Fun and Software

Exploring Pleasure, Paradox and Pain in Computing

Edited by Olga Goriunova

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Monopoly and the Logic of Sensation in *Spacewar!*

Christian Ulrik Andersen

In his book *Homo Ludens* (written in 1938), the play theorist Johan Huizinga states that the instinct for play, and 'having fun' that defines its essence, is core to human civilization. Play is not merely a cultural manifestation; it rather fulfils a general necessity. Civilization is played: it 'arises in and as play, and never leaves it', he claims.[1] Play is what constitutes our culture, and, as Huizinga describes, it can be found in children's games as well as poetry, music, law and warfare. However, playing has a double nature. Play entices a civilized form (as when the judge wears a wig), while, at the same time, playfulness consistently tries to challenge or even destroy that form. As pointed out by another play theorist, Brian Sutton-Smith, play is carnivalesque (as when someone else wears the judge's wig).[2] So, even though play is widely accepted as a cultural and civilized activity that gives meaning to meaningless actions, and builds institutions and industries that perpetuate this meaning, it simultaneously attempts to outgrow its civilized form, to displace meaning and to disrupt its institutions.

The game of *Spacewar!*, developed by a group of 'hackers' at MIT in the early 1960s and popular in a wide circle of programmers, marks the beginning of a history of computation produced and performed for fun. In what ways does *Spacewar!* displace and disrupt the formation of meaning and the institution within which it appears?

At the time, technology was conventionally understood as an enterprise dealing with mechanics, but as Norbert Wiener expresses it, the 'new industrial revolution' perceives the machine 'not as a source of power, but as a source of control and a source of communication'.[3] With computers, the ability to control information became embedded in technology, in the tools and models that simulate the world, and are able to predict and control future events.

Rather than augmenting the physical power of the human, technology began 'augmenting human intellect', according to Douglas Engelbart.[4] Cybernetics and the study of information feedback systems which exhibited a potent usefulness for a wide range of areas, including biology, psychology and economics, originated in Radiation Lab's research on aircraft defence at MIT during World War II. Computer science of the 1960s, with MIT at the heart of it, continued the development of computerized, 'smart' control of airspace.

Despite a shift to the augmentation of the mind, the role of the body is central to *Spacewar!* Unlike the military air defence systems' air control, which operates rather differently, the game of air control in *Spacewar!* is a thrilling experience where the software is designed to challenge the player's bodily control of the computer – literally, letting the player push buttons in order to control a spacecraft on a screen and experiment with the augmentation of the human body. What does this playful reinvigoration of the body in an information control system impose? And which understanding of humans, software and its institutions does playing and making such games imply?

The history of making games as political and disruptive acts is highly informative in this respect. In particular, the popular game *Monopoly* presents an exciting case study. While it is not widely known, *Monopoly* was intended to be pedagogical and provide anti-capitalist education about the negative consequences of the United States' monopolization of land in the early twentieth century. This paradox of an anti-capitalist game, which to many incarnates a celebration of capitalism, reveals a bodily relation between play and meaning that can help build an understanding of the computer scientists bodily play with computers six decades later. Not being able to determine the precise meaning of gameplay can indicate that the kind of sense-making that takes place is closer to the joyous affirmation of a Nietzschean 'play of the world', rather than to finding a particular intended signification.[5]

The Landlord's Game: A politics on land

In 1904 Elizabeth J. Magie, a Quaker woman from the United States, patented the board game *The Landlord's Game*. As explained by Burton H. Wolfe in *The Monopolization of Monopoly*, Magie was a follower of Henry George's theory that private monopolies on land and the renting of land produce an increase in the value of land which profits a few landlords rather than the majority of

