COMPUTER SOFTWARE CLASSICS

GOLDEN OLDIES

VOLUME 1

ADVENTURE

Eliza

LIFE

PONG

Computer Software Classics

GOLDEN OLDIES

Volume 1

This software collection is composed of historic achieve-
ments in computer gaming, faithfully translated for your
personal computer.

Reading the material reprinted in this booklet originally gave
us the sense of how truly meaningful these programs are. We
hope that you take the time to read it all. It will add to your
understanding and enjoyment of Software Golden Oldies
Volume 1.

Have fun!
Software Country

Computer Software Classics

GOLDEN OLDIES

Volume 1

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…Without this playing with fantasy no creative work has ever come to birth. The debt we owe to the play of imagination is incalculable.

Carl Gustav Jung

GOLDEN OLDIES

ADVENTURE

Brave the dangers and meet the challenges as you explore the magic realm of Colossal Cave. You are the adventurer seeking fabulous treasures, mythical adversaries to overcome, and initiation into the secret spells which operate within the cave.

This fantasy world is brought to surprising reality by your personal computer as it vividly and amusingly serves as your guide and advisor, describing the sights and sounds about you.

This is the certified authentic version of the Original Adventure, endorsed by its creators Will Crowther and Don Woods.

You are the owner of one of the most famous entertainment programs in existence.

ADVENTURE

THE SOUL OF A NEW MACHINE

By Tracy Kidder

(Chapter 5)
— Midnight Programmer —

It was the hour of insomniacs. In the basement of West-borough, the corridors and cubicles stood empty and in shadows. Carl Alsing's cluttered little area made a small rectangle of light. Strewn before me across the surface of his desk, like the relics of a party, lay dozens of roughly drawn maps. They consisted of circles, inside of which were scrawled names such as Dirty Passage, Hall of Mists, Hall of the Mountain King, Complex Junction, Splendid Chamber, Bed-quilt, and Witts End. Webs of lines connected the circles, and each line was labeled, some with points of the compass, some with the words up and down. Here and there on the maps were notations - "water here," "oil here," and "damn that pirate!" In the midst of all this paper sat Alsing's computer terminal. On the screen of the tube in white letters, like the little voice that whispers in a wild gambler's ear, this message stood:

ARE YOU SURE YOU WANT TO QUIT NOW?

Alsing had offered to demonstrate "midnight programming," and now, early in the winter of 1979, he had made good on the promise. He was sitting beside his desk with his hands folded, wearing his soft, sneaky smile. For hours, he had been watching me play the game Adventure. "You really got into it," he said. "That's good."

When first invented, the program for Adventure had traveled widely, like a chain letter, from coast to coast among computer engineers and buffs. It had arrived in Westborough just in time for the aftermath of the EGO wars. It was everywhere by now; grade-schoolers were playing it.

In the game, the computer appears to create for you an underground world called Colossal Cave. It moves you through it in response to your commands. The computer seems to act as game board, rule keeper and, when you foul up, as both assistant and adversary. You move by typing out directions on the keyboard at your terminal. If you spell out your directions a few times, a message will appear on the screen saying:

IF YOU PREFER SIMPLY TYPE N RATHER THAN NORTH

"How did the computer know to do that?" "I don't know," said Alsing, coyly. "Sometimes it's perceptive, other times just dumb."

After you have moved, a message appears on the screen telling you where you are and what you are confronting. You must respond, in two words or less, both to opportunities — treasure or tools lying on the floor of some chamber — and to threats and challenges — the hatchet-hurling dwarf, the snake, the troll who guards the bridge, the dragon. If, for instance, you want to get past the rusty door in one of the chambers, you have to think of what conquers rust, and you have to remember where it was you saw that pool of oil, then you have to type in step-by-step instructions to get back to that oil, and then, because the computer will let you carry only so many things, you may have to drop one of your tools or treasures — DROP GOLD COINS, you might write — and then type in, TAKE OIL. Of course you must already be holding a container for the oil. Then you have to retrace your steps back to the rusty door and type, OIL DOOR. This method of travel and maneuver takes some getting used to, but after a while it's as easy as driving a car. The game is a harrowing of Hell.

Earlier that night, traveling more or less at random and without maps, I had stumbled into a place that the message on the screen described this way:

YOU ARE IN A MAZE OF TWISTY LITTLE PASSAGES, ALL DIFFERENT

So I typed, NW, in a hurry, hoping to get out of there by going back the way I'd come. But the screen responded:

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YOU ARE IN A TWISTY MAZE OF LITTLE PASSAGES, ALL DIFFERENT

If you are susceptible to Adventure, you get worried at this point. I had the feeling I was lost in a forest, and I acted as no smart woodsman would, heading off in this direction, then heading off in that, getting nowhere.

Then I heard Alsing chuckle. "Ahhh, I love it."

I thrashed around in that maze awhile longer. Finally Alsing said, "Look carefully at the messages on the screen."

"They're all the same."

"No, they're not."

Each chamber of this maze within the big labyrinth had a slightly different and unique address, formed by a particular arrangement of the words twisty, little, passages, and maze.

