ (Sept. 4, 2021), <https://www.vgchartz.com/article/449479/nintendo-64-turns-25-top-10-best-selling-nintendo-64-games> [https://perma.cc/RPN3-SUYL] (indicating that *Super Mario 64* has sold 11.91 million units).

³⁰⁵ 49 F.3d 807 (1st Cir. 1995).

³⁰⁶ *Id.* at 809.

programs—macros—in reliance upon the menu.”³⁰⁷ This was precisely the case with the Lotus 1-2-3 spreadsheet application, which at one point was “the *de facto* standard for electronic spreadsheet commands.”³⁰⁸ Judge Boudin noted that it was “hard to see why customers who have learned the Lotus menu and devised macros for it should remain captives of Lotus because of an investment in learning made by the users and not by Lotus.”³⁰⁹ In other words, one might argue that the structure of the Lotus 1-2-3 menus and accompanying macros became part of the cultural matrix for users of spreadsheet applications, meaning that intangible concepts became part of the commons and thereby free for others to use and copy, even if copying of the actual Lotus 1-2-3 software package would remain copyright infringement. One might thereby draw an analogy to those Lotus 1-2-3 customers and video game fans: just as Lotus 1-2-3 users, through time investment, created something (a population of employees specifically trained to use the software and macros) that added to the value of the Lotus 1-2-3 software but which was not the original creative work of the creators of Lotus 1-2-3, fans of video games create things (e.g., familiarity, fan works, and decompilations) that add to the value of video games without the creative effort of the original creators of those video games.³¹⁰

Moreover, while perhaps new in the context of video games and decompilations, this argument is not entirely new in the world of intellectual property scholarship. As more eloquently stated by Professor Gordon:

Intellectual products, once they are made public in an interdependent world, change that world. To deal with those changes, users may have need of a freedom inconsistent with first creators’ property rights. If they are forbidden to use the creation that was the agent of the change, all they will have to work from will be the now devalued common.³¹¹

The position advocated herein is, in some ways, an aggressive extension of Professor Gordon’s arguments. Professor Gordon’s work argues that the public may have entitlements to others’ creative labor insofar as it allows them to “create or to draw upon the preexisting cultural matrix and scientific heritage.”³¹² Such a position seems to

³⁰⁷ *Id.* at 819 (Boudin, J., concurring).

³⁰⁸ *Id.* at 821.

³⁰⁹ *Id.*

³¹⁰ *Cf.* Risch, *supra* note 202, at 541–43 (arguing against the proposal that protection for programs ceases when those programs become a “*de facto*” standard).

³¹¹ Gordon, *supra* note 22, at 1570.

³¹² *Id.* at 1563–64.

suggest the right of a creator to stand on the proverbial shoulders of giants; that is, the right to create and innovate based on the past creative work of others, even if such creation and innovation is arguably inconsistent with the property rights of past creators. What is proposed herein is a more aggressive posture: the idea that fans have a right, founded in part by their labor in view of a creative work, to some intangible aspect of that creative work, even if the creative work is owned by another. Such a right may well extend to ensuring that a creative work remains available for enjoyment despite the increasing obsolescence of technology, as this prevents rights holders from proverbially “lock[ing] up” culture³¹³ by failing to preserve their cultural contributions in view of changes to technology. From a legal perspective, such a right can be realized through fair use, a defense to a copyright infringement assertion.

In turn, viewing fair use through the lens of the commons and Professor Gordon’s cultural matrix, it may be argued that decompilation developers and similarly situated entities should have a defense to copyright infringement lawsuits when they preserve access to creative works that are threatened³¹⁴ by technological change. Stated differently, once a creative work has become so popular as to change the world, a rights holder might have an ongoing right to profit from that creative work but might lose the right to pursue copyright infringement actions when they later jealously withhold the creative work from the world through the increasing obsolescence of technology, especially where the public has contributed, through fan labor, to that work. To do otherwise would be to provide a rights holder of a video game an arguably unjust power: that is, the power to assert control over the cultural matrix.³¹⁵

Take, for instance, popular titles such as *Super Mario 64*, which has been listed by some outlets as one of the “biggest games of our lifetime.”³¹⁶ This title might be said to be part of the cultural matrix insofar as it was a “revolution in gaming history,” particularly in its use of 3D and its prominence to many children of a particular generation.³¹⁷ As such, and as already suggested above, *Super Mario 64*’s cultural footprint extends

³¹³ Reed, *supra* note 29 (citing LESSIG, *supra* note 29).

³¹⁴ Of course, this merely invites debate about what creative works are, in fact, threatened—a proposed approach to this issue is discussed in the next Section.

³¹⁵ See Reed, *supra* note 29 (citing LESSIG, *supra* note 29). *But see* Martin Skhrelis *Either Wants to Destroy the \$2 Million Wu-Tang Record or Make It a Spiritual Quest*, VICE (Jan. 27, 2016, 11:45 AM), <https://www.vice.com/en/article/rgp3qq/martin-skhrelis-vice-profile-wu-tang> [<https://perma.cc/QN53-4QDU>] (discussing Martin Skhrelis’s purchase of a one-of-a-kind Wu-Tang Clan album and withholding it from the public).

³¹⁶ Mike Finnerty, *The Biggest Games of Our Lifetime #6: ‘Super Mario 64,’* ENTERTAINMENT.IE, <https://entertainment.ie/gaming/the-biggest-games-of-our-lifetime-6-super-mario-64-516360> [<https://perma.cc/T8VW-XTJ4>].

