Playing History with Games:
Steps towards Historical Archives of Computer Gaming

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Abstract
The historical preservation of interactive software raises a number of issues. In this paper, the focus will be on the particular difficulties presented by computer games, videogames and, to a lesser extent, interactive simulations. Lowood will present the vantage points of both the historian of these media and the curator of collections, first with respect to the problem of defining the objects to be preserved, then with regard to some practical projects planned or underway at Stanford.

Computer and video games are dynamic, interactive and immersive. All of these qualities shape or derive from the interaction of player and game components (hardware, software, game design). They also underline the variability of this medium and its dependence on player input. Thus, games exist in a media space somewhere between the text, the experience and the performance, confounding preservation strategies that rely on notions of content fixity taken from other media. Artifact or activity? Hardware and software objects alone cannot document the medium of the computer game. What is saved by preserving consoles, hardware and software alone, without recording game play, for example?

Just as important, the variability of this medium reflects the nature of games as software, in that the content and the code itself can be changed. Perhaps the most important trend in contemporary game design is the modifiability of published games by the player community, whether in the creation of game "mods" such as Half-Life Counterstrike, the results of subversive play such as speedrunning, or the use of games as platforms for performances such as machinima. Understanding the degree to which game software is modified may also be enlightening with regard to other variable media, but regardless of such generalization, it is a vital step in thinking about problems ranging from how to define computer games as software objects to development of metadata standards.

At a practical level, this paper will present some considerations in the development of The Machinima Archives, as well as some of the hurdles faced in the long-term preservation of Stanford's substantial collection of computer game and videogame software. Looking forward, it will conclude with some of the early planning for the Archives of Wargames, Simulations and Modeling project.

Why Preserve Computer Games?
Why preserve computer games[1]? Often, the argument for research on computer games cites statistics that measure the commercial success of the computer game industry. Let's begin there. According to the Entertainment Software Association, sales in the United States of computer and video game software alone reached $7 billion in 2003, with unit sales of 239 million games, about two per U.S. household.[2] Including

hardware, the game industry generated more than $11 billion in sales.[3] Estimated global sales of hardware and software ranged from $25 to $35 billion, with significant markets for PC or video games in Japan, Korea, Germany, and the U.K. Yet, computer games capture more attention than sales statistics can reveal. Games take longer to complete than most books and films; many multiplayer networked games never end. The publishers of the popular *Half-Life: Counterstrik* reported 3.4 billion player-minutes per month in mid-2002, exceeding what Nielsen ratings yield for *Friends,* the highest-rated U.S. television show. Allow me one more indicator. About 1.5 billion movie tickets will be sold this year. This number means that in the average week less than 15% of the U.S. population goes to the movies, down from 46% after World War II. The ESA reports that "fifty percent of all Americans age six and older play computer and video games," with an average player age of 29.[4]

These statistics suggest that computer games, along with the web and other new media, are displacing television and movie-going, particularly among children, teenagers, and older adults, but profits and popularity are not by themselves reasons for taking historical preservation of computer games seriously. Scholars are also taking note of the cultural and social importance of games. The bibliography of game studies is growing rapidly, fed by research in literary, media and cultural studies, the social sciences, arts and humanities, and, of course, game design. Organizations like the Digital Games Research Association (DIGRA) in Europe and the North American Simulation and Gaming Association (NASAGA); online research journals such as *Game Studies* and the *International Journal of Intelligent Games & Simulation*; teaching and research programs at M.I.T., Carnegie-Mellon University, Georgia Tech, and the University of Southern California, to name but a few, all testify to growing scholarly interest in the study of games and related interactive media. Research on the social and cultural impacts of interactive entertainment is replacing dismissal of computer games and videogames as mindless amusement for young boys.

Today's conference program leaves no doubt that preservation of electronic and interactive art is on the agenda of the Electronic Media Group. So allow me to dwell for a few moments on the cultural importance of computer games with respect to the arts. Henry Jenkins, director of the Comparative Media Studies Program at M.I.T., has written that video games may be the "art form for the digital age." Some of you will find this thought difficult to reconcile with *Pong, Pac-Man* or *Pokemon*. Jenkins answers by suggesting that such reactions "tell us more about our contemporary notion of art—as arid and stuffy, as the property of an educated and economic elite, as cut off from everyday experience—than they tell us about games."[5] I recently guest-curated two exhibitions, "Bang the Machine: Computer Gaming Art and Artifacts," at the Yerba Buena Center for the Arts; and "Fictional Worlds, Virtual Experiences: Storytelling and Computer Games," at the Cantor Arts Center. The YBCA announcement cited the "pervasive influence" of computer games on "artistic invention," and through these exhibits our How They Got Game group at Stanford insisted that there is a place for computer games in the White Cube.[6]