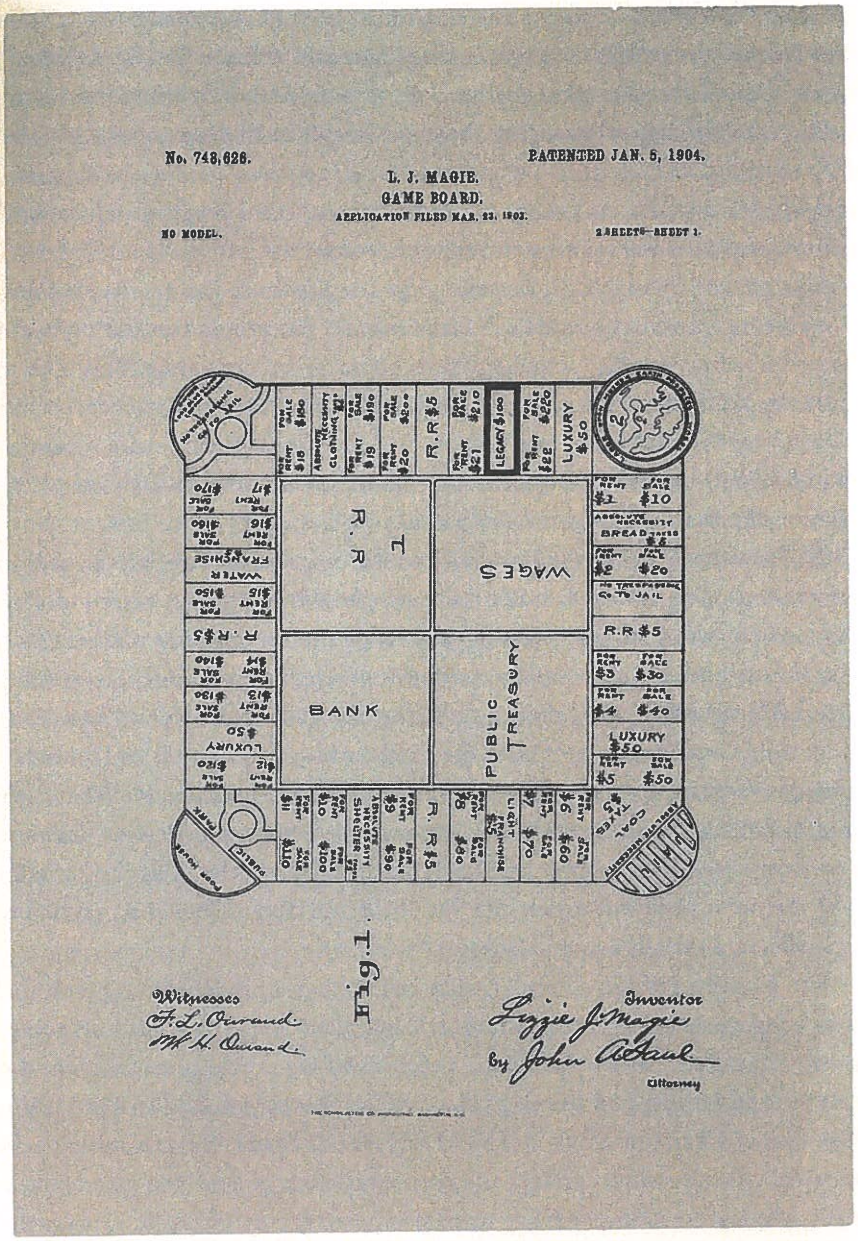

Figure 9.1 Printed patent drawing for a board game invented by Elizabeth J. Magie (*The Landlord's Game*). The game was designed to illustrate the principle of a single-tax idea, proposed by Henry George for use in the United States. In 1935, Magie sold her patent to Parker Brothers, the publishers of *Monopoly*

Source Record of the Patent and Trademark Office, National Archives, United States

tenants.[6] Henry George proposed a 'single tax' on land to discourage speculation and balance the relationship between owners and tenants. In *The Landlord's Game*, players are allowed to explore the processes of monopolization with the deliberate intention of educating them in Georgism. Playing a game is about the tactile exploration of and adaptation to the codes of conduct in the game, and Magie's political intention was, in short, to create a practical, educational demonstration of the negative consequences of private monopolies on land.[7]

Though many similar games were played at the time, *The Landlord's Game* is considered the main inspiration for *Monopoly*, the world's best-selling board game.[8] In other words, modelling the process of the monopolization of land seems to exhibit a purely procedural logic that does not entail any consecutive conclusion: the same game may be perceived as either a celebration or a critique of capitalism and the monopolization of land. What does this say about the relationship between the game and its meaning?

The fact that *The Landlord's Game* had the potential to turn into a cheerful celebration of capitalism first of all exemplifies the ambiguous nature of play. Play serves two seemingly opposing goals: it reproduces prevailing values but it also diverts unacceptable impulses and drives them into personally and socially acceptable activities. Play also has a 'carnivalesque' and 'frivolous' nature, as Brian Sutton-Smith puts it.[9] Under the circumstances of play, you are allowed to assume other roles (e.g. a greedy capitalist) and act out unacceptable behaviours (e.g. brutality). This means that the demonstration of monopolization does not necessarily lead to reflection and awareness; it may also be linked to frivolity and the opportunity to experience the thrill and 'fun' of being an insatiable capitalist in a socially acceptable way.

