Racing the Beam

The Atari Video Computer System

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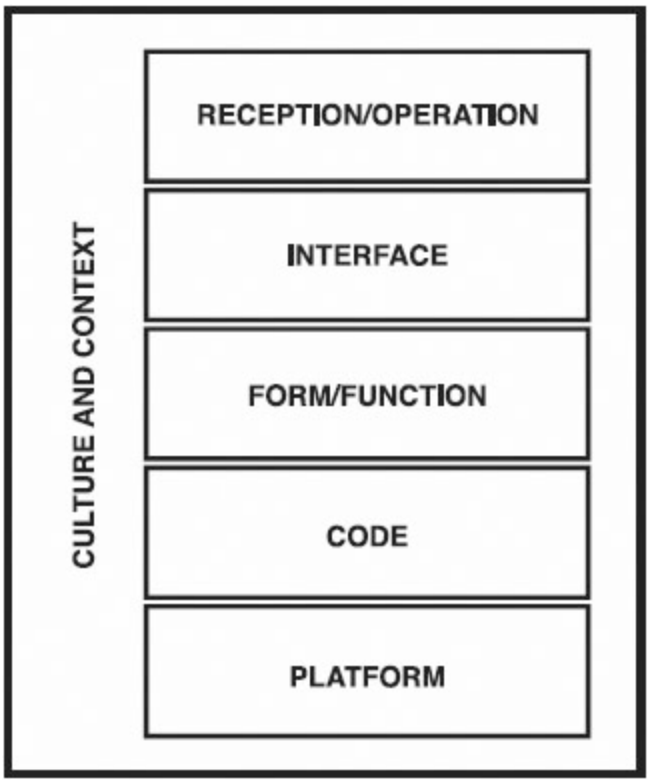
Afterword on Platform Studies

As creative uses of the computer have blossomed in the past fifty years, studies of digital media have also been undertaken, focusing on computational artifacts, video games, and works of digital art and literature. These studies have considered creative computing in many different ways. We find it useful to distinguish five levels that characterize how the analysis of digital media has been focused—each of which, by itself, connects to contexts of culture in important ways. The levels are illustrated in figure A.1.

Reception/operation is the level that includes reception aesthetics, reader-response theory, studies based on psychoanalytic approaches, and similar methods. This level is also where media effects studies, such as desensitization to violence, and empirical studies of interaction and play are found. Although only those types of media that are interactive are explicitly operated, all sorts of media are received and understood. This means that insights from other fields can often be usefully adapted to digital media at this level. The level of reception and operation includes a wide variety of studies that are focused on the player, viewer, or reader, from the studies of Sherry Turkle to applications of Wolfgang Iser's reader-response theory and Geoffrey R. Loftus and Elizabeth F. Loftus's studies of the behavior of game players.

Interface studies include the whole discipline of human computer interaction (HCI); comparative studies of user interface done by

humanistic scholars and literary critics; and approaches from visual studies, film theory, and art history. The approach that Jay David Bolter and Richard Grusin have called "remediation" involves concern for interface, although reception and operation are concerns of remediation, too. This type of approach is not particularly unusual. Many studies of digital media and computer games span multiple levels, but studies often focus on one. The interface is an intriguing focus, because it is visible yet particular to inter active systems. Even if we imagine a poem or a movie as interactive, it is often not very meaningful to characterize such a work as having an inter face apart from its visual or aural appearance. The interface, although an interesting layer, is what sits between the core of the program and the user; it is not the core of the program itself. A chess program may have a text interface, a speech interface, or a graphical interface, but the rules of chess and the abilities of a simulated opponent are not part of the interface.



A.1 The five levels of digital media, situated in context.

Form/function is the level dealing with the core of the program, including the rules of the game, the nature of the simulation, and the abilities of the computer-controlled opponents. It is the main concern of cybertext studies and of much of the work characterized as game studies or ludology. Narratology, which has been used for a while to understand literature and cinema, is an approach that deals with form and function and that has been applied to digital media as well. Because these approaches deal with the same level, it is at least meaningful to imagine a narratology/ludology debate—an early conflict in game studies over whether games are better understood as essentially rule-based or narrative—while it makes much less sense to think about a psychoanalysis/ludology debate or a remediation/narratology debate.

