1

Historical Elements

how did we get here?

Key Chapter Questions

■ What are the significant *milestones* in the history of electronic game development?

■ Who are game development *pioneers*, and how did they contribute to the industry?

■ How did the game industry evolve from coin-operated electrome-chanical and mainframe computer games of the 1960s to the con-sole, personal computer, online, and mobile industries of today?

■ What factors contributed to the *video game slump* of the early 1980s?

■ Why did certain game companies and titles succeed during game development history—and why did some fail miserably?

If you plan to become involved in the game development industry, it is important that you learn about its evolution. Did it begin with video arcades? Was there life before *Pong*? Has the industry always been successful? As you read this chapter, think about the first electronic game you ever played. Did you play it on a personal computer? On a home game console? At a video arcade? At a pizza parlor? What did you like about the game? After you finish this chapter, you will probably be surprised at the strange and unusual events that have occurred during the development of an industry that is still in its infancy.

Before the Arcades

The first electronic games were not played at home or even at video arcades. Instead, research departments at universities, labs, military installations, and defense contractors provided the backdrop for this industry. At military bases, electromechanical games were provided for the recruits to escape from the rigors of basic training. Meanwhile, a few bleary-eyed, overworked students, programmers, faculty, and researchers in academic and government institutions turned their mainframe computers into game machines—providing them relief from traditional duties such as performing complex mathematical calculations for research. Late at night, these pioneers spawned what would become one of the most compelling forms of entertainment in history.
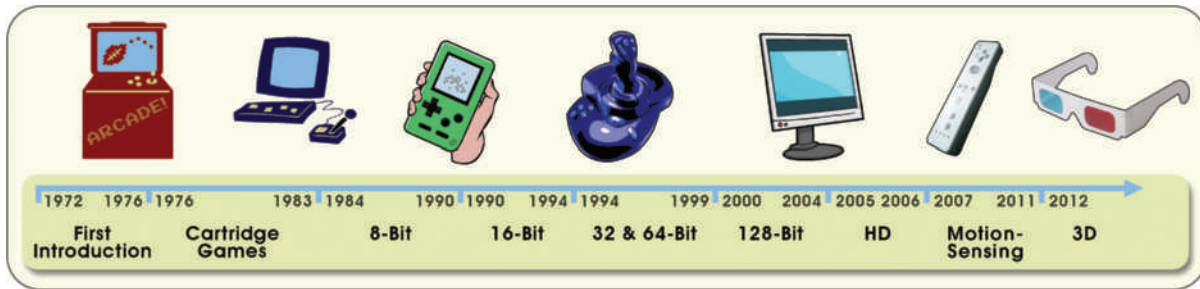
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The first electronic games were played at military bases such as the Marine Corp Air Station Kaneohe (left) and at academic institutions such as the Massachusetts Institute of Technology (right).

Two distinct segments of the electronic game industry developed in parallel, starting in the 1950s. One of these segments began in 1951 when Marty Bromley, who managed game rooms at military bases in Hawaii, bought electromechanical machines and launched SEGA (an abbreviation for SErvice GAmes). This segment of the industry grew into the coin-op video arcade industry, which experienced a boom in the 1970s. Electronic versions of arcade favorites marked the beginning of what was to become the console game industry of today.

The other segment of the electronic game industry started with mainframe computer games developed by faculty and students at universities who wanted to either hone their programming skills or entertain each other during breaks from the long hours spent working on their dissertations. Although an adaptation of one of the early mainframe games (*Spacewar!*) became the first coin-op video arcade game in the United States, it was not until the personal computer revolution that mainframe games were adapted for personal computers. It was then that the computer game industry was born.

| 1972 1976 1976 | 1983 1984 | 1990 1990 | 1994 1994 | 1999 2000 | 2004 2005 2006 | 2007 | 2011 2012 |
| First Introduction | Cartridge Games | 8-Bit | 16-Bit | 32 & 64-Bit | 128-Bit | HD | Motion-Sensing | 3D |

Many companies and developers made significant contributions in the creation of game systems and content. You might recognize many companies that were formed in that era, and you might even have played some games that were developed during that time. What companies made a difference in the evolution of this industry? Who were the pioneering designers, artists, programmers, and producers responsible for developing compelling games that continue to inspire developers today?

A few companies were ready to plunge in just as the electronic game industry began. Some of them maintain a significant presence in the industry. You might be surprised at how they began—and how they continued to develop. Some of them initially had nothing to do with games, or even entertainment. Others tried, and failed, to dominate every segment of the game industry. Many came and went, and a few are still going strong. Some stepped out of the picture for a while, only to return with a vengeance during the second "golden age" of the industry. As we look at the arcade phenomenon, we'll focus on some of these companies and the popular games they developed.

::::: They're *All* Video Games Now!

The term "video game" came out of the arcade business and gravitated toward the home console game business. There was a demarcation between games played on personal computers (*computer games*) and those played on home consoles (*video games*)—with electronic being used to refer to both. Although sometimes you'll still see a distinction made between "computer" and "video" games, today's electronic games are often referred to as "video games" across the board.

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The Arcade Phenomenon

The public was first introduced to electronic games not through home game consoles or personal computers, but through public arcades. Before video games were introduced, the most popular arcade games were electromechanical pinball machines. Arcades were often located in small amusement parks, attracting children and teenagers—who challenged each other to pinball matches as part of a regular weekend social event. As video games became more popular, arcades became more accessible. Conveniently located near schools and residential areas, arcades became flooded with teens after school. At the height of the craze, kids spent hours at the arcades—sometimes into the night, forgetting to eat, or to do their homework!

:::::Sega: Setting the 25-Cent Standard

Sega

In 1956, just a few years after Marty Bromley started SEGA, Rosen Enterprises' David Rosen began importing coin-operated electromechanical games to Japan—launching the country's coin-op business and becoming Japan's largest amusement company. In 1964, Rosen Enterprises merged with SEGA to form Sega Enterprises. Acting as a bridge between the United States and Japan, Sega Enterprises released the first Japanese export, *Periscope*, in the United States. It is interesting that the high shipping costs of this export were what made U.S. arcade owners charge 25 cents to play the game—setting a standard for future arcade games. Sega was purchased by Gulf & Western in 1969—but David Rosen and partner Isao Okawa bought it back in 1984. The price tag: $38 million.

Several games are considered milestones of this era. Although limited by the technology of the time, these games were innovative—inspiring new trends in content, genres, gameplay, and development techniques that had never been considered. Some of these games were extremely popular—successfully capturing a broad market that went far beyond the stereotypical "male teen" demographic. They provided hope for the future of electronic games as a mass entertainment medium. Many of these games are considered so nostalgic by gamers from this era that they have been re-released in console, computer, or handheld format so that they can be experienced again. You might recognize a few of them!

Computer Space

In 1961, MIT student Steve Russell developed *Spacewar!*—the first interactive computer game—on the university's mainframe computer. Nolan Bushnell, who later founded Atari, saw the game and decided to bring it to a larger market by adapting it into a stand-alone arcade coin-op game. Calling his version *Computer Space*, Bushnell sold the idea to Nutting Associates in 1971. The game, which consisted simply of trying to shoot a flying saucer, might not have been as compelling as a pinball game—and its low sales reflected this. However, Bushnell started the coin-op video arcade industry by bringing an elitist form of entertainment that had remained enclosed within the ivory tower of the university system out to the masses. In 1978, after video game arcade technology became more sophisticated, Cinematronics released *Space Wars*—another arcade adaptation of Russell's mainframe game.

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::::: Atari's Wild Ride

After *Computer Space*, Bushnell left Nutting Associates to start Atari with partner Ted Dabney. (The word "Atari" is from the board game *Go* and means roughly, "Look out! The move I'm about to make will be dangerous to you"—similar to "check" in chess.) After surviving a legal dispute with Magnavox over the rights to the first successful video game (*Pong*), Atari became the most prolific presence in the arcade business—churning out games such as *Asteroids*, which became the first blockbuster video game and forever associated the name "Atari" with the video arcade. After Bushnell left the company to start several ventures, Atari was purchased by Warner Communications in 1976, and began spending more energy on business affairs and marketing than design and development. Concerned about the growth of the console and personal computer industries, Atari also began shifting its focus away from its arcade business and toward console systems (such as the VCS/2600) and personal computers. In 1984, Atari was sold to Commodore founder Jack Tramiel—who in turn sold it to disk drive manufacturer JTS, who then filed for bankruptcy in 1999 and sold it to Hasbro Interactive. The Atari name was revived when Infogrames took over Hasbro in 2000 and completed its acquisition of Atari in 2008. Nolan Bushnell came full circle in April 2010 after replacing former Atari CEO, David Gardner, as a member of the board of directors.

Atari Interactive, Inc.

Pong

The beginnings of the first memorable—and controversial—electronic game appeared in 1958 when Willy Higinbotham of Brookhaven National Laboratories in New York showcased his table tennis–style game (*Tennis for Two*) on an analog computer. Almost

Atari Interactive, Inc.

Pong—the first successful arcade game.

a decade later, Ralph Baer of Sanders Associates began researching ideas for an interactive "table tennis" television system. He patented his idea in 1968, and Magnavox licensed it from him in 1970. The Magnavox Odyssey interactive game console—featuring Baer's "table tennis" game—was demonstrated in 1972. The first Atari game, *Pong* (designed by Atari engineer Al Alcorn) was released that same year. The controller was a two-direction rotary dial, and the rules of the game were simply "use your paddle to avoid missing ball for high score." *Pong* soon became the first successful coin-op arcade game. Magnavox sued Atari that same year, claiming that Bushnell had stolen the idea. The case was settled out of court.

::::: Ralph Baer & *Simon*

Hasbro, Inc.

Ralph Baer, who invented the Magnavox Odyssey (the first home console system), was inspired by the Steven Spielberg film *Close Encounters of the Third Kind* when he created the successful musical memory game, Simon—released by Milton-Bradley during the holiday season in 1977. Baer also invented the first light-gun game.

As a young child in the late 1970s, I encountered my first video game, *Pong*, prominently displayed in the children's clothing section of Macy's Department Store in San Leandro, California. I was entranced, excited to play, and mesmerized as I watched my hand control a rectangle that bounced a square to my opponent. Both of us gleefully volleyed the square back and forth, feverishly trying to get the other to miss a shot—as *Pong's* simple "beeps" and "blips" added to our delight.

—*Jennifer Penton (Creative Director, i2i Communications)*

Asteroids

Although *Space Invaders* (1978) was the first arcade game that recorded high scores, *Asteroids* (1979), was the first to allow players to enter their initials into a high score table. *Asteroids* (designed by Ed Logg) utilized monochrome vector graphics, which allowed the game to display fast-moving objects made up of very sharp lines instead of the crude pixel graphics common in video games of that time. (Vector graphics would later come back as polygons—and 3D games!)

Atari Interactive, Inc.

M y first experience with an electronic game was the original *Asteroids*. It was on the second floor of my mom's racquetball club in Cincinnati. The most memorable thing about the game was that for years I only got the chance to dream about destroying the "real detailed" silvery-looking asteroids because I was never allowed to insert 25 cents. My mom thought video games were a waste of money.