The frivolity and fun of playing may lead to joyful immersion in greed, but the pedagogical scope of the game is not just about building arguments pro et contra capitalism. In *The Landlord's Game* there is something frivolous in the very acts of naming and creating rules such as: 'Poverty Place' (land rent $50), 'Easy Street' (land rent $100) and 'Lord Blueblood's Estate' ('no trespassing – go to jail').[10] As a demonstration of the monopolization of land, the game can be seen as a playful act of comparing politics to board games. However, to grasp the critical nature of *The Landlord's Game*, one must employ a different explanatory framework and explore what the fun and frivolity of this kind of demonstration and designation imply.

In the context of a discussion on the nature of humour (in *Logique du sens*), Gilles Deleuze sheds light on this problem. Deleuze discusses Diogenes'

ability to argue by using demonstrations, and praises his ability to show and designate.[11] Deleuze's inclusion of Diogenes is presumably an implicit reference to Søren Kierkegaard. In Kierkegaard's thinking, irony is a path from aesthetics to ethics, whereas humour is the path to a religious being. Deleuze does not quote Kierkegaard's notion of humour directly and thus avoids the religious aspect of his philosophy. However, he refers to his notion of irony.[12] Kierkegaard draws upon Diogenes' method of argumentation and, as an example, presents his argument about the ambiguity of movement. Diogenes' opponent assumed that movement could only be described in terms of instances, but in his response Diogenes rises and walks back and forth.[13] Plato laughed at people who were satisfied with being shown and showing examples, as Diogenes did at those who did not ask *who* was but *what* was, etc.[14] But Deleuze supports Diogenes' way of thinking and points to his ability to tear down Plato's idealism and essentialism by humorously replacing ideas with examples. In other words, meaning and signification are destroyed by designation (and humour), and it is pointless to inquire into the signification of the demonstration. According to Deleuze, the substitution, designation and manifestation (introduced below) that take place in humour, which destroy relations to meaning and signification, also differ from both Socratic and romantic irony. The latter seeks the 'real' signification (the true meaning), and the former remains caught in an indeterminacy of signification ('does the ironic enunciation mean one thing or another?'). Games are, as demonstrations of processes, ruled by designation. The meaning of the game, whether it is to be capitalist or anti-capitalist, is arbitrary, as it is a demonstration.

We may thus conclude that the critical aspect is not intrinsic to the game; it must lie elsewhere. In another section of *Logique du sens* Deleuze draws a semantic distinction between signification, designation and manifestation. A signification entails a connection between a word and a concept; a designation between a sentence and external circumstances; and a manifestation between a sentence and a speaking subject.[15] If *The Landlord's Game* is to be considered political, it should not only be viewed as the *demonstration* of a procedural logic; it must also be seen as a *manifestation* of an alternative. Naming streets, creating rules and creating a parodic and humorous demonstration of capitalism must be understood as a political manifestation of an anti-capitalist movement, and not just as a demonstration of the dynamics of capitalism. It is only if seen through this lens that its challenge to capitalism becomes unmistakable.

As the game is a manifestation it should be examined in relation to the ones who manifest themselves through the activity of play. In other words, to regard *The Landlord's Game* as political and critical, one must not only attend to what is played and how it is played, but also to *who* is playing the game. The critical players are not the consumers of *Monopoly* (enjoying the fun of playing large-handed capitalists), but the Georgists and Quakers making the game. One of the early players of *The Landlord's* Game wrote:

> those who wanted copies of the board for *Monopoly* took a piece of linen cloth and copied it in crayon. It was considered a point of honor not to sell it to a commercial manufacturer, since it had been worked out by a group of single taxers who were anxious to defeat the capitalist system.[16]

The Landlord's Game was not a consumerist game but a folk game developed and modified by the players themselves. Ultimately, 'getting the message' depends on the players' ability to identify with the project. One could even argue that there is no political and critical movement unless there are places where such performances and manifestations can occur. This performative aspect seems to be a core characteristic of political and critical games, whose activity otherwise remains ambiguous and whose meaning arbitrary.[17]

Focusing on the performative action of the player is important to our understanding of what it means to play with software, and what it meant to play *Spacewar!* in the 1960s. In fact, one could argue that the very concept of using computers for gaming and play depends on the manifestation of a critical attitude towards the institutions where computers are applied, and the kind of logic that lies behind them: playing games challenges how cybernetics governs not only the user but also life itself.

