Evolution of the tetromino-stacking game: An historical design study of *Tetris*

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ABSTRACT

The ubiquitous tetromino-stacking computer game known as *Tetris* is followed through its complex 25-year history. Special attention is paid to relatively unknown or under-appreciated technical and business-legal aspects of the game's history as it has evolved in several stages from a hobby project into a massive, global brand and computer game franchise. Some specific innovations and variations in game mechanics through a range of implementations and platforms are analyzed and compared. The design aspects of the game mechanics and other presentational elements are further contextualized by a critical analysis of the business and commercialization of Tetris into an increasingly consolidated brand on the one hand, and the substantial proliferation of free and unlicensed clone variants on the other. Following a discussion of the legal aspects of the intellectual property claimed by The Tetris Company, I conclude by suggesting the possibility of a marked shift in the near future of Tetris, as a result of increasingly-assertive independent developers combined with ambiguous legal claims to propriety that may eventually undermine the stability of the commercial enterprise in its current form.

Author Keywords

Tetris, video game history, video game industry, game design, game mechanics, intellectual property, platform studies, comparative game studies

INTRODUCTION

Almost everyone who has ever played a computer game has at some point encountered the ubiquitous tetromino-stacking game known as Tetris. One of the most popular computer games of all time since its invention in 1984, Tetris has remained an international pastime, an instantly-recognizable cultural icon, and perhaps most suprisingly, Tetris is still a commercially viable best-selling product, despite (or perhaps because of) the relative simplicity of its game rules compared to most of today's much more elaborate productions. However, not much of substance has been said or discussed within the academic community regarding the game's enduring legacy, aside from being cited as a canonical example of abstract game formalism [12] or summaries of its core game mechanics [9]. As a discipline, what more can we contribute to its study and understanding?

Figure 1: Three variants of Tetris: - *ТЕТРИС* (Electronika-60, 1984), *Heboris* (Windows/DirectX, 2001), and *Tetris Friends* (Facebook/Flash, 2008)

First, though is quite old by computer game standards, Tetris is by no means a singular, fixed or stable object, and in order to begin to understand the cultural meaning of Tetris in its entirety we must maintain a strong sense of the game's diversity and historical evolution, not only in its standard set of abstract game mechanics, but also as represented by the hundreds (if not thousands) of concrete implementations, 'official' and otherwise, spread across dozens (if not hundreds) of computing platforms. Although it is clear that the three variants of Tetris in Figure 1 all implement the same general underlying game algorithm in some recognizable form, simply conflating the three because they all share the same essential concept would be a gross simplification and would pass over a great deal of what our digital culture has come to understand as Tetris today and why.

Second, in addition to being a popular game, Tetris has been cultivated into a world-famous brand, strongly protected intellectual property, and a billion-dollar, international commercial business enterprise. I believe that critical discussions of the business-legal significance of

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modern intellectual property law's relation to creative expression is sorely underrepresented in our academic study of video games. The evolution of Tetris is a vivid example of the ability of powerful organizations to exert enormous influence over the reception and direction of creative work, particularly within commercial landscapes so largely dominated by heavily regulated, proprietary technical systems such as console and mobile platforms. The legal system's ongoing development and refinement of digital intellectual property law has constrained and influenced the potential for the unmitigated creative evolution of video games as much (or more) than the constraints of technical platforms alone.

Finally, this paper stems partly from a simple interest in reconstructing the relatively complex quarter-century history of a single, popular video game: to narrate the origin and historical evolution of Tetris in a manner emphasizing different elements from those in its generally reported histories, so that an alternative or supplemental depiction of a central object of computer game culture might not be lost or further distorted over time. My account is hardly complete or definitive, but I hope it will generate some interest from others in the significance of such a perspective. To resurrect Montfort's resonating caricature of 'Tetris Studies' [13], the troubling uselessness of such a hypothetical field is assumed from a largely uncontested assumption that a 'Tetris study' must involve a myopic focus on the timeless, abstract tetromino-stacking algorithm and nothing more - an assumption to which this study is an initial response.

A note on 'platforms'

As a term recently introduced to the game studies community by Bogost and Montfort's inaugural entry in a new book series, Platform Studies "investigates the relationships between the hardware and software design of computing systems and the creative works produced on those systems" [3]. In general, a platform-oriented perspective provides a shift of emphasis away from looking at an object in isolation and instead towards a presentation of the artifact within its various systemic constraints and affordances, so that we can gain a broader appreciation and understanding of the object's particular relevance or cultural value. The primary contribution offered by Bogost and Montfort's initiative that makes it particularly suitable for the study of digital games is a more interdisciplinary scope of 'platform' that extends beyond the domains of traditional social systems in their call to "go deeper, to the metal" - including computer and console architectures, programming languages and development frameworks, where technical platforms had previously been mostly ignored in humanistic study and taken for granted beyond the discourse of the specific technical communities themselves. The technical constraints of various computing platforms heavily informs my understanding of Tetris' historical and cultural significance; however, I caution against a platform focus exclusive to computer systems – I find a softer approach in Bogost's essay on comparative game criticism where the platforms of video game production navigated by a bricoleur “more Macgyver or A-Team, less mere handyman” are eclectic and often very technical, but not necessarily or strictly computer systems [2]. For the study of Tetris, I add the business-legal platform as an equally crucial systemic influence (and an equally-impenetrable technical discipline to the uninitiated).