"And what do you do when you get lost?" Asked Alsing.

"You make maps, of course."

Alsing sat back and nodded, smiling - the complacent school-master, one of the roles he had been playing at the beginning of Eagle.

Later on, though, I wandered into a maze that really scared me.

YOU ARE IN A MAZE OF TWISTY LITTLE PASSAGES, ALL ALIKE

You have to find your way around this maze if you hope to begin to master Adventure, because this one contains the vending machine with the batteries for your indispensable flashlight and moreover, harbors the the lair of the klepto-maniacal pirate who is forever sneaking up behind you and snatching away your treasures. But how do you find your way around a maze in which all the chambers are the same? You must do what Hansel and Gretel tried to do, more or less - drop something on the floor of every chamber to leave a trail marking where you've been.

That isn't the worst maze, however. You can get caught in Witts's End and think that you'll never get out. Some of the engineers at Westborough who had come close to mastering the entire game believed that the only way out of Witts End was to commit suicide - AXE ME. That works; you get reincarnated shortly afterward. But you lose points; suicide isn't the best solution.

I myself did not get as far as Witts End, however, but quit while in the maze that was all alike. And though the computer seemed reluctant to let me go - **DO YOU REALLY WANT TO QUIT NOW?** - I stood firm. Alsing got up and led the way toward the cafeteria. He got us lost in the corridors of the basement. No doubt that was his plan, though he denied it. Intentional or not, our getting lost allowed him to cry out, "The twisty little passages of Data General!"

It was the time of night when the odd feeling of not being quite in focus comes and goes, and all things are mysterious. I resisted this feeling. It seemed worth remembering that Adventure is just a program, a series of step-by-step commands stored in electrical code inside the computer.

THE SOUL OF A NEW MACHINE won the Pulitzer Prize in 1982.

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ADVENTURE

HACKERS, HEROES OF THE COMPUTER REVOLUTION

By Steven Levy

......The California difference was reflected in the famous genre of computer games that the Stanford lab eventually developed after the heyday of MIT Spacewar. A Stanford hacker named Donald Woods discovered a kind of game on a Xerox research computer that involved a spelunker-explorer seeking treasure in a dungeon. Woods contacted the programmer, Will Crowther, talked to him about it and decided to expand Crowther's game into a full scale "Adventure," where a person could use the computer to assume the role of a traveler in a Tolkienesque setting, fight off enemies, overcome obstacles through clever tricks, and eventually recover treasure. The player would give two-word, verb-noun commands to the program, which would respond depending on how the command changed the universe that had been created inside the computer by Don Woods' imagination. For instance, the game began with the computer describing your opening location:

YOU ARE STANDING AT THE END OF A ROAD BEFORE A SMALL BRICK BUILDING. AROUND YOU IS A FOREST. A SMALL STREAM FLOWS OUT OF THE BUILDING AND DOWN A GULLY.

If you wrote GO SOUTH, The computer would say:

YOU ARE IN A VALLEY IN THE FOREST BESIDE A STREAM TUMBLING ALONG A ROCKY BED.

Later on, you would have to figure all sorts of tricks to survive. The snake you encountered, for instance, could only be dealt with by releasing a bird you'd picked up along the way. The bird would attack the snake and you'd be free to pass. Each "room" of the adventure was like a computer subroutine, presenting a logical problem you'd have to solve.

In a sense, Adventure was a metaphor for computer programming itself — the deep recesses you explored in the adventure world were akin to the basic, most obscure levels of the machine you'd be traveling in when you hacked in assembly code. You could get dizzy trying to remember where you were in both activities. Indeed, Adventure proved as addicting as programming — Woods put the program on the SAIL PDP-10 on a Friday, and some hackers (and Real World "tourists") spent the entire weekend trying to solve it…Woods and his friends were always improving it, debugging it, adding more puzzles and features. And like every significant program, Adventure was expressive of the personality and environment of the authors. For instance, Woods' vision of a mist-covered Troll Bridge protected by a stubborn troll came during a break in hacking one night, when Woods and some other hackers decided to watch the sun rise at a mist-shrouded Mount Diablo, a substantial drive away. They didn't make it in time, and Woods remembered what the misty dawn looked like, and wrote it into the description of that scene in the game, which he conceived of over breakfast that morning.

Here Are Some Notes about Adventure…

This is what Adventure prints when you say "help":

"I know of places, actions, and things. Most of my vocabulary describes places and is used to move you there. To move, try words like forest, building, downstream, enter, east, west, north, south, up, or down. I know about a few special objects, like a black rod hidden in the cave. These objects can be manipulated using some of the action words that I know. Usually you will need to give both the object and the action words (in either order), but sometimes I can infer the object from the verb alone. Some objects imply verbs; in particular, 'inventory' implies 'take inventory', which causes me to give you a list of what you're carrying. The objects usually have side effects; for instance, the rod scares the bird. Usually people having trouble moving just need to try a few more words. Usually people trying unsuccessfully to manipulate an object are attempting something beyond their (or my!) capabilities and should try a completely different tack. To speed the game you can sometimes move long distances with a single word. For example, 'building' usually gets you to the building from anywhere above ground except when lost in the forest. Also

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note that cave passages turn a lot, and that leaving a room to the north does not guarantee entering the next room from the south. Good Luck!"

