

Level 1

Welcome N00bs!

OKAY, “NOOBS” MIGHT not set the right tone. You might be new to gaming and want to learn how they are made; that’s no reason to be insulting. You might have been making games for years, you might be in school to learn how games are being made, or you might have been making games all on your own. Forget that I called you a N00b.

But if you are new to gaming, then this chapter is for you. In it, I talk about what is a game, who makes them, and what kind of games there are. It’s pretty basic stuff, so if you aren’t a N00b, then feel free to skip this. However, you are going to be missing out on a lot of great stuff. Don’t say I didn’t warn you.

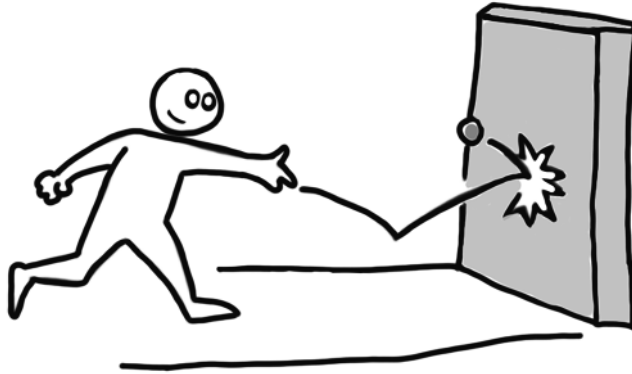
First off, let’s address “*What is a Game?*”

Within the academic gaming community there are many different definitions for what qualifies as a game. Here’s one from USC professor Tracy Fullerton: “a game is a closed, formal system that engages players in a structured conflict and resolves its uncertainty in an unequal outcome.”

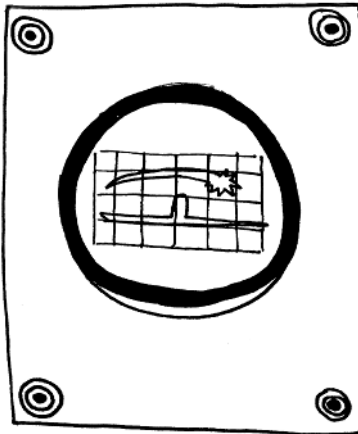
Here’s another from designer Chris Crawford that states “a game needs to be a closed formal system that subjectively represents a subset of reality.” Here’s another from Roger Lewis that says that a game needs to have “players in conflict with each other.”

Bernard Suits says, “a game is the voluntary attempt to overcome unnecessary obstacles.” Author Jesse Schell calls them “a problem-solving activity, approached with a playful attitude.” Designer Sid Meier writes “a game is a series of interesting decisions.”

Let’s consider bouncing a ball against a wall. You only need one player to play this, but does this activity qualify as a game? There’re no other players to be in conflict with as in Roger Lewis’ definition. Bouncing a ball against the wall is hardly Crawford’s “subset of reality”—unless you lead a very boring life. Let’s face it, bouncing a ball against a wall is just a ball bouncing against a wall. It’s not a game, it’s an activity.



Doing the activity of bouncing a ball might seem like a timewaster, but a timewaster can become a game when you add rules and an objective. A rule might be that you throw the ball with your right hand and catch it with your left. A rule might be that you can't drop the ball until you reach a predetermined number of wall-hits. A victory condition could be that you must catch the ball ten times in a row. A failure condition would be if you've violated any of those rules or objectives. You can even add a second player to try to keep the ball bouncing back and forth for as long as possible. These might be simple rules and objectives, but they were enough of a game to inspire William Higinbotham, the creator of one of the earliest video games: *Tennis for Two*.



Tennis for Two

So, let's ask this basic question:

Q: What is a Game?

A: A Game is an activity that

- Has gameplay
- Has rules
- Has a win/lose condition

That's pretty much it.

If it doesn't have all of these, it is either an activity (like bouncing a ball), or a toy (like *The Sims 4* or the beta version of *Minecraft* (before Notch added the Ender level)).

OK, you ask, "What is gameplay?" Gameplay is the interaction of the player with the game. This can also be between two or more players and the game. Gameplay is also dictated by the rules...but I'm getting ahead of myself; I'm so excited to tell you about this stuff!

Now that you know what a game is, you might ask:

Q: What is a video game?

A: A video game is a game played on a video screen.

Sure, you can start complicating the definition and add requirements about devices, peripherals, control schemes, player metrics, monetization, boss fights and zombies (there are always zombies). But by my reckoning, that is pretty much as simple as it gets.

Oh, there's one other thing to consider when discussing what is essential to a game. A game needs a clear **objective** so that the player knows what the goal of the game is! You should be able to sum up a game's objective quickly and clearly. If you can't, then you have a big problem.

Danny Bilson, the current head of USC's Interactive Media Department, has a great rule of thumb when it comes to a game's objective. He says that you should be able to sum up a game's objective as easily as an old Milton Bradley board game. These objectives are taken from the front of those old game boxes:

- *Battleship*: Sink all of your opponent's ships.
- *Operation*: Successful operations earn "Money." Failures set off alarms.
- *Knock Out*: Have more stoppers in the grid at the end of the game.
- *Mouse Trap*: Players turn crank A, which rotates gears B, causing lever C to move and push stop sign against shoe D. Shoe tips bucket holding metal ball E. Ball rolls down

rickety stairs F and into rain-pipe G, which leaps it to hit helping hand rod H. This causes bowling ball I to fall from top of helping hand rod through thing-a-ma-jig J and bathtub K to land on diving board L. Weight of bowling ball catapults diver M through the air and right into wash tub N causing cage O to fall from top of post P and trap unsuspecting mouse.

OK, let's just ignore that last one. The lesson is you need to keep your game objectives simple. Speaking of simple games, let's take a moment to travel back to the dawn of video games. They had to start somewhere, right?