Another theoretical frame to my approach is Bruno Latour's sociological perspective that focuses specifically on processes by which facts and artifacts progress through a period of unformed discursive moments of heavy resistance, controversy and uncertainty into stabilized, accepted and adopted truths. In particular, Latour's perspective on the history of the engineering of the Eagle minicomputer [10] is very much a digital 'platform study' avant le lettre.

From this theoretical basis I raise an additional question: Has the reception, adoption and stabilization of the cultural entity which we know as Tetris advanced to the point that can no longer be considered a singular creative work, but a self-sustaining 'game platform' of its own? Although the enormous diversity of variations and subtly different implementations of Tetris throughout its history seem to suggest broad classification as a subgenre of puzzle game, the universally-recognized game concept is still largely subject to unilateral strategic control by a single, powerful organizational entity. This makes the controlled development of Tetris similar in many ways to the controlled ecosystems of proprietary computing platforms, while at the same time it has no longer become singularly dependent upon many of those same platform constraints.

1. June 6, 1984 – Circa 1986 – "Just for fun" / The Early Years

Tetris was invented around the week of June 6, 1984, initially implemented on an Elektronica 60 mainframe computer at the Computer Center of the Russian Academy of Sciences. Alexey Pajitnov, a computer engineer with a hobby interest in AI algorithms and psychology-related games, brainstormed the concept of “tetramino falling into a rectangular glass and piling up at the bottom” [5] during one of his regular collaborative meetings with his two fellow hobbyist game programmers at the Center, Dmitry Pavlovsky and 16-year old Vadim Gerasimov. As one of several simple game prototypes, Pajitnov threw together the first iteration of Tetris on an Electronika-60 computer in about two weeks using the Pascal programming language.

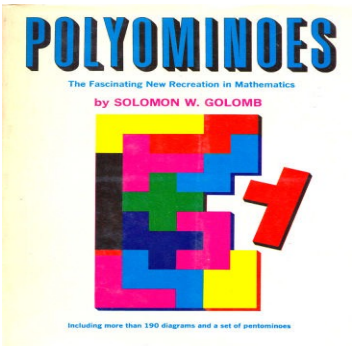

Figure 2: Original cover of Golomb's *Polyominoes*.

The general concept of arranging blocks of simply-connected units ("polyominoes") into packed or tiled configurations had already been a well-studied mathematical field first introduced and popularized by Solomon Golomb, a professor of applied mathematics at the University of Southern California [6]. In particular, Golomb had invented a popular physical-blocks puzzle called "pentominoes", which was a direct basis for the initial prototypes of Tetris. According to the story, Pajitnov had earlier attempted a direct translation of Pentominoes using the keyboard to translate and rotate the blocks, then reduced the blocks to tetrominoes because it was easier to manipulate the smaller pieces within the constraints of the terminal display, and the fewer number of permutations made the game simpler in general. This first prototype, which he called 'Genetic Engineering', eventually morphed into Tetris once the concept of falling blocks was appended.

After Pajitnov showed the game to his team, Gerasimov quickly ported the basic algorithm to DOS using an advanced game porting framework they had developed to handle common game development tasks such as frame timing, keyboard input, graphics display, and a set of relatively sophisticated cross-platform hardware detection routines. Thanks to support for colored text in the MS-DOS terminal, they were also able to render the pieces on screen using uniquely-colored filled blocks rather than the monochrome brackets ([ ]) used in the original representation.

Once the port was completed, Pajitnov and his hobby team attempted to sell their DOS version of the game locally by themselves, but they failed – possibly due to a combination of the lack of business and marketing experience on their side, but I imagine also because there was no real Russian market for independent, commercial computer games at the time (no regulated, accessible distribution channels, no widespread demographic of personal computer owners that could purchase games for their own use, and no real institution of private intellectual property in then-communist Russia). The group eventually started distributing the DOS version of the game for free, and from that point on the game became a huge success, spreading quickly throughout the Academy and beyond. Pajitnov later recalled that "Tetris, in two weeks, was in every single computer in Moscow".

Figure 3: MS-DOS port by Pajitnov and Gerasimov.