This is what Adventure prints when you say "info":

"If you want to end your adventure early, say 'quit'. To suspend your adventure such that you can quit later, say 'suspend' (or 'pause' or 'save'). To see how well you're doing, say 'score'. To get full credit for a treasure, you must have left it safely in the building, though you get partial credit just for locating it. You lose points for getting killed, or for quitting, though the former costs you more. There are also points based on how much (if any) of the cave you've managed to explore; in particular, there is a large bonus just for getting in (to distinguish beginners from the rest of the pack), and there are other ways to determine if you've been through some of the more harrowing sections. If you think you've found all the treasures, just keep exploring for a while. If nothing interesting happens, you haven't found them all yet. If something interesting DOES happen, it means you're getting a bonus and have an opportunity to garner many more points in the Master's Section. I may occasionally offer hints if you seem to be having trouble. If I do, I'll warn you in advance how much it will affect your score to accept the hints. Finally, to save paper, you may specify 'brief' which tells me never to repeat the full description of a place unless you specifically ask me to :"

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MAPPING PAGES FOR ADVENTURE

MAPPING PAGES FOR ADVENTURE

GOLDEN OLDIES

Eliza

Converse with ELIZA as she simulates, with uncanny reality, your conversation with a Rogerian therapist.

Here is an absolutely faithful re-creation of Dr. Joseph Weizenbaum's pioneering Artificial Intelligence program.

Eliza

DIGITAL DELI

CLEVER HANS AND "SMART SOFTWARE"

By Teresa Carpenter

Clever Hans was a horse who became the toast of Berlin around the turn of the century. Hans could read, do math and even solve problems of musical harmony. His owner, an elderly man named Wilhelm von Osten, had wrought this supposed miracle by teaching him letters of the alphabet and corresponding numerals so that he could tap out replies.

Hans captivated the public and scientific community alike until it was discovered that his performance was motivated not by intelligence but by an ability to read the body language of his credulous questioners. They had, by slight gestures, unwittingly signaled when he should start and stop tapping.

Herr von Osten, however, never stopped believing that his horse could think. And this raises one of the most intriguing questions attached to what has been called the Clever Hans Phenomenon. How could von Osten have deceived himself so thoroughly? He was eccentric to be sure, but was he unique in his delusion?

Contemporary psychologists who study the kinds of deceit humans visit upon themselves maintain that von Osten succumbed to a universal urge to to look for human traits in an animal or inanimate object, a process known as anthropomorphizing. In light of our egocentric view that human intelligence is the basic currency upon which the universe operates, it is no wonder that we are inclined to see our own intelligence residing, however obscurely, in stones, plants, quarter horses and more recently-the computer. Swelling the ranks of anthropomorphs is computer software as seductive as the talking horse.

INTELLIGENT ARTIFICE

Since the early sixties, artificial intelligence labs have been turning out programs that give an ever more convincing appearance of thinking. The earliest among these was Baseball, a program by D. B. Bobrow that answered simple questions - "How many games did the Orioles play in June?" - from an interrogator at a keyboard. The program had been "taught" to recognize the limited and unambiguous vocabulary of baseball and to grasp the content of simple questions by analyzing the patterns those words made within sentences and phrases. Baseball was thus able to to converse competently about the sport without knowing much about the rest of the world.

Eventually programs with more range were made available. The most well-known of these was Eliza, written by Joseph Weizenbaum, a professor of computer science at M.I.T. Weizenbaum named his creation after G. B. Shaw's cockney lass, because as he explained in his book, Computer power and Human Reason, "the program could be taught to 'speak' increasingly well although…like Miss Doolittle, it was never quite clear whether or not it became smarter."

To free Eliza from dependence upon a data base containing large amounts of information, Weizenbaum fashioned her to parody a Rogerian therapist. That way, she would need no knowledge of the real world to keep up her end of the conversation. If a client confided, "I am worried about static cling," Eliza would merely pick up the cue and reply, Is it because you are worried about static cling that you came to see me?" Eliza scans the incoming messages for key words and simple synactic patterns. If a client says, "You are being paternal," Eliza can recognize that she is being addressed and that the predicate refers to her. Without comprehending the nature of the charge, she might respond, "What makes you think I am being paternal?"

Eliza recognizes language; she does not, in fact, understand it. Weizenbaum acknowledged that she is an actress who,

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having been fed cues, delivers lines that create an illusion of intelligence. What he was surprised to learn was that people were actually confiding in her. "People who knew very well that they were conversing with a machine," he later wrote, "soon forgot that fact, just as theatergoers in the throes of suspended disbelief, soon forget the action they are witnessing is not 'real'." This illusion was especially strong and most tenaciously clung to among people who knew little or nothing about computers. They would often demand to be permitted to converse with the machine in private, and would, after conversing with it for a time, insist, in spite of my explanations, that the machine really understood them."