³¹⁷ *Id.*

far beyond a game cartridge with code and assets. Along those lines, the public might have a property interest, rooted in the commons, in some intangible aspect of *Super Mario 64*, even though one might agree that outright piracy of the original game might still be unlawful. For instance, the public might have a reasonable expectation to be able to enjoy *Super Mario 64* far into the future, even if rights holder Nintendo might, at some point, want to prevent the public from ever enjoying the game again. This does not necessarily mean that a fair use defense should necessarily apply to recent decompilations of *Super Mario 64*, though: after all, Nintendo currently sells copies of the game on modern hardware.³¹⁸

One caveat to the above argument is that the popularity of a creative work might become a double-edged sword: insofar as a creative work develops popularity and becomes part of the cultural matrix, the public might, through its enjoyment and popularization of the creative work, consider some portion of that work to be part of the commons, even if they have not gone so far as to laboriously reprogram that creative work. To steal a perhaps unfortunately commonly used phrase from the technology world, this is a feature, not a bug. The distinction of publication versus nonpublication in fair use doctrine supports the antisocial creator that wishes to jealously hide their work from the world.³¹⁹ That said, when a creator's work becomes so popular and meaningful so as to become rooted in the cultural matrix, that creator's work can develop a cultural footprint far beyond the four corners of the cultural work itself, and the public may reasonably expect some aspects of that expanded cultural footprint to be the property of the commons. To provide a creator the right to a cultural footprint greater than their actual creative labor in creating their creative work is arguably a deprivation of the commons, even though it might be a tempting avenue for rewarding a particularly successful creator. This, unfortunately, could have some unintended consequences: for example, video game developers may decide to charge more for their video games upon release (recognizing that they might later be forced to cede some control of those games if they become popular) or may continually but halfheartedly rerelease games perpetually (to discourage emulator and decompilation developers). That said, as will be discussed below, such concerns can be addressed by limiting any fair use defense to circumstances where a rights holder is unable or unwilling to preserve a video game themselves.

The fair use arguments posited herein are similar to those taken by advocates of fair use for fan fiction (that is, "fiction created by fans,

³¹⁸ See Fenlon, *supra* note 8; see also *infra* Section III.C.

³¹⁹ See Beebe, *supra* note 275, at 610, 612–15.

typically of popular commercial works”).³²⁰ Some assert that fan fiction (especially author-self-insert “Mary Sue”³²¹ fan fiction and fan fiction that challenges sexual norms) is a quintessential example of fair use, even though such fiction arguably infringes (and debatably perverts) popular creative works.³²² Along those lines, one commentator has argued that the modern fair use scheme overly focuses on “economic and market incentives,” thereby ignoring “the interests of non-commercially focused women” that produce fan fiction and harming the “real public interests inherent in fan fiction’s creation.”³²³ Similarly, the noncommercial efforts of those who seek to preserve video games should be protected, in no small part because they protect the real public interest (however small) in those games. One might even argue that both fan fiction and decompilations are a form of resistance against massive corporate interests that dominate the ownership and control of popular creative works.³²⁴

It is certainly controversial to argue that fan activities—whether characterized as popularization of a video game or characterized as laborious preservation efforts through decompilations—are labor that injects some intangible added portion of a creative work into the commons. That said, a recognition that fans might invest some form of labor in a video game, and thereby have some interest related to that video game, arguably satisfies many of the justifications for private property. Lawrence Becker argued “that there are at least four sound and independent lines of general justification” philosophically justifying private property,³²⁵ and each of these four lines of general justification appear to at least preliminarily support the idea that fans might rightly have a property interest related to video games via their efforts with respect to those games.

³²⁰ Steven A. Hetcher, *Using Social Norms to Regulate Fan Fiction and Remix Culture*, 157 U. PA. L. REV. 1869, 1870 (2009).

³²¹ A “Mary Sue” is a “fictional character who is portrayed in an idealized way and lacks noteworthy flaws.” Anupam Chander & Madhavi Sunder, *Everyone’s a Superhero: A Cultural Theory of “Mary Sue” Fan Fiction as Fair Use*, 95 CAL. L. REV. 597, 599 (2007) (quoting *Mary Sue*, WIKIPEDIA, http://en.wikipedia.org/wiki/Mary_Sue_fanfiction (last visited Sept. 29, 2006)).

³²² See, e.g., *id.*; Rachel L. Stroude, Comment, *Complimentary Creation: Protecting Fan Fiction as Fair Use*, 14 MARQ. INTELL. PROP. L. REV. 191, 207–12 (2010); Hannibal Travis, *Reclaiming the First Amendment: Constitutional Theories of Media Reform: Of Blogs, eBooks, and Broadband: Access to Digital Media as a First Amendment Right*, 35 HOFSTRA L. REV. 1519, 1547–48, 1555 (2007); see also Jaqueline D. Lipton, *Copyright and the Commercialization of Fanfiction*, 52 HOUS. L. REV. 425 (2014).

³²³ Pamela Kalinowski, Note, *The Fairest of Them All: The Creative Interests of Female Fan Fiction Writers and the Fair Use Doctrine*, 20 WM. & MARY J. WOMEN & L. 655, 681 (2014).

³²⁴ See Elizabeth L. Rosenblatt, *Fair Use as Resistance*, 9 U.C. IRVINE L. REV. 377 (2019).

