



# 01: Design Theory

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# History

## The beginning of gameplay

Mankind has been playing games since historical records began. One of the earliest known is an ancient Egyptian game called Senet, which archeological evidence dates to as early as 3500BC. The Royal Game of Ur was also played in ancient Egypt. Two game boards were found by Sir Leonard Woolley in the 1920s while he was investigating the ancient city of Ur. These have been dated to 2600BC.

### ◀ ▶ **Simplicity**

Go and chess both have deceptively simple components—black and white pieces on a squared board—but they are games of many complex strategies. Go is at least 4,000 years old, and chess over 1,000 years old.



### ◀ **Ancient games**

Wall paintings show ancient Egyptians playing strategy games 3,000 years ago.

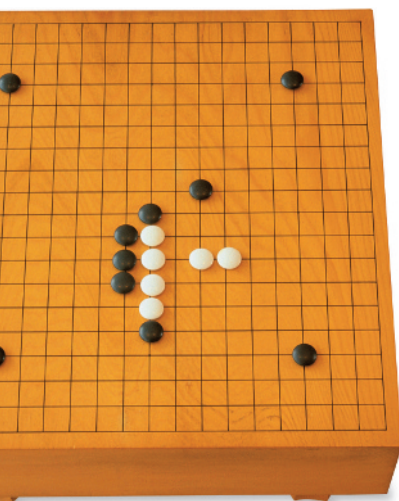
### ▶ **Unchanging**

Backgammon and mah-jongg have been played the same way for hundreds of years.

Ancient games are still relevant—they demonstrate that throughout history mankind has been developing recreational activities, or games, which have a set of commonly agreed ways to act in order to achieve an outcome, usually with a winner and a loser. The nature of gameplay was investigated by Johan Huizinga in his seminal work *Homo Ludens* (“man as player”) in 1938. He defined play and the playing of games as follows:

*“Play is a voluntary activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding, having its aim in itself and accompanied by a feeling of tension, joy, and the consciousness that it is ‘different’ from ‘ordinary life’.”*

This root definition of gameplay encompasses whatever game is being played, from chess to the latest digital game.





## Game mechanics

What many people refer to as “rules” are what game designers call “game mechanics.” These are the roots of gameplay and form a system by which a game is progressed.

For example—rolling a die in Snakes and Ladders causes a random outcome and determines the length of a player’s move, while in checkers leaping your piece over an opponent’s removes it from play. Most games are made up of a series of related and complementary mechanics. Often, it is the mechanics which define a game, and they may be the main factor in a computer game’s success. Here are some common examples of game mechanics:

### Luck

This is random chance, an outcome that the player has no control over; often represented by a roll of a die or the draw of a card. This mechanic is often used for movement or conflict resolution within a game.

### Strategy

This is almost the exact opposite of luck. A player’s ability to plan turns and moves within a game determines the outcome.



### Diplomacy

This refers to how players interact—do they collaborate and help each other? At what point should they stop helping and act selfishly?

### Resource management

A mechanic in a game may give a player a certain amount of assets, which must be used carefully if he is to succeed.

A player who spends them too quickly may be unable to act later. Hoarding them too long might cause a player to miss his chance.

### Territory control

Control of the gamespace is often important. A player should protect and develop the area he owns while seeking to deny his opponent the opportunity to do the same.

### Random outcome

Dice are used in games to generate a random outcome; to determine a player’s move, for example.

### Figurative pieces

In contrast to the simple, stylized counters and tokens used in ancient board games, many modern games have figurative playing pieces. Their form may give an indication of their powers.

## Goals and rewards

A crucial aspect of a game is that it has a definite goal, and reaching this usually allows an individual to win. Goals can include eliminating the other player(s) from the game, achieving an identified target (for example by amassing a number of points), winning a race, or collecting a certain type of token.

Achieving the goal—winning—can be its own reward. A player may have defeated his opponent through his superior game-playing skill or he may simply have been lucky with random factors.

Many modern games, digital and non-digital, do not rely on winning as the sole reward but are designed so that all of the players can derive some enjoyment from the process of playing the game. This is an important factor to remember. The players of your game will all want a challenging and enjoyable experience no matter what the outcome.

## Universal characteristics

The examples on these pages show that playing games is an inherent and integrated aspect of many cultures. Many aspects of game playing connect with people’s desire for entertainment, challenge, and reward. It might seem odd for a book on digital games to start with a discussion of ancient board games but the understanding of gameplay, game mechanics, and game rewards begins with the consideration of our game-playing heritage.



# Non-digital games

Board games, card games, and role-playing games

In spite of continuing technological advances, games that do not require a computer to play them—including traditional board games, card games, and role-playing games—are just as popular today as they ever were. As an aspiring games designer, you should be familiar with these games as they can be an invaluable source of inspiration. Many of the characteristics and mechanics found in these games translate into computer games.

## Board games

Games played on a specially designed board can cover a whole range of themes, from abstract examples, such as Chess and Go, to simulation-style games like Risk and Monopoly. Board games are often viewed as light-hearted family entertainment, and generally do not require a huge time investment. One of the main differences between board games (whatever their subject matter) is whether player

### Simulation

Monopoly and Risk are simplified simulations of real-life situations. As in life, players depend on a combination of strategy and luck to succeed.



success is based on luck or ability to think strategically. Games that depend heavily on luck (based around mechanics such as dice-rolling or card-drawing) leave the player little scope in their gameplay beyond accepting random chances. Examples include Snakes and Ladders and Sorry!. Games which rely more on a player's strategic ability, without any random occurrences, are often considered more satisfying, as it is your ability as a player which decides the outcome. Games such as Icehouse and Carcassonne have few random factors and rely chiefly on the player's skill.





Many innovative, modern board games have emerged from Europe, and particularly Germany. Games such as The Settlers of Catan, Carcassonne, and Citadels all share similar traits. They each have a simple set of rules combined with an ingenious game mechanic. These make them simple to learn, but leave a wide range of strategic options for the players. They have a relatively short length of play and are intended to generate social interaction among the players; they are certainly held in high regard amongst keen board-gamers as extremely enjoyable games.

### Card games

Adding to the myriad of traditional card games, 1993 saw the introduction of a new card game called Magic: The Gathering, by Wizards of the Coast. This signified a completely new genre of game. Players collect cards which represent magical creatures, spells, and fantastic items. Taking on the game role of a wizard they then “duel” to see who the victor is. Though this game uses many familiar terms and conceits from fantasy role-playing it is a completely different style of game. An important marketing aspect of this game is that players must buy random cards to play it. In each new publication of Magic: The Gathering, Wizards of the Coast purposely make some cards rarer than others. This means that particular cards accrue a very high real-world value, due to their power in the game and their physical scarcity in the real world.

Magic: The Gathering spawned the term “collectible card game” (CCG). Since the launch of Magic: The Gathering there have been many releases of CCGs, covering themes from horror to NFL; the enthusiasm for this style of game seems to endure.

### Chance

Winning at Snakes and Ladders is entirely the result of luck.



### Strategy

Players of Carcassonne must use strategy to deploy their pieces, in order to score highly and win. There is an element of luck but it is generally not possible to succeed by depending on luck alone. The basic game has been extended by later editions.







### Game cards

Players of Magic: the Gathering buy cards in sealed packets, ensuring a random selection.

### Role-playing

Dungeons and Dragons was created by Gary Gygax and Dave Arneson. The game was first produced in 1974 and was the result of the development of the Chainmail rule system which was essentially a medieval miniatures war-game. Influenced by a wealth of fantasy literature, the writers took this medieval world and introduced elements of fantasy such as magic and monsters. The nature of the game was innovative too. As a player you took on the role of an adventurer, as did the people you were playing with. The game was organized by a Dungeon Master who controlled and delivered the story that was your adventure. Much of the game action took place in the players' imaginations as the Dungeon



### Fighting power

The creature's power number shows how strong it is in battle. The players fight their "duels" on a tabletop with their cards laid out in formation.



### CCG elements

Duel Masters is a collectible card game, or CCG, in the same vein as Magic: the Gathering and many other imitators which feature common elements.

### Character stats

The text box gives details of the special rules and abilities associated with the character, for example, its attacking style. There may be additional information here that isn't strictly needed for gameplay, but adds interest.



### Creature info

The creature's name and type is displayed at the top of the card. It costs six "manas" to bring this particular being into battle.