Debating the ultimate status of games as an art form strikes me as less important than the potential impact of computer games on artistic expression, more a matter of the

interplay between computer games and artistic practice. My research on the early history of machinima—animated movies made with computer game software—has convinced me that "high performance play" [7] is a form of artistic or performance practice, and this conclusion has also altered my thinking about archives of game software, particularly with respect to the importance of recording and preserving gameplay. In *Perform or Else,* Jon McKenzie challenges performance studies to consider performance in a wider context, one that "links the performances of artists and activists with those of workers and executives, as well as computers and missile systems." And he adds to this challenge, "If performance is in our mist, our mad atmosphere, it's also capable of becoming stratified, of leaving an historical sediment of effects that we can read in both words and actions."[8] So it is with game performance. Historians and archeologists of new artistic and performative media—whether games, machinima, remix culture, poetry slams, or hypertext literature—will dig through this sediment for evidence of use and performance, but only if we can find some way to preserve it.

How do we insure that future scholars will be able to play history with games? I will organize my response to this question around three themes: (1) What characteristics of computer games as a medium and as software present special challenges for building historical collections? (2) Who will be the curators of these collections? (3) What are we doing now, at Stanford or other institutions, to lay a foundation for the computer games archives of the future?

The Nature of the Medium

I am calling several forms of interactive entertainment "computer games." (The term "videogame"--usually one word--is often used in the same way.) Nomenclature aside, it is important to comprehend a diversity of formats. Games have been distributed or published as software and game cartridges, operated by depositing coins in machines, hard-wired into the circuitry of electronic devices, or downloaded and played entirely over computer networks. The machines, or "platforms," for these games include computers, arcade consoles, television consoles connected to home television sets, handheld game machines, PDAs, mobile telephones, simulators and networks. Some games are purely text-based, others rely heavily on graphics; some games are single player experiences, others are multiplayer; some games develop along the lines of a narrative exposition, others involve rapid reactions or cyber-athletic competition. Newer forms known variously as ubiquitous, immersive, or pervasive gaming use mobile, embedded technologies, mix realities, and are often location-specific. I will speak of computer games as a single medium, but preservation strategies will have to be tuned to particular modes and machines of play. Let's consider now a few characteristics of computer games, as software, as technology, and as performance.

Computer games are software. Since the 1970s, the emancipation of software from Big Computing has led to our cultural dependence on computers. Doug Engelbart, Ted Nelson, Alan Kay and others created the possibility of new digital media in the 1960s and 1970s by reconceiving the computer as a communication and creativity machine rather than a calculation engine. Convergences of media and technology have since pushed software into nearly every medium of entertainment, art, recreation and

storytelling. Software has become a condition of our lives; culture is embedded in the computer as much as the computer is embedded in culture.

The idea of playing games on computers is about as old as the computer itself. Most early computer games grew out of university-based computing research laboratories, often as demonstrations of computer technology, such as M.I.T.'s *Spacewar!* in 1962. Graham Nelson has coined the term "university games" in his history of interactive fiction to describe game programs of the 1970s. *Spacewar!*, *Adventure*, the multiplayer games of the PLATO Project, and other games increased tolerance for play in the laboratory; the late-night amusements of programmers and engineers applied their knowledge of coding, computer graphics, interfaces, controllers, and television technology. Experimentation with computers and games provided mutual stimulation. The association of computer games with technical performance, programming mastery, and informal modes of distribution all emerged during these early years. And by the way, the importance of this historical environment for early computer games raises a pressing issue: We are already late in attending to the special preservation needs of early game software developed in the laboratory—unpublished, often modified, written in obsolete languages and saved, at best, as printouts of source code or on media that are today difficult to locate, let alone support.