Spacewar!: A politics of the senses

In the original version, *Spacewar!* is a game for two people, each of whom controls a spacecraft in a two-dimensional world. The object of the game is to shoot the opponent with missiles while manoeuvring and avoiding the gravity well of the 'star' at the centre of the screen. *Spacewar!* was first conceived in 1962 at MIT. Although usually attributed to Steve Russell, it was a collaborative project of 'geeks' or 'hackers', as they were also labelled at the time, which indicates that the computer game was made by and for computer

researchers who shared and sometimes contributed to the game. For example, one player/programmer, Peter Samson, was offended by the 'random stars' in the background and added a program to control the background void based on real star charts which, referring to the price of computers at the time, was entitled *Expensive Planetarium*. Another player/programmer, Dan Edwards, introduced gravity into the game and thus significantly improved the gameplay.[18]

Taking up the theme of the space war in the midst of the Cold War cannot be considered random. *Spacewar!* was developed only a year after Yuri Gagarin's first space travel. Essentially the game itself must be understood as a play on Cold War themes, a satire in which the race for space is turned into popular culture's play: the spacecrafts of the Cold War are replaced by spacecrafts visually resembling those of Tintin (in *Objectif Lune*) and *The First Lensman* (a popular science fiction novel by 'Doc' Smith); and the computer interaction of military defence systems is turned into play with the cinematic model work of beams and explosions.[19]

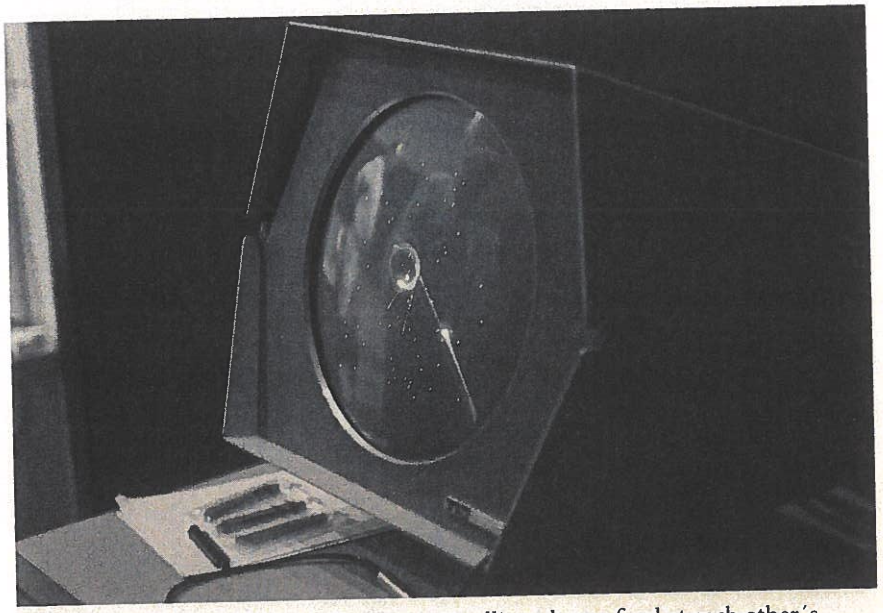

Figure 9.2 *Spacewar!* running on PDP-1. Duelling players fired at each other's spaceships and used early versions of joysticks to manipulate away from the central gravitational force of a sun as well as from the enemy ship

Source Image by Joi Ito

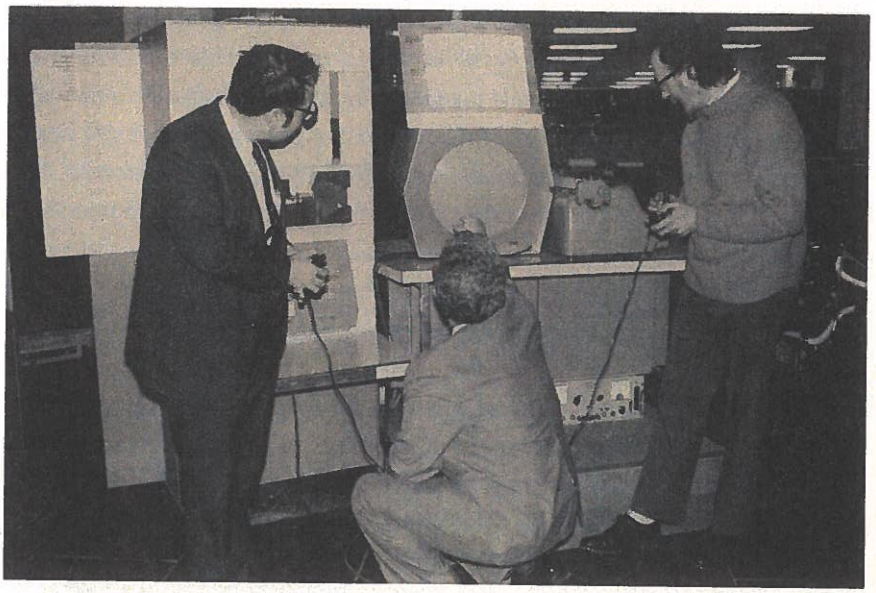

Figure 9.3 Alan Kotok, Steve Russell, Martin Graetz play *Spacewar!* 1983 ca.