Much of the popularity of Tetris was doubtless due to the overall enjoyment of the puzzle-game element itself, but I speculate that a good amount, particularly in its earliest days of public distribution, of its appeal could likely be attributed to its extremely broad platform support, both in terms of the general game algorithm's suitability to character-based terminals with keyboard input, and to their technically-sophisticated MS-DOS porting framework in particular. The rectangular matrix of relatively large cellular blocks, for example, came naturally as a result of the platform constraints of the character-based terminal itself – the now-standard 20-block visible well height was limited by the 24 character-lines of a standard terminal display, and the now-standardized 'delayed auto-shift' parameter was an imposed constraint of the key auto-repeat feature hard-coded into the BIOS of most computer systems and unavoidable without extra low-level workarounds in DOS programs.

The transparency of the game's mechanics combined with its very rudimentary processing and display requirements also meant that after its initial spread throughout eastern Europe it could be ported quickly and easily from one computing platform to another by others. Word of Tetris spread as a sort of folk game in the vein of Nethack or Adventure, developed by a team of hobbyists "just for fun" (to use Gerasimov's own words), having much more in common with the distribution of slang, folktales, or the adoption of an abstract idea or concept than the controlled transmission of a fixed, singularly authored expression.

2. Circa 1986 – June 2, 1989 – Licensing and Consolidation

Soon after Tetris spread throughout Russia and other countries in Eastern Europe, Mirrorsoft, a UK software company noticed ports of the colorful falling-blocks game running on terminals in a Hungarian software company and, realizing the game's appeal and further potential, began license negotiations with the Soviet government in attempts to commercialize it to a wider audience. Within a few years, commercial ports of Tetris blessed by Elorg (Elektronorgtechnica, the Soviet Ministry of Software and Hardware Export that owned and managed all related intellectual property rights for the Soviet Union including Tetris) were developed by Mirrorsoft (and its USA affiliate, Spectrum holobyte) for nearly every home computer platform available at the time.

Figure 4: *ТЕТРИС (TETRIS)* for the Mac II.

The interesting aspect of this 'discovery' of Tetris is the enduring origin narrative quickly affixed to the game as it was packaged and pitched as an exotic, distinctly Russian creation to the rest of the world. The various Mirrorsoft/Spectrum Holobyte versions of Tetris included prominent logos either displaying "ТЕТЯIS" (with a faux-Cyrillic backwards R) or "ТЕТРИС (TETRIS)" (the accurate Cyrillic spelling of the name, usually with a hammer and sickle in place of the final C); title/loading screens and packaging prominently featuring drawings of the brightly-colored and iconic Saint Basil's Cathedral adorned with matching brightly-colored tetromino blocks; in-game background art featuring iconic and historic Russian scenes; and (in some versions) 8-bit reproductions of classic Russian folk songs. Not surprisingly, the historical context of the Cold War made a Russian-invented puzzle game phenomenon particularly attractive meta-narrative for the game, and this unique aspect drew significant media attention above and beyond the game's own formal qualities [11].

During the period of 1987-1989, several competing software companies began engaging in a very complicated and interconnected series of licensing and sub-licensing deals covering the distribution of Tetris on various computer and console-based platforms. (The details of the political, legal and business maneuvering that unfolded is too complicated and unnecessary to recapitulate here, so I instead refer the interested reader to Sheff's thorough account of this period of Tetris history [15].) The struggle ended up with Nintendo owning exclusive rights to the Tetris license for home and portable consoles in the United States, behind which it threw all of its development and marketing clout in order to publish wildly successful variants for the Nintendo and Game Boy.

Figure 5: One of several Tetris-brand board games, bearing the Nintendo packaging design and logo.

However, something subtle and often overlooked took place in the years between the initial spread of Tetris throughout eastern Europe and the 1989 court decision that cemented Nintendo's exclusive console ownership of the game: Through the combined participation of all of the business entities involved, Tetris had evolved from a simple and fun computer game into an industry-dominating, internationally-licensed brand – a collection of trademark and copyright properties, framed by tremendous consumer recognition and appeal, that conferred enormous value to the companies that negotiated the rights to exploit them. A "Pentominoes"-like board game bearing the Tetris brand and the Nintendo logo (Figure 5) provides a visual demonstration of this transformation. The historically significant date is June 2, 1989, the “first use in commerce” date on the official US Patent & Trademark Office registration for the TETRIS mark, despite the name having been used in commerce by various companies other than Nintendo for almost four years at that point. (I will return to examine the intellectual property question later.)

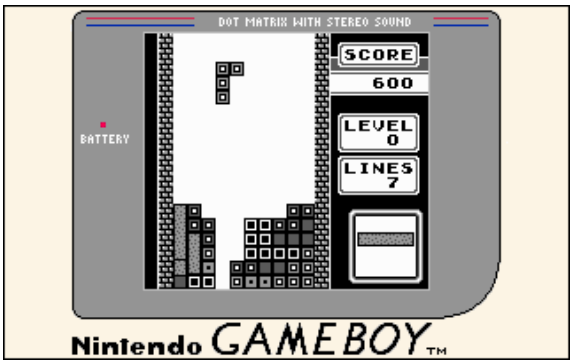

Figure 6: *Tetris* for the Game Boy, the game's best-selling version.