Computer games are software, but not all games are played on computers—whether personal or shared--in the conventional sense. The first game consoles, Nolan Bushnell and Al Alcorn's *Pong* in the coin-operated arcade and Ralph Baer's Brown Box, which would bring the game console into the living room, were products of television technology. Most console games since that time have been digital and software-based, but it is nonetheless important to understand the daunting diversity of the physical objects encountered by the game archivist--source code or packaged software for computer games; circuit boards and ROMs for arcade systems; proprietary cartridge designs for console systems, and so on. Perhaps the lesson here is that we should always keep in mind the difference between physical artifacts necessary for gameplay, the code underlying a game, and the "conceptual object" perceived by a player in a particular instance of playing the game.[9] The same game code may be carried on different physical media and played on different configurations of machines. Similar game experiences (even the same game title) can be delivered via different code or physical objects, just as the same machine and code may produce quite different experiences in actual gameplay. In the archives or museum, preservation of emulators, restored machines, and software objects alone will not take us very far. Careful attention to the relationship between hardware, code, use and context for use is necessary and can only benefit the application of technical solutions such as emulation and bit-perfect replication of software. Even more important, understanding the role played by preservation of artifacts in the preservation of computer game history fundamentally conditions curatorial decisions about retention of objects and the design of metadata schemes to describe them.

As software, computer games can be modified.[10] Unlike most other software applications, however, game content is usually packaged together with the game engine, rather than existing separately as documents or files. Thus when we use a game engine

to create a new game, we are modifying the game software. Lev Manovich has called this the new "cultural economy" of game design, which he traces to the release of id software's *DOOM* in 1993.[11] A published computer game today is often a set of design tools as much as a finished design. With the increasing popularity of modified games–"mods"–it is not that glib an over-simplification to say that game developers ship game engines that happen to be accompanied by their own levels and maps. (Game engines are the software platforms for handling graphics, game physics, artificial intelligence, the structure of game levels and file formats, editors, etc.) Independent level, scenario and mod designers then take over, sometimes even creating entirely new games known as "total conversion" mods. Manovich contrasts modifiable games like *Quake* or *Half-Life* to the more traditional characteristics of a game like *Myst,* "more similar to a traditional artwork than to a piece of software: something to behold and admire, rather than take apart and modify." *Counter-Strike,* the most popular internet-based game of all, is a multiplayer modification of single-player *Half-Life,* demonstrating how mainstream the mod economy of game design has become. Games such as *Counter-Strike* often exist in countless variants, comprising versions of the original game (*Half-Life*), versions of the mod itself, patches, other player mods (such as the World War II game, *Day of Defeat)*, and so on. The contemporary game scene has been enriched by these creative projects, which range from skinning characters, working up freeware utilities, and changing art assets to creating new games or using game engines to produce machinima movies. With the addition of hard drives and network connections to console boxes, we may soon expect modded games to appear regularly on consoles, as well. Capturing the history of community-generated content and the mod scene is a huge challenge, and it will require special attention to the variability and modifiability of software, including provisions for carefully documenting version history through metadata.

Games are technology. Game developers often push the technological envelopes of their hardware, particularly in the use of 3-D graphics and other visual effects. The resulting technical requirements have created markets for PC peripherals such as video and sound cards or driven the need for new generations of game consoles. Keeping up with sturdy technical requirements are one problem for game preservation. The degree to which specific hardware configurations--display, controller, responsiveness of network or storage components, etc.-- alter the experience of gameplay is equally important. Recapitulating the technical discussion about the relative merits of emulation, migration, documentation-based reconstruction, encapsulation and hardware conservation strategies would easily use up the rest of this talk. Here is the main point from a curatorial perspective: There is a difference between preserving game technology and preserving game content, which includes gameplay. Is it necessary to play *The Legend of Zelda* on the original Nintendo Entertainment System, with the original Nintendo controller and a contemporary television set, in order to gain a historically valid experience of the game? The experience of viewing *Birth of a Nation* in a palatial theater with live music is different from viewing it on videotape, on our television, at home, and so is reading any rare book in a modern edition or format. Different, yes, but is that difference essential for scholarly research? The most important artifact is an accurately documented version of content, and as we look forward to the future of new media archives, the safest prediction is that this version will not be in the original medium or format. Access to original artifacts *is* occasionally essential, sometimes for their historical

value, but more usually for their evidentiary value in another context, such as a patent dispute.