Code is a level where explorations are still only beginning. Code studies, software studies, and code aesthetics are not yet widespread, but they are becoming known concepts. With both the Ars Electronica festival and, more recently, the Society for Literature, Science, and the Arts (SLSA) having events with code as the theme, there are more contexts for discussing the way creative work is actually programmed and the way it is understood by programmers. The discipline of software engineering is a related field that concerns itself with the code level as well as with organizational and individual capabilities for software development. Of course, looking at the source code for a particular program is very useful when considering the code level. Comments, variable names, and choices made when writing programs can be telling and can help us understand how programs were written and under what conditions. Even if the source code is not available, however, an analysis at this level of compiled code and of records of the development process can reveal many useful things.

Platform is the abstraction level beneath code, a level that has fortunately received some attention and acknowledgment, but which has not yet been systematically studied. If code studies are new media's analogue to software engineering and computer programming, platform studies are more similar to computing systems and computer architecture, connecting the fundamentals of digital media work to the cultures in which that work was done and in which coding, forms, interfaces, and eventual use are layered upon them.

As we discussed the Atari VCS, we did not shy away from mentioning some things about what games mean and how people play them, what interfaces particular games use, the particular ways that games function, and the code with which they are implemented. But though we have considered other levels, our focus in this book has been on the platform level, the one that we believe is most neglected.

We hope that our book and future studies at this level will help fill in our overall understanding of digital media and benefit the humanistic exploration of computing. We also want to emphasize again that we see all of these levels—not just the top level of reception and operation—as being situated in culture, society, economy, and history. Because of this, we sought to describe how the Atari VCS platform came about as well as how it has influenced further cultural production. A computational platform is not an alien machine, but a cultural artifact that is shaped by values and forces and which expresses views about the world, ranging from "games are typically played by two players who may be of different ages and skill levels" to "the wireless service provider, not the owner of the phone, determines what programs may be run." We hope that this awareness of the contexts of platforms has informed our approach in this book, just as it has informed the best digital media studies at other levels in the past.

We chose the Atari VCS as a starting point because it has been so influential and popular. It is also relatively simple—we were able to discuss every chip on the board in some detail without producing a technical manual. It didn't hurt that the Atari VCS remains, to us, an immensely pleasurable game system to play on, to hack on, and to program.

Platform studies is not just fun and games, though, and the approach that we are advocating doesn't apply to only the simplest computational systems. Yes, considering the platform level can certainly help illuminate other sorts of video games and game systems. Video gaming has been an extremely rich category of creative production on the computer. But consideration of the platform can also enlighten our understanding of interactive visual art, educational programs, hypertexts, works of interactive fiction, demos, creative projects in text generation, visual and kinetic poetry, and much more.

Although the Atari VCS is a platform that was originally realized in hardware, the term "platform" in general does not mean simply "hardware." There have been many influential software platforms designed to run on different sorts of boxes. In the 1970s and 1980s, BASIC became a not-quite-regularized lingua franca for the wide array of minicomputers and, later, home computers. BASIC was perhaps less principled than another beginner's language, LOGO, and was often maligned by advocates of structured programming, but it served well enough for small-scale programs and facilitated a surge in popular programming. Somehow, the "harmful" GOTO statements of the language combined with new possibilities for program distribution and the ease of access to BASIC that microcomputers provided. Studies focused on the code of particular BASIC programs are important to pursue, but studies that consider the programming language as a platform for computational expression will also be important.

BASIC is obviously not the only interesting software platform. Java, released by Sun Microsystems in 1994, has been used for business, scientific, and creative purposes and even to construct higher-level computational platforms, such as Ben Fry and Casey Reas's Processing. Although not originally a programming language, Flash, which became popular as a Macromedia product and is now an Adobe product, is a fascinating software platform that acquired computational capability as new versions were released.[1] It has been used to provide everything from professionally produced interfaces to hilarious low-brow animations and games.