3. June 2, 1989 – April 25, 1996 – Domination and Fragmentation

With Nintendo's securing court-affirmed, exclusive worldwide licenses for the production of Tetris on its near-monopoly console and handheld platforms, the Tetris property was quickly poised for world domination. The Game Boy version of Tetris alone sold over 35 million copies, as the bundled game featured with the enormously successful handheld's initial launch. The continued expansion of the influence of Tetris on every digital game platform is pretty straightforward during this period, so I will emphasize two unique developments:

First, the fallout from the heavily-fragmented licensing situation of the previous Tetris era resulted in at least two distinct, identifiable lines of specific Tetris game mechanics being cultivated by its development houses. In Japan, where Sega ended up with the arcade license, a standard, no-frills arcade version released in 1988 gained a large following across the country and became the de-facto standard Tetris implementation there. In contrast, the NES and Game Boy versions of Tetris published by Nintendo would become the standard for home console versions and come to represent the 'Tetris-ization' of the US market in general.

The evolutionary innovations in Sega's Tetris were significant adjustments in the timing of block movements during and in between placement. The delay auto-shift (DAS) or autorepeat rate was made much faster (1 horizontal block per 60hz frame, or 6 times quicker than in Nintendo's NES variant), allowing pieces to move across the playfield much more quickly. A more noticeable delay between the placement of one block and the spawn of the next was added (known within the player community as entry delay or 'ARE', from the Japanese interjection meaning 'huh?'). Sega's Tetris was also the first to introduce a nontrivial 'lock delay', which let the actively falling block rest on top of the existing stack for a set number of frames, allowing the player to continue sliding the block horizontally before it 'locks' into place and the next piece spawns.

The other branch of Tetris development included the variants of Tetris essentially directed by Henk Rogers, the entrepreneur responsible for negotiating with Elorg to provide Nintendo's Tetris licenses and his Japan-based development company Bullet-Proof Software (BPS). BPS had earlier developed MSX and Famicom versions of the game in Japan, and collaborated with Nintendo to produce their NES and Game Boy versions. Rather than focusing on specific game-mechanic innovations, the main identifying (and lasting) developments within this line of Tetris games were focused on turning Tetris into a household name and an identifiable brand. In contrast to Sega's more generic, no-frills thematic presentation, the BPS line of Tetris continued in the tradition of Spectrum Holobyte's original productions featuring Russian-themed music and artwork highlighting the game's origin. Nintendo's Tetris promotions featured the tagline, "From Russia with fun!", and the Game Boy's infamous arrangement of the Russian folk song 'Korobeiniki' became universally known to gamers as 'the Tetris song'. Also in a deliberate attempt to reinforce the Tetris name, Rogers chose to label the four-line clear move a 'Tetris', taking a cue from Yahtzee's branding of its in-game move.

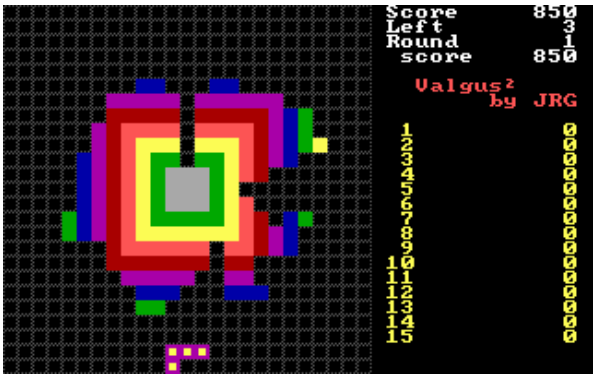

Figure 7: Valgus^2 (1990), a unique shareware tetromino-stacking clone for Atari and DOS platforms.

Second, prompted by its worldwide, multi-platform distribution and exposure, this period also saw a large increase in the number of Tetris clones and homebrew tetromino-stacking games being developed by amateur Tetris fans and distributed on most open-architecture computer platforms such as the IBM-PC, Amiga, Atari ST and Commodore 64. Because console platforms such as the NES were heavily regulated, only officially-licensed Tetris games appeared on those platforms. Interestingly, despite the Tetris brand's uncontested legal monopoly on the right to produce commercial tetromino-stacking games at the

time, smaller-scale titles proliferated without much protest by either Elorg or the various Tetris licensees, probably because most of them never presented any direct threat to the commercialization of Tetris on the closed platforms that were the major markets at the time. Some notably original early unofficial tetromino-stacking games from this era included Valgus^2 (1990 Atari ST, 1991 MS-DOS), a shareware clone featuring named tetrominoes (like the Pac-Man monsters) and stacking blocks in concentric squares in the center of the playfield; Nyet III (1993, MS-DOS), a commercial clone featuring a powerup-purchasing system and over 100 dynamic levels; and ТЕТРИС Semipro-68k (1989, Sharp X68k), a free Japanese clone derived from the Sega arcade version's mechanics, with variable playfield dimensions and the first game to feature a "20G" gravity mode (pieces that drop all 20 rows to the bottom of the well in a single frame, making them movable only during the lock delay period).