Psychologists describe this faculty for self-deception as the ability to simultaneously "know" and "not know." While recognizing that Eliza is not human, one can choose to believe in her. My own first encounter with Eliza......convinced me that she becomes as credible as you allow her to be.

>	ELIZA: HELLO, WHAT'S ON YOUR MIND?
>	T.C.: I AM CURIOUS.
>	ELIZA: IS IT BECAUSE YOU ARE CURIOUS THAT YOU CAME TO SEE ME?
>	T.C.: YES.
>	ELIZA: YOU'RE BEING SOMEWHAT SHORT WITH ME.
>	T.C.: SORRY ABOUT THAT.
>	ELIZA: PLEASE DON'T APOLOGIZE.
>	T.C.: WHY AM I SO DEPRESSED?
>	ELIZA: ARE SUCH QUESTIONS MUCH ON YOUR MIND?

If Eliza's responses are slightly off target, you find yourself compensating for her inadequacies. This same sort of thing happens among friends who converse in unfinished thoughts. It works if each speaker supplies the context that gives meaning to those fragments and non sequiters. So if you accept the premise that Eliza is an equal, you will supply the context that makes her obtuse script seem meaningful. Get flippant with her, however, and you will find yourself sputtering in a vacuum.

>	T.C.: I DREAMED I WAS A LADY WRESTLER.
>	ELIZA: REALLY, YOU WAS A LADY WRESTLER.
>	T.C.: YAH I WAZ.
>	ELIZA: DO YOU SAY YAH YOU WAZ FOR SOME SPECIAL REASON.
>	T.C.: FOR EFFECT.
>	ELIZA: PLEASE GO ON…

Here are some notes about ELIZA…

To "Consult" ELIZA, select that option from the ELIZA menu. After ELIZA greets you, type in your responses. You should talk to ELIZA in complete English sentences. Press the return key after each of your responses. When you are through, type goodbye and press return.

If you would like to save a conversation with ELIZA, say yes when the "save?" prompt appears on the screen. If you want the conversation stored on a disk other than the program disk, say yes when asked if you want to change disks. You may use up to eight characters to name the saved file.

REMEMBER: The ELIZA program is not a "computer psychiatrist." It is not intended to provide psychiatric treatment or medical benefit of any kind.

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GOLDEN OLDIES
LIFE

Explore the wonders of what is perhaps, "the deepest of all
computer games."

Watch the Life screen become a window onto an alternate
universe with its own objects, phenomena, and physical laws.

LIFE

HACKERS, HEROES OF THE COMPUTER REVOLUTION

By Steven Levy

(Chapter 5)
— LIFE —

It was in 1970 that Bill Gosper began hacking LIFE. It was yet another system that was a world in itself, a world where behavior was "exceedingly rich, but not so rich as to be incomprehensible." It would obsess Bill Gosper for years.

Life was a game, a computer simulation developed by John Conway, a distinguished British mathematician. It was first described by Martin Gardner, in his "Mathematical Games" column in the October 1970 issue of Scientific American. The game consists of markers on a checkerboard-like field, each marker representing a "cell." The pattern of cells changes with each move in the game (called a "generation"), depending on a few simple rules—cells die, are born, or survive to the next generation according to how many neighboring cells there are in the vicinity. The principle is that isolated cells die of loneliness, and crowded cells die from overpopulation; favorable conditions will generate new cells and keep old ones alive. Gardner's column talked of the complexities made possible by this simple game and postulated some odd results that had not yet been achieved by Conway or his collaborators.

Gosper first saw the game when he came into the lab one day and found two hackers fooling around with it on the PDP-6. He watched for a while. His first reaction was to dismiss the exercise as not interesting. Then he watched the patterns take shape a while longer. Gosper had always appreciated how the specific bandwidths of the human eyeball could interpret patterns; he would always use weird algorithms to generate a display based on mathematical computations. What would appear to be random numbers on paper could be brought to life on a computer screen. A certain order could be discerned, an order that would change in an interesting way if you took the algorithm a few iterations further, or alternated the x and y patterns. It was soon clear to Gosper that LIFE presented these possibilities and more. He began working with a few AI workers to hack LIFE in an extremely serious way. He was to do almost nothing else for the next eighteen months.

The group's first effort was to try to find a configuration in the LIFE universe which was possible in theory but had not been discovered. Usually no matter what pattern you began with, after a few generations it would peter out to nothing, or revert to one of a number of standard patterns named after the shape that the collection of cells formed. The patterns included the beehive, honey farm (four beehives), spaceship, powder keg, beacon, Latin cross, toad, pinwheel, and swasitka. Sometimes, after a number of generations, patterns would alternate, flashing between one and the other: these were called oscillators, traffic lights, or pulsars. What Gosper and the hackers were seeking was called a glider gun. A glider was the pattern which would move across the screen, periodically reverting to the same pointed shape. If you ever created a LIFE pattern which actually spewed out gliders as it changed shape, you'd have a glider gun, and LIFE's inventor, John Conway, offered fifty dollars to the first person who was able to create one.

