



Volume 68 | Issue 4

Article 3

12-1-2023

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Recommended Citation

Ryan Graham, *Lighting the Fuses: The Third Circuit Loads a Volley Against Interface Copyright Ability in Pyrotechnics v. XFX*, 68 Vill. L. Rev. 667 (2023).

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Notes

LIGHTING THE FUSES: THE THIRD CIRCUIT LOADS A VOLLEY AGAINST INTERFACE COPYRIGHT ABILITY IN *PYROTECHNICS V. XFX*

RYAN M. GRAHAM*

“Considering the exclusive right to invention as given not of natural right, but for the benefit of society, I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not.”¹

I. SMOKE IN THE AIR: THE UNANSWERED QUESTIONS OF COPYRIGHTABILITY IN SOFTWARE FOLLOWING *GOOGLE V. ORACLE*

The American love of fireworks dates back to the very birth of our nation, when fireworks were used to celebrate the first anniversary of the Declaration of Independence in the middle of the Revolutionary War on July 4, 1777, in Philadelphia.² Similarly, American protections for original works of authorship have origins in our nation’s founding: the Constitution vests the power to create such law to Congress in Article I.³

Copyright is an old principle of law, but it has persisted into the modern era of technology and courts have struggled to synthesize long-held principles with a world of computers that becomes more complex each day.⁴ Some tenets of copyright jurisprudence have been longstanding, such as the idea-expression dichotomy and the doctrine of merger, which help courts draw the line between copyrightable expressions

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1. Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813), <https://founders.archives.gov/documents/Jefferson/03-06-02-0322> [<https://perma.cc/77S8-KBGP>].

2. See Letter from John Adams to Abigail Adams (July 3, 1776), <https://www.masshist.org/digitaladams/archive/doc?id=L17760703jasecond> [<https://perma.cc/MFU9-MPZ2>] (describing how John Adams predicted and hoped the enthusiastic festivities devoted to the celebration of the Declaration of Independence, which included fireworks displays, would become an annual tradition in perpetuity).

3. See U.S. CONST. art. I, § 8, cl. 8. (providing Congress with the power to grant authors and inventors exclusive rights in their writings and discoveries for limited times); see also *Overview of Congress’s Power Over Intellectual Property*, CONST. ANNOTATED, https://constitution.congress.gov/browse/essay/artI-S8-C8-1/ALDE_00013060/ [perma link unavailable] (last visited Sept. 20, 2023) (describing the historical origins of copyright law).

4. See Leading Case, *Copyright Act of 1976—Intellectual Property—Fair Use—Google LLC v. Oracle America, Inc.*, 135 HARV. L. REV. 431, 431 (2021) (noting copyright law risks becoming outdated as technology rapidly evolves).

and uncopyrightable ideas.⁵ In light of new technologies, courts have struggled to adapt these longstanding and foundational principles of copyright law to complex works of the digital era.⁶

The general principle of copyrightability often serves the purpose of maintaining a resolute separation between works subject to the protections of copyright and those protected by patent law.⁷ Copyright protects original works of authorship, while patents protect ideas like inventions and processes.⁸ Additionally, obtaining a patent is a more rigorous process than securing a copyright because patent applicants must demonstrate the utility, novelty, and non-obviousness of their idea.⁹ Patents confer the exclusive rights of making, using, and selling the patented idea while copyrights grant exclusive rights of reproduction, adaptation, distribution, and public performance of the copyrighted work.¹⁰ Critically, the periods of protection differ, with a utility patent lasting only twenty years compared to a copyrighted work's protection for the entire life of the author plus seventy years.¹¹ Historically, patent and copyright

5. See, e.g., *Baker v. Selden*, 101 U.S. 99, 102 (1879) (establishing the idea-expression dichotomy); *Morrissey v. Procter & Gamble Co.*, 379 F.2d 675, 678 (1st Cir. 1967) (explaining the merger doctrine). For further discussion of the idea-expression dichotomy, see *infra* notes 36–41 and accompanying text. For further discussion of the merger doctrine, see *infra* notes 42–46 and accompanying text.

6. See, e.g., Ben Depoorter, *Technology and Uncertainty: The Shaping Effect on Copyright Law*, 157 U. PA. L. REV. 1831, 1836 (2009) (arguing new technological breakthroughs create difficult questions in copyright law). Depoorter argues copyright law, by nature, is plagued by its relative inflexibility to the evolving technology it governs. *Id.*

7. See MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 2A.07[B][2] (Matthew Bender rev. ed. 2023) (citing *Baker*, 101 U.S. at 104) [hereinafter NIMMER ON COPYRIGHT] (discussing the concern of overlap between copyright and patent law). The authors describe how the *Baker* Court was concerned “that a clever plaintiff might be able to take advantage of copyright’s less stringent entry requirements and scrutiny in order to obtain protection and thereby circumvent the threshold requirements of patent law to obtain the equivalent under copyright law.” *Id.*

8. See U.S. COPYRIGHT OFF., COPYRIGHT BASICS (CIRCULAR 1) 2 (2021), <https://www.copyright.gov/circs/circ01.pdf> [<https://perma.cc/Q6ZY-87MG>] [hereinafter COPYRIGHT BASICS] (providing a basic overview of what is covered by copyright law); U.S. COPYRIGHT OFF., WORKS NOT PROTECTED BY COPYRIGHT (CIRCULAR 33) I (2021), <https://www.copyright.gov/circs/circ33.pdf> [<https://perma.cc/6RXU-MVWR>] [hereinafter WORKS NOT PROTECTED BY COPYRIGHT] (enumerating items that are explicitly outside the purview of copyright protection); see also *infra* notes 168–78 and accompanying text for further discussion of why patentable ideas are separated from copyrightable works of authorship.

9. See Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719, 721 (2009) (describing the relative ease of claiming a copyright compared to claiming a patent). Fromer describes that authors seeking a copyright need only establish they created a copyrightable work “fixed in a tangible form.” *Id.*

10. See PETER S. MENELL, MARK A. LEMLEY, ROBERT P. MERGES & SHYAMKRISHNA BALGANESH, *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 34 (2022) (describing the exclusive rights of different intellectual property protections).

11. See *id.* (describing the difference in duration of different intellectual property). The authors state: “[i]n general, copyrights are easier to secure and last substantially longer than patents.” *Id.* at 37. This is true of design patents as well, which the law protects for only fifteen years; however, the subject matter discussed in this Note pertains to utility patents. *Id.* at 34.

law governed entirely separate types of works, but recently new technologies have eroded courts' ability to maintain the distinctions between patent and copyright law.¹²

One of the most persistent issues at the nexus of rapid technological advances and copyright protection is the copyrightability of different types of computer code.¹³ Code is at the core of our computer-fueled world because it dictates the functions, images, abilities, and potential of computers.¹⁴ As software code has evolved from its origins of simple binary ones and zeroes, courts have faced difficulty differentiating between types of code that can be copyrighted as original works of authorship and those which cannot.¹⁵

Recently, in *Google LLC v. Oracle America, Inc.*,¹⁶ the Supreme Court handed down a landmark decision concerning the development of copyright law in the technology industry, holding that Google's reuse of Oracle's JavaSun application programming interface (API) on its Android smartphone platform, to encourage programmers to write original Android programs, did not amount to copyright infringement.¹⁷ An API is a programming tool that enables programmers to call upon prewritten computing tasks for use in their own programs—it functions as a helpful digital librarian that quickly retrieves existing code from an existing library of programming functions.¹⁸ Despite *Google's* significance, the Court left a critical question unanswered: was Oracle's JavaSun API copyrightable in the first place?¹⁹ Volumes of scholarly

12. See Viva R. Moffat, *Mutant Copyrights and Backdoor Patents: The Problem of Overlapping Intellectual Property Protection*, 19 BERKELEY TECH. L.J. 1473, 1475–76 (2004) (describing the historical strict separation between the realms of intellectual property law). Moffat describes the problem of recent attempts to gain extended protections through copyright for patentable subject matter as “backdoor patents.” *Id.*

13. See generally NIMMER ON COPYRIGHT, *supra* note 7, § 2A.10 (describing the challenges of adapting copyright law to computer programs and software).

14. See *id.* § 2A.10[B][1]–[4] (describing the different types of computer code and how copyright law is applied to each). The authors identify four distinct types of computer code: source/object code, operating systems, microcode, and APIs. *Id.*

15. See, e.g., Depoorter, *supra* note 6, at 1846 (describing the hesitancy of courts to adapt legal standards to technological changes); see also NIMMER ON COPYRIGHT, *supra* note 7, § 2A.07[D][3][b] (discussing the challenging nature of software in copyrightability jurisprudence).

16. 141 S. Ct. 1183 (2021).

17. See *id.* at 1190 (delivering the holding of the Court's decision); Mark A. Lemley & Pamela Samuelson, *Interfaces and Interoperability After Google v. Oracle*, 100 TEX. L. REV. 1, 1 (2021) (summarizing the holding in *Google*).

18. See Deborah F. Buckman, Annotation, *Copyright Protection of Computer Programs*, 180 A.L.R. FED. 1, 9 (2022) (defining an API).

19. See Carrie Richey, *Supreme Court Answers Some Copyright Questions, Leaves Others Unsettled*, in *Google v. Oracle Decision*, NAT'L L. REV. (May 19, 2021), <https://www.natlawreview.com/article/supreme-court-answers-some-copyright-questions-leaves-others-unsettled-google-v> [<https://perma.cc/WU8J-8KJN>] (summarizing the repercussions of the questions the Supreme Court did not address in *Google*). Richey states: “[b]y sidestepping this question the tech industry thought would be decided once and for all means it will certainly come up again in future IP litigation.” *Id.* See also Lemley & Samuelson, *supra* note 17, at 2 (noting that the holding in *Google* sidestepped the issue of JavaSun's API copyrightability).

articles and amicus briefs submitted to the Court argued it is not, but the *Google* Court declined to give a clear answer despite an opportunity to definitively address the copyrightability of this technology.²⁰ *Pyrotechnics Management, Inc. v. XFX Pyrotechnics LLC*,²¹ a recent Third Circuit Court of Appeals case, could constitute the long-sought resolution to this decades-old question.²² In *Pyrotechnics Management*, the Third Circuit vacated a preliminary injunction issued for alleged infringement of a digital message format used in fireworks ignition control panels, holding the message format was an uncopyrightable idea and the messages themselves failed to satisfy the requirement of originality.²³

By holding that Appellee's fireworks launch protocol system was uncopyrightable, this Note argues the Third Circuit's decision in *Pyrotechnics Management* is significant for two reasons. First, the Third Circuit correctly applied longstanding principles of copyrightability such as the idea-expression rule, and to a lesser extent, the merger doctrine, to purely functional computer code.²⁴ Second, the Third Circuit furthered critical policy goals of copyright in software, such as the distinction between patent and copyright and the preservation of interoperability.²⁵

Part II of this Note provides the background of copyrightability jurisprudence in the context of computer software as it developed in the late twentieth and early twenty-first centuries. Part III discusses the factual context and procedural history of the Third Circuit's *Pyrotechnics Management* decision. Part IV explains the reasoning behind the Third Circuit's decision to reverse the district court's grant of a preliminary injunction. Part V critically analyzes the Third Circuit's holding and argues the Third Circuit correctly applied copyrightability principles and provided a workable analogical framework for future computer copyrightability cases. Finally, Part VI discusses the potential impact of the *Pyrotechnics Management* decision on copyrightability standards, competition in the technology markets, and artificial intelligence.

20. See *Google*, 141 S. Ct. at 1211 (Thomas, J., dissenting) (criticizing the majority's refusal to address the copyrightability of the JavaSun API).

21. 38 F.4th 331 (3d Cir. 2022).

22. See Michael Risch, *Waiting for Google*, WRITTEN DESCRIPTION (Mar. 17, 2021, 11:39 AM), <https://writtendescription.blogspot.com/2021/03/waiting-for-google.html> [<https://perma.cc/L87H-DP9R>] (describing how *Pyrotechnics Management* could provide answers to whether interfaces and APIs are copyrightable).

23. See Nitya Anand, *Copyright Claim in Digital Message Format Fizzles Out*, IP UPDATE (July 14, 2022), <https://www.ipupdate.com/2022/07/copyright-claim-in-digital-message-format-fizzles-out/> [<https://perma.cc/QG2X-DJAD>] (summarizing the holding in *Pyrotechnics Management*).