A (Somewhat) Brief History of Video Games

Welcome to the 1950's. The dawn of television, 3D movies, Disneyland, and rock n' roll!

Didja know video games were invented in the 1950s, too? They were, but they were only played by very few people on very large computers. The first video game programmers were students in the computer labs of large universities like MIT or the employees of the military facility, the Brookhaven National Laboratory.

Early games like *Tennis for Two* (1958) and *Spacewar!* (1962) had very simple or even no graphics at all. These earliest games weren't even displayed on video screens as we know them today. Some used small black and white oscilloscope screens to play their games.



Some game genres are older than you think! The first multiplayer, first person shooter was *Maze* (also known as *Maze War*), which was programmed in 1973 by Steve Colley, Greg Thompson, and Howard Palmer at NASA's Ames Research Center. The adventure game genre started with 1976's *Colossal Cave Adventure* (also known as *Adventure*) and the first VR "game" was GE's simulator that was created to train aircraft pilots in 1973—15 years before the term virtual reality was coined!

After playing *Spacewar!* at the University of Utah's computer lab, future Atari founders Ted Dabney and Nolan Bushnell were inspired to create *Computer Space*, the first **commercial arcade game** in 1971. Atari followed up with *Pong* (1972), which was a huge smash hit. These first arcade games could be found in bars and gyms! Actual video game arcades dedicated to video games didn't start to appear until the late '70's.

Early arcade games were rendered using either **vector graphics** (images constructed from code-generated lines) that created bright, striking images like *Asteroids* (1979), *Battlezone* (1980) and *Tempest* (1981), or **raster graphics** (images created by artists using pixels) that allowed artists to create cartoon-inspired creatures and characters like *Space Invaders* (1978), *Pac-Man* (1980), and the cast of *Donkey Kong* (1981). These early characters became pop culture icons overnight, appearing on everything from t-shirts to bed sheets, Saturday morning cartoons to breakfast cereal.



Asteroids
(Vector Graphics)



Galaxian
(Raster Graphics)

During the early 1980s, video games were played in **arcades**. The arcades were filled with **arcade cabinets** that housed the individual games. There were three styles of arcade cabinets: **uprights** (cabinets the player stood in front of while playing), **cocktail tables**

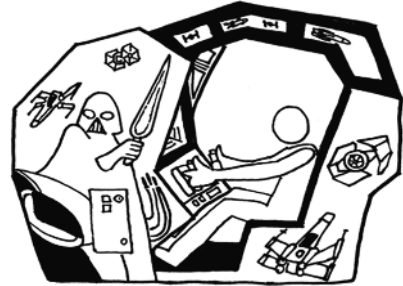
(arcade games set into the top of a small table, allowing the player to sit down while playing) and **cockpits** (elaborate cabinets designed to look like the cockpit of an airplane, race car or spaceship, which allowed the player to lean or sit in to further enhance the gaming experience).



Arcade Cabinet



Cocktail Table



Arcade Cockpit

In the mid-1980s, arcades began springing up everywhere, and video games took the world by storm! Game genres and themes became more imaginative and varied, while the game's controls became more complicated and realistic. The cabinets themselves became more artistic with beautiful graphics decorating their marquees and cabinet sides. You could sit back-to-back in a two-player spaceship cockpit while playing *Tailgunner* (1979), battle Klingons from a replica of Captain Kirk's command chair in *Star Trek* (1982) or "drive" a miniature Ferrari Testarossa that moved, tilted and shook in *Out Run* (1986).

The technology that played the games improved, too. Gameplay that originally kept to single screen, now **scrolled** in all directions. **Laser discs** allowed *Dragon's Lair* (1983) and *Space Ace* (1983) to display Disney-quality animation and games like *Berzerk* (1980) and *Gorf* (1981) "spoke" to the player using **synthesized speech**.

Into the 1990s, many arcade games evolved to resemble single-rider theme park attractions complete with gyroscopically moving virtual **simulators** (*R360*, 1990), rideable rubber rafts (*Rapid River*, 1996) and racehorses (*Final Furlong*, 1997) and fighting booths that allowed players to battle virtual foes using real punches and kicks (*Street Fighter II* on Holoplex's Combatica system, 1999).

The most elaborate of these arcades was Virtual World's BattleTech Center—steampunk themed lounges with linked "battle pods" that allowed eight players to fight each other while stomping around in giant virtual "mechs." The few remaining arcade game manufacturers strived to compete, creating epic gaming experiences like Namco's *Deadstorm Pirates* (2009), *Star Wars Battle Pod* (2014) and Raw Thrills' *Jurassic Park Arcade* (2015). These games are more like theme-park dark rides than arcade games. But these elaborate arcade systems required lots of floor space and were very expensive to maintain.

Home systems began to rival and then eventually surpass the graphics seen in most arcade games. Video games in arcades were replaced by more lucrative redemption machines and games of skill like Skee-Ball, Whack-A-Mole, and basketball hoops. The golden age of video game arcades is over.

But you can't keep a good idea down. In the late '90s, LAN gaming centers combined retail and social space to allow players to play on a computer and console on a per-hour basis. Some upgraded to feature large-scale gaming experiences held in movie theater-sized venues. Internet cafes cultivated a cafe-style environment.

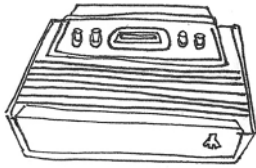
Historians and academics have realized the impact and importance of video gaming. Museums have sprung up around the world, such as the Strong Museum of Play in upstate New York, the Computerspielemuseum in Berlin, Germany, and the Museum of Art and Digital Entertainment in Oakland, California.