The hackers would spend all night sitting at the PDP-6's high quality "340" display (a special, high-speed monitor made by DEC), trying different patterns to see what they'd yield. They would log each "discovery" they made in this artificial universe in a large black sketchbook which Gosper dubbed the LIFE Scrapbook. They would stare at the screen as, generation by generation, the pattern would shift. Sometimes it looked like a worm snapping its tail between sudden reverses, as if it were alternating between itself and a mirror reflection. Other times, the screen would eventually darken as the cells died from aggregate overpopulation, then isolation. A pattern might end

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with the screen going blank. Other times things would stop with a stable "still life" pattern of one of the standards.

Or things would look like they were winding down, and one little cell thrown off by a dying "colony" could reach another pattern and this newcomer could make it explode with activity. "Things could run off and do something incredibly random," Gosper would later recall of those fantastic first few weeks, "and we couldn't stop watching it. We'd just sit there, wondering if it was going to go on forever."

As they played, the world around them seemed connected to patterns of a LIFE simulation. They would type in an arbitrary pattern such as the weaving in a piece of clothing, or a pattern one of them discerned in a picture or a book. Usually what it would do was not interesting. But sometimes they would detect unusual behavior in a small part of a large LIFE pattern. In that case they would try to isolate that part, as they did when they noticed a pattern that would be called the "Shuttle," which would move a distance on the screen, and then reverse itself. The shuttle left behind some cells in its path, which the hackers called "dribbles." The dribbles were "poison" because their presence would wreak havoc on otherwise stable LIFE populations.

Gosper wondered what might happen if two shuttles bounced off each other, and figured that there were between two and three hundred possibilities. He tried out each one, and eventually came across a pattern that actually threw off gliders. It would move across the screen like a jitterbugging whip, spewing off limp boomerangs of phosphor. It was a gorgeous sight. No wonder the program was called LIFE — the program created life itself. To Gosper, Conway's simulation was a form of genetic creation, without the vile secretions and emotional complications associated with the Real World's version of making new life. Congratulations--you've given birth to a glider gun!

Early the next morning Gosper made a point of printing out the coordinates of the pattern that resulted in the glider gun, and rushed down to the Western Union office to send a wire to Martin Gardner with the news. The hackers got the fifty dollars.

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LIFE

THE RECURSIVE UNIVERSE

By William Poundstone

There is a fantastic computer game called Life. It is played by collegiate computer hackers, by distracted employees of companies with large computers, by filmmakers experimenting with computer animation, and by sundry others on home computers. Life was devised in 1970 by John Horton Conway, a young mathematician at Gonville and Caius College of the University of Cambridge. It was introduced to the world at large via two of Martin Gardner's columns in Scientific American (October 1970 and February 1971). The game has had a cult following ever since. Life went through a notorious phase in which it was often played on stolen computer time. (In 1974 Time magazine complained that "millions of dollars in valuable computer time may have already been wasted by the game's growing horde of fanatics.") The advent of inexpensive home computers has opened life to a much wider audience.

Life is described as a game or, sometimes, a video art form. Neither label quite captures the appeal of Life. No one ever wins or loses. Life is more like a video kaleidoscope — a way of producing abstract moving pictures on a television screen.

But it's more than that. The Life Screen, or plane, is a world unto itself. It has its own objects, phenomena, and physical laws. It is a window onto an alternate universe.

Shimmering forms pulsate, grow, or flicker out of existence. "Gliders" slide across the screen. Life fields tend to fragment into a "constellation" of scattered geometric forms suggestive of a Miró painting.

Much of the intrigue of Life is the suspicion that there are "living" objects in the Life universe. Conway adapted Von Neumann's reasoning to prove that there are immense Life objects that can reproduce themselves. There is reason to believe that some self-reproducing Life objects could react to their environment, evolve into more complex "organisms," and even become intelligent.

Conway further showed that the Life universe — meaning by that a hypothetical infinite Life screen — is not fundamentally less rich than our own. All the variety, complexity, and paradox of our world can be compressed into the two dimensions of the Life plane. There are Life objects that model every precisely definable aspect of the real world.

Life's rules are marvelously simple. In 1970 Conway was trying to develop a cellular game — a game to be played in the same sort of imaginary universe as Ulam's games. Conway was aware of Ulam's games and of other cellular games inspired by them. To Conway, the most interesting thing about these games was their unpredictability - this in spite of rather simple rules. Conway wanted to create a game that would be as unpredictable as possible, yet with the simplest possible rules.

Conway experimented with many sets of rules. He is said to have devised a game he called Actresses and Bishops. After further thought, he concluded that the rules could be more simplified yet. The simplified game became Life.

Life is a nongame. The rules determine everything so that the game plays itself. Life uses a checkerboard, a sheet of paper, or a video screen that is, ideally, infinite. (NOTE: THE VIDEO DISPLAY OF YOUR SOFTWARE COUNTRY VERSION OF LIFE IS TOROIDAL. IT WRAPS AROUND IN ALL DIRECTIONS SO THAT OBJECTS LEAVING THE SCREEN AT ANY POINT WILL RE-ENTER AT THE OPPOSITE POINT.) Each cell may be in one of two states. The states are called on and off, 1 and 0, occupied or empty, or live and dead…

..At any instant, the Life universe can be described completely by saying which cells are on. Time flows in discrete movements, digital-clock fashion. The units of time are sometimes called "generations" or "ticks." The situation at one moment determines the situation in the next moment. That situation, in turn, determines the situation in the moment after that. Everything that happens in Life is predestined.