—*Rebecca Voss (Harris Corporation - Defense Communications Systems)*

Pizza & Mechanical Animals: The Family Arcade Experience

In an attempt to remove the stigma associated with the public's idea of arcades, Atari founder Nolan Bushnell opened up a string of pizza parlors initially known as Pizza Time Theater. Eventually becoming Chuck E. Cheese, these family restaurants offered game tokens with every meal, a video arcade for kids who would play while waiting for the pizza, and a "live" floor show featuring Chuck E. Cheese himself (along with other mechanical robot animals) for the whole family to enjoy while eating.

Galaxian

Namco Bandai Games America Inc

Bally/Midway imported some of the most popular "slide and shoot" games to video arcades. *Space Invaders* was the first blockbuster video game, and *Galaxian* was the first video game with a full-color monitor. *Galaxian* was followed by several sequels—including *Galaga*, *Galplus*, *Galaga '88*, and *Galaxian 3*.

In 1976, the first public controversy over video game violence occurred in response to the Exidy Games release of *Death Race*, in which players drove over "stick figures" representing pedestrians. (Compare this to the *Grand Theft Auto* series!) The game was inspired by the 1975 cult film, *Death Race 2000* (starring David Carradine and Sylvester Stallone in one of his first roles)—in which pedestrians are run down for points in a cross-country car race of the future. Protests were so widespread that even *60 Minutes* did a story on *Death Race*—bringing video games into public awareness. The publicity didn't help the game, though—since nervous arcade owners eventually refused to carry it.

::::: "A" for "Activision"

Activision

It is not uncommon for employees in the game industry to leave one company and start a new one so they can retain creative leadership. Activision, one such company, was the first third-party game publisher, and was established in 1980 by former Atari programmers. The name was specifically chosen because it came before "Atari" alphabetically.

Pac-Man

In 1980, Namco released *Pac-Man*—which appealed to a much wider market, in part because it did away with the "shooting" theme that pervaded most other games. The game's controller consisted only of a multi-directional joystick. Instead of shooting spaceships, *Pac-Man* ate power pills—which allowed him to munch on his ghostly enemies for a short while. *Pac-Man* was developed primarily by Namco employee Toru Iwatani over a period of 18 months. Over 300,000 units were sold worldwide—making *Pac-Man* the most popular arcade game of all time. As players successfully completed one maze, they moved up a level—which contained the same maze, but play was more difficult. *Pac-Man* spawned an even more popular and inclusive sequel: *Ms. Pac-Man*, the first game to star a female character. Instead of the increasingly difficult maze used in

Namco Bandai Games America Inc

Pac-Man is one of the most popular arcade games of all time.

levels of play in the original game, there were four different mazes used in *Ms. Pac-Man*. The game even incorporated a rough three-act plot structure that featured animated sequences (a primitive form of the cinematics used in today's games) as dividers. In Act I, Pac-Man and Ms. Pac-Man meet; in Act II, Pac-Man woos Ms. Pac-Man by chasing her around the screen; and in Act III, Pac-Man, Jr. is born. The game had great crossover appeal, helping to further widen the market to include girls and families. Boys played it, too—finding the game even more challenging and addictive than its predecessor.

:::::Arcade Graphics Evolution

Arcade games evolved from the static screen and horizontal movement of *Space Invaders*, to the limited vertical movement of *Centipede* and, finally, to the scrolling screen of *Xevious*.

Taito Corporation   Atari Interactive, Inc.   Atari Interactive, Inc.
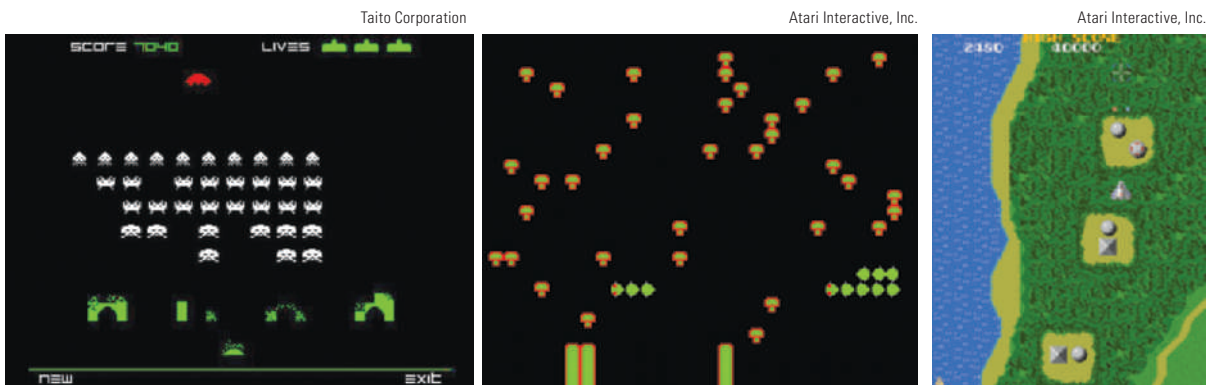
Women Enter the Arcade World

Released by Atari in 1981, *Centipede* was the first arcade game co-designed by a woman. Dona Bailey and Ed Logg teamed up to create a game with the goal of shooting quick-moving centipedes as they appeared at the top of the screen and tried to snake their way down. Each time a segment of the centipede was hit, it turned into a mushroom. The game was designed in a unique pastel color scheme.

My friends and I would go to the local arcade and play games till we ran out of money or our hands developed blisters and went numb. I would get so excited when I played that I would get drenched in my own sweat and have to walk around trying to dry off so that my mom wouldn't find out that I had been at the arcade.

—*Arash John Sammander (game design and production graduate student, Aalto University of Art & Design [TAIK] - Finland)*
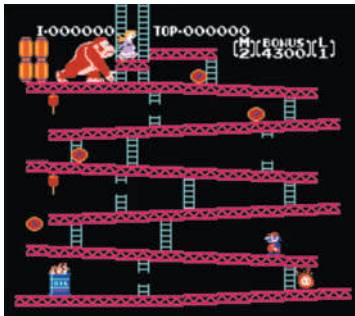
Donkey Kong

In 1977, Shigeru Miyamoto was hired as Nintendo's first staff artist. The company initially assigned him to *Radarscope*—a submarine game that consisted of repetitive button-pushing without any real story or characters. Although this was the typical game style of the time, Miyamoto wanted to create something unique. The result was, a game that represented a cross between *King Kong* and *Beauty and the Beast*. In, an ape steals his keeper's girlfriend and runs away. The player takes on the role of the keeper (Mario)—who becomes the hero of the story as he attempts to rescue his girlfriend (Pauline) from the clutches of the beast.

Nintendo

Donkey Kong kicked off a successful franchise still wildly popular.

Nintendo

Nintendo made its phenomenal entry into the U.S. market with *Donkey Kong*. Like *Pac-Man*, the popularity of this game resulted in a series of successful, although confusing, sequels. Mario (originally called Jumpman) first appeared as the heroic carpenter whose goal was to rescue his girlfriend. The game's sequel, *Donkey Kong Junior*, switched the roles of Mario and the ape so that Mario was the enemy—an evil carpenter who had caged the now apparently innocent ape from the original game. The player took on the role of the baby ape who attempts to rescue his father (the ape from *Donkey Kong*) from Mario's evil clutches. In the third game, *Mario Bros.* (released in 1983), more confusion arose. Instead of being a carpenter, Mario was a plumber. He and his brother, Luigi, were known as the "Mario Bros." (Was Mario's full name "Mario Mario"?) The action takes place in a sewer, where two players take on the roles of Mario and Luigi to battle each other and an infinite supply of creatures (e.g., turtles and crabs) that emerge from the surrounding sewer pipes.

After *Donkey Kong*, Shigeru Miyamoto went on to develop a series of Mario titles. In fact, each time a new game system is introduced by Nintendo (starting with the original NES—discussed later in this chapter), Miyamoto designs a Mario game as its flagship title. Miyamoto's credits also include *Zelda*, *Star Fox*, *Pikmin*, and *Metroid Prime*.

Why "Donkey Kong"?

You might wonder why a game involving a gorilla and a carpenter would be called *Donkey Kong*. Since the gorilla in the original game was "stubborn," Shigeru Miyamoto—creator of *Donkey Kong*—wanted to call the game *Stubborn Gorilla*. In search of a more snappy English translation, Miyamoto found that "donkey" could represent "stubbornness" and "kong" could represent a gorilla (as in the film, *King Kong*)!

The U.S. arcade business reached its peak in 1981, as revenues reached $5 billion and Americans spent more than 75,000 hours playing video games. But the following year, the business experienced a decline from which it never fully recovered.

:::::Nintendo: Ancient History

Nintendo

Nintendo, which became one of the "big three" in today's console wars—and a major contender in the handheld market— was established in 1889 by Fusajiro Yamaguchi to manufacture and distribute Japanese playing cards known as *Hanafuda*. It wasn't until 1980 that Minoru Arakawa opened Nintendo of America. Nintendo jumpstarted the second "golden age" of the video game industry by releasing the Nintendo Entertainment System (NES) home console.

leighjevans (Photobucket)

Tron

Released in 1982 by Bally Midway, *Tron* was the first video arcade game to be licensed from a film studio. The film itself was about characters going inside games and competing with each other, so the tie-in with an arcade game was fitting!

:::::Collecting Quarters for *Pole Position*

Namco Bandai Games America Inc

In 1982, Namco released *Pole Position*—which pioneered the "chase-cam" and became the first wildly successful driving game. One of these arcade games was in the breakroom at a now-defunct but then-successful recording studio in Los Angeles. During breaks from recording, famous bands and artists played the game incessantly—always putting a quarter in the slot per play. Little did they know that this wasn't necessary because the owner had deactivated the coin box control. (The staff knew about it, and they just played for free!) Every few months, the staff used the quarters to pay for a big company dinner—thanks to its clients' video game addiction!

Historical Elements: how did we get here?

chapter 1

The Birth of Console Games

Although the Magnavox Odyssey—the first home game console—was released in 1972, it wasn't until the late 1970s that the home console industry began to take shape. Pre-dating the video arcade industry boom, the Odyssey was ahead of its time. The video arcade industry was business-to-business—with machines sold to arcade operators rather than to consumers. The high price tag on standalone arcade machines made it prohibitive for all but the wealthiest consumers to own them. However, it became clear that selling directly to consumers (business-to-consumer) could expand the industry tremendously—so video arcades began moving into the home in the form of affordable game consoles. These systems used the television as a monitor and competed for market share much like Sony (PlayStation), Microsoft (Xbox), and Nintendo (GameCube).

Atari VCS/2600

Although the first programmable home game to use cartridges (Channel F) was released in 1976 by Fairchild Camera & Instrument, the inexpensive Atari VCS (Video Computer System)/2600 took off one year later—successfully launching the home game console industry. Atari kept the price of the hardware low and made most of its money from the game titles it developed for the console. Popular titles included *Adventure* (where a block-shaped knight searched for keys and a magic chalice, always on the lookout for angry dragons) and *Yar's Revenge* (where a race of mutated houseflies that had relocated to space sought revenge on an army setting up camp on the right side of the screen). When Atari adapted the blockbuster arcade game *Space Invaders* for the VCS format in 1980, the practice of selling home versions of arcade games began. Atari followed up with its less-successful 5200 in 1982, and the 7800 in 1984.

