Overview of Part Three

The challenge to the simulacrum leads to another media theorist: N. Katherine Hayles. The project of transforming the simulacrum switches to paradigm shifts in computing beyond the original formulation of computer science. I bring together ideas from cultural and media theory with the practical movement of Creative Coding.

Hayles is a scholar of posthumanism. In *How We Became Posthuman*, she writes a genealogy of twentieth-century informatics, interpreting the three successive orders of cybernetics.[510] She argues that an idea of information was developed that is disembodied. This could be re-thought with an upgraded re-embodied concept of code. I study ideas and projects of Creative Coding which contribute to a transformative future of informatics.

My exegesis and extensions of the ideas in *How We Became Posthuman* are revised excerpts from three chapters of my book *Star Trek: Technologies of Disappearance*.[511] The chapters are about the three orders of cybernetics and their SF representations in *Star Trek*.

Lost in the original invention of computing were the poetic, musical, ambivalent, and resonant qualities of human languages. As the history of programming languages continues, and in the spirit of Creative Coding, human language increasingly reappears within code. Hayles suggests that we are moving beyond the binary logic of identity and difference towards a language of intelligent machines that resembles the resonant language of humans.

The Science Fiction of *Star Trek*

I published a book on *Star Trek* and its principles of a future utopian society. *Star Trek* predicted many technologies and scientific areas of research – from cell phones and speech interfaces to quantum teleportation and wormhole physics – which later were brought to fruition. *Star Trek* is a vision of a better future for humanity in the twenty-third century. There is a major revival of *Star Trek* going on right now in 2024. I wrote about the literary stories of *Star Trek* and about the futuristic science fiction technologies of *Star Trek*. I wrote about *Star Trek*'s post-capitalist society of the future with better social and economic arrangements.

Star Trek is multiracial, multicultural, and multispecies. It deconstructs anthropocentrism and ecological destruction. *Star Trek* looks at technology with ideas from the humanities. The *Star Trek* civilization of the future is beyond war and poverty. There is bottom-up globalization. Earth is united, but the singularities of local and indigenous cultures are respected. *Star Trek* shows the Replicator technology that makes food and material objects based on digital and quantum information. It resembles the 3D printer technology of today that is making the Additive Manufacturing revolution and the invention of new additive raw materials. *Star Trek* shows a vision of the post-scarcity post-capitalist economy. Through designing and implementing technology intelligently, and with ecological awareness, we can transcend what economics, work, production, and the domination of nature have been under capitalism and industrialism. We can live in harmony with nature in a sustainable way. We can work less and become more creative. We can live in cooperation with self-aware technologies. I develop the ideas of Dialogical Artificial Intelligence and Moral Algorithms.

Star Trek's Spock, Data, and Seven of Nine and the Three Orders of Cybernetics

My writing about the sequence of *Star Trek* characters Spock, Data, and Seven of Nine is accompanied by discussion of the historical cycle of the three orders/waves of cybernetics.

Our society dreams of making *Star Trek*'s technologies "real." Scientists, computer technologists, and science fiction media fans strive to accomplish: the transporter with quantum entanglement, interstellar space travel with faster-than-light speed; time travel with fabricated wormholes; the Holodeck as the Holy Grail of Virtual Reality, and cyborgs and androids with Artificial Intelligence.

Star Trek is also about one's affinity with a certain kind of biographical fate. This is the fascination of alternative cyborg figures like Mr. Spock, Lt. Commander Data, and Seven of Nine. "Pushing the reality of the cyborg harder," in its original context of cybernetics, as Donna Haraway, the author of "The Cyborg Manifesto," recommends.[512]

As a creature of fractured identity, Spock exists at the boundaries between previously defined dichotomous categories which are losing their distinct opposition. Humanism and anthropocentrism are brought into question from the standpoint of radical recognition of others and a broader ethics of life itself. Cyborg Spock shows himself to be sensitive towards our "joint kinship with animals and machines."[513] In high-tech culture, the boundaries that "construct the human" – between human/machine, human/animal, living/nonliving, artificial/natural, male/female, self/other, informatics/biology, reality/fiction, real/virtual, truth/illusion, and science/humanities – are disrupted.

The original meaning of cyborg was an Engineered Astronaut dreamed of by NASA. Spock is not just "Mister Logic," or a figure "torn between logic and human emotions." His inter-species birth was made possible by Vulcan technoscience, his skills as an information processor fitting with the cybernetic paradigm of a self-regulating machine built for command, communication, and control (Norbert Wiener).[514] The seminal episodes about Spock like "The Devil in the Dark" deal with the tension between Spock as an em-

blem of first-wave cybernetics and Spock as potentially subversive boundary-crossing cyborg (Donna Haraway).