24. For further development of this argument, see *infra* notes 152–67 and accompanying text.

25. For further development of this argument, see *infra* notes 168–81 and accompanying text.

II. SCATTERED VOLLEYS: THE PIECEMEAL ORIGINS OF SOFTWARE COPYRIGHTABILITY JURISPRUDENCE

English law established the foundations of American copyright law with the 1709 Statute of Anne, creating protections for the encouragement of learning and “grant[ing] authors the exclusive right to copy their works for an initial term of fourteen years, renewable for another term of fourteen years if the author was still living.”²⁶ The drafters of the United States Constitution preserved this English Common Law principle as an enumerated power of Congress.²⁷ As the creations of authors evolved throughout the centuries, so did the judicial doctrines that protect them.²⁸

Copyright is a complex area of law containing many conceptual layers that intersect, overlap, and interact with one another.²⁹ The idea-expression dichotomy, the merger doctrine, and the bar on copyrighting methods of operation are each relevant factors to addressing the question of the copyrightability of APIs.³⁰ Section A briefly defines the copyright doctrines at issue in *Pyrotechnics Management*. Section B describes the judicial history of each concept and how each contributes to the reasoning used by the Third Circuit in *Pyrotechnics Management*. Finally, Section C introduces and describes the questions left unanswered by the Supreme Court’s decision in *Google*.

A History of Copyright Law and Principles

Copyright protections exist to promote creativity and the spread of the works resulting from such creativity, but the line between what should be protected and what should not is not always clear.³¹ Courts analyzing

26. See *English Origins of Intellectual Property Law*, CONST. ANNOTATED, https://constitution.congress.gov/browse/essay/artI-S8-C8-2-1/ALDE_00013061/ [perma link unavailable] (last visited Sept. 21, 2023) (explaining the origins of copyright law in the Americas (citing *Fred Fisher Music Co. v. M. Witmark & Sons*, 318 U.S. 643, 647 (1943))). The article states “Anglo-American copyright legislation begins . . . with the Statute of 8 Anne, c. 19.” *Id.* (alteration in original) (quoting *Fred Fisher Music Co.*, 318 U.S. at 647).

27. See U.S. CONST. art. I, § 8, cl. 8. (establishing copyright as a congressional power).

28. See, e.g., Depoorter, *supra* note 6, at 1835 (describing the relationship between changes in technology and copyright law). Depoorter argues that copyright law is greatly influenced by technology’s evolution, but the law governing such technological developments lags behind, sometimes by a number of years. *Id.* at 1840–43.

29. See, e.g., NIMMER ON COPYRIGHT, *supra* note 7, § 2A.06[A][3] (describing the lack of uniformity in approaches courts use to apply the idea-expression dichotomy). The authors note that identifying ideas, systems, methods, and other categorical exclusions necessary for determining copyrightable subject matter lacks congressional guidance and often leads to overlaps in interpretation. *Id.*

30. See *id.* § 2A.10[B][4] (citing *Oracle Am., Inc. v. Google Inc.*, 750 F.3d 1339, 1359 (Fed. Cir. 2014)) (describing the legal issues a court should consider when analyzing API copyrightability).

31. See Stephen H. Eland, Note, *The Abstraction-Filtration Test: Determining Non-Literal Copyright Protection For Software*, 39 VILL. L. REV. 665, 674 (1994) (citing

copyrightability use a myriad of doctrines to draw this line.³² This section provides background information on those judicial doctrines—the requirement of originality, the idea-expression dichotomy, merger, method of operation, and *scènes à faire*—and outlines how these doctrines were statutorily codified.

1. *The Originality Requirement*

In order to qualify for copyright protection, an author's created work, regardless of its form, must be "original."³³ Originality is a low bar to meet: it does not require novelty, usefulness, or aesthetic merit—courts have described the originality requirement as merely requiring "independent creation by the author and just a scintilla of creativity."³⁴ This "scintilla" or "modicum" of creativity, although small, is used to reject the copyrightability of works such as facts, typographic ornamentation, lists of ingredients, individual words, and short phrases.³⁵

2. *The Idea-Expression Dichotomy*

Debates over the copyrightability of technical methods and systems can be traced back to the nineteenth century.³⁶ In *Baker v. Selden*,³⁷ the Supreme Court established a foundational concept in copyright jurisprudence: the idea-expression dichotomy.³⁸ The Court distinguished between a bookkeeper's original writing—a method of accounting described in a written medium—which was a valid subject of copyright, and the art or practical knowledge explained by the writing—the actual

Nichols v. Universal Pictures Corp., 45 F.2d 119, 121 (2d Cir. 1930)). Eland notes that even Judge Learned Hand struggled to draw a clear line between copyrightable and uncopyrightable works, stating "[n]obody has been able to fix that boundary, and nobody ever can." *Id.* at 674 n.41 (alteration in original) (quoting *Nichols*, 45 F.2d at 121).

32. For further development of this argument, see *infra* notes 33–63 and accompanying text.

33. See NIMMER ON COPYRIGHT, *supra* note 7, § 2.01 (citing 17 U.S.C. § 102(a) (2018)).

34. See *id.* § 2.01[B][2] (quoting *Luck's Music Libr., Inc. v. Ashcroft*, 321 F. Supp. 2d 107, 118 (D.D.C. 2004)).

35. See *id.* § 2.01[B][3]; *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 348 (1991) (holding that the phone numbers in a white-pages book were uncopyrightable). The Court stated that although the author's choices of arrangement and which numbers to include in the book could satisfy originality, the numbers themselves could not: "[o]riginality remains the *sine qua non* of copyright; accordingly, copyright protection may extend only to those components of a work that are original to the author." *Id.* See also WORKS NOT PROTECTED BY COPYRIGHT, *supra* note 8, at 2–3 (listing items excluded from copyright protection).

36. See, e.g., *Baker v. Selden*, 101 U.S. 99, 102 (1879) (deciding a copyrightability dispute and establishing the idea-expression dichotomy).

37. 101 U.S. 99 (1879).

38. See *id.* at 102; Pamela Samuelson & Catherine Crump, *Why 72 Intellectual Property Scholars Supported Google's Copyrightability Analysis in the Oracle Case*, 36 BERKELEY TECH. L.J. 413, 419 (2021) (describing *Baker's* historical and foundational significance in copyright law).

method of accounting—which could be the subject of a patent but not of copyright.³⁹ The Court used this distinction to explain the difference in copyrightability of an idea’s expression versus the idea contained within the expression: copyright holders are entitled to the protection of the expression of their ideas but cannot exclude others from using the ideas themselves.⁴⁰ The Court justified its distinction by noting that granting authors the right of exclusive use of their books would “be a surprise and a fraud upon the public.”⁴¹

3. *The Merger Doctrine*

Another limiting doctrine of copyright law, closely associated with the idea-expression dichotomy, is the merger doctrine.⁴² The merger doctrine prohibits copyrighting the expression of an idea when there is only one way, or a very small number of ways, to express that idea.⁴³ When options in choosing the expression of an idea are so limited, the idea is considered to “merge[]” with its expression, thus rendering it uncopyrightable.⁴⁴ For example, a company offering sweepstakes rewards cannot copyright a form that requests the name, address, telephone number, and social security number of its contestants because that form is one of only a few ways, if not the only way, to request such information.⁴⁵ The merger doctrine is an extension of the idea-expression dichotomy that has become its own independent principle of copyright law.⁴⁶

39. See *Baker*, 101 U.S. at 102 (establishing the idea-expression dichotomy).

40. See *id.* at 103 (explaining the limits of the rights conferred to copyright holders).

41. *Id.* at 102.

42. See MENELL, LEMLEY, MERGES & BALGANESH, *supra* note 10, at 588 (describing how the merger doctrine is a logical extension of the idea-expression dichotomy established in *Baker*).

43. See *Morrissey v. Procter & Gamble Co.*, 379 F.2d 675, 678 (1st Cir. 1967) (explaining the merger doctrine). The court stated:

When the uncopyrightable subject matter is very narrow, so that ‘the topic necessarily requires,’ if not only one form of expression, at best only a limited number, to permit copyrighting would mean that a party or parties, by copyrighting a mere handful of forms, could exhaust all possibilities of future use of the substance.

Id. (citations omitted) (quoting *Sampson & Murdock Co. v. Seaver-Radford Co.*, 140 F. 539, 541 (1st Cir. 1905)).

44. See Pamela Samuelson, *Reconceptualizing Copyright’s Merger Doctrine*, 63 J. COPYRIGHT Soc’y U.S.A. 417, 417 (2016) (defining the merger doctrine).

45. See *Morrissey*, 379 F.2d at 678 (describing the written forms on the plaintiff’s and defendant’s respective sweepstakes offers and noting the similarity between them). The court in *Morrissey* reasoned that if it allowed the copyright of such basic expression, the subject matter of sweepstakes forms would be entirely monopolized by the copyright holder to the detriment of the public: “[w]e cannot recognize copyright as a game of chess in which the public can be checkmated.” *Id.* at 679.

46. See NIMMER ON COPYRIGHT, *supra* note 7, § 13.03[B][3][c] (describing the origins of the merger doctrine in *Baker* and how the doctrine has become a stand-alone feature of copyright law); see also *Silvertop Assocs. Inc. v. Kangaroo Mfg. Inc.*, 931 F.3d 215, 222 (3d Cir. 2019) (demonstrating the Third Circuit’s adoption of the merger doctrine). The Third Circuit stated: “if copyrighting a design feature

4. *The Method of Operation Exclusion*

The method of operation exclusion is yet another creation of *Baker* that has entrenched itself as a foundational principle of copyright law.⁴⁷ Works that describe a process or method of performing a specific task are ineligible for copyright protection.⁴⁸ This limit on copyrightability is a logical extension of the idea-expression dichotomy and the merger doctrine: a step-by-step description of a method by which someone or something performs an action is unable to be separated from the task itself—it is simply an idea.⁴⁹

5. *Scènes à Faire*

Another extension of the idea-expression dichotomy—the doctrine of *scènes à faire*—prohibits copyrighting the stock elements of a given topic that are so standard as to make them indispensable to that topic.⁵⁰ For example, an author cannot copyright the abstract generalities of the plot of a motion picture.⁵¹ Such elements are considered too broad to enjoy the exclusive benefits of copyright protection: granting authors monopolies over the building blocks others must use to make similar works would discourage creativity and the exchange of ideas.⁵² This doctrine extends beyond the subject matter of literary works, and courts have applied the *scènes à faire* doctrine to computer software to prevent the copyrighting of stock elements of computer programs, such as those dictated by hardware, design, code, and regularly practiced programming standards.⁵³ Courts apply the *scènes à faire* exclusion to software to prevent monopolization of commonplace programming

would effectively monopolize an underlying idea, procedure, process, etc., then the merger doctrine exists to deny that protection.” *Id.*

47. See NIMMER ON COPYRIGHT, *supra* note 7, § 2A.06[A][2][a] (describing the history of the Copyright Act of 1976, which is now codified in 17 U.S.C. § 102(a)). The authors describe how much of the statutory language of the Copyright Act was derived from the holding in *Baker*. *Id.*

48. See *id.* (explaining the method of operation exclusion).

49. See *id.* (explaining the abstraction process that logically reduces a process to an uncopyrightable idea).

50. See Leslie A. Kurtz, *Copyright: The Scenes a Faire Doctrine*, 41 FLA. L. REV. 79, 81–82 (1989) (discussing the definition of *scènes à faire* and how such elements are unprotected by copyright).