³²⁵ Lawrence C. Becker, *The Moral Basis of Property Rights*, 22 NOMOS: AM. SOC’Y FOR POL. & LEGAL PHIL. 187, 193 (1980).

The first line of justification, the “Locke-Mill version of the labor theory,” asserts that:

[W]hen labor produces something that would otherwise not have existed, and when that labor is beyond what morality requires of the laborer, and when others suffer no loss from being excluded from enjoying the fruits of the labor, then property rights for the laborer (in the fruits of the labor) can be justified.³²⁶

Fans of video games might be said to do this in two ways: both in terms of their overall interest and enjoyment in a game, and in terms of their efforts to preserve it. Fan investment in a video game through online discussion, fan art, promotion, and other forms of enjoyment could be viewed as a form of labor, creating something (so-called “hype”³²⁷ by a so-called “fandom”³²⁸) that otherwise would not have existed—and something that no individual had any moral obligation to create. These labor efforts can elevate an original creative work into something greater than it was before such labor, and such additional contributions arguably inure to the commons insofar as no particular fan owns such extension of the work.³²⁹ Similarly, the development of decompilations and other preservation efforts often entail substantial labor, creating something (e.g., code and compiled executables) that otherwise would not have existed, and which acts to preserve a creative work that, without intervention via such a decompilation project, might have been lost to time. The question of whether “others suffer no loss from being excluded from enjoying the fruits of” fan labor is an interesting one, in no small part due to the fact that fan labor is often for free and made available to the public at large, suggesting that the labor inures to the benefit of the commons.³³⁰ While one might certainly argue that a rights holder can be harmed by virtually any activity involving their creative work that they do not control (including the provisioning of some inconsistent property

³²⁶ *Id.*

³²⁷ A “situation in which something is advertised and discussed in newspapers, on television, etc. a lot in order to attract everyone’s interest.” *Hype*, CAMBRIDGE DICTIONARY, <https://dictionary.cambridge.org/us/dictionary/english/hype> [https://perma.cc/WTH2-4HNV].

³²⁸ A “group of fans of someone or something, especially very enthusiastic ones.” *Fandom*, CAMBRIDGE DICTIONARY, <https://dictionary.cambridge.org/us/dictionary/english/fandom> [https://perma.cc/C7KG-XB4V].

³²⁹ The fans might nonetheless have a copyright interest in their individual contributions. For instance, while a fan might debatably have a copyright interest in their effusive blog post about a video game, the resultant hype from the collective gestalt of multiple such blog posts (among other forms of hype) might be said to belong to the commons.

³³⁰ Becker, *supra* note 325. There are dozens of different decompilation projects on the internet, and all appear to be made public for free once completed. See *Decompiled Retail Console Games*, RETRO REVERSING, <https://www.retroreversing.com/source-code/decompiled-retail-console-games> [https://perma.cc/F5AA-J6LE].

interest to the commons), one might counter by arguing that the public benefits when fans invest their passion into a creative work they particularly enjoy, even if such activity is inconsistent with the rights holder's own property interests.

The second line of justification, the “labor-desert” version of labor theory, holds “that when labor produces something of value to others—something beyond what morality requires the laborers to produce—then the laborer desires some benefit for it.”³³¹ From this perspective, fans’ labor produces something of value in a variety of ways: by popularizing a video game that might otherwise be ignored by the world, by creating fan art and online discussions, and by preserving access to a game that might otherwise be lost to time through decompilation, or the like. A justification for some property interest in the commons might follow; after all, if the fans’ creation of something of value is not recognized and rewarded by inuring to their benefit vis-à-vis the commons, that value might unjustly benefit the original rights holder. Stated more bluntly, this perspective supports some property interest on behalf of fans, even when fans’ added value to a creative work is relatively minimal, simply because those fans have produced something of value that otherwise would not exist.

The third line of justification, the “complex of considerations of utility,” is “framed in terms either of economic efficiency or of political and social stability” and is “directed to the task of showing that a system of property rights is necessary for human happiness.”³³² It may fairly be argued that, in balancing the substantial labor of video game creators and labor enacted by fans that are willing to invest economically unreasonable amounts of time popularizing and preserving video games,³³³ such a balancing might—in limited circumstances—weigh in favor of providing those fans some minimal form of rights recognition, especially when those fans’ efforts can (for instance) keep the video game creators’ contributions from being lost forever and thereby potentially wasted. Regardless, allowing video game creators to monopolize the fruits of the efforts of fans could be viewed as wasteful and socially questionable. After all, fans were willing to revolt when rights holders purported to expand their property interest to include the fruits of fan efforts—the fan anger regarding Hasbro’s attempted revisions to the *Dungeons & Dragons* open game license is an excellent example of this dynamic.³³⁴

³³¹ Hughes, *supra* note 22, at 305 (citing Becker, *supra* note 325).

³³² Becker, *supra* note 325.

³³³ See *supra* Section I.B.

³³⁴ See Stephen Totilo, *Fan Revolt Rocks Dungeons & Dragons Scene*, AXIOS (Jan. 23, 2023), <https://www.axios.com/2023/01/23/dungeons-dragons-ogl-wizards-of-the-coast> [<https://perma.cc/9TU6-V24B>].