In the mid-2010s, nostalgia for arcades resurged and “barcades” started to spring up, places where adult gamers could play classic arcade games and pinball while enjoying an adult beverage. Even “retro” arcades are making a comeback, complete with glo-in-the-dark carpet and token dispensers, offering players another chance to play their favorite vintage arcade and pinball games and revisit their favorite old-school home system games.

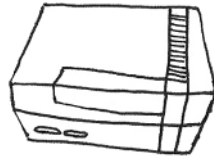
Speaking of home systems, a **console** is a gaming platform that can be used at home. A microprocessor runs the electronic device, which sends a video display signal to the user's TV set or monitor. Unlike the dedicated controllers of an arcade cabinet, a home console controller has enough buttons, triggers, and analog controls to allow for a variety of games to be played. These controllers can also be switched out for more specialized controllers such as light guns, steering wheels and even the controls of a giant mech. And unlike the dedicated motherboards of arcade games, which could only hold one game, console games used cartridges, CDs, and DVD media to allow players to quickly swap and play a variety of games.

The first commercial home console was the Magnavox Odyssey (1972) invented by gaming pioneer Ralph Baer. The games were programmed by Jerry Lawton, the first African American game developer. Technologically, the Odyssey was pretty far ahead of its time. It featured an analog controller, games that were on removable ROM cartridges and, thanks to a deal with Japanese game developer Nintendo, a light gun rifle—the first gaming peripheral.

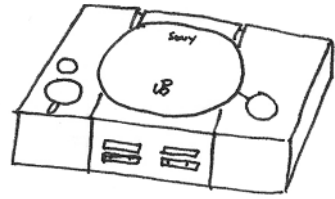
From the late 1970s onward, there have been many home consoles. Some of the most popular and/or well-known consoles include the Atari 2600, the Mattel Intellivision, the ColecoVision, the Nintendo Entertainment System, The Super Nintendo Entertainment System, The Sega Genesis, The Sega Dreamcast, the PlayStations 1-5, The Atari Jaguar, the 3DO interactive player (one of the first CD game systems), the XBOX (and XBOX 360 and XBOX One), the Nintendo Wii, WiiU and Switch. Virtual Reality systems include the Oculus Rift and Quest 3, the PlayStation VR, and the Apple Vision Pro.



Atari 2600



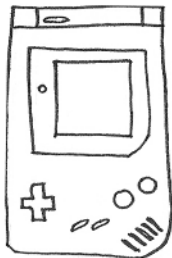
Nintendo Entertainment System (NES)



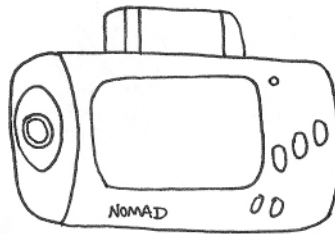
Playstation One (PSX)

Like arcade games, **handheld games** have a visual display, processor, and a controller but are small enough to fit in the hand or even the pocket of the player. The first handheld games were dedicated to only one game per unit. *Auto Race* (1980) used a digital display much like a calculator while the Game & Watch series (1980) features a more appealing liquid crystal display that allowed the game creators to have the player control cartoon characters Jumpman and Popeye. Microvision (1979) was one of the earliest handheld systems to have switchable cartridges.

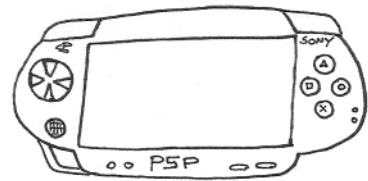
Handheld gaming really took off when Tetris became a phenomenon on the Nintendo Game Boy (1989). Created by Gunpei Yokoi, the Game Boy became the form-factor for all of Nintendo's hardware for the next 30-plus years. Tiger Electronics dominated the handheld market for years with their licensed LED games based on Aladdin, Duke Nukem 3D, Goosebumps, Harry Potter, and Batman. The SEGA Nomad owners could play their existing library of Genesis games. The processor of the Sony PlayStation Portable (PSP) ran the equivalent of a PlayStation 1. Nintendo had another hit with the DS (dual screen) systems: the DS and 3DS. These systems featured innovative touchscreens, two screens and digitally downloaded content. This continued with the newest portable gaming systems such as the Playdate, which provides old-school fun with its novel crank controller while the Nintendo Switch provides state-of-the-art entertainment for players on the go.



Nintendo Game Boy



Sega Nomad



Playstation Portable (PSP)

The Brave New World of Gaming: Mobiles, Online Distribution and Touchscreens

Handheld gaming, especially on **mobile devices**, is the main way many people play games today. With the advent of digital-only content, you can carry an entire gaming library around in your pocket. Touchscreens have enabled the creation of new control systems and increased the popularity of genres such as strategy games, role-playing games, and **hyper-casual** puzzle games.

Mobile gaming has changed not only the way we play games but also the way they are made. By the 1990s and early 2000s, games required large teams and larger budgets to make. Thanks to greater access to inexpensive and even free tools, game developers can make games quicker and for less money than their console and computer counterparts. Mobile games are built around shorter play sessions and repeated play. This is similar to how arcade games were in the earliest days of the industry. As they say, everything old is new again.

Another impact to gaming is the advent of **digital distribution**. Originally used to sell add-ons and expansions, now entire games can be purchased and downloaded at any time of the day or night via the internet. Gamers are able to **stream** content whenever they want, resulting in a severe reduction in the demand for physical media. In the past, the size of the game was limited because of the media, now games can be as large as the player's hard drive can hold. Game developers can have their mistakes and imperfections "**patched**" with a simple download. Season passes and micro-transactions can generate revenue for the developer and publisher, giving them more ways to earn money. It's fair to say that modern mobile gaming and **downloadable content** has forever changed the way we game and make games.