Source Image courtesy of Computer History Museum

Figure 9.4 Operators of SAGE used light guns to pinpoint aircraft tracks. When a blip appears on the scope, the light beam causes the computer to assign a track number and to relay speed, direction and altitude information to various consoles. Publicity photograph of a SAGE console operator with 'gun' pointed at the screen. 1959 ca.

Source Image courtesy of Computer History Museum, and used by permission of the MITRE Corporation

The gameplay echoes one of the most common Cold War computer systems, SAGE. During World War II, the bomber aircraft gained increasing importance in warfare. The time between spotting enemy flights and the required response at high speed was constantly diminishing, even given the use of radar. The ability to predict flight tracks and target positions was crucial for air defence, especially with the development of the nuclear bomb. In the early 1950s, the US military joined forces with researchers at MIT and IBM to produce a Semi Automated Ground Environment system (SAGE). On the basis of a computerized cybernetic system and a number of physical control posts, it became possible to predict flight tracks and automate the interception.[20] The whole gameplay of *Spacewar!* is essentially an imitation of the operation of SAGE. In front of a radar-like display the player's task is to predict the tracks of missiles and intercept the enemy spacecraft. The frivolous nature of play adds a hyperbolic and parodic dimension to the imitation: in *Spacewar!*, the player can control the aircrafts in the outer hemisphere, shoot enemies down and experience the thrill of explosions.

As a *demonstration*, *Spacewar!* is science fiction and does not seem to model a complex process, or even a process that remotely imitates reality (unlike *The Landlord's Game*). The game is science fiction, as whether the Cold War would lead to real space wars was unforeseeable at the time. Hence, the game is not political – it does not seek to make significatory claims about the world. So, what does the game demonstrate and what kind of politics is at play?

As a *manifestation*, the game is based not on similarity but on substitution. In *Spacewar!* the Cold War is replaced by play and battles from popular culture. This manifestation is humorous in Deleuze's sense of the term. Replacing SAGE with sci-fi explosions is absurd and defies signification, but, paradoxically, the thrill of shooting down an enemy spacecraft while performing the parody also makes sense. On one level, of course, it makes sense because of the internal logic of the game, where shooting missiles at the opponent leads to victory. First and foremost, however, it makes sense because it is thrilling and fun: it makes sense as a bodily sensation. The game is a manifestation of the body as a sense-making machine; it simultaneously makes sense (bodily) and remains non-sense. In Deleuzian terms, 'the logic of sense' becomes 'the logic of sensation'.

In this logic of sensation one must not only pay attention to what takes place *in* the game (illustrations, demonstrations, etc.), but also to the body of the player and the sensation of playing. In fact, one might argue that the bodily engagement, 'feeling' the gravity, the thrill of overcoming obstacles and even

the shouting and excitement of playing are central experiences to all computer games. Playing computer games is an uncanny experience of the body's simultaneous (entrapped) presence and absence in a cybernetic system.

Playing a computer game is an experience of the body as an indispensable element that regulates the cybernetic feedback loops in the game. In *Spacewar!* the player constantly seeks to predict the trajectory of the spacecraft and its missiles on the screen, as whenever the spacecraft steers towards the centre of gravity the player needs to counter steer.

However, playing the game on the screen is simultaneously accompanied by an experience of bodily absence: there is no body to make sense with in the cybernetic system of the game-world. There is no 'feeling' of gravity, steering and speed, but only the 'illusion' of a body. Today, experiencing a computer game is compulsory in popular culture and does not seem very revolutionary, but in 1962, to playfully foreground the status of the body as a mediatory and sense-making element (both present and relied upon and absent and repressed) in a cybernetic feedback system was exactly what made *Spacewar!* a rebellion. Playing the game reflected the human and bodily experiences called upon and repressed by SAGE in particular and military computer science in general.