51. See *id.* at 82 (citing *Nichols v. Universal Pictures Corp.*, 45 F.2d 119 (2d Cir. 1930)) (summarizing a well-known example of the *scènes à faire* doctrine). The court in *Nichols* rejected the copyrightability of the idea of “feuding Irish and Jewish families whose children marry and produce grandchildren, leading to reconciliation.” *Id.*

52. See *id.* at 83 (noting the policy reasons behind *scènes à faire*).

53. See Robert Kirk Walker, *Breaking with Convention: The Conceptual Failings of Scènes à Faire*, 38 CARDOZO ARTS & ENT. L.J. 435, 448–49 (2020) (describing how courts have applied the *scènes à faire* exclusions to specific issues in software cases (first citing *Gates Rubber Co. v. Bando Chem. Indus., Ltd.*, 9 F.3d 823, 836–38 (10th Cir. 1993); and then citing *Comput. Assocs. Int’l, Inc. v. Altai, Inc.*, 982 F.2d 693, 709 (2d Cir. 1992))).

ideas.⁵⁴ This objective is particularly important due to the nature of software development as “computer technology is advanced by the means of ‘stepping stones.’”⁵⁵

6. *Statutory Codification and Computer Considerations*

The idea-expression dichotomy and its progeny persisted through the twentieth century in judicial decisions of copyrightability until Congress eventually affirmed the principles through the enactment of the Copyright Act of 1976 (the Copyright Act).⁵⁶ The Copyright Act codified many of the principles *Baker* established, including the idea-expression dichotomy and the method of operation exclusion.⁵⁷ The Copyright Act defined copyright’s valid subject matter, exclusive rights, duration, and defenses to infringement in the context of a rapidly advancing world of creative expression.⁵⁸ Although Congress brought copyright law into the twentieth century with the enactment of the Copyright Act, Congress was unable to account for every new development in technology.⁵⁹ Thus, numerous amendments to the Copyright Act have addressed new technological considerations—such as the recognition of computer software as part of the subject matter of copyright in 1980 and the implementation

54. See Eland, *supra* note 31, at 681 (noting monopolies on software ideas would significantly hinder future software development).

55. See *id.* at 680–81 (quoting Howard Root, Note, *Copyright Infringement of Computer Programs: A Modification of the Substantial Similarity Test*, 68 MINN. L. REV. 1264, 1292 (1984)) (discussing the unique nature of software development’s use of existing material).

56. See NIMMER ON COPYRIGHT, *supra* note 7, § 2A.06[A][1] (first citing *Comput. Assocs. Int’l, Inc.*, 982 F.2d at 703; and then citing *Am. Dental Ass’n v. Delta Dental Plans Ass’n*, 126 F.3d 977, 981 (7th Cir. 1997)) (describing how it is generally accepted that parts of the Copyright Act emerged from an effort to codify the holding of *Baker*). The authors go on to explain that in the Act, “subsection (a) not only codifies the principles of originality and fixation applicable to all works of authorship, but also enumerates eight different categories of works that qualify for protection under the statute.” *Id.* (footnotes omitted).

57. See Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (1976) (codified at 17 U.S.C. §§ 101–1332 (2018)); MENELL, LEMLEY, MERGES & BALGANESH, *supra* note 10, at 522 (describing the history and significance of the Copyright Act of 1976). The authors note that advances in technology were the driving force behind Congress’s efforts to reform copyright law and in 1955, Congress requested that the Copyright Office conduct a series of studies aimed at assessing how new technologies, such as cable television, jukeboxes, sound recordings, and broadcasting were affected by anachronisms in existing copyright law. *Id.*

58. See Copyright Act of 1976 § 101 (detailing the original provisions of the Copyright Act of 1976). It is notable that among the listed recognized works, computer software is not explicitly addressed, likely because such technology was too new to be contemplated by Congress during the original enactment of the Act. *Id.* See also H.R. REP. NO. 94-1476, at 47 (1976) (stating the purpose of the Copyright Act of 1976 was to address developments in technology since 1909). Congress recognized existing copyright law was lagging behind the advancements in technology and that serious revisions to protect the rights of authors were needed. *Id.*

59. See, e.g., NIMMER ON COPYRIGHT, *supra* note 7, § 2A.06[B] (noting that congress enacted the Computer Software Act of 1980 to dispel any doubts that the Copyright Act of 1976 protected computer programs as literary works).

of globalized intellectual property protections through the Berne Convention in 1989.⁶⁰

Considering the Copyright Act as it applies to computer software, Congress quickly realized that computer software fell somewhere outside of the enumerated categories of materials generally considered copyrightable.⁶¹ The Computer Software Copyright Act of 1980 (Computer Software Act) addressed this issue directly by adding an explicit statutory provision to the Copyright Act establishing that a “computer program” fell within the definition of a literary work, and was thus entitled to the same protections that a book or similar work would enjoy.⁶² However, the Computer Software Act’s simple definition of “computer program” failed to capture the intricacies of different types of software, and it was thus left up to the courts to determine the guidelines on a case-by-case basis.⁶³

B. *Judicial History of Copyrightability in Computer Software*

Although the legislature explicitly provided that computer programs fell within the subject matter of copyright, courts across the nation have wrestled with applying other limiting doctrines of copyright law, such as the idea-expression rule, to software.⁶⁴ A computer program as a creative

60. *See id.* § 2A.10[A] (summarizing how copyright law has evolved to include software protections and noting that not everyone agrees computer software is well suited to copyright protection, but nevertheless, its importance to the economy, creativity, and intellectual property objectives of the United States has cemented software’s place in copyright law).

61. *See* 17 U.S.C. § 102(a) (listing the valid subject matter of copyright). The statute lists: “(1) literary works; (2) musical works, including any accompanying words; (3) dramatic works, including any accompanying music; (4) pantomimes and choreographic works; (5) pictorial, graphic, and sculptural works; (6) motion pictures and other audiovisual works; (7) sound recordings; and (8) architectural works” as valid subjects of copyright protection. *Id.* *See also* NIMMER ON COPYRIGHT, *supra* note 7, § 2A.10 (noting, historically, there was confusion over which category computer codes would fit into).

62. *See* NIMMER ON COPYRIGHT, *supra* note 7, § 2A.10[B] (quoting H.R. REP. NO. 96-1307, pt. 2 (1980)) (describing the legislative history of the Computer Software Copyright Act of 1980). The authors claim the 1980 “amendment dispels any lingering doubts as to the copyrightability of computer programs.” *Id.*

63. *See* 17 U.S.C. § 101 (defining computer programs as “a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result”); *see also* Pamela Samuelson, *Staking the Boundaries of Software Copyrights in the Shadow of Patents*, 71 FLA. L. REV. 243, 258 (2019) (describing how during Congress’s consideration of the Computer Software Act, the importance of establishing the line between uncopyrightable processes and copyrightable programs was expressed but not implemented). The organization that lobbied Congress to enact the Computer Software Act (CONTU), had “offered no guidance about how courts should [distinguish between uncopyrightable and copyrightable programs], saying only that the distinction did not ‘shimmer with clarity.’” *Id.* (quoting NAT’L COMM’N ON NEW TECH. USES OF COPYRIGHTED WORKS, FINAL REPORT 18 (1978)).

64. *See generally* *Apple Comput., Inc. v. Franklin Comput. Corp.*, 714 F.2d 1240 (3d Cir. 1983), *abrogated by* *TD Bank N.A. v. Hill*, 928 F.3d 259 (3d Cir. 2019); *Whelan Assocs., Inc. v. Jaslow Dental Lab’y, Inc.*, 797 F.2d 1222 (3d Cir. 1986); *Comput. Assocs. Int’l, Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992). Each case decided software copyrightability issues. *See* Lemley & Samuelson, *supra* note 17, at 8–15

medium can encompass a vast range of functions, expressions, ideas, or purposes, so understanding precisely what a piece of computer software represents for a copyrightability analysis presents a challenge.⁶⁵

An early effort by the Third Circuit to apply the idea-expression rule to computer programs can be seen in the 1983 decision of *Apple Computer, Inc. v. Franklin Computer Corp.*⁶⁶ In *Apple Computer*, the Third Circuit, operating in an era where computers were in their relative infancy, attempted to delineate between the patentable and copyrightable aspects of software.⁶⁷ The Third Circuit evaluated aspects of software copyrightability by adopting a test that centered on whether a software idea could be expressed in multiple ways: if other programs could be written to achieve the same function, the program could be copyrighted as an expression rather than an idea; but if the computer program is the sole way to perform the function, it is an uncopyrightable idea.⁶⁸

The holding of *Apple Computer*, however, proved to be an unwieldy solution in analyzing a computer program's ultimate copyrightability for the Third Circuit.⁶⁹ The next significant case for software copyrightability jurisprudence in the Third Circuit, *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*,⁷⁰ attempted to refine the *Apple Computer* test.⁷¹ In *Whelan Associates*, the Third Circuit held that because computer programs were

(describing the difficulty courts of appeals experienced in applying copyright doctrines to new technologies in the listed cases).

65. See, e.g., *Whelan Assocs.*, 797 F.2d at 1248 (considering the purpose or function of a computer program to evaluate its fitness for copyrightability).

66. 714 F.2d 1240 (3d Cir. 1983), *abrogated by* TD Bank N.A. v. Hill, 928 F.3d 259 (3d Cir. 2019).

67. See *id.* at 1253 (describing the facts of the case). To increase the popularity of its low-selling computers, Franklin installed copies of the popular Apple operating system on their computers, which prompted Apple to sue for copyright infringement. *Id.* at 1243–44.

68. See *id.* at 1253 (establishing an early Third Circuit test for software copyrightability); see also *Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, 38 F.4th 331, 337–38 (3d Cir. 2022) (restating the *Apple Computer* test). The court stated that the previous test for copyrightability in computer programs “focus[ed] on whether the idea is capable of various modes of expression. If other programs can be written . . . which perform the same function . . . then that program is an expression of [an] idea and hence copyrightable.” *Id.* (alterations in original) (quoting *Apple Comput.*, 714 F.2d at 1253).

69. See Howard A. Skaist, *Hybrid IP Rights for Software, APIs and GUIs: Understanding Copyright's Paradigm Shift*, 30 CATH. U. J.L. & TECH. 1, 33 (2021) (noting *Apple Computer* is regularly scrutinized by courts today). Skaist suggests the court misunderstood the differences in different types of code when it ruled that an operating system was no different from an application program and therefore should enjoy similar copyright protections. *Id.* See also Buckman, *supra* note 18, at 4 (summarizing the court's rejection of the functionality distinction in computer programs). Buckman states: “[t]he court . . . rejected the claimed distinction between operating system programs and more practical application programs, noting that copyright of a program should not depend on the uses to which it will be put.” *Id.*

70. 797 F.2d 1222 (3d Cir. 1986).

71. See *Pyrotechnics Mgmt.*, 38 F.4th at 338 (noting *Whelan Associates* refined the *Apple Computer* test). For further discussion of the Third Circuit's evolution in its understanding of computer copyrightability and departure from *Apple Computer*, see *infra* notes 131–36 and accompanying text.

literary works, then components of the programs—such as the structure, sequence, and organization (SSO)—were also copyrightable.⁷² As in *Apple Computer*, the *Whelan Associates* decision took a narrow view of statutory copyrightability exclusions and the idea-expression dichotomy, declining to consider whether the SSO was an uncopyrightable method or process.⁷³ The Third Circuit's reluctance to apply statutory exclusions to computer programs created a problem: broad copyright protections for software were inhibiting incentives to develop new software.⁷⁴

In addition to limiting the copyrightability of computer programs through judicial doctrines, courts have applied statutory exclusions such as the method of operation rule to determine which aspects of computer software are copyrightable.⁷⁵ Section 102(b) of the Copyright Act states that copyright protection does not extend to “any idea, procedure, process, system, [or] method of operation,” regardless of how it is expressed.⁷⁶ Employing this rule in *Lotus Development Corp. v. Borland International, Inc.*,⁷⁷ the First Circuit interpreted the term “method of operation” as “the means by which a person operates something, whether it be a car, a food processor, or a computer.”⁷⁸ Furthermore, the First Circuit explained that the *Baker* idea-expression dichotomy was foundational in its reasoning, and that a copyrighted text describing how to operate something would not prevent others from using that method.⁷⁹ These exclusions were applied to a dispute over the copyrightability of the command hierarchy of the Lotus spreadsheet software, which dictated how certain sequences of user keyboard presses translated to functions

72. See *Whelan Assocs.*, 797 F.2d at 1224–25 (determining the copyrightability of the works in question); see also Lemley & Samuelson, *supra* note 17, at 10 (summarizing the holding in *Whelan Associates*).

73. See *Whelan Assocs.*, 797 F.2d at 1234–36 (reasoning that because the SSO was a literary work, comprised of an expression of an idea that could be expressed in various ways, the § 102(b) method or process exclusions were inapplicable); see also Lemley & Samuelson, *supra* note 17, at 10–11 (summarizing the facts and holding of *Whelan Associates* regarding considerations of interoperability).