4. April 25, 1996 – present – The Tetris Empire

After the Soviet Union collapsed, Elorg became a private company still in control of the worldwide rights to the Tetris property. Starting in 1995, Rogers and Pajitnov began negotiating a joint venture that resulted in the formation of an IP-licensing entity known as The Tetris Company, headed by Rogers and Pajitnov and co-owned by Elorg. Pajitnov would become the new venture's public face, with a public statement by Rogers that "After 10 years of being left out of Tetris licensing deals arranged by a government that no longer exists, modest Alexey is finally getting his due" [14]. With the rights to the Tetris brand finally under direct leadership of Rogers and Pajitnov, the duo used their licensing power to begin exerting a heavy amount of creative influence over all future Tetris-branded games as well as to continue refinements of the Tetris brand itself.

Figure 8: The Tetris logo trademark registration, and an example of its commercial use.

Control over the Tetris brand was reasserted through a major push toward standardization of the use of its licensed property, including product packaging (A new "TETRiS" logo designed in 1995 by album cover artist Roger Dean eventually became the mandatory brand depiction), and terminology (use of the term 'tetrimino' was standardized over the actual mathematical term 'tetromino', possibly in a strategy to eventually assert trademark rights over a more Tetris-like neologism). Officially-licensed Tetris games were now forced to bear a logo designating "Authentic Tetris Game", similar in effect to Nintendo's "Seal of Quality" as an assertion of platform compliance. Finally, The Tetris Company began a strong legal effort to shut down the creation of unlicensed Tetris clones being distributed and/or played online over the rapidly-growing Internet, in efforts to keep this global platform open for their own future plans for expansion.

Another maneuver equally substantial (and controversial) as the consolidation of the Tetris brand was the increasingly mandatory standardization of game mechanics comprising the new official Tetris platform, known as the "Tetris Guideline". After the formation of The Tetris Company, Blue Planet Software (A US-based development company owned by Rogers not to be confused with his Japan-based Bullet-Proof Software, and through which all Tetris-related business licensing deals were funneled) started experimenting with several new innovations of the traditional Tetris game mechanics in its own internally-produced multi-platform Tetris releases, first in The Next Tetris (1999), and next in Tetris Worlds (2001). A subset of these mechanics would eventually form the first revision of the Tetris Guideline, with Tetris Worlds serving as the reference implementation.

Instead of making the Tetris Guideline serve as a conservative implementation of the 'classic' Tetris that players had become familiar with, The Tetris Company pushed the Guideline to standardize not only straightforward design choices (such as block colors, keyboard controls, and playfield dimensions), but additionally as a tool to leverage the adoption of new gameplay elements across its various platform licensees [16]. At the core of the Tetris Guideline is the mandatory "Super Rotation System" (SRS), a set of specifications for the initial spawn and rotation orientations of the seven tetrominoes (derived from BPS' earlier games), as well as a complex and often-counterintuitive 'wall-kick' system designed to allow extremely lenient manipulations of the active piece around other fixed blocks. Part of the SRS algorithm is known as "infinity", an extremely lenient lock delay counter that resets after any lateral movement or rotation of the active piece (essentially allowing the player to suspend a falling block indefinitely without ever locking in place, hence the name). Other Tetris Company-era innovations made mandatory through the Tetris Guideline include a "hold" mechanic (allowing a player to store and retrieve a single falling block for later strategic use) and

"ghost" piece (a faded representation of where a falling piece will land if immediately dropped into the playfield, aiding one's ability to make accurate drops for quicker play).

One of the most interesting aspects of the development of Tetris in the modern era is the ongoing refinement of two extremely specialized, and distinctly different, styles of expert play: High-gravity solo play style perfected by the *Tetris: The Grand Master* Japanese arcade series; and the low/zero-gravity, combo and item-based multiplayer style exemplified by the South Korean online game portal Hangame's multiplayer version of Tetris.

Tetris: The Grand Master

Figure 9: The '>' Secret Grade stacking challenge in *Tetris The Grand Master 2: The Absolute Plus.*

Tetris: The Grand Master (TGM) is a Tetris-licensed arcade game series developed by a small studio named Arika originally released in 1998, that tried to be a version of Tetris that was simultaneously faithful to the classic original experience and as rewarding a challenge as possible [8]. Its design drew heavy inspiration from a strong Tetris-playing culture in Japan which emerged around the early Sega arcade game, where players would not only challenge themselves to play more quickly and accurately, but they would also invent their own unofficial challenges (such as the ">" challenge seen in Figure 9) and even build their own experimental clones (such as *ТЕТРИС Semipro-68k* mentioned earlier) once they reached the limitations of the existing game's control mechanics. TGM relied heavily upon this existing culture in its adaptation and refinement of the 20G concept, and it continues to find new ways to push the cognitive limits of its expert players.