As of this writing, there are still a few publishers who sell games on disc and cartridges like Sony, Nintendo and boutique companies like Limited Release, but most gamers get their games from digital stores such as Steam, the PlayStation Store, Nintendo eShop and the Microsoft Store. Of course, digital distribution has caused retailers and publishers to react with incentives—sweetening the deal with physical goods such as collectibles and exclusive digital content.

As **personal computers** (or **PCs**) became accessible and affordable in the late 1970s, both video game programming and video game playing became more common. An entire generation of game developers started off in their bedrooms and garages, programming games on their PC's. Those early games were stored on cassette tapes used in tape drives. Later, floppy discs replaced tape drives. The young game devs would seal their game discs and tapes in Ziplock bags and sell them at their local computer store. Some of the biggest names in early gaming like Jordan Mechner, Warren Spector, Noah Falstein and Lord British got their start this way.

While early video game consoles were emulating games from the arcades with varying degrees of success, those computer game developers of the 1970s and 1980s took advantage of what computers like the Atari VCS, Apple II, and ZX Spectrum had to offer—more memory, text, and most importantly, keyboards. The keyboard allowed greater user input and created unique-to-the-computer genres including the **text adventure game** like 1976's *Colossal Cave Adventure*.

Since computer gamers could spend more time gaming (and would be more comfortable sitting down while playing!), computer games necessitated a different gaming experience. Story-based adventure games, strategy games, and construction and management games provided longer play experiences than their arcade counterparts...and gave players more perceived value for their money. I distinctly remember determining how much play time I was getting for my money back in the early 1980s. Let's see, an average arcade game costs a quarter for a few minutes of play while *Temple of Apshai* for the Commodore 64 costs \$39.95 and takes several hours to explore its 200 rooms. Hmmm. Which one is the better bargain?

As the computer hardware, memory, graphics processors and storage increased, computer games became even more visually detailed, featured more involved designs and unique gaming controllers were created to play them. The rise of the **first-person shooter (FPS)** can be attributed to the popularity of the **mouse controller**. By the mid-1990s, the computer was the ultimate gaming platform, thanks to leaps in technology including CD ROM and DVD media. Several gaming genres, particularly strategy, FPS, and **massively multiplayer online** games (or **MMOs**) emerged and have remained very strong on the computer platform.

Computers also became host to virtual reality systems such as the Oculus Rift and Oculus Quest, creating new ways for players to put themselves into the game. Digital distribution is even more common on computer systems, with gamers having access to (as of this writing) 73 thousand games on the Steam platform alone! Where will computer gaming go in the future? If I knew that, I'd be rich!

What's the Difference Between AAA and Indy?

A lot of my students ask me “what's the difference between AAA games and independent (indie) games? Currently, there are actually three different classifications of games: AAA games, AA games and indie games. So, what is the difference?

AAA games are created by large studios with hundreds or thousands of employees. Their budgets are exceeding tens or even hundreds of millions of dollars to pay for top-of-the-line graphics, and voice actors. They are the “blockbusters” of the game industry—cinematic cutscenes, gorgeous visuals, often based on well-known IP like *Mario*, *Legend of Zelda*, *Grand Theft Auto*, *Call of Duty*, or the *Batman Arkham* games. Or, they are franchised

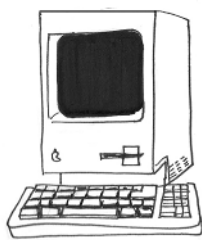
sports games like *Madden* and *FIFA*. They are tried-and-true genres, predictable and often have slight variations on a theme. They get global distribution, physical and digital releases and extensive marketing before and during their release, which generates significant hype for the game.

AA games are titles created by medium sized teams. They have modest budgets compared to AAA games—usually in the tens or hundreds of thousands of dollars, but sometimes in the low millions. They have more varied genres—RTS, RPG, simulations, action-adventure—and they often are original IP. They might get a physical release, but more often they are digitally distributed.

Indie games are made by a small but passionate team. They have a limited budget, often relying on crowdfunding or other methods to raise funds. They can be any genre—indies have complete creative freedom to make any type of game that looks and plays however they want. They are mostly released through streaming services such as Twitch and Switch, and on mobile. They have no marketing budget, so they rely on reviews and word-of-mouth for publicity.



Commodore 64 (C64)



Macintosh Plus



Personal Computer (PC)

Game Genres

The term **genre** is used to describe a category of something—often the categories used to describe books, movies, or music. For example, music can be rock and roll, gospel, or country. Movies can be action, romance, or comedies. Books can be drama, biographies, or horror; you get the idea.

Video games are classified into genres, too, but here's where it gets a little tricky. Games actually have two types of genres: **story genre** and **game genre**. *Story genre* describes the type of story, theme or narrative: fantasy, historical, sports, horror, etc. *Game genre* describes the type of *gameplay*: First person shooter, MOBA, match three, simulator, etc. Simple enough, right? We will talk about story genre later, but for now let's look at some of the different types of game genres:

- **Action:** Games that rely on hand/eye coordination and player skill. There are lots of stylistic variations, making it one of the most diverse genres. Some of the earliest arcade games are action games.
- **Adventure:** Games that focus on characters (like in a role-playing game) but often don't have the characters evolve in skill or ability. This genre is about story and lore, inventory management and often puzzle solving.
- **Augmented Reality (AR):** Games that incorporate peripheral devices like cameras and global positioning systems (GPS) into gameplay. They create a "layer of unreality" over the real world for the player to interact with.
- **Auto Battler:** A game where the player constructs a "build" of cards, characters, etc., which are then tested against an adversary. Players merely observe the interaction to see how well their build did.
- **Card Battler:** Digital version of analog card game where the game automates several aspects of the setup and maintenance for the player. Often there are other elements such as music and effects to enhance the play experience.
- **Educational:** A game with the primary intention is to educate while entertaining. These games are often aimed at a younger audience.
- **MOBA (Multiplayer Online Battle Arena):** A strategy game where two players (or teams of players) compete on a single battlefield. Players control characters while being supported by "creeps," lesser strength helpers controlled by the computer.
- **MMO (Massively Multiplayer Online):** Games that are primarily role-playing games that support many players at once. The gameplay often centers around character progression, quests, and "grinding," doing several menial tasks over and over again for points or money.
- **Party:** A game specifically designed for several players who compete in a variety of styles of gameplay: from quizzes to games of skill.
- **Platformer:** Games where the player controls a character (often a publisher's "mascot") who runs and jumps their way across a series of hazardous landscapes to reach the other side of the playfield. This game genre is often viewed in a side-view perspective. A **Metroidvania** is a platformer subgenre that focuses on non-linear progression and exploration.
- **Puzzle:** Games based on logic, observation, and pattern completion. Sometimes they are slow and methodical, other times they require quick hand/eye coordination like an action game.
- **Real Time Strategy:** A strategy game where the action takes place in real-time. Players must quickly respond to the action on screen or suffer the consequences.

- **Rhythm:** A game where the player must use a controller (or their body) to match a rhythm or beat to score points.
- **Rogue-Like:** Named after the 1980 computer game, a rogue-like is a role playing game (RPG) that takes place in a procedurally generated dungeon, often has grid or turn-based gameplay and the players suffer permanent death upon the loss of their character.
- **Serious:** At first glance, serious games seem similar to educational games but with a focus on social issues. But the genre is more diverse than that! Serious games are used to provide job training, advertise products or even to just exist as art!
- **Shooter:** Games that focus primarily on firing projectiles at other players or enemies. There are sub-genres such as SHUMPs (a contraction of “shoot ‘em up”) and “Bullet Hells.” It’s still one of the most popular genres (at least here in the West).
- **Simulation:** Games that focus on creating and managing a world. Or a theme park. Or a farm. Or the life of an adorable monster or a princess. Many simulations cross over into the realm of “toy games”—games that provide tools for creativity but have no rules or win/lose conditions.
- **Sports:** Games based on athletic competitions—from traditional sports to extreme ones. Like action games, there are many stylistic forms with this genre ranging from ultra-realistic simulations to fantasy variants. There is a subgenre of **Sports Management** games where you play as the sports team owner rather than the players.
- **Strategy:** Thinking, planning and executing are the hallmarks of strategy games. This is one of the oldest genres of games: strategy games’ roots are in **ancient games** like Senet, Mancala, Chess and Go.
- **Survival Horror:** Players of this genre are generally helpless against a supernatural threat. Jump scares, stealth, inventory management, and puzzle solving are key components to this genre.
- **Turn-Based:** Where the players take turns between actions. The pace of a turn-based game is slower and allows the player time to think and strategize.
- **Traditional:** These are games based on (but not always) games that existed in other, often physical, formats. Card games, board games and casino games fall into this genre.
- **Vehicle simulation:** Games where players simulate piloting or driving a vehicle, from a race car to a star fighter. There are a variety of stylistic and control options for the player, which can result in a fast-paced arcade-style experience or a slow-paced realistic simulation.
- **Virtual Reality:** Games where players use headsets and special controllers to see and navigate an all-encompassing virtual environment. Many genres of games fit within this genre, but there are special rules and control considerations that need to be made for this genre...as we shall see.

This list is just the tip of the iceberg! In addition to the genres on this list, there are all types of subgenres and **hybrid games**. New genres are constantly being created. For example, 2015's *Crypt of the Necrodancer* combines a rogue-like dungeon crawler with a rhythm game where players can only move or attack to the beat of the music! What's next? What will be the most popular game genre in the future? Who knows? Perhaps you will create it!

Who Makes This Stuff?

Just as there are many genres of games, there are many types of people who make them. Video game creators are known as **developers** or **development teams**. They are similar to a production team that creates a film or a television show—several creative people who are responsible for different parts of the game, all working together to create entertainment.

In the earliest days of video game development, games were created almost solely by individuals—primarily programmers. For example, the original *Prince of Persia* (1989) was created primarily by Jordan Mechner, who programmed, designed, and animated the entire game. He even composed the game's music!

However, not everyone was as talented. As computer's and console's graphic capabilities improved, game creators realized that better looking games sold well and had to keep up. These programmers teamed up with digital artists who could create beautiful art and animation for their games.

Video games were initially designed by whichever team member had the best idea for a game. When game content became too involved for the programmers and artists to deal with, a dedicated design position was created to make the gameplay. Both Mario creator Shigeru Miyamoto and I started as artists who moved into the field of game design. Although team members can wear many different hats, specialization is commonplace on larger production teams.

Nowadays, only the biggest AAA games have large development teams. I'm talking about hundreds of employees—if not more. On the other hand, currently, most game development is being done by smaller indie developer teams. The initial versions of *Minecraft* (2009), *Undertale* (2015), *Stardew Valley* (2016) were each created by one person! Creative teams are no longer reliant on huge budgets and publishing organizations to make and sell games. The power is back in the hands of the developers!

Let's take a look at who makes up a development team.



Programmer

A programmer must be proficient in coding with languages such as C++, Lua, Java, Objective C, and others, depending on the project and the target platform. They create the code that draws the game's graphics and on-screen text. They develop control systems that allow the player to interact with the game. They code the camera systems that allow the player to see the game world. They program physics that affects the player and objects in the world. They write the artificial intelligence (AI) that controls the enemies. They write the scripting to allow designers to manipulate objects in the world...and much, much more!