74. See Lemley & Samuelson, *supra* note 17, at 8–10 (discussing how the *Apple Computer* court's reluctance to apply the idea-expression dichotomy created an imbalance in policy considerations in software copyrightability). Lemley and Samuelson discuss *Apple Computer* and *Whelan Associates* through a lens of interoperability and describe the problems courts faced in applying copyright doctrines to rapidly evolving technology. *Id.*

75. See, e.g., *Lotus Dev. Corp. v. Borland Int'l, Inc.*, 49 F.3d 807, 815 (1st Cir. 1995) (holding a menu hierarchy in a computer program was an uncopyrightable method of operation), *aff'd*, 516 U.S. 233 (1996). Judge Boudin, in his concurrence, recognized the difficulty in applying traditional copyright exclusions to software, stating: “[a]pplying copyright law to computer programs is like assembling a jigsaw puzzle whose pieces do not quite fit.” *Id.* at 820 (Boudin, J., concurring).

76. See 17 U.S.C. § 102(b) (2018) (establishing the enumerated exclusions from copyrightable subject matter); see also NIMMER ON COPYRIGHT, *supra* note 7, § 2A.06[A] (explaining the modern application of the method of operation exclusion).

77. 49 F.3d 807 (1st Cir. 1995), *aff'd*, 516 U.S. 233 (1996).

78. See *id.* at 815 (defining the method of operation exclusion).

79. See *id.* (emphasizing the importance of the idea-expression dichotomy to the court's conclusions).

executed by the software.⁸⁰ Ultimately, the First Circuit held that the defendant had not committed copyright infringement because the plaintiff's command hierarchy fell within the meaning of an excluded method of operation.⁸¹

Near the end of its analysis in *Lotus Development Corp.*, the First Circuit pointed out that considerations of "program compatibility" play a role in determining whether a computer program is a method of operation.⁸² The court rejected the plaintiff's arguments that the command hierarchy was copyrightable because there were many different ways to operate the spreadsheet functions of the software.⁸³ The court found that this attempt to refute a merger doctrine exclusion was "absurd" and that forcing computer users to learn many different methods of performing tasks on a computer would put outrageous burdens on ordinary users and violate the congressional intent behind the passage of § 102(b).⁸⁴

C. *Current Concerns of Computer Copyrightability: APIs and Interoperability*

Courts employ a multitude of judicial doctrines limiting copyrightability to strive towards a common sense goal: interoperability.⁸⁵ Interoperability is a policy goal often cited by courts to deny copyrights to software that would hinder the ability of other programs to function compatibility with the software at issue.⁸⁶ Because software is a subject matter that innately relies on the building blocks, systems, and code languages

80. *See id.* (describing Lotus's SSO and the elements the court evaluated in the case).

81. *See id.* at 817–19 (holding the hierarchy uncopyrightable due to § 102(b) exclusions).

82. *See id.* at 817–18 (highlighting the importance of compatibility in the copyrightability analysis). For further discussion of software compatibility as a factor of copyrightability, see *infra* notes 85–89 and accompanying text.

83. *See Lotus Dev. Corp.*, 49 F.3d at 816 (holding a developer's quantity of design choices was not relevant to the method of operation exclusion). The court noted: "[t]he fact that Lotus developers could have designed the Lotus menu command hierarchy differently is immaterial to the question of whether it is a 'method of operation.'" *Id.*

84. *See id.* at 818 (discussing the implications of forcing users to learn new methods of operation to perform identical computer functions).

85. *See Lemley & Samuelson*, *supra* note 17, at 25 (noting appellate courts reached a consensus that achieving compatibility between programs was desirable). Lemley and Samuelson explain that despite the varied legal reasoning behind rejecting developers' right to exclude others from reusing elements of software to achieve interoperability, almost all appellate courts between 1992 and 2014 reached the same conclusion. *Id.* *See also* *Sega Enters. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1526 (9th Cir. 1992) (rejecting the copyrightability of functional interfaces when they monopolistically excluded third-party programs from functioning on a popular gaming console).

86. *See* Peter S. Menell, *Rise of the API Copyright Dead?: An Updated Epitaph for Copyright Protection of Network and Functional Features of Computer Software*, 31 HARV. J.L. & TECH. 305, 448 (2018) (outlining the importance of interoperability issues to copyrightability litigation). Menell states that major cases since *Apple Computer* have contemplated interoperability because it is "critical to competition in the software industry." *Id.*

of prior developers, boundary drawing in software copyrightability is especially difficult and important.⁸⁷

A prime example of software that embodies the principle of interoperability is an API, which represents a system of commands that allows programmers to access prewritten code to write programs more efficiently for the computer to execute a process or function.⁸⁸ An API does not execute the process or function—rather, an API retrieves code from “an existing library of [programming] functions . . . it is a programming shortcut” that allows programmers to code efficiently.⁸⁹

As discussed previously in this Note, the Supreme Court recently had the opportunity to address the copyrightability of APIs.⁹⁰ The main issue in *Google* concerned whether Google’s use of Java’s API, a work owned by Oracle, constituted copyright infringement.⁹¹ To incentivize programmers and developers to create applications for Google’s Android phones, Google copied approximately 11,500 lines of code from the JavaSun API, which was a widely utilized and prominent programming language and structure used by programmers.⁹² Java’s API packages had been made available to the public and each package was comprised of “‘declaring’ code” and “‘implementation’ code.”⁹³ Google copied the declaring code in thirty-seven out of the 166 JavaSun API packages, but Google wrote its own entirely novel implementing code.⁹⁴ Despite the fact that Google copied only three percent of the declaring code, Oracle sued for

87. See Lemley & Samuelson, *supra* note 17, at 44 (explaining how developers and software companies have long relied on their ability to create programs that are compatible with other programs). Lemley and Samuelson explain that the entire structure of modern software functionality exists because developers have the freedom to make their software interoperable with existing software. *Id.*

88. See *Google LLC v. Oracle Am., Inc.*, 141 S. Ct. 1183, 1191–92 (2021) (describing the nature of an API and how it is different from most computer programs). The majority goes in depth to explain how APIs function as a computer language, rather than as the functional software itself, drawing distinctions between an API and the creative expressions embodied in the works that the API was utilized to create. *Id.*

89. See Tzipi Zipper, *Mind Over Matter: Addressing Challenges of Computer-Generated Works Under Copyright Law*, 22 WAKE FOREST J. BUS. & INTELL. PROP. L. 129, 237–38 n.878 (2022) (defining an API); see also Risch, *supra* note 22 (explaining how APIs assist programmers).

90. See *supra* notes 16–20 and accompanying text for a brief introduction of *Google*.

91. See *Leading Case*, *supra* note 4, at 434 (citing *Google*, 141 S. Ct. at 1209) (describing the issue considered by the Supreme Court).

92. See *id.* at 432 (citing *Google*, 141 S. Ct. at 1191) (summarizing the facts of the alleged copyright infringement in *Google*).

93. See Zipper, *supra* note 89, at 237–38 n.878 (summarizing the unresolved copyrightability issues of the JavaSun API in *Google*). Zipper explains that when a programmer is using the JavaSun API, the programmer inputs requests, the declaring code identifies which prewritten function to retrieve from the library, and the implementing code gives the computer the instructions for carrying out the function the declaring code identifies. *Id.* See also NIMMER ON COPYRIGHT, *supra* note 7, § 2A.10[B][4] (describing the nature of the code in the *Google* disputes).

94. See Zipper, *supra* note 89, at 237–38 n.878 (summarizing the pertinent facts of the unresolved copyrightability issues of the JavaSun API in *Google*).

copyright infringement, initiating a series of lawsuits that have lasted over a decade.⁹⁵

Notwithstanding years of waiting by the software industry and copyright scholars, the *Google* Court approached the dispute on fair use grounds and failed to answer the question of whether the API itself was copyrightable.⁹⁶ Fair use is an affirmative defense to copyright infringement in which the defendant has used a copyrighted work in such a way that a finding of liability would “stifle the very creativity . . . that [copyright] law is designed to foster.”⁹⁷ The Court, in dicta, reasoned that the code Google copied was more akin to an organizational tool, such as a filing cabinet, rather than a copyrightable expression of an idea; but the Court assumed for the sake of their fair use argument that the JavaSun API was copyrightable.⁹⁸ Therefore, although heavily implied as uncopyrightable by the holding in *Google*, the copyrightability of APIs and similar code is still in question.⁹⁹

95. See Peter S. Menell, *API Copyrightability Bleak House: Unraveling and Repairing the Oracle v. Google Jurisdictional Mess*, 31 BERKELEY TECH. L.J. 1515, 1571 (2016) (discussing the small amount of actual copying done by Google and the lengthy litigation that was started in 2010); see also *Oracle Am., Inc. v. Google Inc.*, 872 F. Supp. 2d 974 (N.D. Cal. 2012) (describing the procedural history of the first opinion issued in the dispute), *rev'd and remanded*, 750 F.3d 1339 (Fed. Cir. 2014), *cert. denied*, 576 U.S. 1071 (2015). This was the first opinion issued in the series of cases that came out of Google and Oracle's copyright dispute; the case was appealed to the Federal Circuit, which reversed and remanded the district court's holding, and was subsequently denied certiorari in 2015. *Id.* The district court rehearing was appealed again to the Federal Circuit and made its way to the Supreme Court of the United States, where the case was ultimately decided in fair use grounds. *Oracle Am., Inc. v. Google LLC*, 886 F.3d 1179 (Fed. Cir. 2018), *rev'd and remanded*, 141 S. Ct. 1183 (2021), *vacated in part*, 847 F. App'x 931 (Fed. Cir. 2021).

96. See generally *Google*, 141 S. Ct. at 1208–09 (addressing the fair use of the JavaSun API). See also *infra* notes 98–99 and accompanying text for an explanation of the unanswered questions from *Google*.

97. See NIMMER ON COPYRIGHT, *supra* note 7, § 13.05 (quoting *Iowa State Univ. Rsch. Found., Inc. v. Am. Broad. Cos.*, 621 F.2d 57, 60 (2d Cir. 1980)). Fair use is a mixed question of fact and law that depends on the circumstances of each case but requires as a threshold matter that the allegedly copied work was copyrightable. *Id.*

98. See *Google*, 141 S. Ct. at 1201 (noting assumptions of copyrightability and explaining the differences between code that enjoys copyright protections and the code Google copied from Oracle). The Court explained the copied lines of code were “inextricably bound together with a general system, the division of computing tasks, that no one claims is a proper subject of copyright.” *Id.* However, the Court stated:

[W]e believe we should not answer more than is necessary to resolve the parties' dispute. We shall assume, but purely for argument's sake, that the entire Sun Java API falls within the definition of that which can be copyrighted. We shall ask instead whether Google's use of part of that API was a “fair use.”

Id. at 1197.

99. See Samuelson & Crump, *supra* note 38, at 437 (arguing for a reevaluation of API copyrightability); Lemley & Samuelson, *supra* note 17, at 2 (criticizing the lack of definitive copyrightability answers from *Google*); see also Richey, *supra* note 19 (summarizing the repercussions of the questions the Supreme Court did not address in *Google*). Richey states that the Court did not hold that APIs were “not copyrightable as a matter of law.” *Id.*

III. STOLEN THUNDER: THE WESTERN DISTRICT OF PENNSYLVANIA
GRANTS AN INJUNCTION FOR REVERSE-ENGINEERED
FIREWORKS DISPLAY IGNITION CODES

In *Pyrotechnics Management*, the Third Circuit considered whether a pyrotechnic firing system's digital communications protocol was copyrightable.¹⁰⁰ The plaintiff, Pyrotechnics Management, Inc. (Pyrotechnics) is a Pennsylvania corporation that manufactures and sells equipment used to coordinate and execute fireworks displays.¹⁰¹ Since 1995, Pyrotechnics has produced a digital pyrotechnics firing system, comprised of two primary components: a control panel and a field module.¹⁰² Pyrotechnics distributes this firing system under the brand name "FireOne."¹⁰³ The FireOne control panel accepts commands from a human operator who manipulates the physical buttons, switches on the control panel, and uses a specific communication protocol (the protocol) to wirelessly transmit messages carrying the operator's commands to the FireOne field module.¹⁰⁴ Upon receiving these messages, the FireOne field modules execute predefined functions, such as igniting specific fireworks that are electrically connected to the FireOne field module.¹⁰⁵

In 2018, fireTEK, a Romanian-based competitor of Pyrotechnics, reverse-engineered the FireOne control panel and copied the protocol.¹⁰⁶ On January 23, 2019, fireTEK began posting online that it was offering a product, the fireTEK router, that could control FireOne field modules at a fraction of the price of a FireOne control panel.¹⁰⁷ After discovering fireTEK's online activity, on June 12, 2019, Pyrotechnics moved to ensure that their firing system was protected and successfully filed a Deposit Copy (the Deposit Copy) for copyright registration with the U.S. Copyright Office, which explained the protocol Pyrotechnics used in the FireOne control panel via three components: a custom digital message format, the specified messages themselves, and the

100. See *Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, 38 F.4th 331, 337 (3d Cir. 2022) (describing the issue of copyrightability the Third Circuit would address).