For the *Star Trek* industry, the predicament of the android Data of *The Next Generation* is that of a postmodern Pinocchio who pines to become human. Yet the stories themselves suggest that Data's quest is more about the struggle than the goal. His condition is that he is neither the "same as" nor "different from" the human, neither comparable nor opposable. The definition of human is not fixed – the android can "double" and induce a transformation in us.

Although Data often says that he has no emotions, one can distinguish between emotions corresponding to the flexible knowledge-acquisition competencies of second-wave cybernetics, which he does have, and those corresponding to the Artificial Life fluidity and turbulent energies of third-wave cybernetics, which he is lacking. In contrast to the first-wave static regulatory and rational homeostatic control exercised by Spock, Data is a figure of second-order object-oriented reasoning and "learning by doing." He has the self-emendating capacity of acquiring emotions from his performative involvements in the world.

Seven of Nine is a cyborg figure descendant from Spock and Data. For the *Star Trek* industry, her narrative arc is summed up in the phrases "recovering Borg" and "becoming human."[515] Her parents were Borg specialists whose imprudent high-risk research in the Delta Quadrant led to young Annika Hansen's being assimilated at age six by the Borg. Captain Janeway represents a maternal superego who, 18 years later, replaces the father's failed authority. Janeway enjoins Seven to "choose" and "enjoy." Choose to stay with *Voyager* and to become human. Enjoy your "individuality," your creativity in Leonardo's Holodeck workshop, your sexuality, your food. Pleasure becomes her Starfleet duty. I reinterpret the stories as Becoming-Borg Seven of Nine. Seven learns to live the singularity of her situation, becoming something that would not have been possible without her experience with the Borg.

What is Posthumanism?

We need a posthuman worldview where we (1) stop anthropocentrically dominating nature and the planet and (2) embrace our co-existence with self-aware technological entities.

For Katherine Hayles, posthumanism has at least two different meanings: (1) A "negative critique" of what has happened in the technoscience mainstream since the advent of cybernetics. (2) A "positive vision" of a possibly emerging society beyond the destructive consequences of anthropocentrism and possessive individualism that is the hidden alternative potential of advanced technologies such as Artificial Intelligence and Virtual Reality.

On the one side, posthumanism is the fantasies of disembodiment of the prevailing informatic discourses and user-experience applications.

On the other side, posthumanism is the breakthrough transdisciplinary understanding of humans as embodied and embedded in complex social, cultural, narrative, and technological circumstances. This comprehension of our embroilment, co-existence, and

ethical partnership with – on the one hand – nature, animals, plants, and our environmental ecology, and – on the other hand – with self-aware technological beings and processes, engenders hopeful, alternative, radical utopian projects of specific changes to those complex circumstances, and a realistic optimism about a general post-humanist planetary reversal.

Posthumanism is a free association of many different and related perspectives. Posthumanism means that rationally thinking and industrially producing Man is no longer the center of the world. White European patriarchal hetero-normative Man is no longer the ruler of something posited as universal. Racist definitions of what counts as humanity are rejected. Posthumanism is about nonhuman agencies and our relationship to them. The boundaries between human and nonhuman dissipate. Six general areas of posthumanism are identified:

(1) **Ecological**: Rethinking and transformation of the relation of humans to nature, the environment, and the planet. Confronting global warming, climate change, and the challenge of sustainability. Animal studies and animal rights.
(2) **Technological**: Humans and Artificial Intelligence. Cyborgs, Androids, and Robots. The rights of robots. Aliens in science fiction and in the "real" galaxy. AI as a different form of intelligence from assumptions of what human intelligence is, or what we imagine AI intelligence should be. AI as surprise. The coevolution of humans and self-aware technologies in "the age of intelligent machines."
(3) **Political**: Otherness or the "recognition of the other" or the acknowledged salutary impossibility of "knowing the other" in post-colonial, feminist, cyber-feminist, queer, gender, and LBGT+ theories and expressions. Afrofuturism: the SF novels of Octavia Butler[516] and Samuel R. Delany[517], W.E.B. Du Bois' short story "The Comet" (1920)[518], Sun Ra's SF film *Space Is the Place* (1974), Ralph Ellison's novel *Invisible Man* (1952)[519], Janelle Monáe's story "The Memory Librarian" (2022)[520], and the films of Jordan Peele like *Get Out* (2017) and *Us* (2019). Technoscience will lead away from biology-based definitions of gender. Opposition to all white-centric, Euro-centric, Russo-centric, and MAGA-centric nationalisms and racisms.
(4) **Philosophical**: Rethinking the Western tradition. Nietzsche, Heidegger, and Foucault. Post-structuralism and deconstruction (Jacques Derrida). Object-Oriented Ontology (Graham Harman[521], Timothy Morton[522]). Embodied cognitive autopoiesis (Maturana and Varela[523]). The Sartrean existentialist idea that there is no fixed human nature – technoscience changes us continuously, biologically, and existentially.
(5) **Virtual**: Avatars and non-player characters (NPCs) in computer games and in the Virtual Reality Metaverse. The substitution of the human subject by her avatar.
(6) **Algorithmic**: The role of non-human agencies in society and in the economy. Assemblages or systems that combine human decision-making and algorithmic processes. Asking if automation must be a continuation of instrumental reason, or if can we rethink automation in a new way as a dialogical encounter?

The Concept of Nature in Whitehead and Merleau-Ponty

Early in his academic career, the French philosopher Maurice Merleau-Ponty was a classical phenomenologist, influenced by Edmund Husserl, close to the existentialism of Jean-Paul Sartre, emphasizing the "radical freedom of the human subject," the subject's perceptions of the world and actions in the world, the interspaces of language or between self and other, and, in a sense, the subject's frustration when confronted with the-world-as-it-is or the-world-as-it-is-conceived which limits and stands in the way of the desire for freedom. Merleau-Ponty, however, evolved philosophically towards the end of his life to a position quite different from that of phenomenology and existentialism. The fullest expression of his new worldview is his 1964 work *The Visible and the Invisible* (compiled, edited, and published by his student Claude Lefort after Merleau-Ponty's death).[524] An important text leading up to that work is *Nature: Course Notes from the Collège de France*, published posthumously in 1995.[525]

The concept of nature as elaborated by the later Merleau-Ponty is a significant step away from phenomenology and towards a philosophy of "the new real," as I call it, or towards an "ontology of the flesh of the world," as he calls it in *The Visible and the Invisible*. The poly-sensorial, embodiment, immersion, interaction, technological and software entities as semi-alive, and hybrid real-virtual environments – these modalities all receive ideational support in the philosophy of nature of the final few works of Merleau-Ponty's *oeuvre*. The French thinker was influenced by a book published in 1920 by the British mathematician and philosopher Alfred North Whitehead entitled *The Concept of Nature*.[526]

In *The Concept of Nature*, Whitehead presses ahead towards fathoming the world in its tension between determination and indeterminacy rather than going back towards any reliance on a knowing subject. He calls this "the passage of nature," which is opposed to assumptions about "the bifurcation of nature." He adds to this thinking the key idea of *the event* – a tier of the world that belongs to nature yet can be neither grasped nor explained by the natural sciences. *The event* is a dimension which we experience through the perceptual senses and the qualities of the world such as colors, odors, and tactility. Whitehead calls this privileged object of inquiry "descriptive generalization" – neither nature nor the human mind is in command. It is a layer of being which escapes the epistemology of Western scientific apprehension, resembling Merleau-Ponty's "flesh of the world" or "the ontology of the flesh."[527]

In *The Concept of Nature*, Whitehead approaches knowledge in a transdisciplinary way by arguing that the philosophy of science is about studying the relations between the different disciplines. The main object of inquiry of science is ostensibly nature, but there is a whole dimension of nature that science cannot capture. When we consider the human senses, nature expands to what we observe in sense perception. Whereas the natural sciences deal with what he calls "homogeneous thoughts about nature," Whitehead develops what he calls "heterogeneous thoughts about nature."[528] Sensory perception and sensory awareness of nature designate the other domain of our interface with nature. It is not part of the natural sciences.

In his university lectures on nature compiled into a book, Merleau-Ponty examines and critiques the concept of nature in Aristotle, Descartes, and Kant. For Descartes especially, nature is a synonym for existence itself, without orientation or inner life. In his

philosophy, Descartes treats animals and plants as automatons without any interiority. This perspective inexorably leads to an idea of nature as a system of laws and their automatic functioning.