Master described magical worlds and terrible foes to the players. The players' responses dictated what happened next in the game. As your character survived the perils presented to you in your quests, you gained experience and equipment in order to improve your skills and reach new levels of power. Dungeons and Dragons spawned a whole industry of role-playing games; nearly every genre is now represented by a role-playing game—science fiction, horror, Wild West, superhero. What is important about Dungeons and Dragons is that it gave rise to the game concept of role-playing; where you, the player, take on the persona of a character and experience the make-believe world set by the game designer through that character's eyes. The game mechanics and terminology developed for use in these early role-playing games are still influencing role-playing computer games today.

### Must-play board/card games:

- Chess
- Go
- Risk
- Monopoly
- Icehouse
- Carcassonne
- Magic: The Gathering
- Duel Masters
- Dungeons and Dragons

### Tabletop war games

This refers to those games usually played on a large playing surface (the tabletop!) with miniature figures. One of the first people to write rules for such activities was H.G. Wells, who wrote *Little Wars* in 1913. This is generally held to be the first war game and provided rules for battles concerning movement, combat, and terrain. As with Dungeons and Dragons, rules for miniature battles have proliferated and it is now possible to battle in almost any historical period, real or imagined. Unlike role-playing games, tabletop war games concern themselves with large groups of figures that usually represent whole armies at war. Results of combat are resolved randomly with dice and players' consideration of massive-scale effects such as troop morale and terrain have a great deal of influence on the outcome of the game.

One of the most commercially successful war games is Games Workshop's Warhammer range. Warhammer is set in a pseudo-medieval fantasy world where armies clash for control of the land. Games Workshop also produces a science-fiction war game called Warhammer 40000. This game sees similar races fighting in the distant future with a variety of high-tech weaponry. An important part of this hobby is the collection and painting of miniature figures. While this is not integral to playing the game it is obvious from the players' commitment and efforts that the intricate painting of the figures is considered a central attraction of the hobby. Besides Games Workshop there are many other miniatures companies with equally exciting, innovative, and diverse rules systems and miniatures.

As with paper-and-pencil role-playing games, these tabletop games are the forerunners of the real-time strategy games now available on PCs. Concepts and mechanics from the physical versions of these games form the basis of many of the mechanics on-screen.



### Tabletop to PC

Warhammer 40,000: Dawn of War is an example of a tabletop war game that has made the jump to being a real-time strategy game for the PC platform.



# Shoot-'em-ups

## Maximum destruction

Shoot-'em-ups are also known as shmups and, as the name suggests, involve shooting things up—a lot. A typical shmup has the player controlling a spaceship with a quick-firing weapon. Enemies attack the player's ship and the objective is usually to destroy them as quickly as possible.

The first shmup was Spacewar!, created in 1962. It ran on a DEC PDP-1—an early computer system—and was created by Stephen “Slug” Russell at MIT. This was not only the first shmup, it was also arguably the first ever computer game.

Space Invaders, released in 1978, was the game that really captured the public's imagination. It was undoubtedly the first mass-market computer game and it was also a shmup. Created by Toshihiro Nishikado, it had simple, intuitive controls—move left, move right, and shoot—a simple, pressing objective, and a clearly laid-out presentation. Space Invaders incorporated many unprecedented features as well as features combined for the first time: waves of enemies; bonuses for shooting more difficult-to-hit enemies; increasing difficulty; destructible shields; a high-score table; a three-lives system; and well thought-out audio design.



### New features

Space Invaders appears primitive by modern standards, but at the time of its release it combined many innovative features.

### Innovations

The scrolling playfield of Defender pushed the shmup genre forward. It was later updated in 3D for the PS2 (far right).

### Commercial success

Space Invaders not only pushed the design of computer games forward, it also made hundreds of millions of dollars in arcades. At the time, arcades were the only places computer games could be played, costing players a small amount of money for each game. The incredible commercial success of Space Invaders suddenly marked computer games as a viable business opportunity, and new companies sprang up very quickly, attempting to copy its money-making formula. Space Invaders was also instrumental in launching the first home console system, the Atari 2600, as many people bought it simply so they could play Space Invaders at home.

### Genre developments

Elements of Space Invaders were copied, refined, and mutated in the games that followed. This led to all sorts of innovations, many of which were made possible only by more powerful hardware becoming available. Galaxian (1979) introduced multicolored aliens which swooped down to attack the player. Defender (1980) introduced a horde of new ideas such as a playfield which wrapped around horizontally, incredible use of sound, smart bombs,

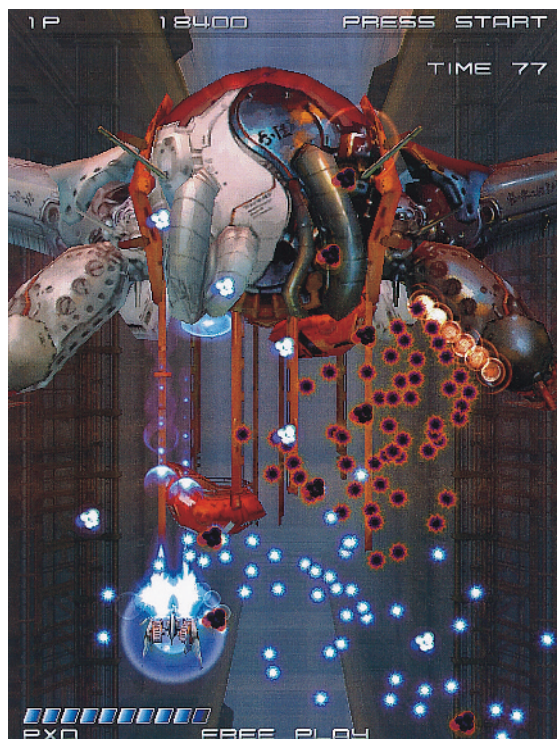
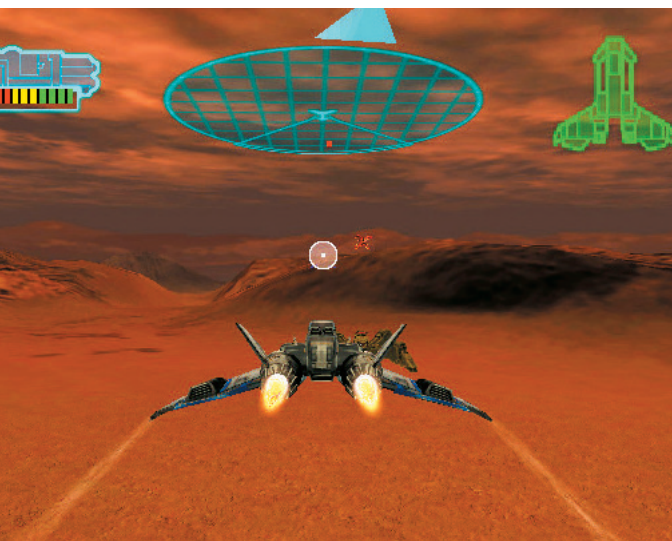


different alien types, and humans to protect. Defender's control system was also unusual in that the joystick was used to move the player's ship up and down while a button thrust the ship in the direction it was facing, and another button switched the ship's direction. Three other buttons were used to shoot, hyperspace, and fire smart bombs. Other innovations such as vertical scrolling, multiple weapons, and power-ups all progressed the shmup genre.

### New twists

Much later, in 1987, R-Type arrived. R-Type was a horizontal scrolling shmup which brought level design into the mix of ideas. R-Type built on many of the advances of its predecessors, but provided an entirely different playing experience. Its designers set out patterns of enemies and terrain so that there was an optimal way to get through each level. The way through had to be learned by trial and error, though much of it could be found with quick thinking. This added a tremendous challenge to the game. The innovation was backed up by a wonderful art style and a great range of weapons, enemies, and bosses.

Ikaruga was originally released in 2001, and was developed by Treasure Co. Ltd, well-known for creating very dense, well-crafted games with unique mechanics. Ikaruga was no exception in that it added an entirely new spin on the old shmup standards.



### Must-play shmups:

- Asteroids (Atari)
- Galaxian (Namco)
- Scramble (Konami)
- Robotron 2084 (Williams Electronics)
- Xevious (Namco)
- Gradius (Konami)
- R-Type (Irem/Nintendo)
- Ikaruga (Treasure, G.rev)
- TUMIKI Fighters (ABA Games/Kenta Cho)
- Geometry Wars (Bizarre Creations)

### Evolution

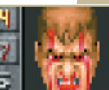
Ikaruga is renowned for its stunning visuals and demanding action, requiring rapid reactions.