101. See *id.* at 333–34 (describing the parties).

102. See *id.* (describing Pyrotechnics's product line); see also *Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, No. 19-cv-00893, 2021 WL 925812, at *4–6 (W.D. Pa. Mar. 11, 2021) (describing Pyrotechnics's manufactured products, associated brand name, and date of origination for the FireOne system), *vacated and remanded*, 38 F.4th 331 (3d Cir. 2022).

103. See *Pyrotechnics Mgmt.*, 2021 WL 925812, at *5–6 (describing the FireOne control panel operation method).

104. See *id.*

105. See *Pyrotechnics Mgmt.*, 38 F.4th at 334 (describing the functionality and purpose of the FireOne pyrotechnics firing system).

106. See *id.* (describing the facts of fireTEK's actions); see also *Pyrotechnics Mgmt.*, 2021 WL 925812, at *5 (stating fireTEK admitted that it had created its router by reverse-engineering the FireOne control panel and copied the command codes entirely).

107. See *Pyrotechnics Mgmt.*, 2021 WL 925812, at *5–6.

transmission scheme.¹⁰⁸ The custom digital message format of the operator's commands dictates which order the firework should be ignited in according to specific values, which are communicated via individual messages and sent to ignite fireworks according to rules set by the transmission scheme.¹⁰⁹

In July 2019, Pyrotechnics sued fireTEK and its United States distributor XFX Pyrotechnics, LLC (XFX) in the Western District of Pennsylvania alleging copyright infringement, tortious interference with prospective contractual relations, and unfair competition, asking the district court to enjoin fireTEK and XFX from selling or distributing the fireTEK router.¹¹⁰ With its freshly granted Deposit Copy in hand, Pyrotechnics argued that fireTEK: (1) blatantly copied the protocol it registered with the United States Copyright Office, (2) capitalized on the market popularity of the FireOne system to profit from illegally manufactured copycat products, and (3) caused Pyrotechnics severe economic harm.¹¹¹

In response, fireTEK did not dispute that it had reverse-engineered the FireOne control router, copied the command codes in their entirety,

108. See *id.* at *4 (explaining that Pyrotechnics registered the protocol with the U.S. Copyright Office); Plaintiff's Exhibit A, *Pyrotechnics Mgmt.*, 2021 WL 925812 (No. 1-2) (showing plaintiffs submitted the Deposit Copy to the court); U.S. Copyright No. TX0008738709 (issued June 12, 2019) (detailing the contents of the Deposit Copy and the issued certificate from the U.S. Copyright Office); *Pyrotechnics Mgmt.*, 38 F.4th at 334–35 (noting the submitted Deposit Copy and communications protocol); *Pyrotechnics Mgmt.*, 2021 WL 925812, at *4 (explaining the first publication of the protocol). The district court described that in the Deposit Copy, Pyrotechnics detailed the functionality and substance of the protocol, and claimed that the protocol, although submitted for registration in June 2019, had been published nearly twenty-five years prior when it was first embedded inside Pyrotechnics's hardware in 1995. *Id.* at *3–4. See also NIMMER ON COPYRIGHT, *supra* note 7, § 4.03[B] (citing 17 U.S.C. § 101 (2018)) (explaining that publication occurs when copies of the work are distributed to the public by sale or other transfer of ownership); *Fourth Est. Pub. Benefit Corp. v. Wall-Street.com, LLC*, 139 S. Ct. 881, 892 (2019) (holding unanimously that a copyright claimant must obtain a valid copyright registration from the U.S. Copyright office to recover for copyright infringement).

109. See *Pyrotechnics Mgmt.*, 38 F.4th at 335 (explaining the programming of the message format). These ignition values are communicated using individual messages, via binary and hexadecimal values, made of ninety-six bits each. *Id.* The court described that hexadecimal is a programming code that uses single digit numbers paired with “the letters ‘a’ through ‘f’ . . . to represent the eight bits—the 0’s and the 1’s—in each byte.” *Id.* at 335 n.4 (citing *Lotus Dev. Corp. v. Paperback Software Int’l.*, 740 F. Supp. 37, 43–44 (D. Mass. 1990)). See also Risch, *supra* note 22 (explaining the functionality of the code on the FireOne control panel). Risch states the copyrighted work at issue in this case “isn’t even software,” but rather is akin to a remote control, where very basic input commands are sent along a wire to execute very basic events, such as firework ignitions. *Id.* See also *Pyrotechnics Mgmt.*, 38 F.4th at 336 (describing the functionality of the protocol’s transmission scheme). The court described how the transmission scheme converts the individual messages into an analog signal that sends the information containing the operator’s commands from the control panel to the field module via wires to execute a designated function, usually igniting a specific firework. *Id.*

110. See *Pyrotechnics Mgmt.*, 38 F.4th at 334 (reciting the initiation of the procedural history and the requested relief).

111. See *Pyrotechnics Mgmt.*, 2021 WL 925812, at *7 (summarizing Pyrotechnics’s claims of damages).

and manufactured, distributed, and sold copycat fireTEK routers; instead, it argued that the protocol itself was not copyrightable in the first place.¹¹² In its defense, fireTEK argued that the protocol: (1) failed to meet the requisite level of creativity required for copyright protection, (2) was barred from copyrightability under the *scènes à faire* and merger doctrines, and (3) was a method or function excluded from copyright.¹¹³

The district court granted the injunction and held that Pyrotechnics was likely to prevail on its infringement claim because its “command codes”—a part of the protocol—were protected by copyright, and fireTEK’s router infringed that copyright.¹¹⁴ The court rejected fireTEK’s copyrightability arguments, among others.¹¹⁵ Regarding the copyrightability of the protocol, the district court held that Pyrotechnics’s command code was an original work of authorship that had been “duly registered with the U.S. Copyright Office.”¹¹⁶ Furthermore, the district court concluded that the command code was copyrightable because it had met the requisite modicum of creativity necessary for originality, had more than one way of achieving its utilitarian function, and was integral to the function of the firing system.¹¹⁷

Next, the district court summarily dismissed the defendant’s remaining arguments that the protocol violated the *scènes à faire* and merger doctrines.¹¹⁸ The district court finalized its decision that Pyrotechnics

112. *See id.* at *5, *11–12 (noting that fireTEK admitted to reverse-engineering and describing fireTEK’s uncopyrightability arguments).

113. *See id.* at *8–12 (describing fireTEK’s lack of creativity, *scènes à faire*, and § 102(b) arguments, respectively); NIMMER ON COPYRIGHT, *supra* note 7, § 2.01 (summarizing the requirement of originality for copyright protection). The authors describe how copyrightability requires at the very minimum a modicum of creativity, notwithstanding novelty, ingenuity, or aesthetic merit: “words and short phrases such as names, titles, and slogans” are not subject to copyright. *Id.* (quoting 37 C.F.R. § 202.1(a) (2022)). *See also id.* § 13.03[B][4] (defining the *scènes à faire* doctrine). The authors explain *scènes à faire* is closely intertwined with the merger doctrine, with both doctrines limiting copyrightability for expressions that are mere ideas when conceptualized. *Id.*

114. *See Pyrotechnics Mgmt.*, 2021 WL 925812, at *15–17.

115. *See id.* at *8–13 (holding the protocol was copyrightable and fireTEK had infringed despite its raised defenses). The district court also rejected fireTEK’s arguments that Pyrotechnics had not properly registered its protocol, that merger and *scènes à faire* doctrines barred extending protection to the protocol, and that fireTEK’s implementation of the protocol was fair use. *Id.*

116. *See id.* at *8 (providing reasoning for the court’s finding of copyrightability).

117. *See id.* at *9 (listing justifications for copyrightability of the protocol); *id.* at *8 (describing how arbitrary selection of computer code weighs against a finding of originality and the separation of idea and expression as it applies to computer programs (citing *Toro Co. v. R&R Prods. Co.*, 787 F.2d 1208, 1213 (8th Cir. 1986))); *id.* at *9 (relying on a decision which held that unnecessary code that discourages interoperability between systems is not copyrightable (citing *Atari Games Corp. v. Nintendo of Am., Inc.*, 975 F.2d 832, 840 (Fed. Cir. 1992))). For further discussion of why courts value interoperability between platforms and generally deny copyrights to programs that inhibit compatibility, see *supra* notes 85–89 and accompanying text.

118. *See Pyrotechnics Mgmt.*, 2021 WL 925812, at *9–10 (rejecting fireTEK’s merger and *scènes à faire* arguments). The district court reasoned that *scènes à faire* could not be used to defeat protection of computer elements not “dictated by

held a valid copyright of the protocol by concluding that the work was “fixed in a[] tangible medium.”¹¹⁹ The court subsequently found that fireTEK had directly and unlawfully copied the protocol for purely commercial purposes, which nullified any possible fair use defense, including interoperability arguments that fireTEK had a right to make compatible hardware.¹²⁰

For these reasons, the district court granted Pyrotechnics’s motion to enjoin XFX Pyrotechnics Management and fireTEK from importing, selling, and distributing their copycat control panel.¹²¹ XFX and fireTEK appealed to the United States Court of Appeals for the Third Circuit, challenging the district court’s determination that Pyrotechnics had shown a likelihood of success on its copyright infringement claim.¹²²

external factors such as ‘the mechanical specifications of the computer on which a particular program is intended to run.’” *Id.* at *9 (quoting *Softel, Inc. v. Dragon Med. & Sci. Commc’ns, Inc.*, 118 F.3d 955, 963 (2d Cir. 1997)). Furthermore, the district court held that because there were multiple ways to write the protocol, the merger doctrine could not be applied. *Id.* at *10 (first citing *Oracle Am., Inc. v. Google Inc.*, 750 F.3d 1339, 1368 (Fed. Cir. 2014); and then citing *Apple Comput., Inc. v. Franklin Comput. Corp.*, 714 F.2d 1240, 1252 (3d Cir. 1983), *abrogated by* *TD Bank N.A. v. Hill*, 928 F.3d 259 (3d Cir. 2019)). *See also* Skaist, *supra* note 69, at 41 (defining the *scènes à faire* doctrine). The doctrine of *scènes à faire* establishes that “some forms of expression have become so commonplace as a means to express a particular idea that to allow such expressions to be copyrightable would provide a party claiming ownership of the expression an unwarranted amount of control over the underlying idea.” *Id.*

119. *See Pyrotechnics Mgmt.*, 2021 WL 925812, at *8, *10–11 (holding the transmission of the code over the wires and the running of the code on the control panel constituted fixation in a tangible medium (first citing 17 U.S.C. § 102(a) (2018); and then citing *Apple Comput., Inc. v. Formula Int’l Inc.*, 725 F.2d 521, 525 (9th Cir. 1984))).

120. *See id.* at *13–15 (discussing the factors of a fair use analysis). Here the district court held that: (1) defendants copied the protocol verbatim, defeating a transformative use argument; (2) the nature of plaintiff’s work was protectable under copyright; (3) the work was copied in its entirety; and (4) the copying caused plaintiff economic harm. *Id.* *See also id.* at *15 (explaining that compatibility considerations focus on plaintiff’s rather than defendant’s choices). The district court drew a sharp distinction, stating: “[i]n other words, the focus is on the compatibility needs and programming choices of the party claiming copyright protection—not the choices the defendant made to achieve compatibility with the [plaintiff’s field modules].” *Id.* *But see* *Samuelson & Crump*, *supra* note 38, at 433 (noting courts have excused infringement for literal copying when achieving compatibility was necessary). *Samuelson and Crump* note, however, that even when infringement was excused on compatibility grounds, the literal copying did not comprise the entire work; only copying to the extent needed to achieve compatibility was excused. *Id.* at 434.

121. *See Pyrotechnics Mgmt.*, 2021 WL 925812, at *17 (enjoining defendants from committing acts that infringe upon plaintiff’s copyrights).