SAGE depends on human users watching the screen, tracking aircraft manually and reporting to the system. Humans make the defence system run but also represent a potential disturbance: they may miss their target or choose not to act. In response to human fallability, cybernetics quantifies the human by reducing him/her to an element that can be calculated. The objectification and quantification of the human is core to a certain version of cybernetics and was addressed by Norbert Wiener, who, in his last book, asks: 'Can God play a significant game with his own creature? Can any creator, even a limited one, play a significant game with his own creature?'[21] Here, Wiener points to the technocratic and administrative nature of cybernetic systems: they are control systems that seek to control the future. In this, they assume the position of a 'God' and thus mark the end of free will and the bourgeois subject: the human is no longer in control of the system, but has become an element in the system. In cybernetic systems, humans enter into a 'symbiosis' with computer systems, as J. C. R. Licklider, one of the key developers of SAGE and a well-known theorist in the field of cybernetics, called it.[22] Media theorist Brian Holmes notes that the human becomes an 'info mechanic being' whose 'double constitution could be felt in the uncanny identity of the strange new creatures that fired the guns

and piloted the planes: both seemed to waver between machine-like, implacable humans and intelligent, humanlike machines.'[23]

This shift in the construction of the subject and subjectivity was certainly not limited to computer systems. Cybernetic thinking provided useful conceptual, epistemological and ontological frameworks to economics, management, sociology, communications engineering, behavioural psychology, HCI and other design branches, among others, where cybernetic ideas are either foundational or remain partially unchallenged. One example is the use of game theory to analyse war strategies. Based on the theoretical game 'prisoner's dilemma', John von Neumann (a key figure in both the development of the nuclear bomb and the computer) advocated for a preventive war against the USSR. In 'prisoner's dilemma' two prisoners, who together have committed a crime, must decide individually whether they should acknowledge the crime and betray the other. Only the one that acknowledges the crime and betrays the other will go free, but if they both acknowledge their crime, they will both be sentenced. A third option is to keep quiet, in which case they both get a lesser sentence for a lesser offence. Most likely, the prisoners will betray each other. As an allegory on the possible war between the United States and USSR, the debate was whether one should 'keep quiet' or 'wipe the other out'.[24] The idea of a preventive war was (luckily) rejected by the Truman administration, but game theory still played a role in the justification of the Cold War arms race. [25] In the application of game theory to politics, which at the time also laid the ground for the actual computerized defence systems, the human and, not least, the human body have been reduced to estimations of potential casualties in a system.

The symbiosis of human and computer emerges as the reality of the post-war subject, and the reality of the subjectivity of the computer scientist. The development of computer systems has always been linked to military strategic objectives such as ballistics or cryptography. In the United States, during the Vietnam War, it was even proposed that financial support for computer research should be dependent on its strategic and military impact.[26] In other words, at the time of *Spacewar!*, computer research was also military research, undergirded by cybernetics.

Computer researchers (including the makers of *Spacewar!*) were involved in a political cybernetic system which produced strategic military cybernetic systems (such as SAGE). In their daily work life, they were creating the systems to which they themselves were quantified objects, subjects with an 'uncanny

identity between cruel, machine-like humans and intelligent, human-like machines'. Employing the computer as a creative tool, giving programmers as well as users agency and 'free will' of parody, making games to which to respond bodily, playing and being frivolous must be seen as a rebellion against the quantification and objectification of the body and of the human. If *Spacewar!* reveals anything about the system dynamics and procedural logic of the Cold War, it is in particular the impact of political power on the bodies and lives of its creators and players. In defiance of their situation, the casualties of cybernetics, the human programmers stage the performance of a cybernetic symbiosis between a human and a machine body as a playful and joyous act.

Playing with software: The redistribution of the senses

Play reproduces behaviours (as rituals), but its frivolous nature also makes it capable of producing change. From time to time, people create new games that challenge how we sense and make sense of the world, and the mechanisms that control these processes. To adopt the words of Jacques Rancière, play may have a similar political role to that of aesthetics in the 'distribution of the senses'.[27] *Spacewar!* is not political – it does not represent an overt struggle between the institution and 'the hackers' (the programmers/players). Hacking was commonly accepted; but the hackers were striving to speak for themselves through play. As information workers at MIT they were part of an established order of cybernetic information systems, but as humans they were subjected to the systems they were creating. Through the aesthetic practice of making games, playing and having fun with software, they could be seen as reclaiming their right to sense and make sense of the world in a non-quantified and non-objectified way, defying the new available forms of being, knowing and expressing oneself.