Rosi Braidotti's Celebratory Posthuman Philosophy

In her much-celebrated book *The Posthuman* (2013), Italian philosopher Rosi Braidotti deploys concepts from Gilles Deleuze and Félix Guattari such as the ethics of "becoming," deterritorialization, flows, and "the nomadic" to argue for the emergence of an emancipatory posthuman subject contesting the possessive individualist subject of liberal humanism and global corporate capitalism.[529] In a time where "discourses and representations of the non-human, the inhuman, the anti-human, the inhumane and the posthuman proliferate," Braidotti's vision is that of "life beyond the self."[530] The basis of her celebratory optimism is the blurring or end of the binary opposition between nature and culture. The new non-dualistic nature-culture continuum enables the emergence of "the vital, self-organizing, and yet non-naturalistic structure of living matter itself."[531] The autopoietic generative vital force of living matter and non-human life dynamically supports the advent of a non-unitary posthuman subject who will be endowed with an expanded sense of connectedness with others.

Through broadening "subjectivity" to that which traditional humanism excluded – ranging from animals to oppressed subaltern human minority groups to creative technological engagements – we humans come closer to the vital force of "the Zoe," which is life itself. Superseding the individualist subject, we identify or feel affinities with many cultural, ethnic, and social expressions. We experiment with "intensities" and with our bio-technologically mediated bodies. We become-animal, become-Earth, and become-machine.

On the question concerning technology, Braidotti comes down strongly on the side of digital technologies as privileged sites for creativity and resistance (to capitalism). She writes:

> I will always side firmly with the liberatory and even transgressive potential of these technologies, against those who attempt to index them to either a predictable conservative profile, or to a profit-oriented system that fosters and inflates individualism.[532]

What is tellingly missing in this statement is any hint of how one would distinguish between the two. Does siding with these technologies' liberatory potential mean that their liberatory potential is a given empirical fact and one is on its side, or does it mean that one is asserting as a philosopher that one has an understanding and vision of how these technologies could be developed or diverted away from their mainstream capitalist guises and in liberatory directions? If it is the first, then one is skirting one's responsibility as a philosopher to explain the principles that would make the technologies emancipatory. If it is the second, then one is again skirting the responsibility by offering no elaboration of how this vision (and Braidotti's celebratory vision of posthumanism overall) is distinguished from the endless adaptability and "recuperating" powers of cybernetic cap-

italism itself. Is this "posthumanism" merely a continuation of humanism in new semblances and phases?

In lieu of rigorous argumentation, Braidotti ends up with elegant poetic expression:

> What we humans truly yearn for is to disappear by merging into this generative flow of becoming, the precondition for which is the loss, disappearance, and disruption of the atomized, individual self… What we most truly desire is to surrender the self, preferably in the agony of ecstasy… the moment of ascetic dissolution of the subject; the moment of its merging with the web of non-human forces that frame him/her, the "cosmos as a whole."[533]

There is nothing wrong with this. It is the inspired (Deleuzian) and inspirational perspective of a creative thinker, and a very interesting and admirable one at that. But it is just one point of view, one interesting way of looking at posthumanism. The poetic sublime expression is packaged in a wrapper in such a way that, in fact, the book has come to be regarded as a centerpiece of the canon of academic posthuman studies. I think that Braidotti's work can be appreciated and respected as creative speculative philosophy. Its status as scientific or (trans-) discipline-founding work is somewhat exaggerated. She has an interesting and beautiful poetic vision of a world beyond the domination of the self-centered liberal humanist subject.

A Fully Posthuman Situation

In his seminal work *Understanding Media* (1964), the founder of media theory Marshall McLuhan defined a medium as being any "extension of ourselves" – for example, the wheel extends our running capabilities, and the hammer extends our arms.[534] In this view, the hammer is more a media than a tool or a technology. Our physical bodies and our senses (our *sensoria*) are extended in and by media. The design of any given media is, in a sense, the design of an artificial human sensorium. Language is, for McLuhan, also a media, since it extends, in the communicational transfer, the thoughts in my head and the words formed by my mouth to the ears and the mind of the listener or interlocutor.

From Friedrich Kittler's viewpoint, there is something human-centered and Promethean about McLuhan's formulation of the "extensions of man," since McLuhan does not elaborate a theory of history that grants an independent and determining role to media.