Atari Interactive, Inc.

The Atari VCS/2600 successfully launched the home game console industry.

::::: The Hidden "Easter Egg"

The first video game "in joke" (known as an "Easter egg") was programmed by Warren Robinett in the VCS game *Adventure*. The hidden information was Robinett's credit; it symbolized the need for game developers to get the credit they deserved for their work. It turned out that Robinett made one pixel on a wall in a room active—linking to a hidden room containing his credit. When the Easter egg was discovered by a teenager—who wrote Atari an excited letter about it—other developers were inspired to hide their names and other messages in games. The tradition continues (whether or not the game companies know about i

FoxTrot by Bill Amend
Courtesy of Universal Press Syndicate
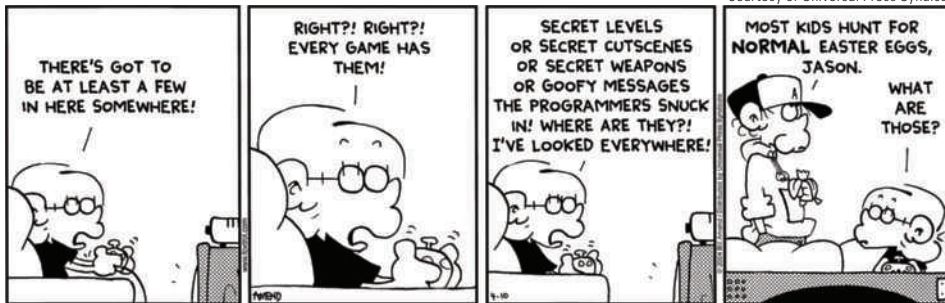
I t was love at first sight when I laid eyes on *Vanguard* for the Atari 2600 (cue Jekyll-Hyde transformation). I never thought blasting those 16-color panels in *River Raid* could be so fulfilling. It was like "bending space and time." I started playing at about 8 a.m.—and suddenly it was 3 p.m. My friend's mom was shooing us out for being inside all day. (I believe it's some sort of singularity like a black hole; neither light nor time can escape!)

—*Aaron Nash (game art and design student)*

Mattel Intellivision

Atari had some competition two years after the release of the VCS when Mattel released an arguably superior (and more expensive) console system known as Intellivision. Instead of a joystick (like the VCS), the Intellivision was equipped with an "intelligent" controller consisting of a keypad and a movement disc resembling the "track pad" on some of today's laptops. Game-specific plastic overlays were available to slide over the controllers, and the system even had

Mattel, Inc.

Mattel's Intellivision game console used a keypad and movement disc instead of a joystick.

rudimentary voice synthesis (with the purchase of an attachable component—the Intellivoice). In 1984, Mattel Electronics was shut down after heavy losses and sold to a Mattel vice president, Terry Valeski, who renamed it Intellivision Inc.

::::: Mattel's Handhelds: One Sport at a Time

In 1977, the same year that Atari released the VCS/2600, Mattel launched the handheld game industry by releasing a series of LED- (light emitting diode) based portable games. Unlike cartridge-based handhelds, these systems could contain only one game! If you wanted to play another game, you had to buy another portable. Fortunately, the games were inexpensive! Some popular titles were *Auto Race*, *Basketball*, *Bowling*, *Football*, and *Sub Chase*.

Mattel, Inc.   Mattel, Inc.

Football and *Sub Chase*—two of Mattel's popular handheld games.

A round 1984 (I was six years old), I took a handheld football game away from my male cousin. I remember feeling a sense of excitement being a girl playing a boy's game, especially when I beat all the neighborhood boys' scores.

—*Carissa Gerardo (Operations Supervisor, Integrated Marketing Services)*

ColecoVision

Coleco's entry into the console market was ColecoVision—containing mushroom-like joystick controllers and superb graphics. Blending the best of the VCS/2600 and Intellivision, ColecoVision soon became the standard for reproducing the arcade experience at home. Nintendo's wildly popular arcade game, *Donkey Kong*, was included with every ColecoVision. Most of the early titles were adaptations of other memorable arcade titles such as *Venture*, *Mr. Dot*, *Lady Bug*, and *Space Fury*.

::::: Cobbler to Cabbage Patch: Coleco's Diverse History

The Connecticut Leather Company (later shortened to Coleco) was established in 1932 by Russian immigrant Maurice Greenberg to distribute leather products to shoemakers. The company

River West Brands

soon began making leather craft kits for kids based on popular icons Howdy Doody and Davy Crockett. After competing in the first console wars of the home gaming industry with a superior system (ColecoVision) and releasing the successful Cabbage Patch Kids toys, Coleco filed for bankruptcy in 1988.

In the 1970s and 1980s, Coleco released some of the most memorable handheld games, including mini tabletop arcade games of popular titles such as *Zaxxon*, *Frogger*, and *Galaxian*. These mini arcade games were cleverly designed to emulate the look and feel of real stand-up arcade games, down to the joystick controller and cabinet art.

The first electronic game I remember playing was *Smurfs* on ColecoVision. I think I was about six years old. I thought I was so cool—as I jumped over the fences and ducked under the bats that swooped down on me!

—Elizabeth Butler (game art and design student)

Sega

Sega's *Zaxxon* was just one of the arcade games transformed into a mini tabletop game by Coleco.

Mattel, Inc.

Coleco's ColecoVision blended the best of the VCS/2600 and Intellivision console systems.

Just when it seemed like the video game industry was unstoppable, it halted. The entire industry—including arcades and the home console segment—experienced a "slump" during the early 1980s. The arcades never recovered from it, although the home console segment experienced an amazing recovery in the mid-1980s. What happened, and why?

Historical Elements: how did we get here?

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The Video Game Slump & a New Golden Age

Several theories have been attributed to the video game industry slump of the early 1980s. Perhaps the industry just experienced a temporary decline, and the platforms and titles introduced were just not revolutionary enough to reverse it. Oversupply might have also contributed to the slump; over 50 software companies produced cartridges, saturating the market with titles. There was also a lack of innovation—and low-quality and derivative games flooded the marketplace. Market conditions forced the price of games to be lowered to $5 to stay competitive. Many video game developers were also concerned that home computers would take over the home gaming market altogether. Because this industry had never experienced a decline, the general public started questioning its legitimacy—wondering whether home gaming was simply a fad, like the short-lived "hula hoop" craze!

Nintendo

Nintendo's entry into the console business in 1985 breathed new life into the home gaming industry—but it also helped push the arcade business into extinction. The system was far superior to consoles of the previous era, and the titles were graphically advanced—with compelling storylines and characters. Titles such as the *Super*

Nintendo

The Nintendo Entertainment System (NES) revolutionized the console industry.

Mario Bros. arcade conversion, *The Legend of Zelda*, and *Punch-Out!!* (where players had the thrill of bashing boxing legend Mike Tyson) were engrossing—with seemingly limitless environments. Over 50 million NES systems were sold. The release of the improved Super NES (SNES) in 1991 solidified Nintendo's presence in the marketplace. A year later, Nintendo released *Super Mario Bros. 3*, the most successful non-bundled game cartridge of all time.

The NES became so successful in the marketplace that the former industry leader Atari established Tengen, a subsidiary that exclusively focused on developing games for the NES. Soon afterward, Tengen discovered a way to bypass Nintendo's "lockout chip" and produce NES-compatible games without Nintendo's approval. Tengen then acquired the rights to sell the extremely popular puzzle game, *Tetris*. After it was discovered that Tengen bought the rights from Mirrorsoft (which did not actually own the rights), the game was removed from the marketplace—and Nintendo, which had acquired the legitimate rights to the game, released it under its own label.

The first real video game I ever played was the *Super Mario Bros.* that came with the original NES system. I played it night and day, and I even taped my final victory against King Koopa. It was quite an achievement for me back then.

—*Robert Ferguson (game art and design student)*

::::: Alexey Pajitnov & *Tetris*

Tetris originated in Russia around 1985 and was never patented. At the time, intellectual property rights were not established in the former Soviet Union for private individuals. The original author of *Tetris* was Alexey Pajitnov, assisted by Dmitry Pavlovsky and Vadim Gerasimov. *Tetris* has been embroiled in a strangely large number of legal battles since its inception. The IBM PC version eventually made its way to Budapest, Hungary, where it was ported to various platforms and was "discovered" by a British software house named Andromeda. They attempted to contact Pajitnov to secure the rights for the PC version, but before the deal was firmly settled, they had already sold the rights to Spectrum Holobyte. After failing to settle the deal with Pajitnov, Andromeda attempted to license it from the Hungarian programmers instead. Meanwhile, before any legal rights were settled, the Spectrum Holobyte IBM PC version of *Tetris* was released in the United States in 1986. The game's popularity was tremendous, and many players

The Tetris Company, LLC

were instantly hooked—it was a software blockbuster. By 1989, half a dozen different companies claimed rights to create and distribute the *Tetris* software for home computers, game consoles, and handheld systems. Nintendo released their version of *Tetris* for both the Famicom and the Game Boy and sold more than three million copies. The lawsuits between Tengen and Nintendo over the Famicom/NES version continued until 1993. In 1996, Alexey Pajitnov and Henk Rogers formed The Tetris Company, LLC and Blue Planet Software in an effort to get royalties from the Tetris brand, with good success on game consoles but very little on the PC front. *Tetris* is now a registered trademark of The Tetris Company, LLC.

What eventually became a great rivalry between Sony and Nintendo began in 1986, when the two companies agreed to create a CD-ROM for the SNES. In 1991, Sony revealed its "PlayStation" console (an SNES with a built-in CD-ROM drive) at the Consumer Electronics Show. After this announcement, Nintendo turned to Philips to create a CD-ROM compatible with the Philips CD-i ("interactive") system. Concerned with Nintendo's move, Sony scrapped the old "PlayStation" developed for Nintendo and began developing a 32-bit CD-only game machine to compete aggressively with Nintendo both in Japan and in the United States.

> I remember being six years old, and all I wanted for the holidays was an NES. I played *Duck Hunt* with my father every day after school. It was like our bonding time between school and work—and it became a routine as the years, and systems, went on. By the time my brother was three years old, he would join in on the fun, too!
>
> —Lisa Hathaway (game art and design graduate)

Cheating with the Genie

In 1991, Galoob Toys released the Game Genie, which lets players cheat in NES games and win more easily. Nintendo attempted to prevent Game Genie sales—citing that it reduced the long-term value of its games.

Nintendo revolutionized the industry again with the Game Boy—a portable system that launched a new era of handhelds in 1989. The ever-popular *Tetris* was the flagship title for the monochrome system. The Game Boy was succeeded by the Game Boy Color (1998) and the Game Boy Advance (2001). The Game Boy Advance SP (2003)—which resembles a miniature laptop and has a backlit screen—is still in wide use. Its successor, the Game Boy Micro, was launched in 2005. Nintendo continues to play a major role in the newest era in portable (now "handheld") gaming with its DS series, first launched in 2004 and discussed later in this chapter.