One programmer may work exclusively on **tools** to help the team members build the game more efficiently. Another programmer may write code to simulate real-world physics to make water act and look realistic. A third could be developing **inverse kinematics** to make a character move and react realistically. Yet another may be working solely on the sound tools needed to play music and effects in the game. Programmers could be working on graphics, or **backend systems** like networking. There are plenty of tasks required to make a game, which is why programmers are usually in such high demand.

Regardless of the position, a programmer needs to have an excellent understanding of mathematics, creating 2D and 3D graphics, know how to code physics, particle systems, user interface displays, artificial intelligence, input devices and computer networking. Programmers can make a good living as contractors, moving from project to project as “hired guns,” writing code and providing solutions to beleaguered development teams.



Artist

In the early days of video games, programmers created all of the game art. Because much of that early art was crude, developers will sometimes call placeholder art “programmer art.” Thank goodness trained artists came along. One of the first artists working in video games was Shigeru Miyamoto, who created Mario, Donkey Kong and Link. He was able to create

these memorable characters on an 8-bit CPU using only 2-bit pixels—that means background elements have four colors and sprites only have three. That’s a lot of personality per pixel!

There were a few exceptions in the early days, such as *Dragon’s Lair* (1983) and *Space Ace* (1983), beautifully animated games created by a team lead by ex-Disney animator Don Bluth. Those games were a rare exception because they needed to be run on laser discs, expensive technology in the early 1980s. Eventually, new, and better hardware with more memory, color depth and the ability to display larger resolution graphics meant that artists could create more detailed characters, images, and backgrounds.

As high-end computer software like Maya and Softimage became more affordable to developers, 3D graphics, which had been limited to the movies like *Tron* (1982) and *Toy Story* (1995) began appearing in games thanks to a deal between graphics tool creator Silicon Graphics and game publisher Nintendo. Eventually other developers followed suit, pushing the limits of what a game could look like.

True 3D graphics have been in video games for a long time, ever since the 1980 arcade game *Battlezone*. The move to bring 3D into homes started on the 3DO game system with games *Crash and Burn* (1993) and *Total Eclipse* (1993). *Wolfenstein 3D* (1993) and *Doom* (1993) allowed players to navigate in 3D space, while *Myst* (1993) and *Donkey Kong Country* (1994) used pre-rendered graphics. The success of these games meant that 3D was here to stay.

At some development studios, art has become a specialized job. A **concept artist** draws what the game characters, environments and enemies look like. These images are translated by **modelers** who create the 3D models of the characters and environments in a computer. **Texture artists** “paint” these models with 2D textures. **Riggers** make it possible for the character models to be moved by **animators**. Visual effects artists create spectacular visual effects using a combination of 2D and 3D art. **User interface (UI) artists** design the icons and elements that communicate important information to the player. **Storyboard artists** illustrate the game’s cinematics and cutscenes and sometimes elements of the gameplay to be passed on to programmers, artists and animators to work from. **Technical artists** help every artist on the team by doing a variety of tasks or sometimes creating tools to help the artist work better. The **art director** supervises all of the work created for the game to make sure it is consistent with the artistic vision of the entire project. Regardless of what kind of art position you are interested in, make sure you study the basics (anatomy, perspective, color theory) and keep drawing!



Designer

Designer, planner, lead designer, senior designer, principal designer—no matter what the job title is, a designer’s role is the same: create the ideas and rules that comprise a game. A game designer needs to possess many skills and must love to play games. As a game designer, you should be able to tell the difference between a good and bad game and, more importantly, communicate why. “Because it sucks” is *never* an acceptable answer.

Within the title of designer, there are many subtitles depending on the task the designer does. **Level designers** create environments that players will navigate. They can start in a variety of ways: paper maps, “gray box” environments; I knew a game designer who would sculpt levels in clay, and designer Hideo Kojima would build his environments out of Legos. We’ll talk more about the term “level” later, but it doesn’t just refer to 3D environments; it can be the environments of an adventure game or a physics-based puzzle game. **System designers** develop how the game’s elements relate to one another, whether it is the game’s economic system or a technology tree. They design the pace of player progression and balance the availability and usefulness of in-game items, ensuring meaningful player choices. **Combat system designers** focus solely on the attacks and interactions of a game’s main character and its enemies. They “balance” the player’s controls and interactions to create the optimal exciting gameplay. A **UI designer** creates the visual layout and functionality of menus, pause screens, as well as the HUD (heads up display) of the main game screen with the intention of clearly communicating the players’ options and abilities. The **creative director** maintains the game’s vision while supervising the other designers, often offering suggestions for improving their work.



There is one other task that a designer is responsible for: ensuring that the game is “fun.” However, I will leave this can of worms unopened until later in the book. I hope you can stand the suspense!

Producer

Overseeing the entire game’s development is the **producer**. Originally, producers were members of the development team who also managed the work of their team members. They had the authority to make all final decisions, including creative ones. A producer’s role on a game has expanded dramatically over the years, in some cases requiring several producer roles on one game. In this case, an **executive producer** is required to oversee the overseers!

A producer's responsibilities include hiring and building the development team, writing contracts, contributing to the game's design, managing the team's work schedule, maintaining good work/life balance, balancing the game's budget, resolving disputes between creative and programming leads, acting as the team representative to upper management and publishers, coordinating the creation of outside resources including art, music and cinematics and arranging testing and localization! It's a lot of responsibility to be a producer!

Producers are usually the first team in a game and the last one off the game's production. More often than not, you will find a producer acting as the public face of the game, talking to the press and public about the game.

Because a producer has so many things to do, often you will find **assistant producers** and **associate producers** helping with the day-to-day tasks. Sometimes, the tasks may seem "trivial" such as ordering dinner for a team that is working late or creating team t-shirts to help create a sense of comradery on the team. Believe it or not, some of those "menial" chores are some of the most important that a producer can provide to a team.