The great insight of the literary Marxist György Lukács in *History and Class Consciousness* (1923) was that one major aspect of "reification" (Lukács' central concept) under capitalism is the ideological operation whereby a phenomenon that is a contingent cultural-historical artefact, extant at a specific time and place, comes to appear – in "false consciousness" – to be ahistorical, necessary, and eternal.[535] Kittler takes the digital-binary logic at the heart of computer science of Alan Turing's "On Computable Numbers" of 1936 and – like Lukács' reification – universalizes it as the only possibility for all structural levels of computing and eternally into the future, claiming to override all differences among successive historical paradigms of informatics.[536] Vilém Flusser takes a more utopian ap-

proach of "after the media," searching for a method to glimpse within the new authoring apparatuses made possible by computational media the potential reappearance of the human and posthuman activity of writing which resembles engraving, inscription, and the penetration of a surface.[537]

McLuhan provides prescient empirical descriptions of "the electronic age" and "the global village" as well as the insight that "the media is the message." He diagnoses the twilight of the principal media of the dissemination of knowledge of the book, a media whose individuating effects which historically strengthened the culture of democracy he had written about in *The Gutenberg Galaxy: The Making of Typographic Man* (1962).[538] With the advanced digital, informatic, and virtual technologies, we are beyond extending who we are and what we can do (*Homo faber* or *man the maker*), fully engaged in transformation into what we are becoming – with the robotic, biotech, and software systems merging with us in a cyborg way, all these devices and processes co-determinant of the posthuman condition.

The new media no longer serves the function of a mediation between two distinct locations or dimensions (here and there, viewer and what is shown on the screen, or the many nodes of a network). The media no longer enable a translation or crossover from one mode of presence to another, as with the mediation between a story and an audience, or the mediation between a live performance and those who wish to hear it but are not physically present. With contemporary technologies, algorithms hold sway over us and govern us.

Today we are in a fully posthuman situation.

Wendy Chun on Software Code

In her book *Programmed Visions: Software and Memory* (2011), Wendy Hui Kyong Chun develops her concept of "programmability" to argue that almost all social and economic institutions and procedures of life under capitalism are now shaped by software that pilots the unfolding of the future by intimately knowing data patterns and making extrapolations from the past.[539] Starting from Foucault's notice of governmentality, Chun sees software as a neoliberal governmental technology that holds together the intense homologous relationship between capitalism and computing. Neoliberalism and computation are a couple. Software enables us to navigate the choppy waters of that tandem. For Foucault, governmentality is the techniques and meticulous ideologies by which citizens in a society are governed, the implemented strategies of power which direct their behavior. Chun's book is a magisterial disentangling and exposure of the primary function of software as socio-cultural production.

Software, for Chun, is fascinatingly ambivalent in every respect. Software is apparently knowable and accessible with its "user friendliness," but it is mysteriously unfathomable. No one can fully understand the organizational structures and relations and many levels of complexity which are happening "under the hood." Software renders the invisible visible, and vice versa. Software is that which can be known and seen, yet simultaneously not known nor seen. It realizes a new world where a great deal that palpably affects our lives is vaguely hidden.

Some common myths about software source code are that of the "all-powerful (male) programmer" who can make happen anything that he wants, and the related assumption that code is a straightforward series of instructions to a machine. Software is in fact embedded in networks of complex systemic assemblages. Source code does not always do what it apparently says that it will do. The code written by the individual programmer gets processed through team code reviews. The execution of the code passes through many mediations of filtering, translation, syntax-matching, and linking with other code in code libraries, compilers, interpreters, and operating systems. The code can modify itself while it is running. It would require an approach of literary textual analysis to fathom all of this. Wendy Chun identifies code explicitly as a form of rhetoric. She writes that source code is a "generalized writing."

Source code is an anthropomorphizing of the machine. This becomes clear for Chun as she considers the history of programming languages. The idea of software never occurred to the original builders of computers around the time of the Second World War. In the late 1940s, "programming" experienced a decisive chapter in its gendered history. Male engineers made decisions and gave instructions to female subordinates. They were the "girls of the ENIAC" who physically went around and set switches in the giant computer. These low-paid women operators were the precursors of the command-line interface and the Graphical User Interface, the literal human female incarnation of the Man-Machine Interface.

After the era of machine code and assembler languages, and the low-level manipulation of registers, bits, and bytes, the development of readable and comprehensible languages was necessary. Programming languages are metonymic languages *par excellence*. Higher-level programming languages mark the capitalist commodification and materialization of software.