122. *See Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, 38 F.4th 331, 334–35 (3d Cir. 2022) (describing the nature of the appeal).

IV. FIZZLING OUT: THE THIRD CIRCUIT REJECTS THE DISTRICT COURT'S COPYRIGHTABILITY ANALYSIS

On appeal, the Third Circuit considered whether Pyrotechnics's communications protocol, as described in the Deposit Copy, could qualify as a valid copyright.¹²³ To characterize the protocol, the Third Circuit analyzed each of its three components:

(1) a custom digital message format; (2) specified individual messages that conform to the format and communicate specific information; and (3) a transmission scheme that describes how an individual digital message is converted into an analog signal that can be sent over the wires that connect the control panel and field module.¹²⁴

The core of the Third Circuit's analysis relied upon the statutory requirement that copyright protection is only available for "original works of authorship fixed in any tangible medium of expression."¹²⁵ Furthermore, the court established that copyright only protects specific subject matter, and thus a valid copyright cannot protect an invalid subject.¹²⁶ Therefore, the elements of the protocol that were clearly methods of operation were summarily dismissed as uncopyrightable, regardless of the originality of Pyrotechnics's development of these elements.¹²⁷ The court applied the enumerated method of operation exclusion in § 102(b) and reversed the district court's ruling that the method by which the messages were communicated between Pyrotechnics's control panel and field modules was copyrightable.¹²⁸

After limiting the scope of its inquiry, the court was left with only one question to answer: whether the digital message format or the individual messages themselves were copyrightable.¹²⁹ The court applied an

123. *See id.* at 335 (listing the considered issues).

124. *See id.* (describing the components of the protocol in consideration for copyrightability).

125. *See id.* at 336 (quoting 17 U.S.C. § 102(a) (2018)) (identifying the statutory scope of review).

126. *See id.* (identifying the subject matter of the scope of review (citing *Star Athletica, L.L.C. v. Varsity Brands, Inc.*, 137 S. Ct. 1002, 1008 (2017))).

127. *See id.* at 337 (dismissing the uncopyrightable elements of the protocol). The court dismissed the choice of frequencies, use of modulation, and the rate of data transmitted in the transmission scheme as methods of operation. *Id.*

128. *See id.* (citing 17 U.S.C. § 102(b) (2018)) (referencing the language of the Copyright Act and reversing the district court's holding). Here, the Third Circuit did not delve into a complex analysis of applicable case law on the method of operation rule; rather, it simply pointed out that the statute clearly excludes certain subject matter from copyright protection, and the elements of the communication protocol that were clearly methods and not expressions were therefore not subject to copyright protection. *Id.*

129. *See id.* (outlining the only remaining issues of the analysis); *see also* Eric Goldman, *Third Circuit Declares Copyright Independence for Fireworks Systems—Pyrotechnics v. XFX, TECH. & MARKETING L. BLOG* (July 4, 2022), <https://blog.ericgoldman.org/archives/2022/07/third-circuit-declares-copyright-indepen->

idea-expression dichotomy analysis and an inquiry of minimum originality to conclude that neither met the requirements for copyrightability.¹³⁰

To begin its analysis of the copyrightability of the protocol's message format, the court summarized the history of computer program copyrightability jurisprudence within the Third Circuit.¹³¹ First, the court introduced the applicability of the idea-expression dichotomy, stating "[i]t is axiomatic that copyright does not protect ideas, but only expressions of ideas," and explaining that such protections are normally afforded to the subject matter of patents, rather than copyright.¹³² The court turned to *Apple Computer* as its starting point for a computer copyrightability analysis and explained that rule as follows: if a computer program's idea is capable of being expressed by other programs, then the program is a copyrightable expression; however, if that function or idea can only be performed using that program, then the program is an uncopyrightable idea.¹³³

The court then described how it refined its approach to computer program idea-expression issues in *Whelan Associates*.¹³⁴ *Whelan Associates* established that the idea behind a computer program is its "purpose or function."¹³⁵ Applying the *Whelan Associates* test, the court held that the district court properly identified the purpose and function of the protocol: to communicate messages between the FireOne control panel

dence-for-fireworks-systems-pyrotechnics-v-xfx.htm [https://perma.cc/RSB6-65V4] (summarizing the primary issue the Third Circuit analyzed in the case).

130. See *Pyrotechnics Mgmt.*, 38 F.4th at 337–41 (applying Third Circuit precedent to conclude that neither remaining component of the protocol was copyrightable); see also Anand, *supra* note 23; Goldman, *supra* note 129 (summarizing the Third Circuit's legal analysis in the case).

131. See *Pyrotechnics Mgmt.*, 38 F.4th at 337–39 (describing a chronological progression of applicable cases as decided by the Third Circuit).

132. See *id.* at 337 (first quoting *Whelan Assocs., Inc. v. Jaslow Dental Lab'y, Inc.*, 797 F.2d 1222, 1234 (3d Cir. 1986); and then citing *Mazer v. Stein*, 347 U.S. 201, 217 (1954)) (establishing that the idea-expression dichotomy is well-established law both within the precedent of the Third Circuit and the U.S. Supreme Court). The court then went on to explain the difference between copyrighted and patented subject matter. *Id.* (first citing *Apple Comput., Inc. v. Franklin Comput. Corp.*, 714 F.2d 1240, 1250 (3d Cir. 1983), *abrogated by* *TD Bank N.A. v. Hill*, 928 F.3d 259 (3d Cir. 2019); and then citing *Dymow v. Bolton*, 11 F.2d 690 (2d Cir. 1926)).

133. See *id.* at 337–38 (citing *Apple Comput.*, 714 F.2d at 1253) (describing an early attempt by the Third Circuit to understand copyrightability issues as they pertain to computer programs). Notably, the Third Circuit did not heavily rely upon this case but merely presents it as a starting point from which its doctrine of copyrightability began. *Id.* at 337.

134. See *id.* at 338 (citing *Whelan Assocs.*, 797 F.2d at 1248) (describing how the Third Circuit considers *Whelan Associates* to be a refinement of the idea-expression rule for utilitarian works).

135. See *id.* (emphasis omitted) (quoting *Whelan Assocs.*, 797 F.2d at 1248). The Third Circuit explained that although the principles of separating ideas from expression in computer program copyright cases is difficult in the abstract, the test of "[e]verything that is not necessary to that purpose or function [is] part of the expression of the idea" is easier to understand when applied to specific facts. *Id.* (second alteration in original) (quoting *Whelan Assocs.*, 797 F.2d at 1248).

and the field modules.¹³⁶ Despite the district court's correct identification, the court concluded that the district court failed to acknowledge the fact that the protocol was the only way to communicate the messages, as admitted by the litigants, which destroyed the separation between the idea and expression and thus made the protocol uncopyrightable.¹³⁷

Additionally, the court drew a comparison between the protocol's messaging format and a part-numbering system, relying on its decision in *Southco, Inc. v. Kanebridge Corp.*¹³⁸ The court recalled that in *Southco*, a fastener manufacturer's copyright for its system assigning a nine-digit number to each manufactured part was invalidated as an uncopyrightable idea.¹³⁹ Like Pyrotechnics's protocol, the *Southco* system's nine assigned digits and groups of digits signified different characteristics, such as screws, thread type, and metal finish.¹⁴⁰ In comparison, the court noted Pyrotechnics's protocol had twelve-byte messages, where different bytes or groups of bytes signified different functions for the operation of the field modules.¹⁴¹ Since both *Southco*'s and Pyrotechnics's works were "produced mechanically using . . . fixed rules," the court considered each an uncopyrightable idea.¹⁴²

After dispensing with the copyrightability of the messaging format, the court then took aim at the copyrightability of the individual messages sent by the protocol from the FireOne control panel to corresponding field modules.¹⁴³ The primary grounds for the court's rejection of the copyrightability of the individual messages was the lack of a modicum

136. See *id.* (citing *Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, No. 19-cv-00893, 2021 WL 925812, at *9 (W.D. Pa. Mar. 11, 2021), *vacated and remanded*, 38 F.4th 331 (3d Cir. 2022)) (summarizing and affirming the findings of the district court). The court pointed out that the purpose and function of communication is reinforced by Pyrotechnics's repeated references to the "communication protocol" and the "communication code." *Id.* (emphases omitted).

137. See *id.* (holding communication between the FireOne control panel and field modules was both the purpose and idea of the protocol). The Third Circuit corrected the district court by concluding that there is no separation between the expression and ideas that form Pyrotechnics's copyright, holding that under *Whelan Associates*, the communicative purpose of the protocol was "also the protocol's idea." *Id.* (citing *Whelan Assocs.*, 797 F.2d at 1236).

138. 390 F.3d 276 (3d Cir. 2004) (en banc) (holding a serial numbers assignment system by a parts manufacturer lacked the requisite originality for copyright protection). In *Southco*, the Third Circuit reasoned that the mechanical application of a parts-numbering system conveyed a purely functional purpose that could not be copyrighted. *Id.* at 282.

139. See *Pyrotechnics Mgmt.*, 38 F.4th at 338 (citing *Southco*, 390 F.3d at 278) (summarizing *Southco*'s holding).

140. See *id.* at 338–39 (citing *Southco*, 390 F.3d at 284) (comparing the parts-numbering system in *Southco* to the communications protocol in *Pyrotechnics Management*).

141. See *id.* (citing *Southco*, 390 F.3d at 282–84) (describing the mechanical nature of the Pyrotechnics protocol).

142. See *id.* (quoting *Southco*, 390 F.3d at 284) (holding the messaging format uncopyrightable). The *Pyrotechnics Management* court explained that the lack of creativity in both works rendered them pure ideas rather than creative expressions. *Id.*

143. See *id.* at 338–40 (analyzing the copyrightability of the remaining components of the protocol).

of creativity.¹⁴⁴ Again, the court used *Southco* as a comparable example for the framework of its originality analysis, stating that the manufacturer's part numbers were insufficiently original because each number was dictated by the rules of the numbering system, and thus had no inherent creativity.¹⁴⁵ The court noted that had the parts been numbered creatively, customers would be unable to use the numbering system to identify parts for purchase.¹⁴⁶

Applying this comparison to the protocol's individual messages, the court reached the same conclusion—the lack of originality disqualified the messages from copyrightability.¹⁴⁷ On this issue, it concluded “Pyrotechnics’s digital messages can ignite fireworks, but like *Southco*’s part numbers, they lack ‘even a spark of creativity.’”¹⁴⁸ Each of the considerations that prevented *Southco* from securing copyright protection for its part-numbering system stymied Pyrotechnics: (1) the protocol’s messages were generated according to mechanical rules, (2) creative formulation of the messages would render them useless, and (3) the messages were “an ‘inevitable sequence dictated by the logic’ of the [protocol’s] format.”¹⁴⁹

In conclusion, the Third Circuit held that because all three components described in the Deposit Copy failed to meet the requirements of copyrightability, the district court erred when it granted an injunction for Pyrotechnics based on a plausible copyright infringement claim.¹⁵⁰ The Third Circuit remanded the case and ordered the district court to

144. *See id.* at 339 (describing the statutory requirements for copyrightability (citing 17 U.S.C. § 102(a) (2018))); *see also* NIMMER ON COPYRIGHT, *supra* note 7, § 2.01[B][3] (describing the creativity requirement in copyright). For further discussion of the creativity requirement, *see supra* notes 33–35 and accompanying text.

145. *See Pyrotechnics Mgmt.*, 38 F.4th at 339 (citing *Southco*, 390 F.3d at 282) (explaining that in *Southco*, once the numbering system was implemented, all the products and parts within the system were mechanically assigned numbers, which allowed for no creativity). The *Pyrotechnics Management* court emphasized that when a work is generated automatically, with no opportunity for any creative changes or individual expression, the originality requirement has not been met. *Id.*

146. *See id.* at 339–40 (citing *Southco*, 390 F.3d at 282–83) (explaining how the method by which a message or part number is chosen can be dispositive evidence of unoriginality). The court observed that “protection should not be extended to part numbers that represent an ‘inevitable sequence dictated by the logic of the parts system.’” *Id.* (quoting *Southco*, 390 F.3d at 282–83).

147. *See id.* at 340–41 (holding the creativity in the messages was insufficient to confer copyright protections). The court expressed its disagreement with the district court, finding that the “creativity in the individual digital messages is, at most, de minimis.” *Id.* *See also supra* notes 33–35 and accompanying text for a discussion of the originality requirement.