To grasp the revolutionary aspects of *Spacewar!*, one must not only consider what the game demonstrates (the space war) but also what it is a manifestation of. *Spacewar!* is revolutionary not because the activity of shooting spacecrafts demonstrates any inherent procedural and persuasive rhetoric that opposes the political or social realm, but because it is a manifestation produced by a group of people, which challenges cybernetics and the way it is embedded in the sophisticated apparati that control and represent the senses (such as the Cold War, its defence systems and even the computer labs themselves). Unlike *The Landlord's Game*, *Spacewar!* does not try to model or oppose processes that

even remotely resemble reality. Rather, the game is part of a movement that turns Cold War computer science into a game in which players/programmers gain an experience of what the cybernetic apparatus otherwise seizes control of: the body as sense-making.

What did this 'programmer identity' and reclaimed right to sense and make sense of the world through play lead to? The game became an icon of a culture of programmers who valued free inquiry, knowledge sharing and a distaste for authority. Stewart Brand describes this culture in a 1972 issue of *Rolling Stone* magazine, featuring a young Alan Kay at Xerox PARC, who said that 'The game of *Spacewar!* blossoms spontaneously wherever there is a graphics display connected to a computer'.[28] It is, at least partially, through playing with software that the players/programmers assumed and spread this ethos. New visions of how computers could serve people as tools for sharing knowledge and creativity were created.

The computer as a means to bodily sensation eventually also led to a whole new industry: the video and computer game industry. *Spacewar!* was the first widely used software program.[29] The popularity of *Spacewar!* is an early indication of the potential of the game industry and a foreseer of computers being brought from the labs to the masses through coin-operated video game arcades in the 1970s. In fact, as early as 1971 a variation of *Spacewar!* entitled *Computer Space* was used in one of the first attempts to commercialize computer games (by Nolan Bushnell, who made the ever-popular *Pong* in 1972 and who later founded Atari).

The fate of computer games and these new visions of software is another story. Ironically, the US military probably learned more from *Spacewar!* than from SAGE. The military has a long tradition of using games to train soldiers, and computer games have provided new possibilities for combat training, among other roles. For example, the game *America's Army*, produced by the US Army and available for free on their website, which gives players a sense of 'the real deal' of warfare, is also used as a branding mechanism to help recruit soldiers. And vice versa: as the gaming industry has developed, the makers of computer games have learned from surveillance systems such as SAGE. In particular in massive, multiplayer online games, player activity is seen as a key mechanism in the production of value. An increase in the number of social relations players engage in during the game, or the time players spend in the game, raises the potential value of the platform for advertisement. With the capitalization of not only the games but also the activity of play itself, the player continues being objectified, quantified and entrapped in the cybernetic system.

Through our playful acts new institutions and regimes of power and control have arisen, including the regime of play and games itself. Revolutionary play with software in the 1960s soon went hand in hand with new marketing strategies that made computer games accessible to everyone. The 'gamification' of other types of software, using the principles of play to make software an engaging experience, is a central strategy to arenas such as social media. Can play in this environment continue to challenge our institutions and hierarchies of meaning and control? Johan Huizinga provides an easy answer: 'animals have not waited for man to teach them their playing', he claims.[30] Play is a natural thing: cats play with mice, dogs pretend to bite while playing, some insects engage in foreplay before mating and so on. Our animal instinct for play cannot be repressed. We simply need to have fun to live. In Michel de Certeau's terms, playing may have lost as a strategy, but it persists as tactics.

Notes

1 Huizinga, Johan, *Homo Ludens: A Study of the Play Element in Culture* (London: Routledge, 1980), 173.

2 Sutton-Smith, Brian, *The Ambiguity of Play* (Cambridge, MA: Harvard University Press, 1997), 11.

3 Wiener, Norbert, 'Men, Machines, and the World About', in *The New Media Reader*, N. Wardrip-Fruin and N. Montfort (eds) (Cambridge, MA: MIT Press, 2003), 71.

4 Engelbart, Douglas, 'Augmenting Human Intellect – A Conceptual Framework', in *The New Media Reader*, N. Wardrip-Fruin and N. Montfort (eds) (Cambridge, MA: MIT Press, 2003), 95–108.

5 Jacques Derrida suggests free play, and 'the affirmation of the play of the world' as the de-construction of significations, rigid concepts and binary oppositions rooted in *logos* and prevailing Western metaphysical thought: 'a Nietzschean *affirmation*, that is the joyous affirmation of the play of the world and of the innocence of becoming, the affirmation of the world of signs without fault, without truth, and without origin which is offered to an active interpretation'. Derrida, Jacques, 'Structure, Sign, and Play in the Discourse of the Human Sciences', in *Writing and Difference*, ed. Jacques Derrida (London: Routledge, 1998), 292.