If we focus on accurately documented content, careful emulation of original hardware will be an indispensable part of the solution for game preservation. By "careful" I mean not only that emulators should be able to run original code, but also that they should encompass as much knowledge of the original hardware as possible. For example, absolute precision with regard to timing issues will probably require emulators down to the level of microcode. We may also need to give more attention to devices that emulate physical artifacts such as controllers or dance pads. Emulation and reformatting are two sides of the same coin. The deterioration of original media means that game software will eventually be available only in reformatted versions. The Classic Amiga Preservation Society has precisely defined acceptable versions of game software--not a crack or hacked version, not a budget version, not a re-release. Cracks that overcome copy protection schemes may be the main source of copied versions available on the web, but copies that circumvent parts of the code may eliminate opening movie sequences, introductory music, screenshots, tips or even information affecting game play (such as elements of back story). The CAPS website[12] admirably summarizes the complex subjects of copy protection, disk duplication, data integrity deterioration, flakey bits, and other factors bearing on the ideal of bit-perfect replication of software. And lest we forget, building emulators and compiling collections of reformatted software will for some time to come require somebody to keep old machines running, even if only for disk analysis or data grabbing.

Games are performance. In *The Study of Games* (1971), their seminal work on the anthropology of games, Elliott Avedon and Brian Sutton-Smith asked, "What are games? Are they things in the sense of artifacts? Are they behavioral models, or simulations of social situations? Are they vestiges of ancient rituals, or magical rites?"[13] Avedon and Sutton-Smith were leading their readers to ponder structural similarities among games, but their question also poses the question of whether games are artifacts or activities. We may ask then, whether computer games are fixed artifacts, more like authored texts, or experiences expressed through interaction, competition, or play, more like performances? Computer games provide the opportunity to think carefully about how to construct a history of *interactivity*. As we preserve interactive media, we must not lose sight of how we will document interactivity itself, which means capturing traces of *activity*, that is, gameplay.

The active, performative aspect of games provides a special challenge for documentation strategies. As a thought experiment, think for a moment about the case of a game like basketball. Let's try to choose between texts, artifacts, or records of performance. How much does the source code, James Naismith's 13 Rules of Basketball (1891), tell us? What about artifacts like Boston Garden, the hardwood court, the hoops? Or do we learn more from recordings of gameplay? Do any of these sources alone tell us everything about the nature of the game?

Computer and video games are both dynamic and interactive. They are dynamic, because each instance of gameplay results in a different set of activities and experiences.

The text is never the same. The interactivity of games is the sine qua non of this new medium; without it computer games would lose their identity. Chris Crawford, the dean of American game designers, has insisted in his writings about game design that "interactivity is not about objects, it's about actions."[14] I would add that these actions usually result in performances. Gameplay encompasses performance in more than one sense of the word. It encompasses performance as mastery of technology, performance as success in perfecting the skills needed for success in the game, and performance as public exhibition. The early history of Machinima illustrates all three modes of performance. Machinima makers appropriated game technology to create movies based on gameplay. Id Software, the developers of *DOOM* and *Quake,* made this possible by opening up access to its game technology just enough to encourage development of *Quake* tools for unforeseen purposes, such as the editing of demo movies and, eventually, the making of machinima using real-time techniques of gameplay as performance. While these modifications were not opposed by id, they were subversive. In other words, technology became a field of play, not just in order to play the game of optimizing game performance, but by redefining the game as a technology for making movies. Machinima subverted the game system, exploiting it as a performance technology. Just as important, machinima drew upon a strong social network spawned by multiplayer gaming. Knowledge of the capabilities built into *Quake* and access to independently-developed tools disseminated rapidly in this virtual community of *Quake* players.

Before *Quake*, the intensity and rapid action of *DOOM*'s multiplayer deathmatch established an important performer-spectator relationship that led to documentation of gameplay. *DOOM* required skills. Star players emerged, and everyone wanted to see them play, to gather insights into their play tactics and possibly learn a trick or two. This was accomplished through the creation of demo movies, or "demos." As a veteran of the *DOOM* demo scene points out, "Use of demos for their educational value has been going on since almost the beginning." In a typical use of these movies, "a new player who wants to get better requests that a game with a higher-skilled player be recorded, and then the new player watches the demo (where presumably he lost) from the higher-skilled player's point of view, hoping to learn ways to improve his own skill."[15] Demo movies made it possible to see gameplay through another player's eyes.[16] They also certified the status of star players. Beginning in 1994, the Doom Honorific Title (DHT) Program, a player rating system, became "the means by which good players can objectively prove to the world that they are as good as they claim." The certification process explicitly promoted the performance of gameplay through demo movies. As the DHT website noted, "An exciting feature of the game is the ability to record the player's input in a form that can be replayed later, like a movie." These recordings came complete with authentication of a players' identity through a unique "dance" of scripted game moves. Demo movies put exploits on exhibit and documented the skills of players and clans. Years later, surviving examples put viewers in the shell of the ghosts of players. One of the best surviving series features perfect reproductions of matches recorded as early as May 1995; these recordings allow us to look through the eyes of one of the first "game gods," NoSkill, having been preserved on the memorial site of this now deceased player.[17] Archives of computer game history must locate, save, and