Nintendo

Nintendo

Nintendo

Nintendo's Game Boy (Game Boy Color, left)—followed by the Game Boy Advance, Game Boy Advance SP (middle), and Game Boy Micro (right)—kicked off a new era in portable gaming.

Tiger's Multipurpose Handhelds

In 1997, Tiger released a monochrome handheld system called "game.com" to compete with the Game Boy. Unlike Nintendo's special-purpose game system, Tiger's featured a built-in solitaire game, calculator, personal contacts database, and calendar. It also included a stylus and touch-screen technology, and it could hook up to a standard modem to access a text-based email service.

Sega

Following Nintendo's successful launch of the NES, Sega began releasing a slew of game systems in the 1980s and 1990s—including the Sega Master System (SMS), Genesis, Saturn, and Dreamcast. In 1991, Sega reinvented itself with *Sonic the Hedgehog*—a game that featured a fast-moving blue creature in red tennis shoes. The character of Sonic was so successful that it became Sega's mascot (and a serious challenger to Mario), giving Sega 55% of the 16-bit market. (The character's name was trademarked by Sega as "Sonic The Hedgehog" with a capital "T"; Sonic's middle name is officially "The"!) Although the Sega Genesis outsold SuperNES in 1992, allowing Sega to effectively take control of the U.S. console market, Sega's follow-up releases did not fare as well and were both discontinued. By 1995, Sega of America was juggling seven separate and incompatible game platforms—Saturn, Genesis, Game Gear, Pico, Sega CD, 32X, and 32X CD.

The Sega Master System (SMS) was Sega's first entry into the console market.

::::: Video Game Violence: Senate Hearings & the ESRB

In 1993, U.S. Senators Joseph Lieberman of Connecticut and Herbert Kohl of Wisconsin held hearings on violence in computer and video games. Shortly thereafter, the industry created the Entertainment Software Rating Board (ESRB) to provide parents and consumers with detailed information on game content so they can make appropriate purchasing decisions for their unique households. The ESRB independently assigns computer and video game content ratings, enforces industry-adopted advertising guidelines, and helps ensure responsible online privacy practices for the interactive entertainment software industry. The rating system is voluntary, although virtually all games that are sold at retail in the U.S. and Canada are rated by the ESRB. Many retailers, including most major chains, have policies to only stock or sell games that carry an ESRB rating, and most console manufacturers will only permit games that have been rated by the ESRB to be published for their systems. For more information on the ratings, visit http://www.esrb.org.

The ESRB rating icons are registered trademarks of the Entertainment Software Association.

ESRB ratings symbols include EC (Early Childhood), E (Everyone), E10+ (Everyone 10+), T (Teen), M (Mature), AO (Adults Only), and RP (Rating Pending).

3DO & the Bit Wars

In 1992, Electronic Arts founder Trip Hawkins started 3DO—a new company that received major backing from Panasonic, Time-Warner, and MCA—to release a 32-bit game console that they hoped would take over as the new industry leader. A year later, Panasonic marketed the console; although reviews were positive, the price (at $699) was not. Atari responded by jumping ahead to a 64-bit console system with the release of the Jaguar. Sega responded by releasing the 32X, a peripheral device that enabled the Genesis to run a new set of 32-bit cartridge games.

Since the Saturn was outselling Sony's PlayStation in Japan, it was assumed that the Saturn would also do well in the United States. After announcing that the system would be released in the United States on "Saturnday"—September 2—Sega released the system four months earlier than expected. Overall, sales were low and few titles were released—primarily because developers were caught off guard by the early release. Although the system continued to do well in Japan, sales remained disappointingly low in the United States. By 1996, rumors persisted that the company would stop developing hardware and focus on game software.

Sony Computer Entertainment America

The launch of Sony's original PlayStation started a new era in the console wars.

In 1997, Sega announced its merger with Japanese toy company Bandai—which, ironically, was developing software for the PlayStation. After Bandai's board approved of the merger, internal dissent ultimately caused Bandai to reverse its decision. In 1998, Sega launched the Dreamcast, which used Microsoft's Windows CE operating system—allowing for easier game conversions to and from the PC. Even with the success of this release, President Hayao Nakayama stepped down from his position and Sega ceased distribution of the Saturn in the United States.

The entry of Sony's PlayStation into the console market in 1995 launched a new era in the console wars. Even with the release of industry leader Nintendo's N64, the PlayStation kept its spot as the number one worldwide next-generation game console. In 1997, Sony and Nintendo continued competing with the PlayStation and N64.

The "Big Three" Console Wars

The console wars involving the "big three" (Sony, Microsoft, and Nintendo) emerged in 2000 with the launch of Sony's PlayStation 2 (PS2)—which became the fastest selling console in history, with over 100 million units shipped by 2006. Nintendo's GameCube and Microsoft's Xbox joined the new console war in 2001 and 2002, respectively. The GameCube focused on a younger (primarily early childhood and pre-teen) market, and the Xbox's emphasis on performance and features attracted the "hardcore" gamer population.

Sony Computer Entertainment America   Nintendo   Reprinted with permission from Microsoft Corporation

The PlayStation 2, GameCube, and Xbox consoles were manufactured by Sony, Nintendo, and Microsoft, respectively (the "Big Three").

A new generation of systems from the "big three" currently vie for attention in the marketplace—Microsoft's Xbox 360, Nintendo's Wii, and Sony's PlayStation 3 (PS3). We will explore these systems in more detail in Chapter 2.

FoxTrot by Bill Amend
Courtesy of Universal Press Syndicate

The Personal Computer Revolution

During the mid-1970s, another segment of the electronic gaming industry began to enter a new era. The personal computer revolution brought technology that was once the exclusive territory of programmers and hobbyists into the home. Games that had once been developed on a whim by university students could now be adapted for personal computers—and the general consumer would get to join in the fun. Already, arcade games were being repurposed into home game systems, taking some of the business away from video game arcades. The growth of computers in the home also contributed to the eventual decline of the arcade business—and it also represented a threat to the game console business. Several personal computers—such as the Apple II and Commodore 64—were created with gameplay in mind. (In fact, Steve Wozniak, who designed the Apple II, was an avid gamer.) As you read this section, think about the first personal computer your or your family owned and what games you liked to play on it.

Mainframes & Text Adventures

Colossal Cave (also known as *Adventure*—not to be confused with the Atari VCS game of the same name) was developed by assembly-language programmer William Crowther and influenced a generation of adventure game developers at colleges and defense contractors. Donald Woods expanded on it, resulting in Infocom's popular *Zork* in 1979. The two-word commands, which originally were developed by Crowther so that his young daughters would understand them—were immortalized in ZIL (Zork Interpretive Language)!

::::: *Colossal Cave*: Text Addiction

Will Crowther

Author Jeannie Novak's father, who was a mathematician for a defense contractor, often brought his work home with him; this sometimes included a terminal with a 300-baud modem attached to it, which is about 100 times slower than a sluggish modern dial-up connection! Playing *Colossal Cave* involved using two-word commands such as "go west" and "get inventory." As simple as this sounds, the game was highly addictive—and the lack of graphics allowed the imagination to run wild.

Other mainframe games included:

- Richard Greenblatt's *MacHack-6* (1966)—the first computerized chess program to enter a tournament (and beat a human player). The program was an expansion of Alan Kotok's BS project on the IBM 7090.
- John Horton Conway's *Life* (1970)—a cellular automata-artificial life program that allowed the "player" to set rules and watch what happened to computer-based "life-forms" as they evolved. Software Toolworks later released *Life* for personal computers.
- Don Daglow's *Trek* (1971)—a very popular *Star Trek*-like sci fi game that began on the Pomona College mainframe. Cygnus Software later released *Star Fleet I* (a "slick" version of *Trek*) for personal computers.
- Gregory Yob's *Hunt the Wumpus*—incorporated a maze based on a dodecahedron (12-sided polygon). Players explored this "map" and attempted to kill the Wumpus (an odorous beast who hid in caves surrounded by pits and superbats). The beast remained asleep until unwary adventurers awakened it by firing an arrow and missing. If the Wumpus ended up in the same room as the adventurer, it ate the adventurer. During the game, the adventurer received clues about how close in proximity the Wumpus was (based on the strength of the creature's odor).

:::::IBM PC: the "Business Machine"

In 1981, IBM released the IBM PC using Intel's 8088 microprocessor. Although the system was not targeted toward the business and programming communities—and it was not designed for entertainment—it ended up capturing the market for computer programmers (including game developers) because IBM used an open system architecture and allowed itself to be cloned. Today, personal computers based on the original IBM technology are the standard hardware used by computer game developers and players.

Apple II

While at Hewlett-Packard, Steve Wozniak designed what eventually became known as the Apple I and demonstrated it at the Homebrew Computer Club—a popular computer hobbyists' hangout. Steve Jobs approached him at the meeting and suggested that they start a company together. The result was the first personal computer system—and the beginning of a revolution that threatened to compete with video arcades and home consoles alike. Computers were out of the exclusive realm of university and research engineering students and hobbyists, and into the home.

Steve Wozniak implemented the BASIC programming language into what he called "Game BASIC" to develop games for the Apple II. Consumers could program the system as well, or play games such as *Zork*, *Lode Runner*, *Wizardry*, and *Ultima*.

The first home computer games were played on the Apple II.

In 1984, Apple released the Macintosh—a system with superior graphics, sound, and an accessible, user-friendly interface. A year later, Microsoft released the Windows operating system to compete with the Macintosh. Although Windows eventually grabbed a majority of the market share, the initial releases of the operating system were weak.

Electronic Arts
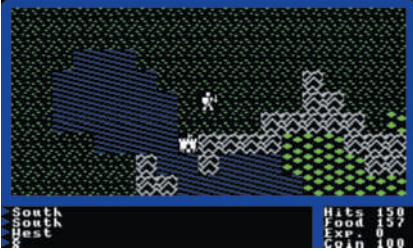
Ultima I is the first of nine games in the popular *Ultima* series.

::::: *Ultima*'s Origin

In 1979, Richard Garriott's California Pacific Computer (later Origin Systems) released *Akalabeth*—the precursor to the popular *Ultima* series. A year later, a tile-based graphics version of *Ultima* was released for the Apple II. After seven sequels, the highly successful adventure/role-playing game series continues with *Ultima Online*.

Electronic Arts: Star Power

Former Apple employee Trip Hawkins later started what became one of the largest game companies in the United States: Electronic Arts. Initially treating his designers and artists like "rock stars," he referred to game packaging as "album covers" and sent his developers on in-store game signing tours. Hawkins' later decision to focus his attention on celebrity advisors in the sports industry helped make sports the top-selling game genre in the United States—with titles such as *Dr. J and Larry Bird Go One-on-One* and the ever-popular *John Madden Football*. (EA's success was arguably built on the sports games it made for the Sega Genesis. The company's experience with the Amiga gave it a leg up when creating games for this console.)

Atari Interactive, Inc.