6 Wolfe, Burton H., 'The Monopolization of Monopoly' (2011), excerpts from *The San Francisco Bay Guardian* (23 April 1976), http://www.adena.com/adena/mo/index.htm (accessed 12.12.2013).

7 The game may be seen to have what game researcher Ian Bogost calls a 'procedural rhetoric', which simply means that the game makes a claim about how something works by modelling its processes. Bogost, Ian, *Persuasive Games – the Expressive Power of Video Games* (Cambridge, MA: MIT Press, 2007).

8 The two games are almost identical. The only exception is that players in *The Landlord's Game* do not own but rent land, and the object of *The Landlord's Game* is not monopolization but educational. As stated in the introduction to the game: 'The object of this game [*The Landlord's Game*] is not only to afford amusement to players, but to illustrate to them how, under the present or prevailing system to land tenure, the landlord has an advantage over other enterprisers, and also how the single tax would discourage speculation'. Quoted in Wolfe, 'The Monopolization of Monopoly'.

9 Sutton-Smith, *The Ambiguity of Play*.

10 Wolfe, 'The Monopolization of Monopoly'.

11 Deleuze, Gilles. 'Dix-neuvième série de l'humour', in *Logique du sens* (Paris: Les Éditions de Minuit, 1969), 159.

12 Ibid., 165.

13 Kierkegaard, Søren. 'Gjentagelsen', in *Samlede værker*, vol. 5, ed. S. Kierkegaard (Copenhagen: Gyldendal, 1991), 115.

14 Deleuze, Gilles. *Logique du sens*, 160.

15 Ibid., 22–4.

16 Wolfe, 'The Monopolization of Monopoly'.

17 Many contemporary political and critical computer games, most of which exist on the internet, have inherited the ambiguous nature of *The Landlord's Game*. For instance, the game *Super Columbine Massacre RPG!* (2005) may be interpreted as a demonstration of the dynamics behind the high-school killings, but may also be seen as a new documentary genre. Responses to the game are contradictory, and there is no intrinsic mechanism in the game to encourage the latter interpretation, unless one considers the developer Danny Ledonne's position as an American documentary film director who was bullied as a child in school, as a priori ethical. Jose Antonio Vargas, 'Shock, Anger over Columbine Video Game – Designer Says Web Creation an "Indictment" of Society', *Washington Post* (Saturday, 20 May 2006).

18 J. M. Graetz, 'The Origin of Spacewar', *Creative Computing* 7(8) (1981), http://www.wheels.org/spacewar/creative/SpacewarOrigin.html (accessed 12.12.2013).

19 The inspiration from popular culture is also documented by one of the creators of *Spacewar!*, Graetz, ibid.

20 The system was fully operational up till 1983, and the overall idea persists. In 1983, Ronald Reagan introduced the SDI (the Strategic Defense Initiative that included space-based systems for air defence), which was later to be followed by

other missile defence systems. The SDI was perceived as science fiction by some and was labelled Reagan's 'Star Wars' project.

21 Wiener, Norbert, *God and Golem, Inc.* (Cambridge, MA: MIT Press, 1964).

22 Licklider, J. C. R.. 'Man-computer Symbiosis', in *The New Media Reader*, N. Wardrip-Fruin and N. Montfort (eds) (Cambridge, MA: MIT Press, 2003), 74.

23 Holmes, Brian, 'Future Map or How the Cyborgs Learned to Stop Worrying and Love Surveillance', *The Laboratory Planet* 63(2) (2008): 4–7.

24 Poundstone, William, *Prisoner's Dilemma: John Von Neumann, Game Theory and the Puzzle of the Bomb* (New York: Doubleday, 1992).

25 To continue this line of argument, the arms race can be explained as analogous to the 'dollar auction'. A dollar is put up for auction, but unlike other auctions, any participant in this auction will have to pay his/her highest bid, no matter if he/she wins the auction or not. The most successful strategy is to keep bidding, even if the bid exceeds $1. If winning the auction symbolizes victory in a possible war, the theory suggests that no one will dare to withdraw from the arm race, even though it far exceeds the prize to be claimed. Ibid., 262.

26 Gere, Charlie, *Digital Culture* (London: Reaktion Books, 2002), 130.

27 Rancière, Jacques, *Le Partage du sensible* (Paris: La Fabrique Éditions, 2000), 14.

28 Brand, Stewart, 'SPACEWAR – Fanatic Life and Symbolic Death among the Computer Bums', *Rolling Stone* magazine (7 December 1972): 50–8.

29 The code for *Spacewar!* was distributed for free by Digital Equipment Corporation, the leading vendor of computers in the 1960s.

30 Huizinga, *Homo Ludens*, 1.