preserve vestiges of gameplay and performance, whether demo movies, speedruns, replays, or machinima, both as original gamefiles and in portable movie formats.

Curatorial Models

Curatorship of interactive digital media collections confronts the growing volume and diversity of impermanent software. Software diverges from print or museum culture not just in the impermanence of its media but also in the flexibility of its use. Software converges previously separated realms: texts, stories, audio-visual experiences, interactive simulations, data processing, records management, and metadata applications such as indexing, among them. Who should be responsible for the custodial care of software and new media collections? Traditional institutions and professional identities provide uncertain guidance. Doron Swade, a museum curator, notes that:

"Some software is already bespoke: archivists and librarians have 'owned' certain categories of electronic 'document': Digitised source material, catalogues, indexes, and dictionaries, for example. But what are the responsibilities of a museum curator? Unless existing custodial protection can be extended to include software, the first step towards systematic acquisition will have faltered, and a justification for special provision will need to be articulated ab initio in much the same way as film and sound archives emerged as distinct organisational entities outside the object-centred museum."[18]

Swade calls this the problem of "preserving information in an object-centred culture," and he ponders the relevance of artifact collections of software. Libraries are coming to grips with related issues that might be described as "preserving information in a text-centred culture." Software creates a relationship between media objects and their content that no longer privileges the original artifact. Current debates about the best methods for preserving software turn to some degree on institutional and professional allegiances to the conservation of objects.

Games and other interactive multimedia need new models of curatorship and collections. So far, we have many ideas about this. As an example, Jürgen Claus, Professor of Media Art at the Kunsthochschule für Medien in Cologne, already noted the expansion of media art in 1985 and asked, "What Will Remain of the Electronic Age?" He then reasoned that "we have to ask for adequate spaces to display and store this art, that is, we have to ask for media museums."[19] Claus insisted that "The Museum must not be relieved of its duty of being a place of reference for works of remaining value. Certainly, film, photography, video, disc, tape, etc. are media to store events of art. Where should they be collected, examined, and passed on if not in an adequate museum, that is, a media museum?"[20] More recently, Matthew Kirschenbaum, a literary scholar working with hypertexts, has thought about treating electronic texts such as Michael Joyce's *afternoon* as textual artifacts "subject to material and historical forms of understanding."[21] He rejects a duality of printed texts as durable and fixed and electronic texts as "volatile and unstable," warning of the danger of post-modern acceptance of the ephemeral in electronic media. His conclusion that textual scholarship should be applied to the "authorial effort to create links, guard fields, and so forth," thus preserving the network of code, technology and documentation underlying the creation

of hypermedia, seems to point toward a new model of e-bibliography, library work, as being particularly important for preservation of new media. The History of Computing Committee of the American Federation of Information Processing Societies (AFIPS) recommended over two decades ago that, "If we are to fully understand the *process* of computer and computing development as well as the end results, it is imperative that the following material be preserved: correspondence; working papers; unpublished reports; obsolete manuals; key program listings used to debug and improve important software; hardware and componentry engineering drawings; financial records; and associated documents and artifacts."[22] In short, AFIPS offered the notion of an archival repository of software history.

W. Boyd Raymond has argued that electronic information is reshaping the roles of all these institutions—museums, libraries, and archives. He points out that "the functional differentiation of libraries, museums and archives as reflected in different institutional practices, physical locations, and the specialist work of professional cadres of personnel is a relatively recent phenomenon." According to Raymond, individual scholars never stopped favoring the ideal of a "personal cabinet of curiosities" tuned to subject matter, an ideal that considers format of artifacts and media as irrelevant, while stressing content. He asks us to reconsider this "undifferentiated past."[23] I submit that computer game archives, as cabinets of new media curiosities, will provide a good test for this idea. We will play history with games in a LibrArEum that unites digital libraries, software archives and media museums.