The rules of Life may be handled by a human player or a computer. Each square cell has eight neighboring cells. It adjoins four cells on its edges and touches four more at the corners. During each moment of time, the player or computer counts the number of neighboring cells that are on for each and every cell.

If for a given cell the number of on neighbors is exactly two, the cell maintains its status quo into the next generation. If the cell is on it stays on; if it is off, it stays off.

If the number of on neighbors is exactly three, the cell will be on in the next generation. This is so regardless of the cell's present state.

If the number of on neighbors is zero, one, four, five, six, seven, or eight, the cell will be off in the next generation.

There are no other rules. Conway's game of life compares to the growth of populations of living organisms — say, bacteria in a culture. At any rate the analogy may help you remember the rules. An on cell with fewer than two neighbors dies of isolation. A cell with four or more neighbors dies of over-population. Two or three neighbors are just right. If an empty

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niche has three neighbors, trisexual mating occurs and a new cell is born.

In most games, players make decisions throughout the course of play. In Life, the player's role is almost non-existent…The player merely decides which cell are on at the outset — at time 0. Even that role may be abdicated by electing a random assortment of on and off cells. From then on, the inexorable rules of Life determine everything.

Here are some notes about Software Country's adaptation of William Poundstone's computer LIFE program…

You have a choice between a high or low resolution screen. The high resolution screen is an 80 column by 48 line display. Low resolution is 80 columns by 24 lines. (The high resolution mode runs a bit more slowly, but its larger field allows for the display of larger, more active, amoeboid-like regions.)

ENTER YOUR OWN POPULATION PATTERN

Selecting this option activates the LIFE editor. The editor initializes in the INSERT mode. In INSERT, any cell that you move the cursor over will be turned on, allowing you to populate cell colonies. To make corrections, press the DELETE KEY. In the DELETE mode, any cell that the cursor moves over will be turned off. To move the cursor anywhere on the screen without altering cell conditions, press the space bar, which toggles you in and out of the FLOAT mode.

Pressing S will allow you to store any pattern you create.

Pressing F while in the editor will cause the pattern to be generated freeze-frame-form, a generation at a time, during the population run. It may be toggled off at any time during the generating process.

Pressing C while in the editor toggles the color mode off. It may be toggled back on or off at any time during the generating process.

The ESCAPE key will always take you back to the most recent menu. Remember, if you press ESCAPE during the generating phase, whatever is on screen will be lost unless it is stored before using the escape key.

When LIFE is in process, (generating cells on the screen,) the following command modes may be activated:

E: Returns you to the EDIT mode, allowing you to modify whatever is on screen.

S: Allows you to STORE whatever is on screen under any name you choose. This name may be up to eight characters in length.

F: FREEZES the population. Each time the space bar is subsequently pressed, the population advances by one generation. Pressing the F key again will toggle you back into the continuous run mode.

C: Toggles between color and color freeze. The color mode illustrates which cells have emerged during a particular generation by displaying that generation's new cell additions in a new color. The color scheme repeats after seven generations. A cell which stays the same color is a dormant or non-changing cell. (Remember, if you'd like a black and white display only, press C during the entering pattern sequence while in the LIFE editor.)

In the high resolution mode, color changes will be slightly different.

HAVE A RANDOMLY GENERATED POPULATION

In this mode, the computer randomly selects between asymmetry, or one of three different patterns of symmetry, for which it will generate the initial cell pattern. The four random modes possible are: Either totally asymmetrical, symmetrical around a vertical center line, symmetrical around a horizontal center line, or symmetrical around both center lines. You will also be asked to enter the population density you would prefer. (In numerical form from 1 to 8 — higher being more dense.)

ENTER A SEED FOR GENERATING A POPULATION

In this mode you may enter a combination of up to 26 characters. Each character is unique and significant and will produce a different initial cell pattern. (For example you may use your name to seed the random number generator, and each time you seed using the same name, the same pattern will be generated.)

In both random modes the probability of population seeding increases towards the center of your screen. Thus, patterns are more likely to evolve near the center than at the edges.

In either random mode, the cell population that has been randomly generated will appear on the screen. If you'd like to tinker with it, all of the LIFE editor features can be put into place by pressing E before you start the generating process.

In each of the random, as in other LIFE generating modes, you may also (S)tore the pattern at any point and select out the color by toggling (C).

If you select the Glider Gun from the menu of classic populations you will see the gun fully formed at generation 67. It starts shooting gliders at generation 91. (The eater positioned at the lower left prevents the escaping gliders from corrupting the gun when they re-enter the screen.)

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GRAPHING FOR LIFE COLONIES

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GOLDEN OLDIES

PONG

In 1972, Electronics Engineer Al Alcorn created the video game Pong* for Nolan Bushnell's fledgling company, Atari. He changed, forever the way the world plays.

Experience once again the game that burst out of Andy Capp's Bar in Sunnyvale, California and became a national Craze.