The fourth line of justification, the “argument from political liberty,” assumes that “some measure of acquisitiveness among humans is inevitable and goes on to assert that effective prohibition of all acquisitive activity would require a comprehensive and continuous abridgement of people’s liberties that is at best unjustifiable.”³³⁵ This prong is perhaps the most nebulous, in part because video games are far from crucial for the preservation of liberty. That said, one might fairly argue that a careful legal balancing of the interest of creative works’ rights holders and those creative works’ fans is necessary for the purposes of facilitating a just society. After all, one might argue, creators certainly have a right to profit when they generate creative works, but the public has an equal right to consume, enjoy, and ensure the ongoing availability of those works without such labor inuring to the sole benefit of the rights holder.

The idea that fans’ labor, via their engagement with a past creative work, might create a property interest that inures to the benefit of the commons also serves a broader goal: to promote creative engagement with intellectual products. Professor William Fisher has argued that, with respect to a judge’s hypothetical fair use analysis, “uses of copyrighted material that either constitute or facilitate creative engagement with intellectual products should be preferred to uses that neither constitute nor foster such engagement.”³³⁶ A fair use schema that provides some form of protection to fans (e.g., decompilation developers) may do precisely that.

Rather than viewing fan labor writ large from the perspective of a property right and the commons, one might instead view the aforementioned fair use arguments with respect to decompilation developers from the perspective of then-Professor Guido Calabresi and A. Douglas Melamed’s liability rules.³³⁷ Per Calabresi and Melamed’s framework, “[w]henever someone may destroy the initial entitlement if he is willing to pay an objectively determined value for it,” such an entitlement “is protected by a liability rule.”³³⁸ In turn, one might argue that video game creators’ interest in their games is at least partially destructible and thereby protected by a liability rule when fans’ effort to preserve those games (debatably a payment of value in terms of person-hours) is expended. In such a framework, video game rights holders might be analogized to property owners in the eminent domain context, forced to cede control of their property to reasonable compensation

³³⁵ Becker, *supra* note 325, at 193–94.

³³⁶ Fisher, *supra* note 22, at 1768.

³³⁷ See generally Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

³³⁸ *Id.* at 1092.

(albeit not in terms of money, but instead in terms of person-hours spent preserving a video game using modern hardware).³³⁹

From this liability rule perspective, one might also go as far as analogizing the fair use schema described herein as applied to video game decompilations to a form of copyright adverse possession. Analyzing the issue of real property abandonment, Professor Sally Brown Richardson has advocated for a relaxing of the possession requirement for adverse possession, arguing that doing so would provide “an effective tool in the fight to get empty properties back into commerce while still offering a temporal safety net to protect true owners.”³⁴⁰ While an abandoned video game might not necessarily invite a vicious cycle of “negative externalities” like “blight and crime,” as Professor Richardson suggests,³⁴¹ such abandonment is nonetheless economically wasteful insofar as a presumably enjoyable creative work might be lost forever. Providing decompilation developers—debatably an adverse possessor of video game copyright—a fair use defense against infringement can avoid this result, and in a manner that (unlike conventional adverse possession law) does not require title transfer.

That said, one problem with this labor-rule perspective is that it may be impermissibly difficult to define an objectively determined value for forcing a video game rights holder to cede some intangible aspect of their copyright. While one might analogize fan decompilation efforts to a form of value in terms of person-hours, such value is not provided to the rights holder as compensation but rather inures to the benefit of the public at large. Moreover, it is not particularly clear what quantity of such labor would be sufficient. For example, if a fan gives up after coding fifty percent of a decompilation, is this partial completion sufficient payment of an objectively determined value for the original copyrighted work?

C. *The Boundaries and Complexities of a Fair Use Defense for Video Game Preservation*

The above analysis does not counsel for all decompilations being considered per se fair use. Indeed, the mere existence of some intangible property interest in the commons does not, standing alone, necessarily merit a finding of fair use. Rather, the question of whether a particular decompilation should be protected as fair use arguably hinges on whether

³³⁹ See *id.* at 1106–07.

³⁴⁰ Sally Brown Richardson, *Abandonment and Adverse Possession*, 52 HOUS. L. REV. 1385, 1393 (2015).

³⁴¹ *Id.* at 1388.

that decompilation acts as a way to protect the public's interest in the commons by preserving access to a creative work (e.g., a video game) that has firmly rooted itself in the cultural matrix. For instance, while a fan decompilation might be viewed as an infringement of a video game, particularly under the understanding of the copyrightability of video games advocated above, that fan decompilation might also be understood to be fair use when it protects the public's legitimate property interest in the video game against technological obsolescence and/or breakdown.

As a practical matter, virtually all forms of copyrightable works are vulnerable to becoming unavailable. A countless number of original, creative, and copyrightable works (e.g., doodles on sticky notes) have been permanently destroyed (e.g., thrown in the trash shortly after creation) such that they are no longer available to the world. Moreover, creative works can become unavailable because they are no longer economically worthwhile to sell. For instance, Paul Heald has, based on an analysis of books available for purchase on Amazon and their publication dates, argued that the availability of works can vary over time due to their copyright status such that, “[s]hortly after works are created and propertized, they tend to disappear from public view only to reappear in significantly increased numbers when they fall into the public domain and lose their owners.”³⁴² In other words, there is no guarantee that popular copyrighted works of any form remain available for consumption at all times.