148. *See Pyrotechnics Mgmt.*, 38 F.4th at 340 (quoting *Southco*, 390 F.3d at 283) (holding the digital messages lacked originality); *see also supra* notes 33–35 and accompanying text for a discussion of the originality requirement.

149. *See Pyrotechnics Mgmt.*, 38 F.4th at 340 (quoting *Southco*, 390 F.3d at 282–83) (reasoning the mechanical nature of the messages’ creation could not support a finding of creativity).

150. *See id.* at 341 (summarizing the decision of the case).

dismiss Pyrotechnics's copyright infringement claim against fireTEK with prejudice.¹⁵¹

V. IGNITING SPARKS: THE THIRD CIRCUIT SHINES LIGHT ON A
LONG-IGNORED ASPECT OF API COPYRIGHTABILITY

This Note argues that in *Pyrotechnics Management*, which held that Pyrotechnics's communications protocol fell outside the subject matter of copyright, the Third Circuit: (1) correctly applied longstanding principles of copyrightability, such as the idea-expression rule, by using analogous caselaw, (2) used an efficient approach to the merger doctrine to apply to purely functional computer code, and (3) furthered longstanding policy goals by separating copyright from patents and preserving interoperability. This Note, however, contends that despite laying the logical foundation to do so, the Third Circuit did not definitively conclude that APIs and similar computer interfaces are uncopyrightable.

A *Proper Application of Copyright Doctrines*

The exclusion of systems and methods from the subject matter of copyright has been a well-established principle of copyright law since the Supreme Court's decision in *Baker* and its codification in 17 U.S.C. § 102(b).¹⁵² It is evident from the labyrinthian case law emanating from this seemingly simple rule that application of the rule becomes difficult when the court encounters a computer program it has not seen before.¹⁵³ The question the Third Circuit had to face in *Pyrotechnics Management* concerned how the essence of Pyrotechnics's protocol could be framed to allow for a copyrightability analysis.¹⁵⁴ This Note argues that the court's hybrid use of analogies and precedential copyrightability tests illuminates a useable framework for courts evaluating new software's copyrightability

151. See *id.* (declaring the court's intention to vacate the injunction).

152. See Samuelson & Crump, *supra* note 38, at 421–22 (describing the impact of the exclusions inspired by *Baker*). The authors discuss how in addition to other courts' application of *Baker*'s holding to reject claims of infringement for the copying of systems, Congress codified the method and systems exclusion in 17 U.S.C. § 102(b). *Id.* at 422.

153. See, e.g., Mathias Strasser, *A New Paradigm in Intellectual Property Law? The Case Against Open Sources*, 2001 STAN. TECH. L. REV. 2, 24 (2001) (describing the challenges of copyright doctrines). Strasser argues that “a central question that arises in virtually all copyright cases involving software is which aspects of software constitute original expressions of ideas and are thus copyrightable literary works within the meaning of Section 101, and which are merely facts or ideas and as such ineligible for copyright protection.” *Id.* at 15.

154. See *Pyrotechnics Mgmt.*, 38 F.4th at 338 (describing the difficulty in applying the idea-expression rule). The court recognized that the idea-expression rule for utilitarian works is “‘difficult to understand in the abstract,’ [but] the rule becomes clearer in its application.” *Id.* (quoting *Whelan Assocs., Inc. v. Jaslow Dental Lab’y, Inc.*, 797 F.2d 1222, 1248 n.28 (3d Cir. 1986)).

and allows *Pyrotechnics Management's* holding to be applied to other technologies such as APIs.¹⁵⁵

The Third Circuit in *Pyrotechnics Management* reflected on its decision in *Apple Computer* and recognized that the harsh constraints its test placed on the idea-expression rule for software were untenable; the *Apple Computer* court refused to recognize that there was a line to draw between different types of computer programs to evaluate copyrightability.¹⁵⁶ By considering what purpose or function *Pyrotechnics's* protocol actually served and then comparing the findings to previously evaluated works and systems, the Third Circuit followed the test developed in *Whelan Associates* and used *Southco's* parts numbering system as the closest analogy.¹⁵⁷

The Third Circuit's hybrid analogical approach in evaluating the copyrightability of the protocol was correct for two reasons: it acknowledges the fact that computer software subject to copyright varies significantly in composition, function, and design, and compares logically analogous software to determine logically analogous copyrightability—a consideration that the *Apple Computer* test ignored.¹⁵⁸ Additionally, the Third Circuit's analogy to *Southco's* parts numbering system mirrors the Supreme Court's analogy in *Google*, where the Court drew comparisons between the JavaSun API and “file cabinets, drawers, . . . the Dewey Decimal System, gas pedals . . . [on] cars, . . . QWERTY keyboards,” website categories for browsing, and “most strangely, human keystrokes that might direct robots to fetch recipes and deliver them to cooks.”¹⁵⁹ Other scholars have compared the protocol in *Pyrotechnics Management* to the functionality of a remote control.¹⁶⁰ The conceptualization of complex

155. See, e.g., Strasser, *supra* note 153, at 25 (demonstrating issues with copyrightability of certain processes). Strasser notes that “[s]ince protocols and interface specifications consist of factual information, similar to the description of the bookkeeping system that was at issue in *Baker v. Selden*, they are not considered eligible for copyright protection.” *Id.* at 15.

156. See Skaist, *supra* note 69, at 33 (noting the modern departures from *Apple Computer*); see also Buckman, *supra* note 18, at 4 (summarizing the *Apple Computer* court's rejection of the functionality distinction in computer programs). Buckman recites how the court in *Apple Computer* refused to consider the differences between operating systems and application programs on the grounds that “copyright of a program should not depend on the uses to which it will be put.” *Id.*

157. See *Pyrotechnics Mgmt.*, 38 F.4th at 338–39 (drawing analogies to other cases); see also *Whelan Assocs.*, 797 F.2d at 1248 (establishing the line drawing approach to the idea-expression rule that focuses on purpose and function); *Southco, Inc. v. Kanebridge Corp.*, 390 F.3d 276, 282 (3d Cir. 2004) (holding the parts-numbering system was an uncopyrightable idea).

158. See, e.g., Skaist, *supra* note 69, at 33; Buckman, *supra* note 18, at 4 (demonstrating the inadequacies of the *Apple Computer* test).

159. See Lemley & Samuelson, *supra* note 17, at 37–38 (explaining that in *Google*, “[t]he Court spoke of the Java API's overall organization as a ‘system’” and determined that Google copied some of the declarations of the API for the sole purpose of ease of interoperability between platforms for their programmers (quoting *Google LLC v. Oracle Am., Inc.*, 141 S. Ct. 1183, 1192–93 (2021))).

160. See Risch, *supra* note 22 (noting the analogies used in *Pyrotechnics Management* were also applied in *Google*); see also Michael Risch, *Google v. Oracle and the Search for an Analogy*, WRITTEN DESCRIPTION (Oct. 12, 2020, 8:00 AM), <https://writtendescription.blogspot.com/2020/10/google-v-oracle-and-search-for-analogy>.

software via analogies to more generally understood phenomena allows courts to properly apply copyrightability doctrines to software, as the Third Circuit shows in *Pyrotechnics Management*.¹⁶¹

B. *Merger and Scènes à Faire*

It should be noted that, in contrast to previous cases, the *Pyrotechnics Management* court did not delve into a deep merger or scènes à faire analysis to establish that the protocol was uncopyrightable under the idea-expression rule.¹⁶² The court's lack of analysis does not pose a problem, however, as merger and scènes à faire are variations of the idea-expression dichotomy.¹⁶³ To apply the merger doctrine as a basis of exclusion from copyrightability, a court must identify the expression contained within the copyrighted work and the concept of the expression; if those two components are the same—meaning there is only one way to express the concept of the copyrighted work—the work is regarded as an idea rather than the expression of an idea.¹⁶⁴ Rather than diving into a complex analysis to identify exactly what the concept of the protocol means, the court instead concluded that its reliance on the method of operation rule was sufficient to address the copyrightability of the protocol.¹⁶⁵

Although other cases have heavily relied upon merger and scènes à faire analyses to scrutinize the issue of code copyrightability, the Third

html [<https://perma.cc/9DVD-NGHG>] (outlining the arguments that a remote control should not be copyrightable). Risch explains how a television's remote control operation is identical to what is performed by the Pyrotechnics protocol. *Id.* The television's remote control takes an input—a physical pressure from a human finger—and translates it into an electrical signal that is beamed via an infrared wave to the television receiver, thus changing the channel. *Id.*

161. See, e.g., Depoorter, *supra* note 6, at 1848 (noting new technology makes reasoning by analogy more difficult in copyright). Depoorter claims that technology's evolution complicates copyright law because courts have more difficulty using analogies to understand the nature of the works they are evaluating. *Id.*

162. See *Apple Comput., Inc. v. Franklin Comput. Corp.*, 714 F.2d 1240, 1253 (3d Cir. 1983) (considering the merger doctrine implications of the disputed computer program), *abrogated by* *TD Bank N.A. v. Hill*, 928 F.3d 259 (3d Cir. 2019).

163. See *Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, 38 F.4th 331, 339 n.7 (3d Cir. 2022) (discussing the merger doctrine in footnotes). The court stated: “[b]ecause we conclude that Pyrotechnics’s digital message format is an essential part of the protocol’s idea, even if any part of the digital message format is expression, the merger doctrine bars enforcement of copyright protection for that expression.” *Id.* See also MENELL, LEMLEY, MERGES & BALGANESH, *supra* note 10, at 588 (describing how the merger doctrine is a logical extension of the idea-expression dichotomy established in *Baker*).

164. See NIMMER ON COPYRIGHT, *supra* note 7, § 2A.05[B] (explaining the permutations of the *Baker* decision and the merger doctrine).

165. See *Pyrotechnics Mgmt.*, 38 F.4th at 339 n.7 (addressing the merger argument). The Third Circuit briefly concluded that even if it was to apply the merger doctrine to the protocol, the same result would ensue: the protocol is an uncopyrightable idea regardless of the analytical path. *Id.* See also Joshua L. Simmons, *The Five Ws of Merger*, 43 COLUM. J.L. & ARTS 407, 412 (2020) (arguing that applying merger is unnecessary when other doctrines would answer the question of copyrightability (citing *Apple Comput.*, 714 F.3d at 1253)).

Circuit declined to apply these tests due to the nature of Pyrotechnics's protocol.¹⁶⁶ The programs considered in other cases were more complex, often containing both object and source code; here, the Third Circuit took the most straightforward approach to address a simpler work of authorship.¹⁶⁷

C. *Preserving the Distinction Between Patent and Copyright
and Protecting Interoperability*

The Third Circuit correctly applied the idea-expression rule when it held that the protocol was an uncopyrightable idea, which was established in *Baker* and codified in 17 U.S.C. § 102(b).¹⁶⁸ The separation between expressions and ideas serves an important policy of intellectual property: the law should strike a balance between encouraging creativity through copyright rights and preserving the freedom to use the created ideas.¹⁶⁹ Methods, processes, and ideas have historically and continuously been relegated to the protections afforded by patent law, not copyright.¹⁷⁰ In the text of *Pyrotechnics Management*, the Third Circuit noted that extending copyright protection to the protocol would give Pyrotechnics a monopoly on the methods of communication with its hardware—a right that can only be secured through a patent application.¹⁷¹

Additionally, the Third Circuit's decision to reject the protocol's copyrightability recognizes that the utilitarian nature of computer

166. See, e.g., *RJControl Consultants, Inc. v. Multiject, LLC*, No. 16-10728, 2022 WL 163614, at *7–8 (E.D. Mich. Jan. 18, 2022); *Lexmark Int'l, Inc. v. Static Control Components, Inc.*, 387 F.3d 522, 535 (6th Cir. 2004) (relying on both merger and *scènes à faire* to evaluate copyrightability); see also *Lotus Dev. Corp. v. Borland Int'l, Inc.*, 49 F.3d 807, 815 n.9 (1st Cir. 1995) (applying a brief note to merger in the footnotes), *aff'd*, 516 U.S. 233 (1996).

167. See Strasser, *supra* note 153, at 8 (providing the definition for source and object code). Strasser explains that object code is “directly executable on computers” and therefore must conform to the specific machine language of the computer on which it operates. *Id.* Source code is not directly executable and must be “translated” via a method called “compiling” in order for a computer to read it as object code and execute the task contained in the code. *Id.* at 5.