Regardless of how helpful producers can be, some studios consider producers an unnecessary part of development. Others feel that producers should not have any creative control, but just manage the game's production and schedule. As with designers the role and influence of the position of producer varies wildly across the industry.



Tester

Do you like to play games? Do you like to play games over and over and over? Do you like to play the same level over and over and over and over and over and over and over and over and over and over and over and over again? Then testing is for you!

While **testers** work long hours and have to play to a degree that some would classify as mind-numbingly boring; being a tester requires more skills than this description might imply. Good testers have patience, persistence, and great communication skills to report any problems (also known as **bugs**) that they find in a **build** of a game. It's not a glamorous job, but without testers games would be far more "broken." We'd be plagued with games that

crash upon loading, have crappy camera systems or unplayable controls and unfair balance. Let's take a moment to thank the testers of video games.

Quality assurance (or **QA**) is crucial to the successful completion of a game. Publishers hold games to a rigorous quality standard so the game that you buy is (mostly) free of bugs and problems. The standard can be met only by thoroughly testing a game for weeks, if not months. Only after it has passed muster with a QA department, can it be offered for submission or certification with a publisher. Then after the submitted version of the game is approved, it is truly ready to be released to the public. Sometimes, several submissions are needed before a game is ready for release. No one wants to release a buggy game!

Being a tester is a great gateway job for newcomers to the game industry. I have seen testers go on to be great designers, artists, producers and even the heads of studios! You can find out a lot about games in a short time by working first as a tester.



Composer

In the earliest days of video games, game music was nothing more than crude bleeps and bloops to accompany the game's action. Very quickly, technology evolved to allow, for example, audio engineer Yukio Kaneoka to create the memorable tunes of *Donkey Kong* (1981) and *Mario Bros.* (1983).

Music is extremely important to the gaming experience, and it is a **composer** who creates that music. Game music is created digitally and is integrated into the game either by the composer or the programmer. To be a composer, you need a keyboard, microphones, maybe

instruments and, of course, you should know how to play them! You'll need software to create the music; Pro Tools is a popular option. Another useful tool is a sound library that contains a good mix of orchestral and synthesized instruments.

As the sound technology has improved in games, many composers have created "live" and orchestral pieces for games; this requires a whole new set of skills, including conducting an orchestra. It's not just waving a baton around!

For you amateur composers, home versions of modern audio software are powerful enough to mix and master professional sounding samples. If you want to become a composer, you should write some music, record it, and then get it into the hands of a game producer. Or, you could present it on YouTube, TikTok, or some other social media platform for game creators to see.

As someone who has reviewed lots of composer's audio portfolios, I can tell you that the designer has a specific idea for the style or feel of the type of music in their mind. If your music sample matches what the designer wants, they will contact you for the job. What matters most is that your music style is unique and diverse so it will be appealing to game developers and fit a variety of game genres.

Oh, one more note, writing music for games is somewhat different than writing music for movies. Most game themes are either very short or have to repeat over and over again. Being able to compose powerful and exciting music with these limitations in mind will make your music more appealing than someone who just composes "songs." I will cover more about music in a future chapter.



Sound Designer

Unlike the composer who creates music for a game, the **sound designer** creates all of the sound effects (and sometimes the voices) that are used in the game. Go ahead and fire up a game, turn off the sound and try playing it. Do you notice that the game just isn't the same without sound effects? A lot of information is delivered to the player via sound. These audio cues are the sound designer's responsibility to create.

Personally, I think creating sounds is a lot of fun. I've done it for several games I've worked on. Games come to life when sound is added to them. That's why it is important to have placeholder sound effects even when creating your game. Sound design requires a lot of creativity. Mixing and blending sounds to create something no one has ever heard before is pretty cool. However, a good sound designer needs to understand the game they are working on and how to create sounds that help the player.

Some sound effects need to sound "positive" to encourage players that they are doing something correct or have collected something valuable. Other sounds warn the player of danger or that they are about to make a bad move. A sound designer can make a sound effect sound happy, deadly, scary, or valuable—and sometimes all of the above!

If you want to be a sound designer, you need to know how to take direction from game developers who may or may not know what they want, or they have unreasonable or ridiculous requests. For example, they might ask for a "creature that sounds like a phlegmy cougar from hell but make it sound more shriek-y than growly." If you can create that, then congratulations, you are on your way to becoming a video game sound designer!



Narrative Designer/Writer

Unlike in Hollywood where **writers** come up with the initial idea for a movie with a screenplay, in video games, writers are often hired late into the process, which I feel is a mistake. Getting a writer on-board as early as possible just makes sense to me.

A writer or narrative designer does more than just write the story and lore. They need to understand how games work and how games are made in order to contribute to the team. Too often I have seen writers (including big-name ones) who have no idea how to write for games. It's a very different beast than writing for movies or comic books, and not everyone can do it.

Writing for games requires the writer to not just write dialogue, but variations of that dialogue so the player doesn't read or hear the same dialogue over and over again. They need to write "**barks**"—short vocal snippets for when the player completes a task, interacts with an object, responds to a situation in the game or gets injured during battle. Writing a dozen variations of "aarrgh!" is a fun challenge.

They need to write for a variety of forms of communication—a hastily written note is very different from a correspondence letter for example—and they need to be able to write in many different "voices" so that each character sounds unique. In this era of story-driven games, a lot of content needs to be created by the writer, depending on the game. Some games have scripts that run as long as hundreds of pages!

I have encountered many people who want to get into the game industry, and when I ask them what they want to do, they tell me they want to be a narrative designer. They want to write a story! They want to write lore! What I tell them is, if you want to write a narrative, you really need to have a different position on the team—most likely as a game designer or a tester. Any job to get your foot in the door, and when the opportunity comes to write something, you take it.