The player's ship in Ikaruga could flip between two polarities (black/white) and the enemies and their weapons fired in one of these two polarities. The player's ship could absorb energy by switching to the color of the bullets and colliding with them, but different-colored shots killed the player's ship instantly. The absorbed energy could be used to fire a more powerful weapon capable of destroying many of the enemies on the screen. Ikaruga also had a chaining system which accumulated points faster if more enemies of the same polarity were killed consecutively. Ikaruga was notable for how tough it was to beat. To hardcore shmup fans this became the game to beat.

Developer Kenta Cho deserves a mention as he has made some unique and interesting shmups, completely independently—with no external financing, help, or distribution. He has excited the indie games scene with freeware games such as TUMIKI Fighters and Gunroar. Kenta Cho is the designer, programmer, and artist for all of his creations.







# First-person shooter



Kill or be killed

Probably the most recognized genre of computer games, the first-person shooter (FPS) is so called because the view you are given is as if you were seeing through a character's eyes. The first game to cement FPS games as a distinct genre was id Software's *Wolfenstein 3D*. *Wolfenstein* appears crude by today's standards but it set in motion a massive area of gaming.

Hot on the heels of *Wolfenstein* was the famous *Doom* which has seen many sequels and has been adapted into a film. *Doom* pitched the player as an unnamed marine in the near future based upon Mars. An experiment in teleportation has gone wrong and now the hordes of hell and zombies stalk the player.

*Doom* had improved graphics and more complex maps but the kill-or-be-killed gameplay remained the same. One of the new features of *Doom* was that you could play against other human players over a computer network in specially made levels called arenas. This gave rise to what is now known as a deathmatch. When a player is killed in a multiplayer game he usually returns to the game (called "respawning") after a short interval, while the player who dispatched the other player gets a score for his "kill." *Doom* enabled the players to create their own maps and levels (known as WAD files) through applications of level editors. Literally tens of thousands of user-made *Doom* maps were

## Graphic hit

By pushing early PCs to their graphic limits, *Wolfenstein 3D* became a smash hit.

## Sophistication

*Doom* built on *Wolfenstein*'s success, and as well as being more visually sophisticated, gave the player an exciting array of enemies and weaponry to dispatch them with.



constructed and made available over the internet. This spawned what has now become known as "modding" (or producing modifications for games). Many developers of FPS games now release the game-editing programs as a matter of course and it is seen as a good way of prolonging the life of a game by keeping up interest via user-generated material. Valve Software actively makes the best user-generated mods available through its web-based Steam portal.



## Status bar

The animated face can become wounded and distressed, indicating the player character's health.



### Must-play FPS games:

- Doom (id Software)
- Quake (id Software)
- Half Life (Valve Software)
- Return to Castle Wolfenstein (id Software)
- Marathon (Bungie)
- GoldenEye 007 (Rareware)
- Battlefield 1942 (EA Games)
- Thief (Looking Glass Studios)
- Rainbow Six (Red Storm)
- Max Payne (Remedy)
- XIII (Ubisoft)

#### Fully 3D

In Quake, characters and environments were both rendered in three dimensions. Enemies were complex 3D models with a certain amount of artificial intelligence. The gameplay was fast and furious, with a variety of moves available to the player. Play could be single- or multiplayer.

#### In-game data

Marathon provided a comprehensive in-game data panel, showing the weapon used and remaining ammunition. It also had a strong, distinct style, with some truly alien enemies.



### Increasing complexity

Once the idea had been developed there followed a rush of FPS games to meet the demands of players. A notable development was Bungie's Marathon. It did not receive as much attention as other games because initially it was available only on Macintosh computers. But it was one of the first FPS games to have a complex story. You played a security officer sent to the colony ship U.E.S.C. Marathon, orbiting a colony on the planet Tau Ceti IV, in response to a distress call. The game required you to defeat aliens and defend the colonists. The story unfolded through frequent use of computer terminals which told of events via the viewpoint of the ship's artificial intelligence (AI) computers. There were two sequels to Marathon and it also saw the release of a level editor and the incorporation of multiple-player games. Bungie went on to develop one of the Xbox's trademark games, Halo.





## Key first-person shooter games

The following details of FPS games and their developers provide an overview of some of the pivotal innovations in the field.

### 1 Halo: Combat Evolved

The player's damage-absorbing shield is shown by the blue bar at top right.

### 2 Half Life

Pulling the pin out of a grenade in order to blast through an obstacle.



### GoldenEye 007 (Rareware)

One of the earliest FPS games on a console, the Nintendo 64. The widespread critical acclaim for this game means that it is still cited as one of the best FPS games to this day.

### Star Wars Jedi Knight: Dark Forces 2 (Lucas Arts)

The beginning of film franchises being adapted to FPS games allowed players to experience other aspects of the Star Wars universe.

### Thief (Looking Glass Studios)

The player played a thief in a world that was a cross between the Middle Ages and the Victorian era. This game is notable because the player had to sneak and be stealthy to succeed.

### Rainbow Six (Red Storm Entertainment)

This modern SWAT/military game was based upon the popular Tom Clancy novels. It saw the inclusion of squad-based tactics with non-player character helpers and a mission-success requirement much like the "real-world" scenarios it was meant to imitate.

### Half Life (Valve Software)

This is one of the most famous FPS games, encompassing story, combat, and adventure in one package. The sequels to this game continue to be extremely popular and the modding community surrounding this game is massive.

### Max Payne (Remedy Entertainment)

The player takes on the role of a New York cop cast into a murky world of crime and deception. This game is of note because of its use of a game mechanic referred to as "bullet time." The player could elect to slow the action down, enough to see the passage of a bullet, while making his actions and reactions in real time. This enabled the player to make complex acrobatic maneuvers in combat, as seen in movies such as *The Matrix*. The game also occasionally switched the camera to a cinematic mode, panning around a victim to show their end in grisly cinematic style.

### Deus Ex (Ion Storm)

This science-fiction game had a great deal of

role-playing and story as well as action and adventure. Game critics praised this game highly and it is still held to be one of the benchmarks of the genre.

### Halo: Combat Evolved (Bungie)

This was one of the landmark games for the Xbox and continues to be so with its sequels. The introduction of vehicle use and cinematic techniques make this game notable.

### Battlefield 1942 (Digital Illusions CE)

This saw a large-scale rendition of World War 2 battles where the player could use nearly anything and drive, fly, or sail any vehicle. It could be played as a single-player game (versus the machine) or as a multiplayer game where large numbers of people could perform different roles on opposing forces.

### XIII (Ubisoft)

The unique feature of this game—a modern-day spy FPS game based on a cult Belgian comic—is that it is rendered in a comic or cel-shaded style, with the action often occurring in comic-style panels.

**GAMEOGRAPHY****Title** Max Payne**Developer** Remedy  
Entertainment**Key features**

- Lavish, stylish visuals
- Cinematic movement
- Mayhem opportunities



A notable benchmark in the early history of FPS games is Quake, produced by id Software. This was the first first-person character game to be made in true 3D, with characters as well as environments being rendered in 3D. The basic game engine of Quake went on to be licensed to other companies to make their own games, which became successful in their own right. The popularity of Quake continues, with new versions of the game being released.

**Influencing violence?**

As FPS games became ever more realistic, a debate raged about whether these games caused people to be violent in real life. Public figures and psychologists claimed that playing these violent games desensitized people and made them more liable to engage in real acts of violence. Other prominent figures produced equally compelling evidence that these games did nothing of the sort. This is a highly complex argument which cannot be fully explored or resolved here. Of note, though, is the fact that games started to come with an age rating, similar to films, which indicated their content and themes.

**The future**

There is a long lineage of FPS games and this list barely begins to catalog them. The FPS genre can certainly claim to be one of the most popular areas of gaming and shows no sign of letting up, with many different game mechanics and story settings being used and developed. The increased ability of modern gaming machines to provide better visuals and better NPC interaction through artificial intelligence routines means that this aspect of gaming is rapidly approaching a cinematic ideal.