The Atari 400 was a hybrid computer-game system.

::::: From Console to Computer

Atari shifted its focus to compete directly with Apple by releasing the 400 (a game machine that was also a computer), 800 (with a real keyboard and internal expansion capability), and 5200 (a pure game machine—but it did not handle 400 or 800 cartridges). Coleco also tried to compete with Apple by releasing the unsuccessful Adam Computer. Not only did this effort detract from the ColecoVision console system, but 60 percent of all Adam Computers were returned defective.

CDTV: Commodore's Edutainment System

In 1990, when companies such as Davidson & Associates, the Learning Company, and others launched the "edutainment" computer software movement, Commodore released the CDTV (Commodore Dynamic Total Vision)—a home entertainment system that was basically a Commodore 64 without a keyboard. This "interactive" system was one of many released at the time that stressed educational software as well as games. The software was sold on CDs rather than cartridges.

Commodore 64

After releasing the PET (Personal Electronic Transactor) and the VIC-20 to compete with the Apple II (and failing to do so), Commodore Computer made another attempt to enter the personal computer market in 1982. This time, the company was successful beyond belief. The affordable Commodore 64 (C-64), released in 1982, was a formidable competitor to the more expensive Apple II. In fact, the C-64 was one of the most successful computers of all time. Its $300 price tag (equivalent to Intellivision) and programmability made personal computing affordable. Its color monitor and spacious memory made rival computer Texas Instruments' TI-99 look primitive. Software continued to be developed for the Commodore 64 into the next decade. Commodore also released the Amiga computer in 1986; designed to support high-end games, the Amiga was an exceptional platform but was marketed poorly.

Commodore Computers

The Commodore 64 made personal computing affordable.

::::: Sierra On-Line: Leading the Pack in Computer Game Development

New game companies were launched that created software only for home computers instead of arcades and consoles. Inspired by *Colossal Cave*, Roberta Williams started Sierra On-Line with her husband Ken; most of the team's game development was done at the kitchen table! In 1984, Sierra released *King's Quest*—a graphical adventure/role-playing game targeted for IBM's PC Jr. The game became a successful and long-running series.

Sierra Entertainment

One of the first graphical computer adventure games, *Mystery House* launched Sierra On-Line

Before the personal computer revolution even began heating up, innovations in the online world were going strong—among those fortunate enough to have access to the online world. It took the emergence of networked gaming—and especially the commercialization of the Internet—to break open this world for the consumer public. Until the introduction of the World Wide Web in 1993, playing personal computer games was mainly an isolated activity. Let's look at the evolution of online games—an industry segment that began with a small, elite market decades before personal computers took over home entertainment.

Historical Elements: how did we get here?

chapter 1

Multiplayer Meets the Online Elite

You might think that online games began when the Internet became commercial, attracting a wide market of consumers. In reality, online games pre-dated this era by several decades. In the early days of online gaming, players had access to technology that was not readily available to the public. As a result, networked games evolved away from the public eye—and they really did not get public attention until the World Wide Web came into consumer use.

The following are a few milestones in the history of online gaming. You might recognize some of the services that helped fuel this segment of the industry. In fact, you might even be using at least one of them today!

PLATO

It all started with PLATO (Programmed Logic for Automatic Teaching Operations), introduced in 1961 at the University of Illinois. The system was intended to be used for research in the area of computer-based education, but Rick Blomme turned it

Atari Interactive, Inc.

The mainframe game that started it all—
Spacewar!

into a multiplayer game network. Creating a two-player version of *Spacewar!*—Steve Russell's MIT mainframe game that started it all—Blomme catalyzed the growth of a new phenomenon in gaming. PLATO soon introduced a *Star Trek*-based game for 32 players (*Empire*), a flight-simulation game (*Airfight*), and a popular precursor to today's chat rooms known as *Talk-O-Matic*—foreshadowing the importance of social interaction in online games. In the 1970s, PLATO featured *Dungeons & Dragons*-inspired *Avatar* (origin of the *Wizardry* series) and *Oubliette*. This was the beginning of what became online role-playing games—which are now played on a "massive" scale, with thousands of simultaneous players. It was also the beginning of many educational games and interactive experiments.

MUDs

Roy Trubshaw and Richard Bartle at Essex University (U.K.) created what later was referred to as a Multi-User Dungeon (MUD) in 1978. As the Essex network became

Dr. Richard Bartle

MUD1, considered to be the oldest virtual world in existence, was created by Richard Bartle and Roy Trubshaw in 1978.

a part of ARPAnet—a worldwide computer network of academic institutions and the basis of what is now known as the Internet—students and researchers connected to the network began creating their own MUDs with the freely available code. Like *Talk-O-Matic* and future online chat rooms, MUDs focused heavily on the social aspects of games. This, and the ability for players to design their own environments, helped build social interaction and player design into the online game tradition.

CompuServe

CompuServe, the first Internet service provider (ISP), immediately recognized the monetary potential of allowing its customers to play games over a public network. Teaming up with developers John Taylor and Kelton Flinn of Kesmai Corporation, CompuServe released ASCII-text role-playing games such as *Islands of Kesmai* and *Megawars I*. Charging its customers a whopping $12 per hour (even more expensive primetime at $25–65) to play these games, CompuServe launched commercial online gaming.

The First Monthly Game Service

Marc Jacobs provided the first online gaming service for a monthly rate ($40) with the text-based role-playing game called *Aradath*. Jacobs' company, AUSI, was the predecessor to Mythic Entertainment—the developer of *Dark Age of Camelot*.

Quantum Link

America Online (AOL) actually started as a game company. The predecessor of today's AOL was launched in 1985 to directly compete with CompuServe's online multiplayer game services. The first graphics-based online service, Quantum Link, was initially available only to Commodore 64 users. The first game available on the service—developed by Randy Farmer and Chip Morningstar at LucasFilm—was *Habitat*, the first graphics-based MUD online environment that focused on social interaction. Richard Garriott of Origin Systems approached Quantum Link in 1991 to develop *Ultima Online*—an online version of the successful *Ultima* series.

Why Not Play-By-Email?

Play-by-mail (PBM) games such as *Diplomacy* (which began in the 1960s) were developed as a way for geographically separated gamers to compete with each other. With the advent of online services such as GEnie and QuantumLink (AOL), pioneers Don Daglow and Jessica Mulligan launched the first commercial play-by-email (PBeM) games. Chat-based multiplayer space strategy game *Rim Worlds War* was developed by Jessica Mulligan for the GEnie online service. *Quantum Space* was designed and programmed by Don Daglow for QuantumLink (AOL).

Historical Elements: how did we get here?

chapter 1

GEnie

The GE Network for Information Exchange was an online service that competed directly with CompuServe and Quantum Link. Kelton Flinn of Kesmai Games developed *Air Warrior* for GEnie. *Air Warrior* was a groundbreaking World War II flight simulator that could be considered the first graphically based massively

IDT Corporation

During the late 1980s, GEnie established itself as the premier online service for multiplayer online games.

multiplayer online game. During the late 1980s, GEnie established itself as the premier online service for multiplayer online games—licensing game environments such as AUSI's *Galaxy II* and Simutronic's *Orb Wars*. The first commercial online 3D shooter, *A-Maze-ing*, was launched in 1989. (In 1974, Dave Lebling and Greg Thompson wrote a multiplayer first-person shooter called *Maze* for the Imlac PDS-1, with PDP-10 as a server. It supported up to eight players, chat, and bots.)

:::::: id Software: Revolutionizing Networked Gaming

In 1993, several events took place that helped accelerate the online multiplayer game segment. The first graphical web browser, NCSA Mosaic (created by Mark Andreessen while he was a student at the University of Illinois) marked the end of text-only communication on the Internet—opening up this global network to the commercial world, as well as to the general public. The commercial online service competed for subscribers. Then, in 1993, id Software released *Doom*—which allowed up to four players to connect over a LAN (local area network) and play against each other in a "death

id Software

Doom helped commercialize networked gaming.

match." The company's next title, *Quake*, featured built-in Internet capabilities so that geographically dispersed players could engage in death matches. Other computer game developers added modem and LAN functionality to games that allowed for simultaneous players. Yet another entirely new section of the computer game market was created, involving CD-ROM products being played over networks. Built-in, Internet-based multiplayer capability also became a requirement with games—rather than an option.

::::: The LAN Party Phenomenon

The 1990s saw major developments in computer graphics, processing speed, and sound—and computer games were raised to new standards. Networked multiplayer games such as *Doom*, *Quake*, *StarCraft* and *Diablo* spawned a new social trend among gamers. "LAN parties" involved friends networking their computers together in a room and playing in teams or against each other—in between bites of pizza and (root) beer.

::::: The Saga Continues in the Online World

The rise of massively multiplayer online games (MMOs) in the United States began when Origin Systems launched *Ultima Online*—hitting the 50,000-subscriber mark within the first three months. Turbine Entertainment developed *Asheron's Call*, and Verant Interactive (later acquired by Sony) launched *EverQuest*—which became the largest massively multiplayer online role-playing game (MMORPG) in the United States, claiming to have over 500,000 simultaneous players. (MMOs are discussed in more detail in Chapter 3.)

Electronic Arts   Sony Online Entertainment

Ultima Online (left) and *EverQuest* (right) were two of the first massively multiplayer online games (MMOs).

As the information revolution, fueled by the World Wide Web, infused American culture in the mid 1990s, computer games became truly interactive—with the capacity for hundreds of thousands of people worldwide to play "massively multiplayer" games simultaneously. Players immersed themselves in a simulated, persistent fantasy world—customizing their own characters, forming collaborative teams or "guilds," and engaging in adventurous quests.

Mobile & Handheld Games: Nomadic Culture

Other segments of the industry are starting to experience growth. The portable game business—first seen in the 1970s with Mattel's sports-oriented handhelds—has evolved into a full-fledged mobile game market. Digital download services have also helped make games much more available to players worldwide.

Nintendo

Nintendo revolutionized the handheld industry with the Nintendo DS—a dual-screen system with Wi-Fi and local wireless capabilities. Past models in the series include (left to right) the original DS (2004), DS Lite (2006), DSi (2009), and DSi XL (2010).

Sony Computer Entertainment America

Sony's PlayStation Portable (PSP) was the first portable game console to launch with games supporting online play. Past models in the series include (left to right) the original PSP-1000 (2005), PSP-2000 (2007), PSP-3000 (2008), and PSPgo (2009).

David Carr (Wikipedia Commons)   Nokia, Inc.

The Nokia 6110, released in 1997 (left), was the first cell phone to include a pre-installed game (*Snake*). Nokia's N-Gage, released in 2003 (right), was an early attempt at a multi-purpose cell phone/game/MP3/Internet-based system.

Developers and hardware manufacturers are jumping on the bandwagon and putting together portable gaming development initiatives (Sony's PSP), creating innovative motion-sensing hardware (Microsoft's Kinect and Sony's Move)—and experimenting with techniques that address the graphics, memory, and screen size limitations (mobile and handheld devices). See Chapter 2 for a detailed discussion of current game platforms.