Plans and Projects

In October 2002, I spoke at a Stanford mini-conference about the computer game archives of the future.[24] At the end of that talk, I proposed five salient tasks and challenges:

1. Build emulation test-beds.
2. Build a game performance archive.
3. Build archives of design documents, source code, digital assets, and ancillary documentation of game development.
4. Stabilize representative artifact collections in museums and archives.
5. Collaborate.

Rather than repeat the justifications and tactics for each of these goals today, allow me to identify some projects that are moving these goals forward.

The first project is the Machinima Archive. Stanford's How They Got Game Project, which I co-direct, took the lead in assembling files and information about machinima movies about a year ago, and today the collection is the work of a collaboration of interested parties. It is hosted by the Internet Archive <http://www.archive.org>. The Machinima Archive is presently in a "soft launch" mode; it will be launched with greater fanfare later this summer. The collaboration partners are the Internet Archive, the How They Got Game research project (based at the Stanford Humanities Laboratory), the Academy of Machinima Arts and Sciences, and Machinima.com. The goal of this collection is to secure a significant body of game performance. Galen Davis, a Stanford graduate student, and I selected an initial group of works for inclusion in the Bang the Machine show. At that time, we also requested permission from the artists to

include their works in the Archive. The inaugural collection includes early works such as "Diary of a Camper," a speedrun from the Quake Done Quick project, and movies from the Ill Clan, Jake Hughes, and Strange Company, to name only a few titles and artists.

The Machinima Archive will be presented in the manner established by the existing Moving Images collections at the Internet Archive, such as the SIGGRAPH Electronic Theater.[25] The primary archival format will often be game data files, since many machinima movies, particularly early projects, were created as demo movies meant to be seen within the games themselves. This has led us to consider the technical problem of developing a player for these movies that would make it possible to view these movies in their original format without owning games like *Quake* or *Quake II*. In addition, following the established practice of the Internet Archive, we will offer a standard encoding, MPEG2 in most cases, for distribution of surrogate copies over the web. Many if not most movies will need to be converted to this format, and it is expected that often we will receive other portable formats (quicktime, windows media, etc.), sometimes as surrogates for the original movie formats, sometimes because the creators originally offered that particular format. We will always endeavor to acquire movies in the original format of creation, though the practices of modification and collaboration that produced these movies occasionally obscure precise identification of the original version. The collection of machinima files will include associated metadata for descriptive, technical, and rights-management information. The Internet Archive's bandwidth and server space, while not unlimited, is adequate to the task. It already stores more than 10 billion web pages reaching back to 1996—more than 100 terabytes of data, with growth of 12 terabytes per month at present. Even with the appetite that pre-rendered machinima files might have for hard disk space, the needs of the Machinima Archive will be relatively modest. Given our early success in convincing machinima artists and collective sites such as machinima.com to deposit their movies with the Machinima Archive, the Internet Archive has decided to create additional collections for demo movies, speedruns and replay movies. The Machinima Archive is a game performance collection. Following the lead of the Live Music Archive and the Open Source Audio collection, we hope that the Machinima Archive will establish itself as a community site, so that the creators of game recordings and movies will routinely deposit their work directly into these digital collections.

Work on emulation, reformatting of game software, and conservation of game artifacts is also making progress. These projects are often interlinked. Simon Carless of Slashdot and the Internet Archive is putting together the Classic Software Preservation Project (or CLASP), also a part of the growing network of Internet Archive collections. CLASP was established at the beginning of this year to help permanently archive obsolete retail software from the late 1970s through the early 1990s. The bulk of this collection thus far consists of computer games. With the help of CLASP's digital partners, such as the Classic Amiga Preservation Society and the Stanford University Libraries, the Archive will store perfect digital copies from original media before they deteriorate. These files will be locked away in a dark repository until either copyright expires or the rights holders release their titles into the public domain. In order legally to migrate data from copy-protected media, the Internet Archive with support from the Stanford University

Libraries and other institutions successfully lobbied the Copyright Office in October 2003 for a three-year exemption to the Digital Millennium Copyright Act. This exemption allows circumvention of certain stipulations of the DMCA for the purpose of preserving obsolete software in archival repositories. However, it is important to note that the clock on this exemption is ticking. Renewal of the exemption may depend upon demonstration of its application, and so we should hope that CLASP will provide a basis for significant software reformatting projects. While the software in CLASP itself will not be publicly available without permission from rights holders, the Archive will create a public catalog with basic metadata about the titles in the collection, as well as box and disc scans, screenshots, and other information. It is possible that portions of Stanford's Stephen M. Cabrinety Collection in the History of Microcomputing at Stanford University, probably the largest historical collection of microcomputer and game software in the world, will be included in the CLASP Project.