Every aspect of TGM's audiovisual design was carefully crafted to optimize the player's experience of total cognitive control, as described by PetitPrince in his essay on the series [8]: "A white line contours the shape of your stack to provide a good impression of its structure. A unique sound is tied to each of the 7 pieces and is played in advance so you know what is coming next. Similarly, each piece has its own colour. They might seem like small details, but these features add up to allowing the player to know the state of the game in the blink of an eye." Other new, subtle innovations in mechanics, such as the ability to pre-rotate the upcoming piece during the 'ARE' pause, and a more strictly-tuned randomization algorithm that ensured a more even distribution of pieces, made it possible for practiced players to control the playfield even at 20G and with very fast lock delay timings.

Unfortunately, Arika's vision of Tetris did not align with the vision put forth in the Guideline by The Tetris Company, and so the later iterations of the game began to see further refinements to its perfectionist formula mixed up against extraneous additions reluctantly added in order to comply with increasingly strict Tetris licensing requirements. The Guideline-required hold mechanic was added in TGM3 (2005), and the expert difficulty timings were tuned to be much quicker to compensate for the resulting easier block placement. The mandatory SRS rotation with 'infinity' was also added in TGM3, but as an optional, separately-tracked play mode which most expert players were able to easily ignore.

Hangame Tetris

Figure 10: *Hangame Tetris* played live at the televised Korean Burgerking Tetris League event, 25 June 2009.

Hangame Tetris, on the other hand, comes from a line of competitive multiplayer Tetris games directly shaped by the Guideline. In contrast to TGM's 20G mode where piece manipulations take place entirely along the stack's contour, Hangame players manipulate pieces almost entirely at the

top of the playfield, generally hard-dropping the piece before it even moves down a single space. Because piece placements are completely player-controlled and never usually against the stack floor, lock delay is never a factor (and so the use of SRS 'infinity' is less controversial), and ARE and line clear delays are instant in order to maximize the speed at which the player is able to execute actions.

The core competitive mechanic in the Hangame line of expert play emerges from three new Guideline innovations: Holds, combos, and T-Spins. The hold mechanic allows experienced players to more easily and quickly arrange and manipulate well-formed stacks from above. Combos and T-Spins are added score-recognition mechanics (in addition to multiple-line clears) which provides the player a choice of several balanced options for scoring attacks sent to opponents (in the form of 'garbage' which adds rows of blocks to the bottom of the playfield). In competitive play, players will train their play styles in order to maximize the opportunities these new recognition mechanics present in fast-paced matches.

Judging from several videos of competitive tournament play recently televised in Korea, it seems that the play style requires a much greater degree of multi-awareness (watching other players' fields as well as one's own) compared to the intense, singular focus on serialized manipulations found in the TGM series; the pace of action is also much more varied and pushed forward in fits and starts by the players' own sequence of actions, compared to TGM's unrelenting, machine-dictated pace that the player must place under control in a mostly reactive manner.

The Tetris Property

Aside from the intriguing history of the Tetris licensing battles of the late 1980's (which were relatively straightforward from the perspective of legal analysis), the legal history and status of Tetris has since remained peculiarly interesting due to the ambiguous, unresolved status of the various elements of intellectual property claimed by The Tetris Company, and its constant efforts to protect its brand and remove other successful unlicensed titles from competitive marketplaces.

Patent

A patent provides an inventor with a limited protection to the exclusive use and sale of any new and useful machine, algorithm or process. Of the three types of intellectual property, patent applications are held to more rigorous analysis of the original claims, and offer the shortest duration of protection (currently 20 years in the United States).

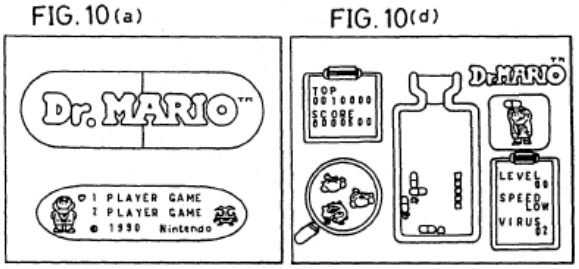

Figure 11: Drawing from Nintendo's 1993 patent for *Dr. Mario*.

No aspect of the Tetris game algorithm was never patented, though the game would clearly fall under the scope of patent protection. For comparison, Nintendo filed a patent in 1993 for 'Dr. Mario', a falling-blocks puzzle game later developed by Nintendo, providing a description of Tetris as its primary background art disclosure and citing the Game Boy Tetris instruction manual in its list of references [17]. Had Tetris been patented when first invented, it would have expired in 2004.