Convergence: Industry Segments Come Together

After decades of developing in parallel, the console and computer game segments began experiencing some technology convergence—where characteristics of once-separate industry segments intersect. This has been fueled by an unexpected development involving online games. The online world has become a popular place for communication and entertainment. Console game companies, in their desire to grab this market, now offer Internet connectivity through their systems: Xbox 360 (Microsoft), PlayStation 3 (Sony), and Wii (and its successor, the Wii U—from Nintendo).

Reprinted with permission from Microsoft Corporation   Sony Computer Entertainment America   Nintendo

The three current dominant console systems—Xbox 360, PlayStation 3 (PS3), and Wii—all offer online multiplayer games, browsing, and transactions through Internet connectivity.

Convergence is the theme for most newer portable and console systems—whether they connect to the Internet or incorporate cell phone technology. The current generation of console systems has pushed the notion of convergence to new levels. The Xbox 360, PS3, and Wii not only connect to the Internet (some through very usable browsers), but they allow players to connect to each other and purchase games and HD movies. (See Chapter 2 for more specs on current portable and console systems.)

Samsung   Apple   Apple   Nintendo   Sony Computer Entertainment America

Galaxy S2 (Android phone), iPhone, iPad, 3DS, and PlayStation Vita

Even arcade and online worlds are converging in the form of online arcade emulation programs—which duplicate the function of one system with a different system, so that the second system appears to behave like the first. For example, the MAME (Multiple Arcade Machine Emulator) software emulator allows computers to run arcade games on computer hardware. One of the more creative is a *Pac-Man* emulation that was programmed through an Excel spreadsheet! A popular use of emulators is to run games written for hardware that is no longer sold or readily available—not only arcade hardware, but console and computer hardware (such as Commodore 64 and Amiga). The Nintendo Wii has a Virtual Console functionality (NES, SNES, Genesis, and TG-16), and compilations are now common (such as the Sega Genesis Collection for PS2/PSP).

Into the Future

You have taken a brief look at major milestones in the history of electronic game development. Where do you think the industry will be 10 years from now? Do you sense another industry segment beginning to bubble under the surface? Will one particular segment experience a growth spurt? Will another touted segment fail? Will consumers choose portability over the cinematic experience of home theatre-style console gaming? As the mobile gaming industry continues its rapid climb, will developers start to focus overwhelmingly on the small screen? Will the social aspects of online multiplayer games become so compelling that players will spend more time in the virtual environment than in RL ("real life")—or will they integrate both worlds successfully through augmented reality or an as yet unknown technological breakthrough? Throughout the rest of the book, you'll have the opportunity to form your own opinion on these possibilities.

:::

This chapter introduced you to the history of electronic game development—covering the companies, people, and games that helped this industry take shape. In the next chapter, we'll take a more thorough look at current game console, mobile, handheld, computer, and arcade systems. As you read the chapter, consider how these systems and the number of players using them simultaneously might affect the way a game is developed and played.

:::CHAPTER REVIEW EXERCISES:::

1. What are the key phases and milestones in the history of electronic game development? How has convergence played a role in connecting these phases?

2. Why have some game development companies succeeded while others have failed? How can you apply this knowledge to the current industry?

3. What electronic games helped attract a larger audience to the industry? Why did they succeed in doing so?

4. What traditions in early game development are still in existence? How are they appealing and useful to developers and players?

5. Several theories have been used to explain the decline of the arcade industry and associated video game slump of the early 1980s. Do you agree with any of these theories in particular? Do you have a theory of your own? Is there anything that could have been done to prevent this slump?

6. What was the first electronic game you ever played? Did it capture your attention? Why? What are some non-electronic games that were popular when you were a kid? Do you feel that the thrill of any of these games has been captured in digital form?

7. Choose a time in the history of electronic game development, and pretend you are a developer working in the industry. Knowing the limitations of the time, what type of game would you create?

8. You've read about the many eras and phases of the electronic game industry. Are we at the dawn of a new era? Can you predict the primary features of the next phase in game industry history?

Platforms & Player Modes

what is the framework?

Key Chapter Questions

- What *platforms* are available for games, and what specific elements are associated with each platform?

- How does choice of *hardware* affect the way a game is developed and played?

- How do *modes* based on number of players affect the way games are created?

- What types of platforms and modes are most appropriate for *cooperative* or *competitive* styles of play?

- What are time *interval* options, and how do they change the way a game is played?

Chapter 1 introduced you to some games that succeeded (or failed) during the brief history of electronic game development. Much of the industry's historical development has been fueled by advances in hardware—including progressive console generations and multi-purpose hardware such as smartphones. This chapter picks up where Chapter 1 left off—honing in on current and near future game systems. From there, the discussion moves to player modes and time intervals associated with the way games are played—and how choice of platform can affect both. The foundational elements introduced in this and the remaining chapters in Part I apply to all areas of game development. As you continue to read through this book, you will notice that these elements come up repeatedly in other contexts.

Platform

You are familiar with the evolution of arcade, console, computer, handheld, and online games from Chapter 1. All of these formats are known as game systems or *platforms.* Since each game platform has distinct characteristics, games developed for each platform differ in several important respects. Let's review the platforms, discuss their distinctions, and look at how this might affect game content.

Arcade

Arcade games are stand alone game systems found in public venues—such as video arcades, bowling alleys, amusement parks, and pizza parlors (a trend begun by Atari founder, Nolan Bushnell). Most games are played standing up—with player controls consisting of buttons, joysticks, or a combination.

JN

Mach 3 arcade game being played during the Classic Gaming Expo at the Electronic Entertainment Expo (E3).

Two-person cocktail table arcade games were introduced in the mid-1980s and became popular items in diners and hotel lobbies. Some games use other types of controllers—such as pedals and steering wheels (sit-down driving simulators), guns (shooters), and foot pads (dancing, as in *Dance Dance Revolution*). These games evolved from black and white/grayscale to full-color displays. Since these

games are usually coin-operated, it is important from a business perspective to get players to deposit as many coins as possible into the game—so arcade developers focus on creating fast-moving, time-limited games that do not involve detailed story or character development. During the height of the arcade craze, there were also many technical issues such as memory limitations that made it difficult to provide this complexity. Since time is limited in arcade games, action is one of the main elements of this platform. Arcade games gave birth to the *action* genre— which still focuses primarily on speed and certain types of skills (eye-hand coordination, aim, and navigation—as in shooting and racing games). Other elements, such as story and character, have been emphasized more in the action genre on other platforms.

Atari Interactive, Inc.

Crystal Castles is one example of a cocktail table arcade game—often seen in diners and hotel lobbies in the mid-1980s.

There are three main entities associated with arcade game development:

1. *Hardware manufacturer*—owns the rights to the hardware and has control over what content is played on it.

2. *Game (or content) developer*—often develops the game for the manufacturer, but is sometimes the same company as the manufacturer.

3. *Venue operator*—licenses or purchases the game from the manufacturer and collects revenue from the players.

Since the hardware manufacturer owns and controls the content, it is involved in the planning, development, and testing process. In cases where the developer and manufacturer are separate entities, the developer has to answer to the manufacturer—who has final approval over whether the game will be developed.

Console

Console systems are usually played in the home, hooked up to a television set. The systems support four controllers. Three proprietary console systems on the market are vying for audience attention: Microsoft's Xbox 360, Sony's PlayStation 3 (PS3), and Nintendo's Wii.

Reprinted with permission from Microsoft Corporation   Sony Computer Entertainment America   Nintendo

The Xbox 360, PS3, and Wii are the dominant console systems on the market.

Like the arcade platform, the console platform is proprietary—which means that hardware manufacturers such as Sony, Microsoft, and Nintendo have control over what software is developed for their respective platforms. An advantage of developing for a proprietary console system is that the hardware will not vary from player to player. (As you will see in the next section, this is a problem for the computer platform and for Android development.) When a game is developed for the Xbox 360, there's no doubt in the developer's mind that the game will work on *all* Xbox 360s (assuming the hardware is working correctly).

Another feature of game consoles is that (like arcade systems) they have traditionally been special-purpose devices that were created specifically for playing games. The hardware controllers, for example, were designed to provide an optimum game-playing experience. This is in contrast to computer platforms, which were not originally intended as game-specific machines.

Console systems are also moving away from their special-purpose roots; most are used for playing DVDs, MP3s, streaming movies, and television content—not just for playing games. Sony's PS3 has a Blu-ray drive, and the Xbox 360 originally had an HD-DVD add-on drive (which now only works as an external drive, since the HD-DVD format has been supplanted by Blu-ray). All three major console systems have Internet connectivity—such as browsers, online multiplayer networks, and marketplaces where players can download games, music, TV shows, and movies. The original PS3 model contained a 20, 40, 60, 80, or 160 GB hard drive. The redesigned, slimmer version (known as "PS3 Slim") is currently the only model in pro-

duction—with an upgradeable 120, 160, 250, or 320 GB hard drive and 33% smaller than the original. Microsoft's Xbox 360 has gone through several configurations: 20 GB Pro/Premium and Core (both available at launch), Elite, Arcade (which replaced the Core), 60 GB Pro, and Xbox 360 S—with redesigned internal architecture featuring the Valhalla motherboard containing 30% more space, two additional USB ports, and a custom port for use with the Kinect sensor. Nintendo's Wii revolutionized the concept of the wireless controller, which can be used as a handheld pointing device and detects movement in three dimensions. All three major console platforms are used heavily for Netflix streaming.

::::: Wii U: The Console with a Twist

After Nintendo unveiled the Wii U prototype during E3 2011, there was a rush of excitement – but amidst all the "oohs" and "aahs," there was also some confusion. Was the Wii U a new console, a new controller or a portable system? The truth is that the Wii U is "all of the above"—sort of. The Wii U controller resembles a portable system—but it interacts with a new console base. The prototype version features a six-inch touchscreen, built-in microphone, speakers, gyroscope, accelerometer, rumble, and a camera that supports video chat. By acting as an overlay (trivia, sniper scope) or extension (golf tee) of the game being played on the television screen, the controller allows for *augmented reality* games (where graphics are superimposed over a real-world environment in real time). Cooperative and competitive play experiences are enhanced by having one player use the new controller while another uses the original Wii remote; if the players solely use the Wii U controller's screen and television screen, respectively, their experiences are completely different. Although the controller looks like a standalone portable system, it actually depends on the console base for processing. The controller's touchscreen either supplements or replicates the gameplay displayed on the television screen—and it allows a player to continue a game session by displaying the game even when the television is turned off. The system, which outputs in HD (a nice step up from the original Wii) is fully backwards compatible with the Wii and its associated peripherals.

Nintendo

All this represents a dramatic move toward multi-purpose convergence; the flipside of convergence is known as *transmedia*—a way of telling stories and/or delivering content across multiple platforms, such as game platforms, televisions, radio, books, and film. Console systems are clearly destined to support *all* features associated with computers and providing all content viewed through our television sets.