168. See Samuelson & Crump, *supra* note 38, at 421–22 (describing the history of the exclusions of systems and methods from copyright protection).

169. See, e.g., NIMMER ON COPYRIGHT, *supra* note 7, § 2A.06[A][1] (describing Congress's purpose in limiting the copyrightability of functional expression).

170. See *Baker v. Selden*, 101 U.S. 99, 104–05 (1879) (describing the separation of copyright and patent). The Court stated:

The description of the art in a book, though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself. The object of the one is explanation; the object of the other is use. The former may be secured by copyright. The latter can only be secured, if it can be secured at all, by letters-patent.

Id. at 105.

171. See *Pyrotechnics Mgmt., Inc. v. XFX Pyrotechnics LLC*, 38 F.4th 331, 339 n.7 (3d Cir. 2022) (reiterating that patent protection would have afforded Pyrotechnics the right to exclude others from creating compatible devices (first citing *Silvertop Assocs., Inc. v. Kangaroo Mfg. Inc.*, 931 F.3d 215, 222 (3d Cir. 2019); and then citing *Mazer v. Stein*, 347 U.S. 201, 217 (1954))).

programs requires a different copyrightability and infringement treatment than traditional literary works: before considering infringement, the functional components of a computer program must be “filtered out” as they exceed the scope of copyright under § 102(b).¹⁷² The Third Circuit corrected the district court’s failure to implement this treatment, and in doing so preserved the distinction between uncopyrightable ideas and expressions that Congress intended when it codified *Baker*.¹⁷³

The Third Circuit’s decision echoes previous judicial approaches to promoting the policy of the right to interoperability as well.¹⁷⁴ In the lens of software, courts strive to avoid stifling innovation by creating rights that inhibit interoperability or the ability of systems to work with one another.¹⁷⁵ Here, the Third Circuit mirrored the conclusion the Ninth Circuit reached when it considered whether an unlicensed software developer had committed copyright infringement by adapting its own video game platform to be able to run on a popular gaming console.¹⁷⁶ The Third Circuit similarly rejected the copyrightability of a work that would give the holder a de-facto monopoly over the functional interface of its hardware, a right conferred to patent holders after a far more rigorous approval process.¹⁷⁷ The facts in *Pyrotechnics Management* show an unlicensed developer trying to achieve compatibility with a popular platform, and the Third Circuit correctly preserved the distinction between patent and copyright.¹⁷⁸

172. See Samuelson & Crump, *supra* note 38, at 424–25 (quoting *Comput. Assocs. Int’l, Inc. v. Altai, Inc.*, 982 F.2d 696, 706–11 (2d Cir. 1992)) (describing the need to treat computer programs differently from literary works to assess infringement).

173. See *id.* at 422 (noting the exclusions for methods and systems was well established when it was codified in § 102(b)). By codifying the exclusion for methods and systems, “Congress sought to ensure that the copyright in computer software and other works that embody functional elements would not be construed too broadly.” *Id.* (first citing H.R. REP. NO. 94-1476, at 57 (1976); and then citing S. REP. NO. 94-473, at 54 (1976)).

174. See *Pyrotechnics Mgmt.*, 38 F.4th at 339 n.7 (noting that granting copyright protection to the protocol would have given Pyrotechnics a monopoly on communication with its products).

175. See Lemley & Samuelson, *supra* note 17, at 4 (describing the policy benefits to courts promoting compatibility between software). Lemley and Samuelson note that there has been a longstanding commitment by the courts to promote this policy objective. *Id.*

176. See *Sega Enters. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1526 (9th Cir. 1992) (rejecting the copyrightability of functional interfaces). In denying the copyrightability of the Sega interface, the Ninth Circuit held that if Sega wanted to enjoy the right to exclude others from using its interface, it would have to obtain a patent. *Id.* See also Pamela Samuelson, *Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement*, 31 BERKELEY TECH. L.J. 1215, 1260 (2016) (summarizing different cases with interoperability issues).

177. See *Pyrotechnics Mgmt.*, 38 F.4th at 339 n.7 (noting Pyrotechnics could have a monopoly on their protocol with a patent); see also Samuelson & Crump, *supra* note 38, at 417–18 (explaining the standard established in *Sega Enterprises* for interface copyrightability (citing *Sega Enters.*, 977 F.2d at 1522)).

178. See *Pyrotechnics Mgmt.*, 38 F.4th at 339 (denying an interface monopoly to Pyrotechnics); see also Samuelson, *supra* note 176, at 1260 (summarizing different cases with interoperability issues).

D. *Continuing the Debate Over Interface Copyrightability*

The Third Circuit's decision in *Pyrotechnics Management* did not provide a conclusive answer to whether all APIs and other computer interfaces are uncopyrightable for a simple reason: the question was beyond the scope of its review on appeal from the district court.¹⁷⁹ The logical foundation laid in this opinion leads to a conclusion that computer interfaces fall outside the scope of copyrightability, but the words themselves are absent from the *Pyrotechnics Management* opinion.¹⁸⁰ Therefore, despite the omission of an unequivocal holding on the copyrightability of computer interfaces, the Third Circuit's promotion of interoperability, reinforcement of the requirement of originality, and application of the method of operation exclusion all indicate that a Third Circuit court using *Pyrotechnics Management* as precedential authority could likely rule that APIs and interfaces fail a copyrightability analysis.¹⁸¹

VI. END OF THE SHOW? THE FUTURE OF THE TECH INDUSTRY
ON COPYRIGHTABILITY

Although the scope of the impact of a case involving technology as niche as fireworks display equipment seems limited at first glance, the *Pyrotechnics Management* decision has the potential to influence copyrightability standards, views on interoperability, the technology market, and even artificial intelligence.¹⁸² If the Third Circuit had allowed *Pyrotechnics*'s protocol to retain its copyright protection, other manufacturers, developers, and competitors in the fireworks display industry, such as fireTEK, would have been legally barred from creating compatible devices.¹⁸³ The Third Circuit's holding is a victory for proponents of interoperability and will benefit startup software developers.¹⁸⁴

Holding APIs are uncopyrightable will encourage innovation and development in the technology markets.¹⁸⁵ The *Google* Court contemplated this policy objective, stating that in addition to protecting the

179. See generally *Pyrotechnics Mgmt.*, 38 F.4th at 333–41 (highlighting that the question of interface copyrightability was never posed to the Third Circuit).

180. Compare *id.* (disregarding an unraised issue of interface copyrightability), with *Google LLC v. Oracle Am., Inc.*, 141 S. Ct. 1183, 1211 (2021) (Thomas, J., dissenting) (criticizing the majority's refusal to address the copyrightability issue of the JavaSun API).

181. See, e.g., Anand, *supra* note 23 (advising practitioners to seek alternative intellectual property protections for similar software); see also Goldman, *supra* note 129 (describing how the Third Circuit's decision addressed some of the missing pieces from *Google*).

182. For further development of this argument, see *infra* notes 183–95 and accompanying text.

183. See *Pyrotechnics Mgmt.*, 38 F.4th at 337 n.6, 339 n.7 (demonstrating that *Pyrotechnics* was seeking a monopoly through copyright).

184. See Lemley & Samuelson, *supra* note 17, at 51 (arguing interoperability is crucial for small software companies).

185. See *id.* (discussing the wide variety of benefits interoperability brings to technology markets).

intellectual property rights of an author, courts should also consider the public benefits of copying and the risk of public harm caused by copyright enforcement.¹⁸⁶ Particularly, the *Google* Court expressed disapproval of Oracle's perceived actions as "trying to put a lock not only on Google's, but also on millions of Java programmers', creativity."¹⁸⁷ As discussed throughout this Note, the challenge of balancing creativity and protection when drawing the line of copyrightability is critically important to software, much more so than in other areas.¹⁸⁸ Additionally, other scholars argue the defense of fair use that delivered victory to the petitioners in *Google* is not enough to protect interoperability: copyrightability is a more robust protector.¹⁸⁹

Interoperability and broad ability to use APIs also have antitrust implications, and without the legal ability to utilize APIs, programmers and software developers would "be at the mercy of platform and programming giants who could decide whether, when, and how anyone could write or use a computer program that ran on their system."¹⁹⁰ Interoperability is not merely concern for markets in the United States; the European Digital Markets Act, which entered into force in November 2022, requires operating systems to permit interoperability to combat the "walled gardens" of tech giants that dominate the internet today.¹⁹¹

Finally, because the mechanical production of the messages in Pyrotechnics's protocol rendered them insufficiently original, more complex works generated from machines could be affected by the Third

186. See Pamela Samuelson, *Three Surprises in the Supreme Court's Google v. Oracle Decision*, KLUWER COPYRIGHT BLOG (Apr. 12, 2021), <http://copyrightblog.kluweriplaw.com/2021/04/12/three-surprises-in-the-supreme-courts-google-v-oracle-decision/> [<https://perma.cc/LR3E-DKUT>] (summarizing the market-harm consideration factors recognized in *Google*). Samuelson views the Court's focus on the harm to future programmers' creativity to be antithetical to the "basic creativ[e] objectives" of the protections afforded by copyright. *Id.* (quoting *Google LLC v. Oracle Am., Inc.*, 141 S. Ct. 1183, 1208 (2021)).

187. See *id.* (summarizing the Court's distaste for Oracle's anti-competitive activities).

188. See Lemley & Samuelson, *supra* note 17, at 52 (explaining the dangers of copyright overprotection in software). Lemley and Samuelson argue that overprotecting song copyrights, for example, might discourage others from making similar music, but overprotecting software threatens to shut down the "software development ecosystem altogether." *Id.*

189. See *id.* at 43–44 (explaining the problems with reliance on fair use). Lemley and Samuelson argue that the fact-specific nature of a fair use defense, the burden of proof on defendants, the requirement of a competent jury, and high litigation costs are all factors demonstrating how fair use is a less desirable approach than an uncopyrightability argument for software copyright infringement defendants. *Id.*

190. See *id.* at 52 (noting the asymmetry in developing capability between large and small software developers); see also Charles Duan, *A Tale of Two Interoperabilities; or, How Google v. Oracle Could Become Social Media Legislation*, 2021 CARDOZO L. REV. DE-NOVO 246, 250 (2021) (discussing that without interoperability of software, inexorable monopolies could become entrenched in the social media industry).

191. See Lemley & Samuelson, *supra* note 17, at 52–53 (quoting Dan Hunter, *Walled Gardens*, 62 WASH. & LEE L. REV. 607, 611 (2005)) (noting the international efforts taken to address the problem of software copyrightability in the context of promoting competition).

Circuit's decision.¹⁹² The Third Circuit ultimately rejected much of the Pyrotechnics protocol's copyrightability for a want of originality in the works—effectively, an uncreative, rigid, and routine-driven values selection method did not meet the requirement of human creativity needed for copyright protection.¹⁹³ Some have speculated that this rationale of originality in *Pyrotechnics Management* could be used to deny copyrights to works created by artificial intelligence, despite the significant human effort expended to create such machines.¹⁹⁴ Answers to this question are beyond the scope of this Note, but eventually, courts will face the challenge of deciding AI copyrightability.¹⁹⁵

192. See David Rabinowitz, *Court Extinguishes Firework Co.'s Copyright, but Decision Sparks Debate on the Future of Copyrightability of AI*, MOSES SINGER BLOG (Sept. 14, 2022), <https://www.mosesinger.com/publications/court-extinguishes-firework-co-s-copyright-but-decision-sparks-debate-on-the-future-of-copyrightability-of-ai> [<https://perma.cc/W7RK-YLK5>] (raising the question of AI copyrights).

193. See *id.*; see also *supra* notes 33–35 and 144–50 and accompanying text for a discussion of the requirement of originality and the Third Circuit's application of this principle.

194. See Rabinowitz, *supra* note 192 (arguing *Pyrotechnics Management* could be applied to more complex machine-created works).

195. See, e.g., Riddhi Setty & Isaiah Poritz, 'Wild West' of Generative AI Poses Novel Copyright Questions, BLOOMBERG L. NEWS (Nov. 18, 2022, 11:00 AM), <https://news.bloomberglaw.com/ip-law/wild-west-of-generative-ai-raises-novel-copyright-questions> [<https://perma.cc/78W9-SK7M>] (highlighting the lack of decisions and consensus in artificial intelligence copyright jurisprudence).