That said, and as discussed above, video games are unique in that, even postpurchase, they can become unavailable rapidly because of fundamentally technological reasons.³⁴³ Absent fire, flood, book-eating worms,³⁴⁴ or the like, the purchaser of a book can generally expect that book to remain readable for decades, if not centuries. And, even physical degradation of paper is not much of a risk: Project Gutenberg preserves thousands of novels as e-books for future enjoyment, and entirely for free.³⁴⁵ Similarly, the storage media of movies and music might degrade over time, but concerted efforts are ongoing to preserve these works using modern techniques.³⁴⁶ In contrast, the creative output of video games is intimately tied with hardware, meaning that a video game cannot be

³⁴² Paul J. Heald, *How Copyright Keeps Works Disappeared*, 11 J. EMPIRICAL LEGAL STUD. 829, 830 (2014).

³⁴³ See *supra* Section I.C.

³⁴⁴ A surprisingly significant concern. See *Library Preservation and Conservation Tutorial: Pest Control*, CORNELL UNIV. LIBR., <https://chinapreservationtutorial.library.cornell.edu/content/pest-control> [<https://perma.cc/7ZCE-ZPD7>].

³⁴⁵ PROJECT GUTENBERG, <https://www.gutenberg.org> [<https://perma.cc/W68J-SNZG>].

³⁴⁶ See, e.g., *The Film Preservation Guide*, THE NAT'L FILM PRES. FOUND., <https://www.filmpreservation.org/preservation-basics/the-film-preservation-guide> [<https://perma.cc/SH3D-RMZY>].

enjoyed without the continued availability of both the game and the original hardware (e.g., the game console),³⁴⁷ and such hardware can become quickly antiquated (if not outright unusable).³⁴⁸ This also means that inaction or foot-dragging by a rights holder of a video game can result in that video game being all but inaccessible to modern audiences due to hardware obsolescence.³⁴⁹ This intimate relationship between video games and their accompanying hardware means that a video game can become entirely unavailable due to technological limitations and/or obsolescence outside of the control or involvement of the video game creator and the owner. As a simple example of such a dynamic, if a consumer's Sega Genesis video game console dies, that consumer ceases to be able to enjoy the Sega Genesis games they own, even if the games themselves are in perfect condition. Video games also can have a different consumption pattern as compared to other forms of media: while a consumer might enjoy a movie in a single sitting and a book over the course of a few days, video games can be intended to be played on a daily basis,³⁵⁰ suggesting that the regular availability of such video games is possibly a more pressing concern here than for other forms of creative works.

In the rare instance, when other forms of creative work become unavailable due to technological obsolescence, fan preservation efforts can occur. Take, for example, the *Twin Peaks Visual Soundtrack*, “which pairs Angelo Badalamenti’s *Twin Peaks* score with ‘silent video footage shot by a Japanese TV crew visiting the Snoqualmie, WA locations where the series was shot.’”³⁵¹ The *Twin Peaks Visual Soundtrack* was only released on LaserDisc in Japan (and was never released on DVD or subsequent video formats), rendering the LaserDisc extremely valuable—that is, until fans made bootleg DVDs and, eventually, released the entire video on YouTube.³⁵² In other words, in a circumstance where an original rights holder apparently had little interest in preserving access to their creative work and seemingly stood ready to allow the creative work to become unavailable due to technological obsolescence, fans stepped in and used modern technology to preserve that work for future generations. Thankfully, such preservation efforts do not require the sort

³⁴⁷ See *supra* Section I.C.

³⁴⁸ See *id.*

³⁴⁹ See *id.*

³⁵⁰ For example, some games feature daily challenges. *Daily Challenge*, GIANT BOMB, <https://www.giantbomb.com/daily-challenge/3015-8710/games> [<https://perma.cc/39VN-5L4V>].

³⁵¹ Matt Singer, *20 Laserdiscs That Are Still Extremely Valuable*, SCREEN CRUSH (Feb. 24, 2020), <https://screencrush.com/most-valuable-laserdiscs/> [<https://web.archive.org/web/20230416213250/https://screencrush.com/most-valuable-laserdiscs/>].

³⁵² *Id.*

of lengthy labor required to program decompilations: old video formats can be somewhat easily “ripped” such that the stored content can be stored on new hardware and in new formats.³⁵³

In practice, the fair use defense advocated herein requires a careful balancing of the concepts of availability and preservation. This means that the fair use defense proposed herein is similar to many other fair use defenses in that it is far from a bright-line rule.

Consider, for example, the question of availability. The definition of unavailable might vary from person to person and may hinge on practical considerations. For example, as of September 2023, a fan could use online auction websites to purchase a complete, in-box Nintendo 64 console and copy of *Super Mario 64* for around \$340³⁵⁴ whereas, to do the same with the relatively rarer game *Clay Fighter Sculptor’s Cut*, the same fan would need to spend around \$5,422.³⁵⁵ This financial conundrum could even originate where a rights holder purports to preserve a video game. For instance, a rights holder might offer new, modern-hardware-ready copies of their once-popular game for sale for a million dollars, rendering it effectively inaccessible to all but the ultra-wealthy.³⁵⁶ In either circumstance, whether one defines either game as available or unavailable becomes, in part, a question of whether that unavailability is a question of absolute availability (i.e., available at all to at least one person) versus reasonable availability (i.e., available to the average consumer of average means). The latter approach is a much more reasonable approach in this context: after all, the fair use defense proposed herein is rooted in the public’s interest in the commons, not merely the interest of the rare ultra-wealthy fan.