Copyright

The copyright status of video games is ambiguous in general, with courts offering contradictory judgements and widely differing interpretations of the applicability of copyright law to video games. On the one hand, courts have narrowly interpreted copyright law to cover only the components within a video game that can interpreted as a literary or audiovisual work; however, other courts have more broadly interpreted copyright protection to cover general design elements of the video game itself.

A legal analysis of the copyright status of Tetris (or any video game, for that matter) asks one to attempt the impossible: to separate the fixed expression from the abstract idea or algorithm, in a medium where the algorithm is essentially expression itself. However, if we interpret the scope of copyright from the perspective of the crucial interplay between patent and copyright protection, one could reasonably argue for the scope of a copyrighted expression to be that which remains once the embodiment of an idea protectible under a patent is exhausted, since the two are designed to protect mutually exclusive components of a work. (One might say, to invoke a different disciplinary dualism, that the ludologist takes the patent and the narratologist gets left with the copyright.) Since most (if not all) of the basic algorithms underlying Tetris could have been clearly covered by a patent (as it was for Dr. Mario), it follows from this logic that very little, if any, would remain protected by copyright (perhaps the early Russian-themed origin narrative described earlier).

Trademark

A trademark is a word, name, symbol, or device used in trade to indicate a source of goods and to distinguish them from the goods of others. Trademarks are designed to give companies protection over the ability to 'brand' their product, to make it uniquely and instantly identifiable to consumers through a distinctive name or logo. However, this protection is explicitly limited to protect distinguishing marks in order to prevent confusion in the marketplace, not to give one company exclusive rights to the use of any mark - if a mark becomes too commonplace, such that it's used to identify a product itself rather than a specific brand of product, then it can be considered 'generic' and would no longer be protected. (Examples of 'genericized' trademarks include aspirin, escalator, and thermos.)

Despite the Tetris Company's recent efforts to unify its brand image through its standard logo and the Tetris Guideline consolidating the singular impression of an 'authentic Tetris game', I believe that the TETRIS trademark has been conveyed so broadly that it is quite vulnerable to claims of genericness that could render it invalid. Since the beginning of its commercial use, TETRIS has always been marketed to the public as the sole name for tetromino-stacking games in general, and not as a source-identifying name for any implementations in particular. Unlicensed tetromino-stacking game implementations (such as those played on buildings) are always recognized as 'Tetris' by the general public, even despite their obvious non-affiliation with The Tetris Company. The insertion of the 'Tetris' four-line clear into the game's own lexicon is also a particularly vulnerable strategy, as it demonstrates a deliberate willingness to further embed this generic usage of the term in the mind of the consumer.

One precedent dealing with trademark genericness in game names is actually found in the precursor to Tetris itself, in the 1979 cancellation of Golomb's own trademark registrations for the mark PENTOMINOES, the name by which he sold a block puzzle game (and preventing others from selling their own game variants) [7]. In this case, in which Golomb tried to prevent a competitor from registering a trademark for a similar pentomino-based puzzle game 'Pentomino Challenge', the federal court affirmed that the words had been "abandoned into the lexicon of the game language" as a result of having "become words of art in the field of mathematical puzzles", despite the fact that the terms had originally been coined by Golomb himself. The PENTOMINOES ruling doesn't apply perfectly to the case of TETRIS, however, because this mark is different enough from the established mathematical term 'tetrominoes' to not be considered generic by the same logic.

A 1979 court discussion of the validity of the MONOPOLY trademark in the infamous 'Anti-Monopoly' lawsuit provides a more relevant and thorough analysis of trademarked game names [1]. In this case, citing a 1944 cancellation of the PARCHEESI trademark due to its generic usage as the name of a well-known game, the federal court clearly states its position that "a trademark which the public uses primarily to denote the name of a game, rather than a producer, is generic," and therefore invalid. Although the federal court did strongly state its opinion that the MONOPOLY mark was indeed generic, the trademark was never officially canceled because the case was settled before any final judgement was enacted. Although this seems to suggest a vulnerability of the TETRIS trademark, it also presents an open challenge to many other trademarked game names - particularly ones that have never been patented, or games (such as Monopoly or Scrabble) that were once protected by patents that have since expired.

The future of Tetris?

One final piece of history worth noting is still in the making: Tetris has recently filed suit against BioSocia, owners of the online social gaming portal "OMGPOP" and Blockles, a multiplayer tetromino-stacking variant, for copyright infringement, and BioSocia intends to defend themselves in court as this case proceeds over the next year [4]. It's very possible that the legal ambiguities latent in the game/brand will eventually lead to a game-changing decision in the US courts, and if a decision concerning the Tetris enterprise's claimed IP ever makes it through a court ruling it could dramatically change the tetromino-stacking game landscape quickly and permanently. A lenient ruling probably wouldn't eliminate the Tetris Company outright, but for the first time, 'Tetris-brand Tetris' would face competition from a proliferation of newly-legitimated generic variations for the valuable mindshare of a tetromino-loving public that has been long taken for granted. If such an event ever took place, it would clearly mark the beginning of a fourth Tetris era.