# Platform games

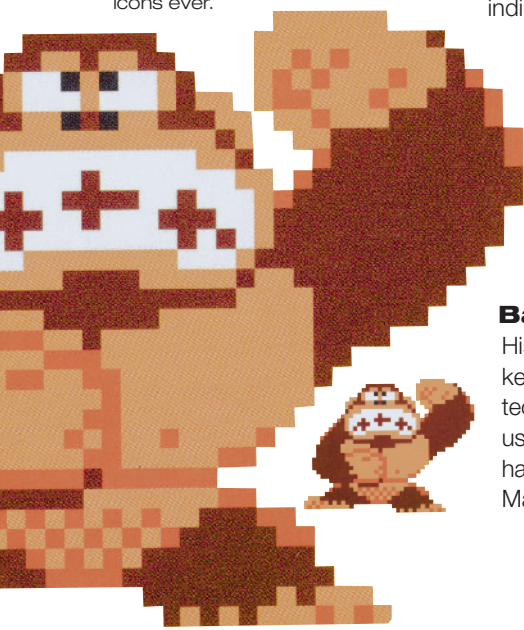
## Hazardous gameworlds

The platform game is one of the most enduring and influential genres of computer games. From Donkey Kong to Sonic the Hedgehog, the scope and sophistication of the platform game genre has evolved with every hardware innovation.

Many games not actually considered to be platform games feature large sections of gameplay that borrow heavily from the traditions of the platform game genre. The term “platform game” usually conjures up the image of a cute (often animal) “mascot” character—think Sonic, Mario, or Yoshi—jumping around an eye-bleedingly vibrant environment, dodging an array of deadly obstacles.

### Icons

Though they are simple in form, Donkey Kong and Sonic the Hedgehog have become two of the most emblematic game icons ever.



The core elements that make up a platform game are: an engaging player character; a story involving the theft of something sacred to the player character by an evil dictator; a protracted quest to return the player character's universe to normality; and a world so fraught with danger it's a wonder it had any indigenous life in the first place.

This standard setup has become a cliché in platform games, which may explain the reason for the genre's decline in popularity in the last few years. However, the history of computer games would be incomplete without some of the pivotal titles from the platform game genre.

### Basic concepts

Historically, the platform game has been the key genre that pushed computer game technology. While the first platform games used a static single screen that the player had to complete to progress (Donkey Kong, Manic Miner), they introduced the concept of



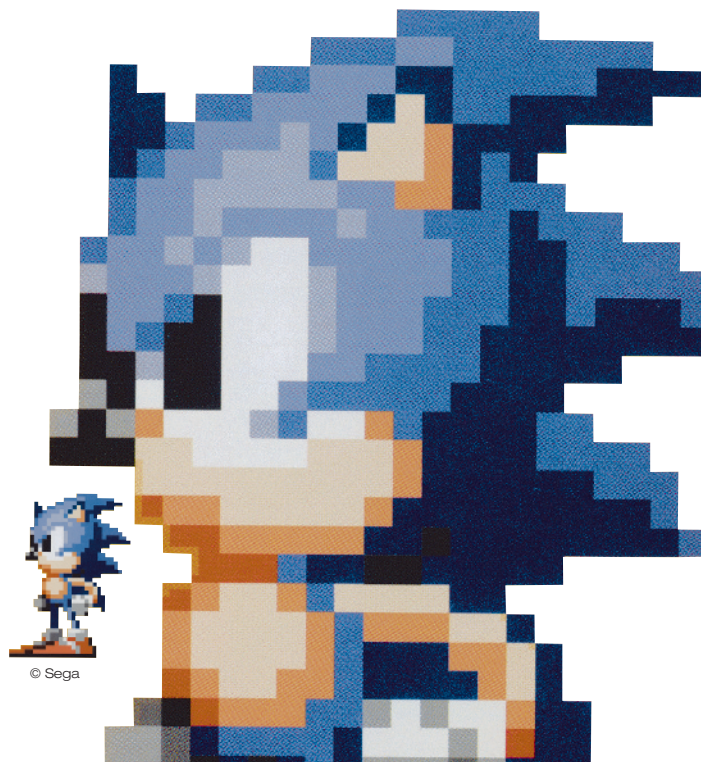
### Enemy ape

Donkey Kong was not always a hero; originally he was a giant ape who had kidnapped Mario's girlfriend, and rolled barrels to hinder her rescue.

the “jump” to gameplay.

Activision's Pitfall extended this concept with multiple static screens linked together, creating the linear concept of progressing left to right (or right to left) through a level to complete a goal.

Super Mario Brothers added a scrolling environment, power-ups, and coin-collection. Sonic added speed and graphical sophistication, while Super Mario World and Yoshi's Island progressed platform game design by adding sophisticated environmental puzzle solving.





© Sega



### 3D games

Many platform games, such as Sonic (far left), made the transition to 3D. New characters emerged, such as Jak & Daxter (left).

### Must-play platform games:

- Super Mario World (Nintendo)
- Sonic the Hedgehog (Sega)
- Yoshi's Island (Nintendo)
- Crash Bandicoot (Naughty Dog)
- Super Mario 64 (Nintendo)
- Jak and Daxter (Naughty Dog)
- Super Mario Sunshine (Nintendo)

### Into the 3D world

With the move toward 3D and the launch of the Sony Playstation, Sega Saturn, and Nintendo 64, the race was on to translate the platform game genre into a fully 3D game experience.

Platform games in their purest form work best in 2D because the side-on perspective allows the player a wide, fixed view to assess the challenges ahead. In 3D the camera has a limited view and its position can rarely be predicted.

When Naughty Dog created Crash Bandicoot (launched in 1996), they solved this issue by creating what was effectively a 2D game, projected in 3D. In Crash Bandicoot the player is simply running "into" the screen in the same way that Mario runs from left to right. The camera is fixed on a path, allowing the designers the luxury of knowing exactly what was visible on screen at any one time.

The simplicity and familiarity of this concept helped soften the impact of 3D platform gaming to an audience new to the world of polygons.

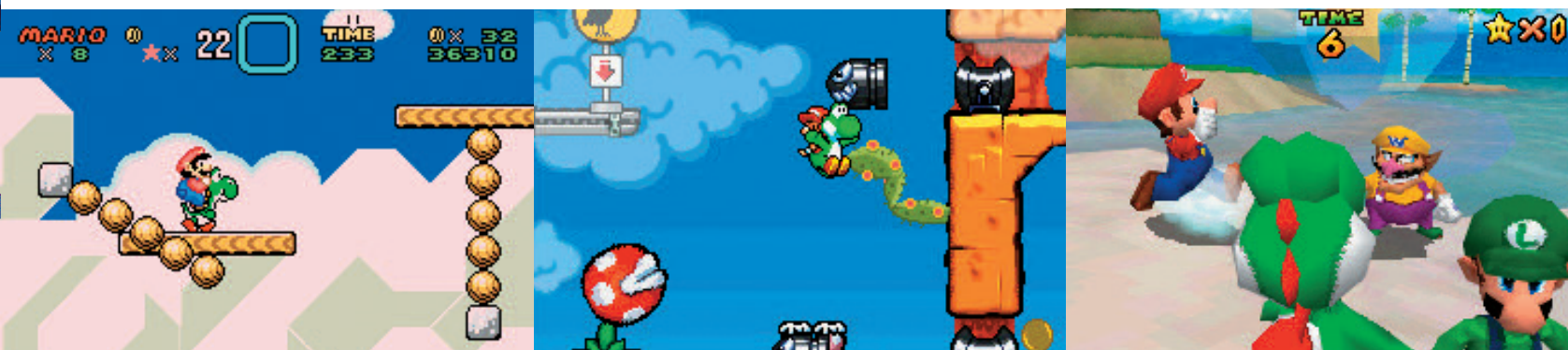
Sega took a different route with its first 3D platform game, Clockwork Knight. This game was essentially a 2D platform game, but the environments were made of polygons.

With the arrival of Mario 64 on the Nintendo 64 the genre was successfully re-visioned from a 2D world into a fully explorable 3D world. Progress came with the introduction of the analog stick on the N64 controller. This allowed the player a sophisticated level of control that was missing in earlier offerings.

The platform genre has lately declined in popularity, but it was these games that sold consoles and made companies. People bought an NES for Super Mario Bros, a Genesis/Megadrive for Sonic, or a Super Nintendo for Super Mario World. Lessons learned from key platform game titles are even now incorporated into the all-encompassing "action game." Pure action such as Sony's God of War, Ubisoft's Prince of Persia, and Capcom's Devil May Cry™ owe a lot to a certain charismatic Italian plumber.

### Changing Mario

The development of Mario, both visually and in game sophistication, can be traced from his early days in arcade booths.





# Strategy games

The gameworld in your hands

Strategy games usually place the player in command of a large number of characters and resources. To succeed, the player has to manage: the collection and consumption of resources; the development of the skills of the population, their acquisition of technology and their general disposition; the amount of control within the game, and to try to increase it; to resist the actions of the opponent AI or another player trying to do the same with their faction. Sometimes these games are turn-based but they usually happen concurrently, hence the name real-time strategy (RTS) games.