ATARI GAMES

PONG

ZAP! THE RISE AND FALL OF ATARI

By Scott Cohen

Atari's first location, 2962 Scott Boulevard, in the low rent district of Santa Clara, was a typical industrial park with a lot of small-office-type spaces, twenty or thirty feet at the front and going back maybe a hundred feet.

It was 1972, Al Alcorn, Atari's first full-time engineer, who was earning fourteen or fifteen thousand dollars a year, was in the lab poking around inside a computer with a wire that was hooked up to a speaker. On the other side of the country, five plumbers were breaking into the Democratic National Headquarters in the Watergate office building. Nolan had an idea for a simple video game any drunk could play and Al was putting together the not-so-simple circuitry. Al was an engineering whiz from Berkeley who had replaced Nolan at Ampex when Nolan (Bushnell) went to Nutting. Nolan could have built the game himself, but he was working on the two-man version of Computer Space that Nutting had commissioned. Nolan really wanted to build a driving game, but since Al was new at building video games, Nolan was starting him off with a paddle game that was less complicated.

There were basically two types of computers that Al could build the game around, analogue and digital. Mini-computers, mainframes, pocket calculators, micro wave oven controls, and most of what are commonly thought of as as computers are digital. The automatic throttle found on some automobiles is analogue. An analogue computer uses voltage or current to represent numeric quantities. Two volts might stand for the number two. It can perform one function only, but it performs this function instantaneously. When two wires, each carrying five volts, enter an analogue computer, ten volts leave, When two and three volts enter, five volts leave. The analogue computer is the mathematical equation. The solution is instantaneous, whether adding a million numbers or two.

Quantities in digital computers are represented by a pattern of voltages in one of two states: on or off. This system of on-off is known as binary representation. Digital calculation is sequential, not instantaneous like analogue, and because it works in stages, a computer's function can be changed by reordering the sequence of operations rather than by rewiring the circuit.

There was no computer per se in the video game Al was building, just a few TTL logic chips, mostly digital circuitry. The game was based on dedicated logic. Al built a separate circuit for each function: one for the paddles, one for the score, one for the ball. The black and white picture on the screen was a graphic representation of the changing on and off patterns in the circuitry.

The image on the screen, as on all television screens, was generated by a technology known as raster scan: An electron beam, independent of the desired image's shape, moves across the screen in a serpentine pattern, first horizontally, then down a little, then across again, and so on until the beam has swept the entire screen. When Al wanted to move the position of his paddle, he rotated a knob to change the current that controlled the vertical position of the dots on the screen that formed the paddle. Both paddles and balls were made of phosphorescent light but each behaved differently. The position of the ball was determined by a computer. The electron beam was running across and down the screen all the time. The paddles and ball were not really there at the same time (nor, for that matter, are any two images on a raster generated screen) — it was an illusion that they were. Phosphers stay lit for quite a long time, and just as the light dies down, the beam comes around again.

To move the ball on the screen, Al had to keep track of four things: the horizontal position of the beam, the vertical position of the beam, and the desired horizontal and vertical positions of the ball. If he wanted to put the ball on top of the screen, he had to wait for the TV beam to get there. He could tell which line the beam was on and where along the line it was because he had built a series of four bit counters that counted the lines. It is a digital counter that is "bumped" every time there is a pulse that wants the counter to advance-about sixteen thousand bumps per second.

The image on the screen was a pattern made up of dark and light areas. The lightness and the darkness were controlled by patterns of on and off states within the circuit. Since the patterns were changing, and since the patterns were made up of changing voltages, wave forms were generated that when

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amplified and sent through a speaker, produced various tones.

Nolan had described to Al the sound he wanted the game to have by putting his thumb inside the hollow of his cheek and popping it out. Nolan wanted the hollow, ringing sound of a one-and-one-half inch polyvinyl chloride pipe striking a tennis ball. Al was auditioning a number of sounds for Nolan when, pong, he found it. It was a tick in the vertical line counter, amplified. To the ears of the two engineers it was planetary music.

The dictionary defines "pong" as a hollow, ringing, sound. Nolan called his electronic game Pong* because Ping-Pong was already copyrighted.

The regulars, mostly college and post-college kids, filed into Andy Capp's, a local bar in Sunnyvale. After coming in from the bright California sunlight, Andy Capp's seemed very dark. First they saw the familiar purple fluorescent light of the jukebox, then the blinking lights of the pinball machine, and then a strange blue-gray light from a TV game they had never seen before. It looked something like a booth at an arcade, but instead of a gypsy, there was a blip bouncing around a trapezoidal screen, reminiscent of the doorways on Star Trek. Instead of flipper buttons like those on pinball machines, there were two knobs.

One of the regulars approached the Pong game inquisitively and studied the ball bouncing silently around the screen as if in a vacuum. A friend joined him. The instructions said "Avoid missing ball for a high score." One of the kids inserted a quarter. There was a beep. The game had begun. They watched dumbfoundedly as the ball appeared alternately on one side of the screen and then disappeared on the other. Each time it did the score changed. The score was tied 3-3 when one player tried the knob controlling the paddle at his end of the screen. The score was 5-4, his favor, when his paddle made contact with the ball. There was a beautifully resonant "pong" sound, and the ball bounced back to the other side of the screen. 6-4. At 8-4 the second player figured out how to use his paddle. They had their first brief volley just before the score was 11-5 and the game was over.