You see, the need for a writer on a game isn't very consistent. A writer is often brought in late in the process to write a script or to fix or "punch up" what some other team member wrote. This means that you won't be working the entire life cycle of the game's development. This is why many writers are freelance contractors rather than employees of a game company. We'll talk more about all of this and much more in Level 3.

Well, now you know all the different employment opportunities in the video game industry, right? Wrong! People don't generally think of this, but there is an entire second career path in video game publishing.

Community Manager

A community manager is a position that you often find at game studios that make MMOs or other games with large player counts. They interact with the public to find out what they like and don't like about the game. They often help create events with the game designers for the players to experience in the world. They help settle problems that happen within the game world. They are the wielders of the all-mighty ban-hammer! So, stay on their good side!

Have You Thought About Publishing?

Publishers provide the funding for game development teams, manage the game's production, handle any legal issues (like securing IP rights or writing contracts), manufacture physical media, provide promotions at trade shows and handle public relations and marketing for the game. They even distribute the finished game via streaming or at brick-and-mortar stores. The following sections describe some of the more common positions found at a game publisher.

Product Manager

Much like game producers, **product managers** work with the development team and manage them based upon an agreed production schedule. They help determine production priorities, act as an intermediary between the studio and the publisher, manage contracts and other issues from the publisher's legal department, review and approve milestones, and make payments to the studio. They talk to licensors to ensure that they approve of how the game is turning out. They work with the ESRB to secure a rating for the game. Needless to say, they're pretty busy people.

Creative Manager

When people ask me what I did as a **creative manager** at THQ, I tell them "I had the job that people think of when they think of someone working in video games." Working as a creative manager wasn't just "thinking up games and playing games all day," but sometimes it was.

Creative managers are usually game designers who, after being worn down by the long hours of game development, seek more stable employment with publishers. I kid. I kid. Like a product manager's involvement with a game developer, a creative manager's involvement on the game can vary from developer to developer. In some cases, I flew to the developer (usually in another country) and helped them design their game from the ground up while I just left others to their own devices; played their builds and gave them occasional feedback. Mostly, my job was to do this...give a developer feedback, keep them true to the game's core idea, and make sure that their game was "fun" (there's that word again!)

The best benefit that a creative manager can provide is what I call the “**thousand-foot view**” (as if I were looking down on the game from a thousand feet in the air, not looking at thousands of feet!)—an unbiased viewpoint on a game that can help root out weaknesses in the game design and execution. When games aren’t “solid,” it was my job to provide the team clear feedback on how the gameplay can be improved or to give advice on how the team can explore another creative direction.

Creative managers may also work with the marketing or public relations teams to provide marketing or press materials to make sure the game is shown in the very best light. Often, it was me playing those games that you saw videos of online or on giant monitors at E3. I won’t tell you how many times I wrote what was on the backs of game boxes while I was at THQ!

Art Director

An **art director** is similar to a creative manager but deals only with the game’s art. Art directors can help a team create a visual style for the game and take it in directions that the team hadn’t previously considered. An art director can even create examples to help the team understand what a licensor or publisher wants. Art directors often also work with the marketing teams to create packaging materials (such as the cover of a game’s case) or wrangle or create assets like screenshots and concept art that is used to publicize the game.

Technical Director

Technical directors come from a programming background. They review and recommend tools and software to game development teams to help them create their games more efficiently or to solve a problem they were wrestling with. They provide technical support and advice when there are deficiencies in the team’s programming staff. They also perform **due diligence** on a new team to help assess whether they can make the game they are being hired to make.

Marketing Team

The marketing team promotes the game to the world. They work with magazines (the few that are left), websites, YouTubers, and other influencers to promote the game. They help design packaging materials (when applicable) and write copies for the back of the box—when they aren’t having the creative manager doing it for them. They work with advertising firms to create promotional material or even create stunts and events for trade shows. Those t-shirts have to come from somewhere!

When working with a marketing team, make sure that someone on the team plays your game (sadly, I’ve found that many marketing teams don’t play your game! It happens more often than you’d think). They need to understand what’s great about your game so they can market and sell it in the best way.

And the Rest...

Other publishing positions aren't directly involved in making games but are important in creating and selling a game, nonetheless. **Business development** staff build relationships with studios, hold game pitch meetings, and review prospective game demos. They make deals with external studios and find emerging studios to acquire or partner up with. If you ever own your own game development studio, you will eventually meet a lot of business developers. A **lawyer** negotiates all the contracts and makes sure the production team isn't creating content that will get the publisher into any legal trouble, such as copyright infringement.

A **brand manager** creates a marketing strategy to promote and advertise a game. This person works with internal or external marketing teams to develop print materials such as case covers, billboards or magazine materials. A **public relations manager** talks to influencers and the public and organizes press events to show off the game in the best light. A **quality assurance manager** runs the **game testing department** (also known as the QA department) organizing play sessions and relaying bugs back to the developer.

In addition to production and publishing staff, many others interact with development teams and publishers. A **talent recruiter** searches for new (and old!) talent and helps them get employment. **Game reviewers** and **influencers** play games before they come out and create videos and other content for gamers to read and watch, helping form an opinion of the game and building hype before it comes out. **Licensors** work for major entertainment companies and make sure their brands are properly represented in the games based on their IP.

As you can see, there are plenty of options if you want a career in games. But, I say forget all of those other jobs. You want to find out how to make great game designs, right? Trust me, game design is where the real fun is!

But to make great games, you need great ideas. Where do you get them? Let's find out!

Level 1's Universal Truths and Clever Ideas

- A game has rules, gameplay, and a win/lose condition.
- Your game objective should be simple.
- Game genres come in all shapes and sizes. Don't be afraid to mix and match.
- Gaming technology is always evolving. Adapt or get left behind.
- It takes all kinds of people with all kinds of skills to make video games.