Computer

Unlike the console and arcade platforms, the computer (or PC) platform is not proprietary. This frees the developer from having to answer to the manufacturer. However, there is so much variation in hardware setups between players that it is next to impossible to predict the average speed, hardware space, and memory allotment that players will be using. In the planning stages of creating a game, the development team needs to create prospective technical specifications for the game and try to develop the game around these requirements. Both *minimum* and *recommended* tech specs should also be available to the player. Minimum specs are those that are necessary to load and play the game from beginning to end (e.g., processing speed, memory, disk space). Recommended specs expand further on the minimum specs—also allowing for an enhanced game-playing experience (e.g., high-end sound and video cards). Many games have a variety of advanced graphics and sound options that a player can disable if the system is incapable of handling them. A computer traditionally has had sharper graphics than a console system due to higher resolution; even a computer's lowest resolution (640 × 480) has twice that of any 16-bit console and most 32-bit titles.

iStock Photo

The computer platform adds complexity to the development process due to non-standard setups and a variety of systems.

Console systems such as the Xbox 360 and PS3 arguably have as sharp (or even sharper) graphics than computers—at least given the resolution permitted by software. Both consoles have 1920 x 1080 as native resolutions (1080p), and the Wii has a resolution of 720 x 480 (480p). Computer resolution can conceivably go much higher (1600 × 1200) than next-gen consoles.

Online

Online games are played on a computer platform or through a console system connected to the Internet, but the technology behind online games differs greatly from games on other platforms. Players need an Internet connection to play, and game information might be stored on a *server.* The largest online games involve thousands of simultaneous players, which sometimes requires that the information for the game be stored on several servers. *Massively multiplayer online games* (*MMOs*; (discussed in more detail in Chapter 3) might even entertain thousands of players simultaneously. Due to the 24/7 nature of the Internet; MMOs are also ongoing *persistent worlds*—posing some unique development and maintenance problems. (The monthly subscription-based model that was initially associated with MMOs has given way to micropayments, virtual item sales, in-game economies, and premium services.)

Reprinted with permission from Microsoft Corporation   Sony Computer Entertainment America

Downloadable games have seen a dramatic rise in popularity, with the help of console-driven online services such as Xbox Live Marketplace (left) and PlayStation Store (right).

Another technical issue related to online games includes connection speed, which is made up of bandwidth and latency. Bandwidth is how many bytes per second the connection can average, and latency is the time it takes for packets to be transferred to you (plus any delays from your own computer).

Live 24-hour customer service is essential for subscription-based MMOs. Players expect to get help immediately on a diverse set of issues. Customer service representatives must be trained to solve online-specific problems, including connectivity issues and player misbehavior. Customer service is of primary importance for any game that involves a subscription fee. Some customer service representatives are referred to as *Game Masters (GMs)* (see Role-Playing Games in Chapter 3 for the history of this term) and provide technical support, create new content (e.g., quests, events), and participate in online game-related discussions with players.

Bill Louden on the Role of Online Services : : : : :

BL

Bill Louden
(Director, International
Business Institute at
Austin Community
College; online game
industry pioneer)

Bill Louden is one of the early pioneers in the online, Internet, and computer massively multiplayer online game (MMOG) industries. He was a founding member of CompuServe and Founder and President of GEnie at the General Electric Company from 1985-1991. Bill designed and developed *MegaWars*, the first commercial multiplayer game, in 1982 while at CompuServe. *MegaWars* was a science fiction, space exploration game based on multiplayer teams. The game ran continuously for over 18 years until it was retired in 2000. Bill was also instrumental in the production, licensing, and publishing of over two dozen multiplayer games that helped to launch Mythic Entertainment, Kesmai, and Simutronics. Bill teaches game computer industry courses at Austin Community College, where he is department chair and professor in International Business. He also teaches graduate business courses in digital media at St. Edward's University in Austin.

In 1982, when I was in charge of games at CompuServe, I bought a copy of *DECWAR* on tape for $50 and soon discovered that it did not run as hoped. It also was laden with many Star Trek and other copyright violations and had to be extensively modified before it could ever become a commercial product. I took *DECWAR* and made some major changes designing the game for CompuServe's Fortran IV language. Working with the "Wizard of Dec-10," Russ Ranshaw, the *MegaWars* game was developed. I also had to remove *Star Trek* related copyright names (no more Romulans, etc.), and develop a new scenario/storyline to become the first commercial MMOG, *MegaWars*. It went up on CompuServe in late 1982 and ran continuously until 1998.

The biggest design changes included different ship classes and goals, offline strategy and world-building components, exploration strategy, planetary economics, live team combat, and extensive team collaboration. By the time that game launched in 1983, it was much more complex and a commercially stable product in comparison to *DECWARS*—very little like the original.

In 1985, I moved on from CompuServe and convinced GE's Information Services division to set up a public service similar to CompuServe—using the evening hours excess capacity on GEIS's mainframe computers. Named GEnie by my wife for "GE Network for Information Exchange," it was priced at $5 an hour for both 1200 and 300bps—making it half the price of CompuServe at 1200bps.

I also convinced GE that in order to make the service a success, GEnie would need online games. So in 1986, I hired Kesmai to rewrite *MegaWars* I and relaunched it on GEnie as *Stellar Warrior*. The game ran for years—dying only when GE threw in the towel and unplugged the entire GEnie service a few years after I had left.

Handheld

The small size of handheld devices makes it convenient for them to be taken with the player almost anywhere. Nintendo's Game Boy series initially focused on kids—but, with the release of the Game Boy Advance SP (GBA SP), this format has become much more popular with adults. The GBA SP is a significant improvement over the original GBA—with a backlit screen and fully rechargeable (and long-lasting) battery. Add-ons, such as Majesco's GBA video player software with a DVD-style interface, allow players to experience the GBA as a multipurpose device—watching movies as well as playing games. The Nintendo DS (a dual-screen portable) presents another innovative expansion of the handheld experience—as players experience simultaneous perspectives and points-of-view during a game.

Nintendo

Sony Computer Entertainment America

Nintendo's 3DS (left) and Sony's PlayStation Vita (right) currently dominate the handheld market.

In 2011, Nintendo released the 3DS—an *autostereoscopic* handheld system, which means that it can project stereoscopic 3D images without requiring additional accessories (such as goggles or glasses). *Stereoscopy* (discussed in more detail in Chapter 8) is a technique for creating a 3D image by by presenting two offset images separately to the left and right eye of the viewer; these 2D images are then combined in the brain to give the perception of 3D depth.

The 3DS contains a slider that adjusts the intensity of the 3D effect, a round analog input known as the "Circle Pad," an accelerometer, and a gyroscope; it also has two cameras that are capable of taking 3D photos, as well as a camera positioned above the top screen on the inside of the device that faces the player that is capable of taking 2D photos and capturing 2D video.

Sony's PlayStation Vita (also known as PSVita or PSV), also released in 2011, is the successor to the PSP; it includes two analog sticks, a five-inch OLED multi-touch screen, Bluetooth, Wi-Fi, and 3G support (in the 3G version), and LiveArea as its main user interface (succeeding the XrossMediaBar). Games are distributed on a proprietary flash card format known as NVG Cards rather than on the Universal Media Discs (UMDs) used by the original PSP.

Mobile

In addition to handhelds such as Nintendo's DS series and Sony's PSP and PSVita, which were created specifically for playing games, other portable devices such as mobile phones and PDAs have also been used as platforms for games. When first introduced at the tail end of the 20th century, these devices were more popular outside the United States and often contained puzzle or trivia games that didn't require a lot of time investment to play. Nokia made the first effort to combine a cell phone with a handheld platform with the release of its N-Gage in 2003. Although the N-Gage's initial launch did not meet expectations, the QD (its follow-up release) was an improvement—and Nokia's effort inspired other manufacturers to consider the possibilities of the mobile gaming market.

Greg Costikyan on Issues in Mobile Game Development:::::

GC

Greg Costikyan
(game industry
consultant and
freelance game
designer)

Greg Costikyan has designed more than 30 commercially published board, role-playing, computer, online, and mobile games—including five Origin Award-winning titles. Among his best-known titles are *Creature That Ate Sheboygan* (board game), *Paranoia* (tabletop RPG), *MadMaze* (first online game to attract more than one million players), and *Alien Rush* (mobile game). His games have been selected on more than a dozen occasions for inclusion in the Games 100, *Games Magazine's* annual roundup of the best 100 games in print. He is an inductee into the Adventure Gaming Hall of Fame for a lifetime of accomplishment in the field, and won the Maverick Award in 2007 for his tireless promotion of independent games. He also writes one of the most widely read blogs about games, game development, and the game industry (*www.costik.com/weblog*).

The spread of iOS devices and other smartphones has been a huge boost to the market for mobile games—but Apple's insistence on the best-sellers list as the main view into content and its gatekeeper role (along with the huge number of apps now available) make developing for its devices an increasingly chancy undertaking, especially for new entrants. There may actually be more opportunities for small developers in moving to Android or Meego (an open-source smartphone OS promulgated by Intel and Nokia). Unfortunately, Apple competitors have not yet provided functionality as robust as the iPhone store, meaning that finding customers and converting them to purchase on these platforms is as yet an unsolved problem.

Apple   Samsung

Smartphones such as Apple's iPhone series (iPhone 4, shown; left) and a a variety of Android-based systems (Galaxy S2, shown; right) dominate the mobile market.

Apple

Samsung

Tablet systems such as Apple's iPad series (iPad 2, shown; left) and a variety of Android-based tablets (Galaxy Tab 10.1, shown; right) are basically larger versions of their smartphone counterparts.

The mobile market has been undergoing rapid change since 2007, when developers and publishers began to recognize that the "always on/always connected" nature of the mobile platform could help widen the player market and make room for a new type of playing experience. Since then, the mobile platform (dominated by Apple's iPhone series and a whole slew of Android systems, such as Samsung's Galaxy S2) has become more sophisticated—threatening the single-purpose handhelds. Tablet devices such as Apple's iPad series and Android-based systems such as the Galaxy Tab 10.1 present an interesting hybrid—falling on the continuum between smartphones and netbooks. For example, as a larger-scale iPhone, the iPad's size allows for local multiplayer capabilities (see Player Modes in this chapter)—and it lends itself to other uses, such as an e-book reader rivaling Amazon's Kindle and a "bottomless" sheet music repository … a performing musician's dream!

Tabletop

A tabletop game refers to the traditional analog (rather than digital) game platform—including games that might be played on a tabletop. Examples of tabletop games include board, card, dice, tile, block … and even pen-and-paper games such as *Dungeons & Dragons (D&D),* where the game pieces literally consist of pens (or pencils) and paper! Miniatures and battle maps (plasticgraph paper players can write on with erasable markers) are also common in games such as *D&D*. It's extremely important to study tabletop games to understand the underlying gameplay challenges and strategies behind

pearlgracehu (PhotoBucket)

A high-energy game of *Risk*—the popular "world domination" board game.

games in general. (See Chapter 6 for a discussion of gameplay.) Another important use of tabletop games is as prototypes for future electronic games (discussed in Chapter 11). Many game development companies create preliminary versions of their games in tabletop form to ensure that the gameplay is functioning properly.