Depending on this legal future of Tetris, the future evolution of the game itself could lead in any number of directions. If the ambiguous legal status of tetromino-stacking clones is ever affirmed and upheld, we could see a flood of Tetris-like variants on all platforms, possibly even cheaply produced by platform manufacturers themselves preinstalled on mobile devices or embedded in cheap electronic components. We might expect to see certain game mechanics evolve or new ones invented, as developers experiment with new innovations in order to maintain market share of an increasinly discerning and specializing Tetris-playing public. Maybe a larger number of variants would be embraced and sustained by smaller game-playing communities as is the case with Mancala and

other folk games, with each group adding their own subtle adjustments to suit their own locally evolving play styles, techniques and platforms. Finally, perhaps we might begin to see such a broad proliferation of variants that it makes sense to recognize an entirely new class of games - "stack-four", say, in relation to "match-three" - with such a general fluidity of game concepts and design elements among them that it would be no longer possible to isolate individual Tetris features within the resulting 'family of games' in the Wittgensteinian sense. It's entirely possible that The Tetris Company could remain relevant in such a scenario, providing an "official" ruleset no longer exclusively mandated and policed through intellectual property law, but offered voluntarily and adopted as an open platform along the lines of chess organizations or other similarly large game-playing institutions.

Whether the Tetris of the future continues to be controlled by the solitary Tetris Company or by a diverse Tetris-playing community, or some combination of the two, I hope this brief history of under-appreciated aspects of the evolution of Tetris as a computer game platform makes clear the ongoing interpenetration of formal, social, and legal factors in shaping one of the most enduring digital artifacts of our time.

REFERENCES

1. Anti-Monopoly, Inc. v. General Mills Fun Group, 611 F.2d 296, US Court of Appeals, 1979. <http://www.altlaw.org/v1/cases/444658.>

2. Bogost, Ian. "Comparative Video Game Criticism." *Games and Culture* 1, no. 1 (January 2006): 41-46.

3. Bogost, Ian, and Montfort, Nick. *Platform Studies* <http://platformstudies.com/>.

4. Dannenberg, Ross. "New Case: Tetris Co. v. BioSocia Inc. (S.D.N.Y) [Copyright]". *Patent Arcade*, March 16, 2009. <http://www.patentarcade.com/2009/03/new-case-tetris-co-v-biosocia-inc-sdny.html>.

5. Gerasimov, Vadim. "Original Tetris: Story and Download" <http://vadim.oversigma.com/Tetris.htm>.

6. Golomb, Solomon. *Polyominoes.* C. Scribner's, 1965. Revised and expanded 2nd edition, Princeton University Press, 1994.

7. Golomb v. Wadsworth, 592 F.2d 1184, US Court of Customs, 1979. <http://www.precydent.com/citation/592/F.2d/1184>.

8. Hoang, Pham. "Tetris the Grand Master: A gameplay essay". 17 April 2009 <http://bsixcentdouze.free.fr/tc/tgm-en/tgm.html>.

9. Juul, Jesper. "Swap Adjacent Gems to Make Sets of Three: A History of Matching Tile Games". Artifact journal. Volume 2, 2007. London: Routledge. <http://www.jesperjuul.net/text/swapadjacent>.

10. Latour, Bruno. *Science in Action.* Harvard University Press, 1987.

11. Lewis, Peter. "New Software Game: It Comes From Soviet". New York Times, January 29, 1988. <http://www.nytimes.com/1988/01/29/business/new-software-game-it-comes-from-soviet.html>.

12. Lowood, Henry et al. "Ten Games You Need to Play: The Digital Game Canon." 2007 Game Developer's Conference, San Francisco, CA. <https://www.cmpevents.com/GD07/a.asp?option=C&V=11&SessID=3885>.

13. Montfort, Nick. "Against Tetris Studies". Blog post on *Grand Text Auto* (April 25, 2004) <http://grandtextauto.org/2004/04/25/computer-games-at-ssnls-narrative-conference/>.

14. PR Newswire. "TETRIS INVENTOR GETS HIS DUE IN HISTORIC RUSSIA/US JOINT VENTURE". April 25, 1996 <http://www.prnewswire.co.uk/cgi/news/release?id=34683>.

15. Sheff, David. *Game Over*. New York: Random House, 1993.

16. *Tetris Concept Wiki* <http://www.tetrisconcept.net/wiki>.

17. Yamamoto, Yasao et al. "Game apparatus and memory cartridge used therefor". US Patent 5265888, 1993. <http://www.google.com/patents?vid=5265888>.