## Economics

An important factor in the success of a civilization is how prosperous it is. In Civilization, this information is presented as a simple balance sheet.



## Customization

Civilization allows much visual customization at the outset, for example of characters, as shown here.



## DOMESTIC ADVISOR

Income from cities : +25 Income from other civs : + 5 Interest income : + 2	<b>Income : +32</b>	-8 : Corruption -5 : Maintenance -2 : Unit costs -3 : Payments to other civs
	<b>Expenses : -18</b>	
	<b>TOTAL : +14</b>	Treasury is Growing



Your sparkling Civilization is home to Mr. Clean. Perhaps we should start a line of household cleaners?

Cities							Population	Producing
Rome	6.3	6.3	3	6	3	3		
Montreal	4.2	4.2	2	4	2	7		
Guam	3.3	3.3	6	5	6	3		
Kerplakistan	1.3	1.3	3	9	3	7		
Stalingrad	12.9	12.9	12	8	12	12		
Seattle	8.9	8.9	6	2	6	2		

## World view

An overview of part of a Civilization world shows settlements, with resource and opponent data in the menu bars.

## Managing resources

In a resource-management game such as Civilization, detailed data concerning resources and disposition is critical to the game.

Players can win Civilization in different ways. They may conquer rival civilizations, or win a cultural or technological victory. The comparative status of these aspects can be assessed during the game.



### ◀ Familiar world

The Sims live in a world that reflects our own, with all the opportunities and pitfalls of modern life.

Strategy games can draw a direct lineage from tabletop games such as board games and war games with lead figures. But with computers to provide virtual playing pieces and opponents they have now become an established computer game genre. They fall into two broad camps—building games where the collection of resources and development of position is paramount, and military games which focus on single battles or engagements and depend less on development and more on strategy with the given material and men at hand.

### God's eye view

Strategy games provide the player with a “god's eye view”—he can see the whole playing world and move around it or zoom into specific parts as he sees fit. The ability to move quickly around the map and identify troublespots is a vital part of the game.

Within the game the player will have people to be looked after, nurtured, and developed in order to succeed. There will also be resources such as food, materials, or strategic locations. Using the people under their command the player can harvest the food and exploit the resources to feed his people and provide them with the raw materials they need.

### Technology tree

A common feature of RTS games is a series of stages of progression which the player will have to move through in a set order to get better equipment and skills for his people. This is commonly referred to as a technology (tech) tree. For example, a player of a historical game will have to pass through a level of bronze-working technology before he can start working with iron. Within some RTS games, tech trees ask the player to make choices, excluding possible paths of development. This forces the player to make the best of what the game provides them with, often referred to as an “optimization exercise.”

### ▶ Growth strategy

Sim City requires the player to care for the inhabitants of a modern city, and to make it prosper and grow.

### ▼ Managing lives

A Sim is one of the simulated humans in The Sims. The player manages the Sims' lives, to help them achieve success.



### Fog of war

Opposing forces may come into contact and will inevitably try to assimilate or destroy their opponents. The side with the best technology or larger population usually wins. As a rule, the player cannot “see” the section of the playfield where the opponents are until he has sent a player unit there. This mechanic is termed “fog of war,” after the real-world military phrase referring to the smoke-haze on a battlefield which can obscure views.

### Civilization

Sid Meier's Civilization series of games (Firaxis Games) are probably among the best-known games in the strategy genre. Within these games players take on the management of a primitive people and attempt to raise their civilization up to the modern day by the careful acquisition of land, development of technology, and the resistance or defeat of the in-game opponents.





### ► Rome Total War

Rome Total War is one of the most polished RTS games, which also attempts to put the player into historically accurate situations. Here you can see a highly detailed overview map as well as a resource window.

An interesting variation on this type of game is the Sim City series (EA Games, see previous page). In Sim City the player must control a modern city, developing it from a small town into a bustling metropolis. The player is forced to take on all the roles of a typical city governing body and keep the inhabitants of the city happy and productive by continually balancing consumption and production in the development of their city. Sim City gave rise to the hugely popular game The Sims (see previous page), by the same designer, Will Wright. In The Sims the player controls virtual individual people and attempts to make them happy and fruitful.

### Military RTS games

There are many military RTS games which run from a historical past to an imagined future. Age of Empires (Microsoft) allows the player to take a primitive tribe from the Stone Age to the Iron Age. Age of Empires 3, a sequel, explores the new-world colonies of the Americas up to the end of the 19th century.

### ►► Zooming in

In Rome Total War, you can view armies from above, issue battle orders, then zoom in to witness the conflict first-hand.

Image © The Creative Assembly



Image © The Creative Assembly



Image © The Creative Assembly

Another historical military RTS of note is the Total War series from Creative Assembly. These games attempt to recreate historically accurate battles and campaigns from ancient and medieval history. The player has the ability to command hundreds of troops at once but can also zoom right into the action to see individuals doing battle. These games are renowned for their accuracy in setting and visuals and have even been used by makers of historical documentary films to recreate scenes from ancient times.

### ROME TOTAL WAR



Image © The Creative Assembly

- 1** Cities, garrisons, and other features of tactical importance.
- 2** World map giving an overview of the global state of the game.
- 3** A local area map giving an overview of surrounding countryside and strategic points.
- 4** The faction commander as highlighted on the local area map.
- 5** The troops under the control of the faction commander.



### ▶ Miniatures

Warhammer 40,000 faithfully reproduced Games Workshop miniatures. Players can even "paint" their armies.

### Fantasy war games

Blizzard Games are famous for their fantasy war game WarCraft, and its science-fiction counterpart, StarCraft. Both of these games were immensely successful and well received by critics. They were easy for players to learn and had extremely well designed visuals. They are usually credited for making the RTS genre more popular.

No list of RTS games would be complete without mentioning the Command and Conquer series (Westwood Studios, now EA Games). This was another military RTS but set in the near future with various "what if?" scenarios. Command and Conquer continues to be developed as a franchise with the storyline moving incrementally into the future.

Also of interest is the development of RTS games based on the highly successful tabletop games from Games Workshop. Its Warhammer and Warhammer 40,000 games have both seen development into digital games in a curious reversal of inspiration. Both of these games benefit from years of market success and provide the digital game developer with a rich heritage of source material to draw from.



### Enemies

In Warhammer 40K, enemy units conform to their typical racial stereotypes in terms of their behavior. They provide the player with a variety of challenges. Some enemy races are controlled and methodical in their actions. Others can be wild and unpredictable, providing an especially challenging experience on the battlefield.



### ▶▶ Mass combat

The mass combat game featured the diverse units and foes present in the Warhammer 40,000 world.

### Weapons

In this futuristic scenario, well-placed support weapons defend the player's territory.





# Puzzle games

Good for the brain

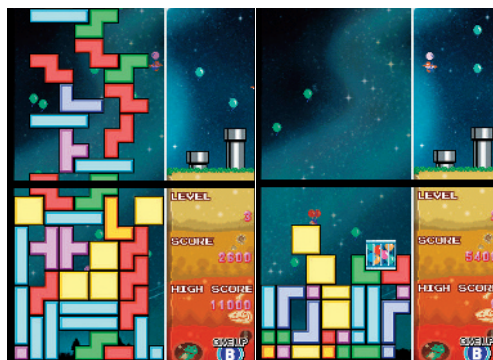
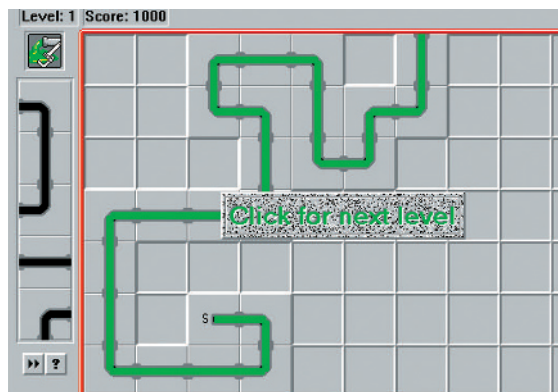
Puzzle games are probably the most widely played types of computer games, as many pieces of electronic equipment come with some puzzle games included. Perhaps most notably, all computer operating-systems contain free puzzle games, such as Solitaire (with playing cards) or a shape puzzle. Puzzles are available on dedicated game machines, cell phones, and even through your Web browser, without the need to install special software.