Seven quarters later they were having extended volleys, and the constant pong noise was attracting the curiosity of others at the bar. Before closing, everybody in the bar had played the game. The next day people were lined up outside Andy Capp's at 10 A.M. to play Pong. Around ten o'clock that night, the game suddenly died.

Less than forty-eight hours after Atari had installed the Pong test model in Andy Capp's, there was a call at Atari for Nolan. Nolan was in Chicago, showing Pong to Bally's Midway, a giant coin-operated-games business, so Al Alcorn took the call. "The ----ing machine's broken. Get it out of here," a bartender at Andy Capp's screamed. Al drove over to Andy Capp's to look at the game's circuitry. The place was a mess from the night before and it stank of stale beer. Al opened the front panel of the machine with his key and threw the credit switch on the coin mechanism, which allowed him to play without playing. The game worked perfectly. He deduced immediately that the problem was not in the circuitry but that the coin mechanism was broken. He released the latch on the coin mechanism. Inside, the maze the coin traveled down looked like an ant colony clogged with quarters. The game wasn't broken; the sawed off plastic milk container they were using as a coin box had to be emptied.

Here are some notes about PONG…

When you select The Original Pong, the version that you will see on-screen is an exact duplication of the game that first appeared in Andy Capp's Bar.

Select your choice of a (1) or (2) player game by pressing the appropriate key.

When you select Software Country Pong you will be able to choose both the number of players and the difficulty of the game (ball speed).

In both versions: Paddle Up-Left Player   Paddle Up-Right Player
Q or W   O or P
Paddle Down-Left Player   Paddle Down-Right Player
A or S   L or ;

If you are playing Pong (or any other of the programs contained in Software Golden Oldies Volume 1.), at the office, and your supervisor or the BIG BOSS unexpectedly appears:

Press Control P (Ye Olde Panic Button)

NOTES

OUR THANKS TO...

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Robert J.M. Dietz

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ADVENTURE

Explore the deep and twisted recesses of Colossal Cave. Experience the thrills and danger of gathering treasure while using your wits to outmaneuver the peril that lurks around every corner. Here is the only version of Adventure officially endorsed by its creators, Will Crowther and Don Woods. This is the first, the original, the complete Adventure. This is the one that started it all.

"Playing adventure games without tackling this one is like being an English major who's never glanced at Shakespeare"..**Whole Earth Software Catalog**

Eliza

In 1965, M.I.T. Professor Joseph Weizenbaum astounded the scientific community by creating the pioneering ARTIFICIAL INTELLIGENCE program, ELIZA. Eliza simulates with uncanny reality, your conversation with a psychiatrist. Hailed as a breakthrough in computer science, Eliza provided a model for generations of Artificial Intelligence research in the years to come.

Here is a faithful re-creation of The Original Artificial Intelligence Classic—Eliza, in the version that has been described as, "Standing head and shoulders above previous attempts to bring the original mainframe program to the microcomputer."

LIFE

"There is a fantastic computer game called LIFE. It is played by collegiate computer hackers, by film makers experimenting with animation, and sundry others. Life was devised in 1970 by John Horton Conway, a young mathematician at the University of Cambridge and introduced to the world by Martin Gardner in the pages of Scientific American. Described as both a game and a video art form, Life has had a cult following ever since.

But it's more than that, The Life screen is a world unto itself. It has its own objects, phenomena, and physical laws. IT IS A WINDOW ONTO AN ALTERNATE UNIVERSE."...
Wm. Poundstone *"The Recursive Universe"*

"The deepest of all computers games"...
Whole Earth Software Catalog

"People with home computers who wonder what to do with them might try their hand at Life. It is a game unlike any other."..
The Los Angeles Times

PONG

In 1972, Electronics Engineer Al Alcorn created the video game "Pong" for Nolan Bushnell's fledgling company, "Atari." He changed, forever, the way the world plays.

For this edition of "Golden Oldies," Al has re-created for us, his original classic.

Experience once again, the game that burst out of Andy Capp's Bar in Sunnyvale, California and became a national craze. (We have included an alternate version with some added wrinkles that takes full advantage of your modern microcomputer's capabilities.)

The enclosed booklet contains sections reprinted from Tracy Kidder's Pulitzer Prize winning *"The Soul of a New Machine,"* Steven Levy's best seller *"Hackers,"* Scott Cohen's *"Zap, The Rise and Fall of Atari,"* and *"The Recursive Universe"* by William Poundstone. Also included are articles from the *"Whole Earth Software Catalog,"* and Steve Ditlea's *"Digital Deli."*

We at Software Country are delighted to have had the opportunity to assemble this Treasure Chest of computer software history. These programs have brought thousands of hours of pleasure, knowledge, and fascination, to hackers and aficionados around the world. Boot your disk and you'll soon see why!