Other institutions, such as the Computerspielemuseum in Berlin and the Computer History Museum Center in Mountain View, California, are building collections of game-related computer hardware and software, so that the potential for a truly multi-institutional project spanning reformatting, software and hardware collection, and perhaps even an emulator museum is encouraging. The creator of the Computerspielemuseum, Andreas Lange, has also founded DiGA, the Digital Game Archive. DiGA, like the Internet Archive, is collecting commercial software with the permission of rights holders, however it is already providing access to this software, in light of "the multitude of emulators" available on the web that can be used to execute these files.[26] These emulators have to date been largely the work of hobbyists and player communities, and it behooves institutions concerned with the long-term preservation of software to build bridges of communication and coordination with these groups. Unfortunately, the time available today does not permit description of any more archival and historical projects, but I would like simply to mention the proposed Archives of Wargames, Simulation and Modeling devoted to military wargames, the Battle of 73 Easting collection and the Richard Bartle papers, just a selection of the projects under consideration or underway at Stanford in the realm of computer game archives. Together with the other projects already mentioned, we can conclude that current work is addressing a range of goals for historical game archives: artifacts collections, original and reformatted software repositories, performance archives, and special collections of manuscripts, documentation and game design materials.

James Cortada, an IBM executive and historian, made a provocative point in the preface to *Archives of Data-Processing History,* published in 1990:

"The first group of individuals to recognize a new subject area consists usually of participants followed closely after by students of the field and finally, if belatedly, by librarians and archivists. It is very frustrating to historians of a new subject, because it takes time for libraries to build collections or to amass documentary evidence to support significant historical research. This situation is clearly the case with the history of information processing."[27]

I am hoping that computer game archives and preservation will be an exception to Cortada's portrayal. Let's begin now to build the computer game archives of the future. I hope that you will take away three ideas from this talk about how we will do this. The first is we should be open to revision of institutional and curatorial roles for historical new media collections. The second is that we will need to create repositories that will be focused less on conserving physical objects than emulating the "look and feel" of interactive media, documenting and delivering computer-mediated performance, describing and reformatting media objects, and possibly even recreating the social and personal experiences made possible by historical media such as computer games. The third notion is simply that the lynchpin of all that follows will be to solve these problems in collaborative, multi-institutional projects. Without the cooperation of industry groups, game designers and publishers we cannot make progress on the sticky social, business and legal issues that might hinder our work. Playing history with games will be a team sport.

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[1] Throughout this paper I will use the term "computer game" as a catch-all phrase for many forms of software-based electronic entertainment, including videogames, PC games, military simulations, handheld games and arcade consoles.

[2] Entertainment Software Association website. "Top Ten Industry Facts" URL: http://www.theesa.com/pressroom.html.

[3] According to the NPD Group. Ben Fritz, "Vidgame Biz Buoyed," *Daily Variety* (26 Jan. 2004): 8. Cited from on-line version in LexisNexis. See also "NPD Funworld Reports 2003 Game Data" Game Marketwatch.com (26 Jan. 2004). URL: http://www.gamemarketwatch.com/news/item.asp?nid=2850.

[4] Entertainment Software Association website. "Top Ten Industry Facts" URL: http://www.theesa.com/pressroom.html. Earlier ESA (then IDSA) statistics were gathered from: Interactive Digital Software Association, *Essential Facts about the Computer and Video Game Industry* (Washington,D.C.: IDSA, 2000): 5. See also: Khanh T. L. Tran, "U.S. Videogame Industry Posts Record Sales," *Wall Street Journal* (Feb. 7, 2002); Valve L.L.C., "Valve Unveils Steam At 2002 Game Developer's Conference," (Press Release, March 21, 2002); Sharon Waxman, "Hollywood's Great Escapism; 2001 Box Office Receipts Set a Record," *The Washington Post* (Jan. 4, 2002); Anne Valdespino, "The Big Screen Keeps Pulling Us In," *Los Angeles Times* (July 1, 2002).