Puzzle games reach a large audience, possibly due to the fact that there is a wealth of precedent of people setting brain teasers for each other. Puzzles such as tangrams, jigsaws, and crosswords have a long history and are still popular today. Variations on established puzzle patterns emerge and find favor with the public, such as the Sudoku craze.

Puzzles are an easily accessible form of entertainment and usually for a single person. They are suitable for filling in bits of free time such as commuting or work breaks. With puzzles so established in society it is no wonder they have made the leap to a digital setting. Puzzle games take on different formats based upon the nature of the puzzle and can be categorized into several themes.

## ► Pipe-arranging

In Pipe Mania, the player is presented with a series of random pipe shapes, and must arrange them in such a way that they cross the screen.



## ◀ Shape-fitting

Tetris is based on the shapes made by arranging four squares. As they fall from the top of the screen the player must orient them so that they fit neatly without any gaps, in order to make a completed layer of squares disappear.



## ▲ Three in a row

In Bejeweled, the player must swap adjacent gems to line up three of the same type. The gems then disappear, and others fall down to take their place.

## Shape association puzzles

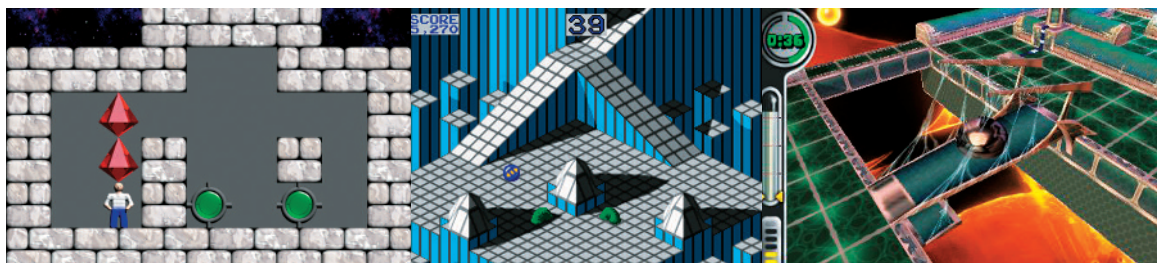
Arguably the most famous of the shape association type puzzle games is Tetris. Invented by Alexey Pajitnov in 1985 for an IBM PC, Tetris was a worldwide phenomenon spawning many copies and variations; most noteworthy was the extremely popular Nintendo GameBoy version.

Another similar game of this type is Puyo Puyo produced by Compile in 1991. This had a similar appearance and aim to Tetris but the mechanic of matching to get the rows to disappear was different.

Games such as Bejeweled and Zuma by Pop Cap Games built on the legacy of earlier shape association games, and are available on a wide number of platforms.

## Building puzzles

An example of a building-type puzzle is Pipe Mania, developed by The Assembly Line in 1989. This game requires the player to construct a pipe from a random assortment of shorter pipes in order to allow liquid to flow from the start to the finish of the level. The popularity of this game can be seen by the number of variants and similar games produced over the years.



## Maze games

Mazes and labyrinths are among the oldest forms of puzzles, including computer game puzzles. Sokoban, by Hiroyuki Imabayashi, was published in 1982. Sokoban is Japanese for “warehouse keeper.” In this game the player must push boxes around a maze into their designated positions. It is easy for the player to make a wrong move and get a box stuck, and the more complex puzzles require a very definite order of moves.

An early variant of a maze game was Marble Madness by Atari in 1984. In this game, players had to roll a marble around a complex landscape without it becoming stuck or falling off a precipice, to complete a puzzle level.

On the PSP, a game with a similar theme is Archer Maclean's Mercury by Awesome Studios. The player has to negotiate a tilting maze again, but this time must guide a blob of mercury around the maze. In the game, the mercury can be split into separate drops and made to change color, to activate color-coded switches. The increased power of the PSP makes the simulation of the mercury very convincing, and the screen visuals extremely engaging.

## Added complexity

The maze concept can be made more complex if the player has to move a character around a space, and interact with other characters. One of the most famous examples of this idea is Lemmings by DMA Design, published in 1991. Cartoon lemmings enter a door and walk until the player guides them to the exit. If the player allows the lemmings to wander they usually fall to their doom or blunder into a deadly trap. The player must quickly work out a series of actions to guide the lemmings to safety.

## Traditional puzzles

Traditional puzzles and solitaire games inspire digital versions. Instantly recognizable is Solitaire which comes with all Windows operating systems. Other firm favorites include variants of mah-jongg solitaire, or Shanghai. This requires the player to match pairs of similar tiles in an ornate stack in order to remove them. As the tiles are removed the player can access tiles on lower levels.

An extension of a traditional puzzle which has found new life on a different platform is Dr. Kawashima's Brain Training for the Nintendo DS. This has become a smash hit and presents the player with familiar number, word, and association puzzles. The interactive capability of the Nintendo DS means that players can respond in a variety of ways. Interestingly the game claims that “exercising” your brain for a few minutes a day can keep your mind young and alert—a rare case of a game claiming to be good for the player.

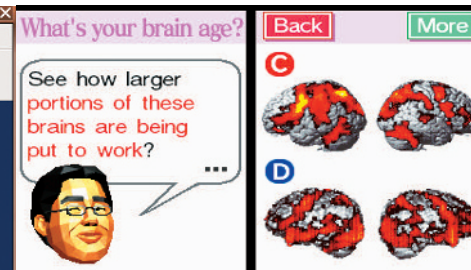


## Mazes and logic

Sokoban (left) forces the player to visualize the outcome of his moves. A wrong move may mean that the game is impossible to complete. Ramps, bridges, and moving obstacles add complexity to a simple ball-and-maze game in Marble Madness (middle). Archer Maclean's Mercury (right) is a modern take on the ball-and-maze concept, with the added twist of guiding a liquid.

## Health claims

Dr. Kawashima's Brain Training not only tests your mind, but claims to keep your brain healthy, too.



## Traditional

Shanghai is an example of a digital game based on a traditional solitaire game using mah-jongg tiles.



# Game structure types

“Linear” v. “sandbox”

Game structure is the “architecture” of the game—how it all fits together, how the levels are laid out, and how higher objectives are staged. When you step back from the immediate experience of gameplay and begin to assess what you are doing within a game and what your goals are, you might become aware that games treat players in two distinct ways. Some games provide the action in a set sequence of events, with little or no variation every time you play it. Other games leave the player to his own devices and let him find his own way around.

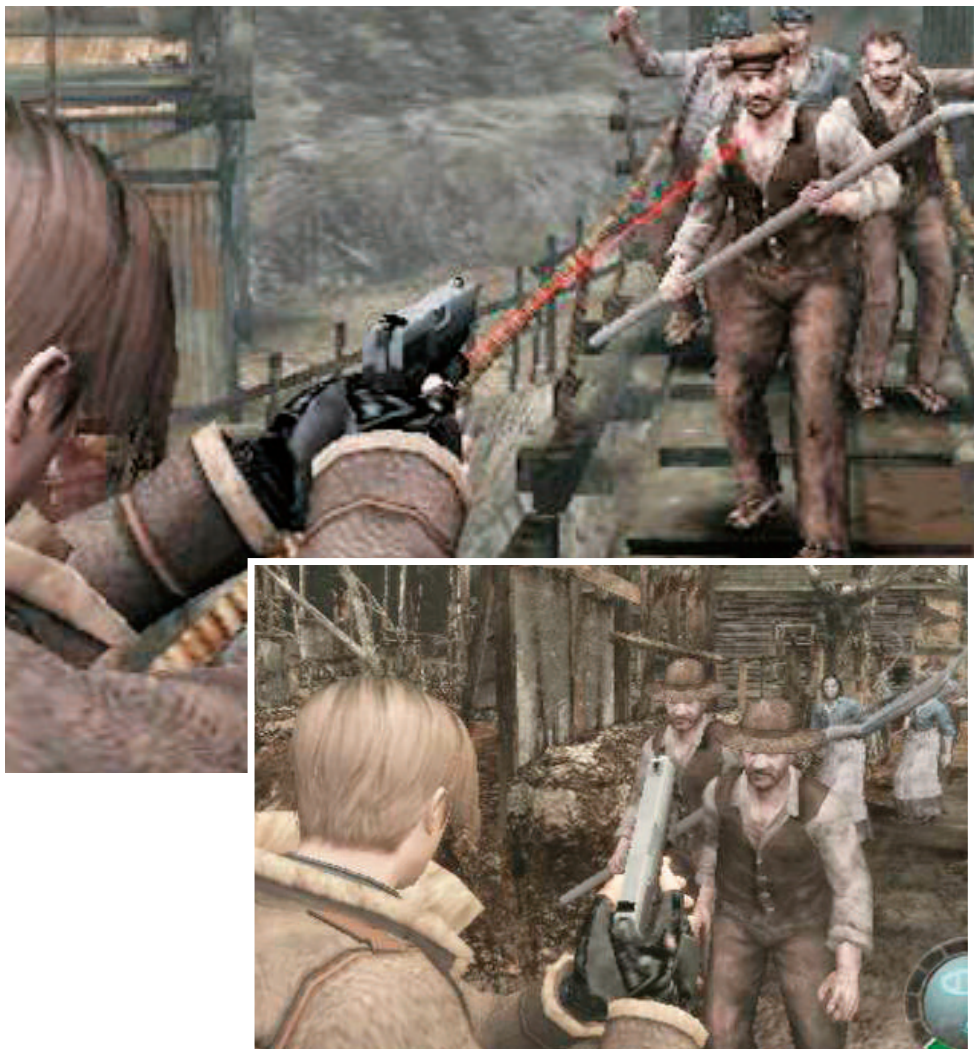
A game which has a single path to follow in order to successfully complete it is often referred to as a “linear” game. Linear games have explicit goals that the player must achieve in the near future to progress; these games are often level-based. “Sandbox” games are those in which there seems to be much more freedom about when and how to achieve goals, which may be implied rather than explicit. Sandbox games allow the player to approach challenges in more or less any order. (“Sandbox” is a reference to childhood play, where the games children play in their sandboxes have no restraints, and the children can mix and match play elements.) Some sandbox-style games are truly open-ended and can never be completed, although these are likely to become quite repetitive. They are often based in large, open environments.