Relatedly, the question of availability may hinge on how technological obsolescence is defined. Is the Nintendo 64 technically obsolete because, absent additional hardware, it connects to a television using now-antiquated composite cables or a radio frequency

³⁵³ See *Ripping*, WIKIPEDIA, <https://en.wikipedia.org/wiki/Ripping> [<https://perma.cc/J4R7-7J4J>] (June 15, 2023, 11:16 PM).

³⁵⁴ This is the sum of \$221.99 for the console and \$117.88 for the game. See *Nintendo 64 System*, PRICE CHARTING, <https://www.pricecharting.com/game/nintendo-64/nintendo-64-system> [<https://perma.cc/L7RJ-KZ27>]; *Super Mario 64*, PRICE CHARTING, <https://www.pricecharting.com/game/nintendo-64/super-mario-64> [<https://perma.cc/H79W-C44B>].

³⁵⁵ See *Nintendo 64 System*, PRICE CHARTING, <https://www.pricecharting.com/game/nintendo-64/nintendo-64-system> [<https://perma.cc/TP9S-K6WA>]; *Clay Fighter Sculptors Cut*, PRICE CHARTING, <https://www.pricecharting.com/game/nintendo-64/clay-fighter-sculptors-cut> [<https://perma.cc/62DD-7XZ9>].

³⁵⁶ Relatedly, some game companies have been criticized for the high pricing of the ports of old games. See Jason Schreier, *Square Enix Defends the Surprisingly High Pricing of Their iOS/Android Games*, KOTAKU (Oct. 9, 2012), <https://kotaku.com/square-enix-defends-the-surprisingly-high-pricing-of-th-5950253> [<https://perma.cc/UD34-HDL2>].

modulator?³⁵⁷ Given that some retro gamers actively seek out and preserve cathode ray tube televisions with such inputs,³⁵⁸ the answer to that question might, as was the case above regarding pricing, become a question of absolute availability versus reasonable availability. As was the case above, the latter approach is more reasonable, given that the fair use defense presented herein is rooted in the interest of the public, not the rare avid collector of old technology.

This concept of availability provides rights holders a clear path for protecting themselves against decompilations. After all, if a rights holder continues to make their popular video game available in some form or fashion, then fans scarcely have a justification for attempting to preserve that game. On the other hand, the rights holder that allows their popular video game to become unavailable risks fans leveraging their property interest, rooted in the commons, to preserve access to that game.

That said, consider the question of faithful preservation. Rights holders can preserve access to popular video games in a number of ways, and not all of those ways may be sufficient from the perspective of fans (who, as discussed above, can be difficult to fully satisfy).³⁵⁹ For example, a rights holder might half-heartedly preserve a once-popular game on new hardware, providing an overall experience so fraught with deficiencies that the preserved game is a downgrade from the original game.³⁶⁰ In a hypothetical lawsuit between such a rights holder and a fan claiming that their decompilation of such a game is protected by fair use, whether the decompilation is in fact protected by fair use might hinge on whether the public has a right, via their own labor as reflected in the commons, to a faithful reproduction of the game, and how far afield the half-heartedly preserved game is from such a faithful reproduction. In practice, these considerations are highly fact-specific, and can vary greatly based on the video game in question.

The video game *Body Harvest*, once sold for the Nintendo 64 video game console,³⁶¹ has never been rereleased for modern hardware, and in general features many gameplay and graphics limitations that were a

³⁵⁷ See *How to Connect Your N64 to a TV*, N64 SQUID, <https://n64squid.com/faq/how-to-connect-a-n64-to-a-tv> [<https://perma.cc/LK2S-VTJ2>].

³⁵⁸ See Ryan Houlihan, *Gamers Are Rushing to Scoop Up Retro TVs. Here's What to Look For*, INPUT (Mar. 12, 2021), <https://www.inverse.com/input/guides/gamers-are-rushing-to-scoop-up-retro-tvs-heres-what-to-look-for> [<https://perma.cc/N9VD-NMGQ>].

³⁵⁹ See *supra* Section I.D.2.

³⁶⁰ This is arguably what happened with the 2018 port of *Chrono Trigger*. See Jason Schreier, *Oh No, Chrono Trigger Looks Awful on PC*, KOTAKU (Feb. 27, 2018), <https://kotaku.com/oh-no-chrono-trigger-looks-awful-on-pc-1823364933> [<https://perma.cc/U4KQ-7M37>].

³⁶¹ Zoey Handley, *Body Harvest for N64 Is Just a Maelstrom of Excellence*, DESTRUCTOID (Oct. 2, 2021), <https://www.destructoid.com/by-the-wayside-body-harvest-n64> [<https://perma.cc/NTR3-6Y23>].

product of the processing limitations of the Nintendo 64.³⁶² That said, *Body Harvest* has been “jank[ily]” decompiled by a lone programmer.³⁶³ This decompilation of *Body Harvest* arguably serves to preserve the availability of that title on modern hardware in a circumstance where the original developers of that game seemingly have no interest in doing so. One might debate whether the public has a right, through the commons, to preserve *Body Harvest* in the first place: after all, many readers might have never heard of the game, suggesting a somewhat limited presence on Gordon’s cultural matrix. That said, such an argument would seemingly impose an unfairly high popularity requirement on the video game: Gordon’s cultural matrix does not require worldwide popularity. Even if *Body Harvest* was meaningful to a handful of people, an argument could fairly be made that those fans reasonably expect, by virtue of their fan investment or otherwise, the game to be preserved, such that a decompilation developer has a right, via the commons, to endeavor to preserve that game.