[5] Henry Jenkins, "Art Form for the Digital Age," Technology Review (Sept.-Oct. 2000). Available here: http://www.techreview.com/articles/oct00/viewpoint.htm

[6] Brian O'Doherty, *Inside the White Cube: The Ideology of the Gallery Space* (Santa Monica, Calif.: Lapis, 1986)

[7] Henry Lowood, "High-Performance Play: The Making of Machinima." Forthcoming in special issue of *Anomalie,* eds. Andy Clarke and Grethe Mitchell.

[8] Jon McKenzie, *Perform or Else: From Discipline to Performance* (London and New York: Routledge, 2001): 3.

[9] The relationship of conceptual, logical and physical object and the connection of this distinction to software preservation focused on games is covered in Karsten Huth's excellent "Probleme und Lösungsansätze zur archivierung von Computerprogrammen—am Beispiel der Software des Atari VCS 2600 und des C64." M.A. Thesis, Humboldt-Univ. zu Berlin (Jan. 2004). See pp. 16-21.

[10] This statement privileges games on computer platforms, despite historical examples (such as *Ms. Pacman* or speeded-up Xbox games) of arcade and television console games being modified or "hacked."

[11] The term is found in Lev Manovich, "Navigable Space" (1998). URL: http://www.manovich.net/docs/navigable_space.doc.

[12] Found as of June 2004 at http://www.caps-project.org/.

[13] Elliott Avedon and Brian Sutton-Smith, *The Study of Games* (New York: Wiley, 1971): 419.

[14] Chris Crawford, "Why is Interactivity So Hard?," *Interactive Entertainment Design* 9 (1995-1996). URL: http://www.erasmatazz.com/library/JCGD_Volume_9/Why_so_Hard.html.

[15] E-mail from Laura "BahdKo" Herrmann to Henry Lowood (28 Jan. 2004). Interestingly, it has long been suspected that some star players abstained from the practice of delivering demo movies of their gameplay in order to maintain their competitive edge. However, such reluctance seems to have been unusual and the absence of demo movies from players such as Thresh (whose fame is based on his dominance in *Quake* deathmatch) is now seen as evidence that they were not as active in the *DOOM* scene as word-of-mouth would

have it. Thus the importance of spectatorship and community, as well as skill, in achieving the status of a "God-like" player

[16] A result that obviously benefited from the first-person, 3-D perspective of these "shooters."

[17] "NoSkill Memorial Site, April 22, 1978-Dec. 26, 2001." URL: http://www.*DOOM*2.net/noskill/index.htm

[18] Doron Swade, "Collecting Software: Preserving Information in an Object-Centred Culture," in: Seamus Ross and Edward Higgs, eds., *Electronic Information Resources and Historians: European Perspectives* (St. Katharinen: Scripta Mercaturae, 1993): 94.

[19] Jürgen Claus, Expansion of Media Art: What Will Remain of the Electronic Age?" (1985?), reprinted in *Ars Electronica: Facing the Future, a Survey of Two Decades,* ed. Timothy Druckrey (MIT Press, 1999). (Source: Books24x7.com electronic edition)

[20] Claus, *op cit.*

[21] Matthew Kirschenbaum, "Materiality and Matter and Stuff: What Electronic Texts are Made Of," *ebr* 12 (2002), URL: http://www.altx.com/ebr/riposte/rip12/rip12kir.htm.

[22] "Preserving Computer-Related Source Materials" (1979). This brochure was later reproduced in the *IEEE Annals for the History of Computing* 2 (Jan. 1980). The text of this brochure is available via the website of the Software History Center at URL: http://www.softwarehistory.org/.

[23] W. Boyd Raymond, "Electronic Information and the Functional Integration of Libraries, Museums, and Archives," in: Seamus Ross and Edward Higgs, eds., *Electronic Information Resources and Historians: European Perspectives* (St. Katharinen: Scripta Mercaturae, 1993): 227-43, esp. 232.

[24] Henry Lowood, "Shall We Play a Game: Thoughts on the Computer Game Archive of the Future," Bits of Culture conference, Stanford University, 7 Oct. 2002. URL: http://www.stanford.edu/~lowood/Texts/shall_game.pdf.

[25] SIGGRAPH Electronic Theater. URL: www.archive.org/movies/siggraph.php

[26] The Digital Game Archive. URL: http://www.digitalgamearchive.org/games.php

[27] James W. Cortada, "Preface," in: *Archives of Data-Processing History: A Guide to Major U.S. Collections* (New York: Greenwood, 1990): ix.