Software is ephemeral. It is material and immaterial. Critical of new media theorists Geert Lovink and Alexander Galloway, Chun declares "vaporiness" to be the essence of software. She writes: "Vaporiness is not accidental but rather essential to new media and, more broadly, to software… New media projects that have never, or barely, materialized are among the most valorized and cited."[540] Against the anthropocentric model of the programmer-as-human-subject holding power over the processor-object as "dead" mechanical machine, the direction of software trends towards the absence of both the human programmer and the machine. Creative projects like software poetry point towards the promise of unknown future paradigms. "Source code may be the source of many things other than machine execution."[541]

In her historiography of twentieth-century computing, Chun further argues that the idea of software code as "logos" did not come from the computer engineers themselves but rather "emanated from the elsewhere" of Mendelian genetic biology. The code of DNA as the blueprint of life was the "larger epistemic field of biopolitical programmability" that set the stage for programmability in software code.[542] Norbert Wiener's first-order cybernetics made the key link of proclaiming itself to be the science of systemic "command and control," independent of whether the entities being controlled are machine, human, or animal.

Today computing is evolving toward less strictly "programmable" systems – "in theory if not yet in everyday practice," writes Wendy Chun. She continues: "The pressing

question therefore is: What do we do with this move away from the map that nonetheless presupposes the map in a fundamental way?"[543] This corresponds to my idea of Creative Coding "building on top of" the programmable informatics that was rooted in the axiom of purely "formal language" towards reconciliation with human idioms and intuitively visual expression.

Chun reflects as well on hyperreality, and on simulation and simulacra. She writes: "Digital images challenge photo-realism's conflation of truth and reality: the notion that what is true is what is real and what is real is what is true."[544] Analog machines are (representational or descriptive or mimetic) *simulation machines par excellence*. Digital computers are *simulacra par excellence*. The universal technology of the computer, with its numerical method of 0s and 1s, can simulate all other previous analog machines which, in their physicalness, were dedicated to specific tasks. The digital simulates other simulations – a pure simulacrum. Chun's idea that software is evolving towards less "programmable" systems is parallel to the present study.

Software Code as Expanded Narration

In the second essay of Part Three, entitled "Software Code as Expanded Narration," I explain the history and principles of Creative Coding. How can the writing of software code become an expressive media? What is the relation of Creative Coding to post-humanism? What is the relation of software code to the history and future of writing? How do the main theses in software studies differ from my hypotheses and conclusions? What is the difference between existing computer science's concept of code and that of Creative Coding? Are cultural studies undergoing a knowledge shift from the paradigm of media to a paradigm of code? Can Creative Coding influence the future of computer science?

Creative Coding began as a movement of artists and creatives who had the intention of making art and design projects with computer technology. I explore the implications of the movement for cultural and media theory. Creative Coding demonstrates that informatics changes over time parallel to paradigm shifts in culture. Creative Coding initiates the artistic genres of "generative art" and generative Deep Learning.

I review and critique the ideas of Friedrich Kittler in his famous essay "There is No Software," and comment on his "media archaeology" approach.[545] I enumerate ten historical paradigms of informatics and programming. I comment on the first computational machines built around the time of the Second World War. I compare my ideas about software and code to those of luminary media theorists Lev Manovich, Vilém Flusser, and Jay David Bolter. I comment on two books in the MIT Press Software Studies book series. I make an interpretation of Alan Turing's famous "imitation game" and "Turing Test" in his 1950 pioneering Artificial Intelligence essay "Computing Machinery and Intelligence."[546] I present my take on Turing's equally famous 1936 paper "On Computable Numbers with an Application to the *Entscheidungsproblem*," where he devised the "Turing Machine."

The Software of the Future

In the third essay of Part Three, which is excerpts from my book *The Software of the Future*, I pursue Flusser's idea of connecting the future of software code and the history of writing. I discuss the paradigm of object-orientation in software development in relation to procedural programming, to future AI, to software objects, and to the idea of "taking the side of objects." I ponder the relation between technological and cultural simulations. I write about the SF film *Moon*. I write about the ideas of calculation in Pascal and Leibniz, and about the nineteenth century difference engine and analytical engine of Babbage and Lovelace.

I turn to consideration of the Q-Bit of quantum computing in software. MIT mathematician Peter W. Shor has written an important paper on this subject and on the Fourier Transform.[547] I touch upon David Gelernter's idea of "tuple spaces" in his book *Mirror Worlds*.[548] I write something about the SF film *The Matrix* as telling us something important about "the code of the simulacrum." I conclude with a statement about moral algorithms.