In contrast, the aforementioned fair use defense would likely not provide the developers of the decompilation of *Super Mario 64* a defense. As already indicated above, Nintendo already sells a version of *Super Mario 64* on modern hardware, even though some commentators assert that other emulated versions of the title perform better.³⁶⁴ Because Nintendo is already providing access to *Super Mario 64* on its modern video game console, one can scarcely argue that it is failing to provide access to the video game. It thus becomes quite difficult to argue that the *Super Mario 64* decompilation is an attempt by the public to maintain access to that title. One might quibble that Nintendo’s own version of the game is technically inferior to that provided by fans,³⁶⁵ but this technological quibbling scarcely provides the justification for finding a decompilation to be fair use.

D. *An Alternative to Fair Use: Compulsory Licensing*

One alternative to the above fair use–based approach to protecting decompilations is a compulsory licensing model.³⁶⁶ Rather than forcing

³⁶² See *id.*

³⁶³ jaytheham, *Body-harvest-decompilation*, GITHUB, <https://github.com/jaytheham/body-harvest-decompilation> [https://perma.cc/E32P-WT6S].

³⁶⁴ Nerrel, *Mario 3D All-Stars and the Case for Competition*, YOUTUBE (Oct. 31, 2020), <https://www.youtube.com/watch?v=N0d82ZJ4sd4> [https://web.archive.org/web/20230314165628/https://www.youtube.com/watch?v=N0d82ZJ4sd4].

³⁶⁵ *Id.*

³⁶⁶ See, e.g., Jethro Dean Lord IV, Comment, *Would You Like to Play Again? Saving Classic Video Games from Virtual Extinction Through Statutory Licensing*, 35 SW. U. L. REV. 405 (2006).

fans to defend their decompilations by invoking fair use upon receipt of a copyright infringement lawsuit, it might instead be preferable to require that rights holders provide a license to decompilation developers.

Compulsory licenses can act as a remedy for antitrust violations,³⁶⁷ and in some cases can increase competition.³⁶⁸ Though arguably an abrogation of a rights holder's right to control the licensing of their own work, there are many appealing benefits to a compulsory licensing model as applied to the world of video game decompilations. First, this approach might allow decompilation developers to avoid copyright infringement lawsuits: fair use is a defense to copyright infringement that is generally invoked once a lawsuit has already been brought,³⁶⁹ whereas a compulsory license might discourage that lawsuit from being brought in the first place. Second, a compulsory licensing model may be beneficial where the identity of a rights holder of a video game might be unclear. For instance, even if a decompilation developer has no idea who legally owns the copyright(s) to a particular video game (such as is the case with the video game *No One Lives Forever*),³⁷⁰ a compulsory licensing model might allow them to proceed with decompilation development, safely assured that—whoever owns the copyright—the rights holder is required to provide a license to the developer. Third, a compulsory licensing model could be designed in a manner which provides subtle market pressure for rights holders to continue making their creative works available to the general public. For example, compulsory licenses could be provided to decompilation developers only if a rights holder fails to sell a particular video game within a certain time period, thereby providing a strong incentive for those rights holders to continue to sell their games to willing buyers.

That said, from a practical perspective, compulsory licenses are a somewhat less likely form of protection for fans making decompilations. After all, while fair use might be crafted through judicial decisions,³⁷¹ a comprehensive compulsory licensing scheme would likely require

³⁶⁷ See, e.g., *United States v. Nat'l Lead Co.*, 332 U.S. 319 (1947); see also Comment, *Compulsory Patent Licensing by Antitrust Decree*, 56 YALE L.J. 77 (1946).

³⁶⁸ See George E. Frost, S. Chesterfield Oppenheim & Neil F. Twomey, *Compulsory Licensing and Patent Dedication Provisions of Antitrust Decrees—A Foundation for Detailed Factual Case Studies*, 1 PAT., TRADEMARK & COPYRIGHT J. RSCH. & EDUC. 127 (1957).

³⁶⁹ Along these lines, the Copyright Alliance cautions laymen that fair use is an “affirmative defense that can be raised in response to claims by a copyright owner that a person is infringing a copyright.” *What Is Fair Use?*, COPYRIGHT ALLIANCE, <https://copyrightalliance.org/faqs/what-is-fair-use> [<https://perma.cc/B9QA-YBGM>].

³⁷⁰ Hamilton, *supra* note 99.

³⁷¹ Though, as noted above, an empirical study of the doctrine revealed that even Supreme Court and renowned circuit court opinions had little impact on the “mass of . . . fair use case law.” Beebe, *supra* note 275, at 622, 622 n.239.

extensive and time-consuming legislative action. The likelihood of that legislative action on behalf of a small number of decompilation developers seems unlikely.

CONCLUSION

Stepping momentarily away from the particular issues of copyrightability and fair use, the aforementioned tension between the need to fully protect the creative labor inherent in video games and the desire to allow passionate fans to preserve access to video games that might otherwise be lost to time underscores the larger question of the extent of the public's right to expect that a creative work remains available for enjoyment in the future.