Time Interval

Time intervals are time-dependent elements that affect the pacing of the game. This pacing affects whether the game is played *reflexively* or *reflectively.* Would you develop a game that allowed players to spend an unlimited amount of time responding to challenges—or one that encouraged them to react quickly to them? What about something between the two extremes: allowing each player a limited amount of time to make decisions? There are three basic time intervals used in games: turn-based, real-time, and time-limited.

Turn-Based

In traditional board and card games, each player takes a turn moving a token along the board or playing a card. Usually, the time allotted for each turn is unlimited (unless the player's opponents begin impatiently drumming their fingers on the table). In this case, players have as much time as they need to plan their moves and decide how to play their hands—allowing for reflective, deliberate thought. These games are *turn-based*—meaning that each player (whether artificially generated or human) may take a turn.

Getty Images

Pool and billiards are classic turn-based games.

Big Stock Photo

Soccer is a real-time sport.

Real-Time

The opposite of a turn-based game is known as a *real-time* game. In this case, there is no time interval between turns. In fact, there are no turns at all. Winning a real-time game requires having quick physical reflexes, as opposed to the reflective thought required for turn-based games. Real-time games are difficult to play online due to performance-related technology issues—including the speed of the player's connection, server load, and regional Internet traffic bottlenecks. However, these games are extremely popular online—partially due to the ability to communicate in real-time with other players.

Time-Limited

A *time-limited* game is a compromise between turn-based and real-time games. Time-limited games limit the time each player has for their turn. In the case of some single-player puzzle games (discussed in Chapter 3), a time limit is placed on the game itself. In timed games containing more than one player, each player can take their turns separately (as in chess) or at the same time (as in some online games). In the latter case, each player has the experience of taking a turn—but the game itself is happening in real time because neither player waits while the other player is taking a complete turn.

Big Stock Photo   Big Stock Photo

Boxing is a time-limited, real-time sport, while timed chess is a time-limited, turn-based game.

Deciding on an interval for your game is the first step in considering how the game will be played. How does the interval affect a player's involvement in the game? Do real-time games feel more real? If turn-based games encourage reflective thought, does this mean the game always appears to be slow paced? These are some questions to consider when considering time intervals.

Player Mode

There are several possible *player modes,* which directly correlate to the number of people playing a game. These modes range from single-player to massively multiplayer—involving thousands of players. Your choice of player mode—as well as the content—has a significant impact on how your game is played. What platforms might work better in certain modes? Can you combine a real-time interval with a single-player mode? Think of ways you could combine intervals and modes to create a unique game.

Silver Creek Entertainment

Solitaire (*Hardwood Solitaire IV,* shown) is a classic single-player card game.

Single-Player

Only one person can play a *single-player* game. Any additional players (usually opponents) in the game are known as *artificial intelligence (AI)* characters or *non-player characters (NPCs).* (Player characters and NPCs are discussed in Chapter 5.) The limited amount of screen space (known as *screen real estate,* discussed further in Chapter 8) on handheld platforms such as Nintendo's Game Boy Advance SP and Sony's PSP makes these systems ideal for single-player games. If you were to create a single-player game, what platform might you avoid?

Two-Player

Two-player (also known as *head-to-head)* games initially evolved from single-player arcade games. Early in the industry, games weren't CPU-controlled because there wasn't enough computational power to drive the *artificial intelligence (AI)*; this meant that local two-player games such as *Tennis for Two* and *Pong* were were more common early on. The first two-player arcade consoles contained two start buttons—one for single-player mode, and one for two-player mode. Players took turns playing against the game itself. Each player's experience of playing the game was identical to what it would have been in single-player mode. The only difference was that the game kept track of both players' scores and compared the two to determine the winner. Players did not compete against each other onscreen, but they both knew that the game would declare only one of them the winner. This idea of player-to-player competition was akin to trying to beat a high score on the arcade console—but instead of a faceless set of initials on a screen, your opponent was standing right next to you.

Sega

In *Streets of Rage 2,* two players control characters such as Axel and Max to cooperatively defeat enemies simultaneously.

These early games were turn-based. It wasn't until *Double Dragon* that a two-player arcade game had a real-time interval. In this game, two players were able to share the console and play side-by-side at the same time—using buttons and joysticks to control the movements of their characters as they fought cooperatively against a common enemy. (*Double Dragon* might be one of the earliest examples of "coopetition," a term that will be discussed in Chapter 6. After playing cooperatively against common enemies and beating the "big boss" at the end of the game, both players play against each other for the final competition.)

Local Multiplayer

In *local* player mode, all players sit in the same space and play the game on the same machine—sharing the same screen using separate *input devices* (controllers). This is a common mode of play on console systems, which allow for local play of up to four players. Since all players share the same screen, each player can see what the other players are doing. Players cannot hide information from each other; this poses a problem when creating games that require players to make secret moves and decisions. Since consoles have introduced network capability, this pattern of local play might change or disappear. Players with Game Boy Advance systems can plug them into the GameCube console as controllers. This allows the players to hide information from each other.

DL

Getty Images

DDRMAX2 Dance Dance Revolution is a two-player, real-time game where players dance side by side and control the game with footpads.

Local console games allow 2–4 players to share the same screen and use separate input devices.

Players can also engage in local play on a personal computer—which involves not only sharing a screen, but input devices (in this case, a keyboard and mouse) as well. Needless to say, a real-time interval would be next to impossible in this case. (Some early computer games, such as *Rampage,* were developed for local play—requiring each player to use a different area of the keyboard.) It is interesting that local play has increased in recent years as parents play games with their children—who sit on their laps!

::::: "Co-op" Play

PD

Some two-player and multiplayer games are known as co-op two and co-op multiplayer. In these cooperative games, players team up to play against the game itself. An early co-op two game was *MicroSurgeon* for the Intellivision console—where one player would move a robot inside a human body and find viruses, while the other player would shoot antibodies at the viruses to heal the person. *Gauntlet* was an early co-op multiplayer local arcade game with four joysticks that involved up to four simultaneous players. Each player was either a wizard, warrior, valkyrie, or elf; all players cooperated with each other to kill monsters, ghosts, grunts, and demons.

Gauntlet's four joysticks enabled four players to cooperate simultaneously to fight a common enemy.

LAN-Based Multiplayer

LAN-based games allow players to share the game on a *local area network (LAN)* without sharing the screen or input device. In Chapter 1, you learned how LAN-based games represent an intersection between the personal computer and online multiplayer phases of electronic game history. With LAN-based games, it became possible to combine the networking capabilities of online mainframe games with personal computers that could be placed in one local area. A simple LAN can be created by linking 2–4 Game Boy Advance handheld systems together through gamelink cables. Unlike home console-based local play, the players *can* hide information from each other because they are not sharing the same screen—only the game itself. At a LAN party, players might bring their personal computers to one location (anywhere from a modest living room to a large convention hall), plug them into the LAN, and play games together as one large group. (Workplaces are also often on LANs, making LAN play popular as a lunchtime or after-work activity.)

Fragapalooza

LAN-based games allow several players to plug their machines into a local area network (LAN). Fragapalooza (shown), with about 1,000 players, is the biggest LAN party in Canada.

Online Multiplayer

Like LAN-based games, *online* games represent a form of *networked* play—where players connect their computers to a network and share the game. In the case of online games, the network is the global *Internet.* You've already learned that *online multiplayer* games can be played by thousands of players simultaneously. Although single-player and two-player games can be played online (and on a LAN, for that matter), it is the multiplayer mode that has become closely associated with online play.

Thousands of players interact while while playing the online multiplayer game, *Rift*.

When do online games become massively multiplayer? This mode is associated with games that persist 24 hours per day and maintain a subscription-based revenue model in which players pay a monthly fee to continue playing the game. The sheer number of players (who might or might not be playing at certain times of the day) greatly affects the way this sort of game is developed and maintained. These games often encourage team-based play, where players form groups and cooperatively defeat opponents or solve problems together. Since the game involves large numbers of players who could easily be playing from locations throughout the world, it's fairly easy for players to find other players at any time of the day or night.

:::::Player vs. Player (PvP)

The player vs. player (PvP) mode specifically refers to instances in MMOs in which players compete against each other. The usual MMO mode involves players forming cooperative teams to defeat non-player characters (NPCs; discussed in more detail in Chapter 5). Many players prefer PvP because combat is more interesting if it occurs against another player. Some players in an MMORPG (massively multiplayer online role-playing game—an MMO sub-genre discussed in Chapter 3) would rather kill a member of a competing guild than kill a computer-generated monster.

PvP mode is a popular feature of *Guild Wars 2*.

MMO developers have learned that the society of the game (friends made while playing) is a primary incentive for many people to keep playing the game. By offering team-based play, the developers encourage friendships to form, thereby strengthening the game's society and increasing its player-retention rate. It is next to impossible to expect large numbers of people to play the game the way it was originally meant to be played. Instead, players drop in and out of the game and socialize with other players about topics unrelated to the game. Are massively multiplayer games really social communities? Is not the *player control* and a sense of freedom of choice important in almost every type of game? These ideas will be discussed in more detail in Chapters 5 and 6.

Game Elements: The Significance of Platforms, Intervals & Modes

This chapter is the first to focus on the basic elements necessary for the development of electronic games. The target platform is one of the first components that must be considered—and it can have a great effect on how a game is played due to everything from screen size, surrounding environment, online capabilities, portability, audio/video quality, processing speed, and storage capacity. Time interval and player mode interact with platform to provide a variety of playing experiences. All of these elements should be considered early on when planning a game project.

::

Consider applying the basic game elements you learned in this chapter to the next chapter—which focuses on genres and goals associated with game development. You'll learn that platform and genre are interrelated, and the content of many games is closely associated with their target systems.

Expanded assignments and projects based on the material in this chapter are available on the Instructor Resources DVD.

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:::CHAPTER REVIEW EXERCISES:::

1. What is your favorite game platform, and why? Choose a game that you enjoy playing on that platform and discuss how the platform enhances the playing experience. How would that experience change if the game was only available on a completely different platform?

2. You've recently acquired the rights to port a computer game to the arcade, console, handheld, and tabletop platforms. Choose two of these other platforms and discuss how you would modify the game so that it is optimal for your chosen platforms.

3. Play *Scrabble* or *Words with Friends* on a smartphone or tablet system. Both of these games are turn-based, but the time between turns can last for days—allowing primarily nomadic players using portable systems all the time they need. This type of asynchronous play can be thought of as an extension of the turn-based time interval. Another feature of these games is that there can be several games running simultaneously—allowing players to jump from game to game at any point in time. Choose another game that might benefit from these features, and discuss why.

4. Local play is common on console systems, but it can be awkward on computer systems. Can you think of a situation in which it would be fairly comfortable for two players to share a keyboard and mouse? Your company has been asked to develop a local play game for the computer plat¬form. What type of game would you develop for this player mode—and why?

5. How do platform, time interval, and player mode affect the playing experience? You learned in this chapter that the chess tabletop game isn't always merely a turn-based game – but it has a time-limited version. Imagine what chess would be like if it were played in real time. Now change the player mode to multiplayer. How would the experience of playing chess change if it was a real-time, multiplayer game? Come up with a variation of one of your favorite electronic games by tweaking the time interval and player mode.