## Debate

There is much debate in the game-playing community as to which structure is better—linear or sandbox. Some say that sandbox-style, open-ended games give the player the ultimate freedom to do as they will. The counter-argument is that linear, objective-based games give a more structured game and focus the player’s actions and excitement on the relevant parts. Of course, there is no right or wrong answer to this argument. It depends on individual taste, and a structure that is appropriate for one game may be completely unsuitable for another.

## ▼ Narrative thread

Resident Evil is a game with a strong narrative thread. This affects the game in that the encounters during play tend to follow in an order which tells the story as well. To progress in the game the player has to complete the challenges presented.



### Cinematic vision

Cinema is a useful analogy when considering linear games. When you watch a film you get the story and nothing else—there is little interaction. Your imagination may add a few items that your subconscious feels might be going on beyond what is on the screen, but in the main it is purely the film that you experience. From this, you get an enjoyable story, and are presented with the film director's point of view as to how a series of events happened. Many people have favorite film directors and seek out their work because they like the way the directors present a dramatic story. There is no need to generate an original version of events because the director creates a dramatic narrative. In a similar way, many people enjoy linear games with a clear and defined narrative sequence—they like the way the designers build the drama and present a sequence of events.

### Advantages of linear style

As a designer of games there are questions to be answered, and some practical considerations to make, when deciding on the appropriate structure for your game. In terms of design there are good reasons to choose to make an objective-based linear game over an open-ended non-linear game. With an objective-based linear game the designer knows where the player will be so all the design, art, and code effort can go into those areas. This means the game will have much higher production values. It will look better and there should be better paced and choreographed action.

Resident Evil 4™, for example, is very linear. Although players are able to wander freely around most places they have visited before, they cannot do much unless they follow the path they are supposed to follow. But because it is linear, the experience of playing is extremely rich, and there is a lot packed into small areas. If the game were turned into a free-roaming, mission-based, open-ended structure, the



### ◀ ▼ Mix of styles

The Legend of Zelda: The Windwaker presents an interesting blend of linear and sandbox styles. The game is linear in that there are quests that must be completed in order. However, between these quests, the player is allowed to wander around and experience a rich and varied gameworld.



game would either be far more expensive and more difficult to make or it would have to compromise in either the quantity or quality of the experiences.

If the designer of the game has an established reputation, similar to a film director, then players may buy the game on the strength of the designer. This approach can result in a strong game with a dynamic and significant storyline.





### ► Ever-changing

Animal Crossing is an example of a truly open-ended game, and has no defined ending, yet it manages to remain consistently interesting through surprises, community activities, and special events.



### Which type of structure?

Not sure which structure type a game conforms to? Try breaking it down.

**“Linear”** means everything happens in a set sequence: level one—level two—level three.

**“Non-linear”** means there is no set sequence, although there are usually some restrictions: drive to Los Santos—do a mission—fly to San Fierro—do a mission—drive back to Los Santos—play mini games.

### New possibilities

Almost all of the early computer games had explicit objectives and were linear in structure. The first highly successful non-linear, open-ended computer game was Elite.

Elite was impressive for many reasons: it was in 3D; you only had one life; you could save your game in order to return to it later; it was from a first-person viewpoint; it featured whole galaxies to explore; you could upgrade your ship; you could choose how to make money (trading, piracy, mining, or a mixture); and the universe seemed possessed of a life of its own. Elite achieved all this and more by virtue of having wonderfully elegant rules and a simple structure. Every system visited consisted of just one

star, one planet, and one orbiting space station. When you arrived at the system you only really had three choices: go to the star to scoop up fuel; go into deep space to fight unending waves of ships (for bounty or piracy); or go to the planet to trade, upgrade, and repair. The difference between the systems was really just dependent on a text file and some parameters that altered prices and whether the police ships attacked you if you'd broken some law.

There are many other wonderful rules in Elite and so many of these ideas have been refined and extended in later games such as the Grand Theft Auto series, Animal Crossing, and City of Heroes.

## Interaction

Returning to the cinema metaphor, if you don't like watching another director's film, you may get the overwhelming urge to become involved in the action yourself and have the opportunity to do as you please, and interact with the situation and the other characters as the whim takes you. All you want is an outside agency to provide the setting, characters, and props and then leave you to it. Preferring this point of view leads to the development of a sandbox game. The developers and designers create an environment and setting, populate it with characters and props, and then step back and leave you, the player, to your own devices.

## Advantages of sandbox style

In an open-ended game the designers have to design everything, and decide where the gameworld ends. Even with modern processing power, sandbox games still need defined limits. However, when the limits have been decided on, the player is free to do what they will, attempt to complete the game or just have fun with the tools and equipment provided. There is a part of the human psyche that enjoys being an individual and asking "what if?" Sandbox games provide an outlet for this urge to experiment and challenge the environment.

## Structure type?

**1** Metroid Pinball takes its theme from a semi-linear adventure game, but was developed as a more traditional puzzle game.

**2** Myst is arguably a puzzle game, but in later incarnations the story and potential role-playing angle have been explored.

**3** Pro Evolution Soccer attempts to deliver a realistic (and fairly linear) soccer-playing experience.

**4** Gotham Racing depicts high-performance car racing and works in a linear way, though the player can choose between fantasy settings for the races.

**5** The Legend of Zelda: Twilight Princess offers a linear narrative to follow, but with opportunities to explore the varied delights of a richly detailed world.

## Thought exercise

Select one game from each list and play them. While playing make note of the types of opportunities and activities the game provides you with throughout. Compare and contrast the games, see how each offers you different experiences.

### NON-LINEAR

**Animal Crossing**  
**Sim City**  
**The Elder Scrolls**  
**Gary's Mod**  
**Grand Theft Auto**

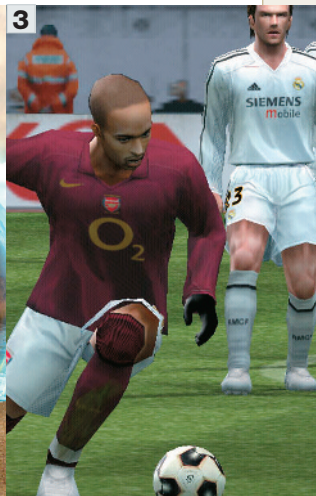
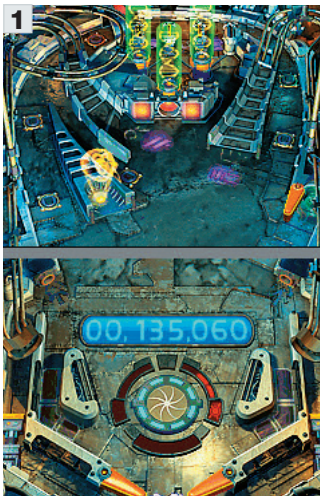
### LINEAR

**The Legend of**  
**Zelda: The Windwaker**  
**Metroid Prime**  
**Myst 5: End of Ages**

Ask yourself the following questions:

- How many different ways are there of achieving your goals?
- Can you "play" the game without reference to the central story?
- Is there a central story?
- Does the game have an end?
- Are both types of games enjoyable for different reasons or the same reasons?
- What factors have been designed in (game mechanics) to provide this experience?
- What choices have the designers made when creating their games?