Many of the early microcomputers that had BASIC built in were very interesting platforms in their own right. The Commodore 64 and Apple][were both important in the development of computer games, and, although many games were ported between the two platforms, their unique features encouraged different sorts of games to be made. The Apple][also provided a platform for advances in educational software and for the development of the first spreadsheet. The Commodore 64, on the other hand, was the first platform embraced by the demoscene, a movement that grew to be strongest in Northern Europe and that focused on programming computer-generated music videos.

There are many other significant computational platforms, from the computer-aided instruction system Programmed Logic for Automatic Teaching Operations (PLATO), which debuted in 1960, to today's mobile phones. Many are of much greater complexity than the Atari VCS. In these cases, a study the size of this book would not be able to discuss the platform technology as broadly and as deeply as we have been able to do with our chosen example. Just as it is useful to peel back layers of abstraction in a few cases, it will be useful in other cases to discuss how larger-scale systems are integrated without exploding every technical detail of every part of the system. The Atari VCS, as elegant and important as it is, cannot be used to explain how an operating system works and how that part of a system influences

creative production. The console simply does not have an operating system. Other studies that don't consider chips and registers in as much detail can deal instead with this component and with other important aspects of computational platforms.

Our hopes for the future of platform studies are twofold. First, we hope that new media studies of all sorts, by curious fans and devoted scholars, will look to the platform level more often and will explore how the platform is relevant to the work, genre, or category of creative production that is being considered. It is not always obvious how to go about this, and explorations of technical details can be challenging, but already we have been provided with some good examples of platform-aware work in Alexander Galloway's *Protocol: How Control Exists after Decentralization*, Steven E. Jones's *The Meaning of Video Games*, and Matthew G. Kirschenbaum's *Mechanisms: New Media and the Forensic Imagination*. We will of course be glad if the work we have done here is useful to those undertaking studies of specific VCS games and comparative videogame studies that consider the 1977-1983 period. But we also hope that this book will serve as a more general reminder that studying what is underlying and assumed—the platform—is rewarding in all sorts of digital media research.

Beyond that, we hope that others will choose to undertake studies that center on platforms themselves. This encourages the comparison of works done on the same platform, a type of comparison we have found to be particularly fruitful. It also can lead to a more holistic view of an integrated computer system, one that wouldn't be obtained by looking at a single program or a single component. To provide a place for studies that focus on the platform level and on particular computer platforms that have influenced creative digital media work, the MIT Press is publishing the Platform Studies series, of which this book is a part.[2]

1. Bogost, *Persuasive Games*, 296. This was one of several examples of a VCS device that prefigured later videogame developments. Another was the GameLine modem, allowing the same sort of service that later came to be offered by the PlayStation Network, Wii Channels, and Xbox Live. Forster, "The Encyclopedia of Game Machines," 27.
2. For a detailed consideration of the challenges of emulating the VCS, see Vavasour, "Back to the Classics." In that article, the developer of the *Atari Anthology*emulator explains how he dealt with one aspect of emulation: "The Atari 2600 console had 128 different unique colors. The circuits for generating those colors are hidden inside a custom chip. Rather than guess, I created a special ROM and downloaded it into my Atari 2600. It was programmed to cycle through all the possible colors. A bar code on the top of the screen identified which color was being selected. The result was captured with a PC video card and the program scanned the captured video, deciphering the bar code and noting the dominant color that was on the screen with it."
3. Batari Basic is a BASIC language compiler for the Atari VCS, created by Fred Quimby. It is available at http://www.bataribasic.com.
4. Null, "The 10 Gadgets that Changed the World"; Null, "The 50 Best Tech Products of All Time"; Bourzac, "Objects of Desire"; Dobbin, "Atari 2600, Raggedy Andy, Kite Enshrined."
5. Rothman, "Atari 2600."

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1. Before Macromedia bought it, Flash was called FutureSplash Animator.
2. See the Web site http://www.platformstudies.com for more information on theseries.