Even historically significant creative works can be lost to time. Due to fire, decay, and similar destructive forces, only fourteen percent of American silent feature films survive as originally released, with another eleven percent surviving in "less-than-ideal" conditions.³⁷² As such, no matter how impactful those films were, no matter how important they were to their fans, and no matter how much labor went into their creation, those creative labors may be assumed to be lost forever. The same might similarly be said for Terry Pratchett's unpublished literary works (which were crushed by a steamroller per the late author's wishes),³⁷³ dozens of episodes of the television show *Doctor Who*,³⁷⁴ and Sergei Prokofiev's opera *The Giant* (which was composed when he was nine years old and was performed privately by his family).³⁷⁵

With the advent of digital technology and cheap storage devices, consumers are increasingly fighting back against the risk of such loss. Particularly, as mass media (and, in particular, digital storage technology) has become increasingly affordable, so-called "data hoarders" have begun to laboriously collect all forms of creative work, no matter how small, including everything from audio recordings of the 1960s radio show *Top of the Pops* to video recordings of old *CBS Evening News* broadcasts.³⁷⁶ Although often copyright infringing, these collections are routinely

³⁷² DAVID PIERCE, THE SURVIVAL OF AMERICAN SILENT FEATURE FILMS: 1912–1929, at 21 (2013), https://www.loc.gov/static/programs/national-film-preservation-board/documents/pub158.final_version_sept_2013.pdf [<https://perma.cc/GZ8D-DY7B>].

³⁷³ *Terry Pratchett's Unpublished Works Crushed by Steamroller*, BBC NEWS (Aug. 30, 2017), <https://www.bbc.com/news/uk-england-dorset-41093066> [<https://perma.cc/GH6H-4AVK>].

³⁷⁴ *The Missing Episodes*, BBC, <https://www.bbc.co.uk/doctorwho/classic/episodeguide/missingepisodes.shtml> [<https://perma.cc/6URA-G7Z3>].

³⁷⁵ James Bennett II, *5 Musical Works Time Left Behind*, WQXR (Dec. 7, 2016), <https://www.wqxr.org/story/5-musical-works-time-left-behind> [<https://perma.cc/TQ3L-H77J>].

³⁷⁶ Rutland, *supra* note 17.

provided online for the world to enjoy for free.³⁷⁷ For instance, thanks in no small part to such digital hoarding efforts, anyone around the world can listen to all three hours of the May 7, 1977, *American Top 40* broadcast as if it were being broadcast today.³⁷⁸

Given such technological developments, the public's expectation of the availability of a creative work has arguably changed. While a limited number of fans might have recorded and thereby preserved the May 7, 1977, *American Top 40* broadcast for future enjoyment, the average fan in 1977 might have expected to hear and enjoy that broadcast only once in their lifetime. Now, digital technology and the internet make that broadcast available to the world at any time. This has significant ramifications for rights holders: for example, even if an original rights holder wishes to allow their once-popular creative work to be lost to time, the likelihood they can do so is quite low given the voracious collective appetite of data hoarders. In other words, and returning back to the language of property interests, once a creator has released a creative work to the world, the public may develop an expectation—fostered in part by modern advances in technology—that the work remain accessible for consumption. Such an expectation means that, if a rights holder is unwilling or unable to preserve a creative work, some portion of the public may believe it has a right—possibly one rooted in the commons—to preserve the creative work themselves.

Video game decompilation developers operate in view of such a modern expectation of the availability of a creative work. Video game fans—armed with powerful but consumer-grade computing hardware, decompilation tools, and adequate know-how³⁷⁹—can ensure that a game remains available to the world, whether or not the original rights holder is willing or able to do so. In this way, some video game fans seem to expect that they have a right, rooted in the commons or otherwise, to ensure that video games remain available and playable independent of changes in technology, particularly in circumstances where rights holders fail to preserve access to those games themselves.

The approach herein, advocating for a recognition of copyright protection for the creative labor embodied in video games (tempered by a recognition that the public might have a fair use right to preserve such video games), attempts to strike a balance between those decompilation developers and the interests of video game rights holders. On the one hand, recognizing video game rights holders' interest in their video games as more than the mere assets of those video games helps protect the full

³⁷⁷ See *id.*

³⁷⁸ WALLWALKER44, *American Top 40 (May 7, 1977)*, INTERNET ARCHIVE (Aug. 27, 2022), <https://archive.org/details/american-top-40-week-of-5-7-77> [<https://perma.cc/F7M7-BF73>].

³⁷⁹ See generally *Beginners Guide to Reverse Engineering*, *supra* note 4.

spectrum of original creative labor input into those games. On the other hand, a fair use defense afforded to video game decompilation developers recognizes the growing modern expectation that fans can have a right to preserve those works for future generations.

It remains to be seen whether this growing preservationist trend is economically or socially positive. One can scarcely complain about great creative works being preserved for future generations. That said, the corpus of creative work that needs to be preserved grows every year as more creation occurs, and even great new creative works could quickly be buried in a veritable sea of older preserved content. And, while nostalgia for older video games can “serve to orient people closer to their ideal self,” can contribute to “self-continuity,” and can “have an impact on how people see and identify themselves,”³⁸⁰ the labor cost of preserving video games in service of such nostalgia could theoretically be devoted elsewhere, such as to the creation of entirely new creative works. To pave the way for amazing new creative works, the public might need to become comfortable with the idea that some creative works might need to be allowed to gracefully fade away in history as little more than a fond memory.

³⁸⁰ Tim Wulf, Nicholas D. Bowman, Diana Rieger, John A. Velez & Johannes Breuer, *Video Games as Time Machines: Video Game Nostalgia and the Success of Retro Gaming*, 6 MEDIA & COMMUN 60, 62 (2018).