In analyzing and examining these two types of games you should begin to get an idea what different gameplay types there are and how some or all of the features are present in certain games. As a follow-on from this, create your own lists of types of games and discuss your choices with other gamers.





# Case studies

## Game structure

### Case study 1: Linear structure

There are many games which could be said to have a linear, or objective-driven, structure. Two excellent examples are *God of War* and *Resident Evil 4™*. As well as being classic examples of the linear structure these two games are interesting to compare with each other.

Both games guide the player along a fixed route—with minor asides—and line up groups of generic opposition characters, followed by set-piece battles with much larger or more powerful opponents, usually with particular attack-patterns and weaknesses. Both games also allow the player some customization of ability and/or weaponry, and some degree of freedom over the way this is done. The games often force the player to annihilate the current set of enemies before being able to continue to the next section. They also make extensive use of cut scenes to inform the player of the goals, level layout, level access changes, and key points of call necessary to complete the section.

All these elements are typical of linear games, and linear games are often—if not always—defined by a series of objectives. But though they share such a lot of similarities, *God of War* and *Resident Evil 4™* feel and look like very different games. It might not be obvious they are both using

similar design solutions. They have different combat and movement mechanics, different camera systems and very different settings and styles, but underneath all these superficial features, the structure is essentially very similar. They even have identical save systems, using fixed points on the map which must be reached to store progress.

An objective-driven, linear structure such as this allows the developers of a game to spend time making each section of each level work. Both *God of War* and *Resident Evil 4™* show evidence of this, being highly polished, well-crafted games which provide a good variety of challenges and many hours of play.

#### 1 Opponents

Levels in *God of War* are punctuated by opponents which the player must defeat to progress.

#### 2 Order of events

In *Resident Evil 4™*, the player progresses through a set order of events, and items collected in the game are made available later on.

#### GAMEOGRAPHIES

**Title** *God of War*  
**Developer** SCE Studios  
**Key features**

- Third-person combat
- Puzzle-solving elements
- Intuitive controls
- Unique mini-games

**Title** *Resident Evil 4™*  
**Developer** Capcom  
**Key features**

- Third-person shooter
- Cinematic style
- Context-sensitive controls



## Case study 2: Sandbox structure

There are far fewer games with open-ended, or sandbox, structures than there are games with linear structures. A good example of a game with a truly open-ended structure is *Animal Crossing*. It has an implied goal—to get a big house and furnish it stylishly—but presents the player with many ways of achieving this, and no time restrictions at all.

*Animal Crossing* is ingeniously designed so that there is always something going on. Even when you aren't playing, things are happening (or at least will appear to have happened when you play again). Each day there are new ways of making money and opportunities to discover new things. Each hour the game changes in subtle ways. Every night the game changes again; and certain tasks can only happen at night. All the time things are growing

and dying, leaving and arriving, chatting and snubbing, trading and stealing, changing and discovering.

All this happens through a simple interface consisting mainly of talking and asking set questions, fishing, digging, planting, mailing, buying, and selling. For example: When you are fishing, you'll get different fish depending on what time of day (or night) it is, where you fish, what time of year it is, and what the weather is like. The end result is that you'll always get a fish (or possibly a boot, or squid), but you can keep the fish for display in your house, sell it, or donate it to the museum. Some fish are rarer than others, and they sell for more. This system drives most of the "collectible" part of the game. The structure works because the activities, although repetitious, often result in surprises, and all activities nudge the player toward the implied goals of the game.

### GAMEOGRAPHY

**Title** *Animal Crossing*

**Developer** Nintendo

#### Key features

- Open-ended
- No linear structure
- Many different opportunities
- "Living, persistent gameworld"

### 1 Clothing design

One aspect of *Animal Crossing* is to create designs to go on clothing.

### 2 Graphics

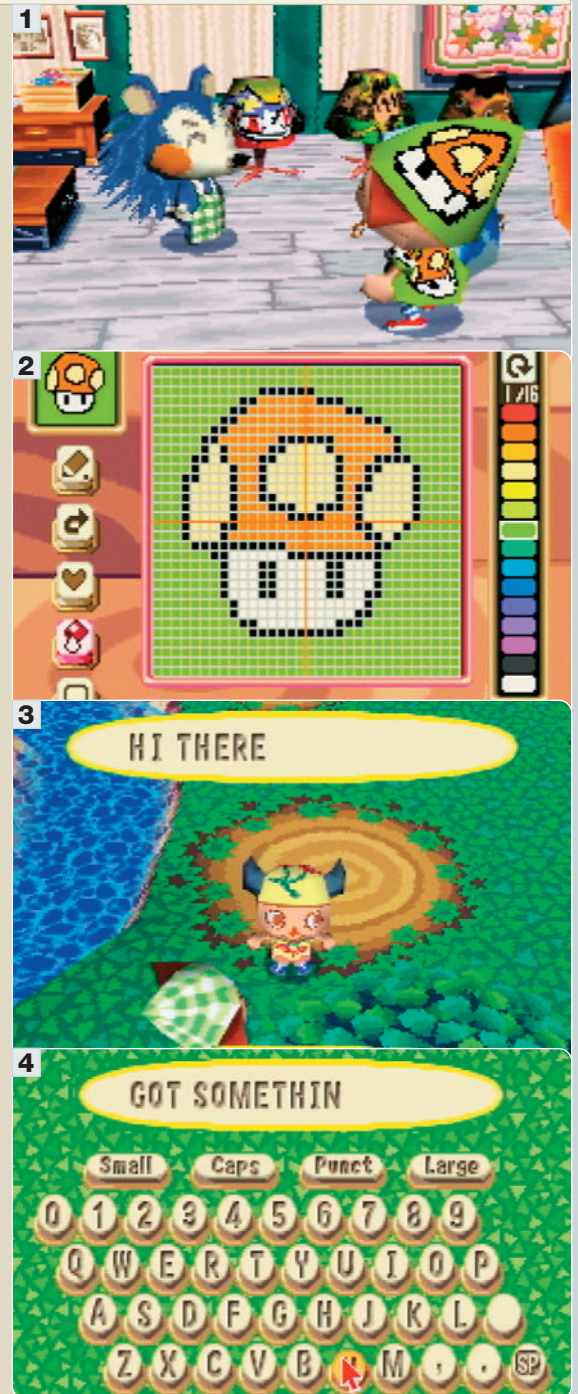
A drawing application lets the player design graphics for inclusion in the game.

### 3 Other characters

The non-player characters in the game have their own "lives" and react to the player's input. They often give the player jobs to do in return for items.

### 4 Text input

A text-based input can be picked up by the non-player characters and used in conversation with the player.





# Single-player v. multiplayer

Know your opponents

A single-player game involves a player competing or cooperating with non-player characters (NPCs) and objects controlled by the computer. A multiplayer game is when the player plays against or with other human players, either on the same computer, a Local Area Network (LAN), or over the Internet. The difference between the two can be subtle or dramatic and both have advantages and disadvantages.

## Single-player games

In a single-player game, the focus of the designer is to entertain the player. The designer is free to create opponents and characters which are entertaining to interact with and play against but which would be dull or unrewarding for a human to control.

Until recently, most enemies in games would have been very boring characters to play, such as the invaders in Space Invaders or the Barnacles in Half Life 1 or 2. The designer has the opportunity to create unbalanced opponents so that a variety and combination of challenges can be orchestrated to get the player to perform in a particular way. For example, a very small, weak—though moderately fast—character might be fun to play, but it wouldn't be a very fair match if pitched against a well-rounded opponent. However, many different opponents all controlled by the computer can be placed in a way that presents an entertaining threat requiring a particular tactic to defeat them.

## Multiplayer games

A multiplayer game is almost always set up so that the players involved are given equally able toys (characters). The reason for this is that players usually want competition to be based on their relative skills, so if all players are equal, winning or losing can only be down to player ability. A good example of a multiplayer game which neatly fits this system is

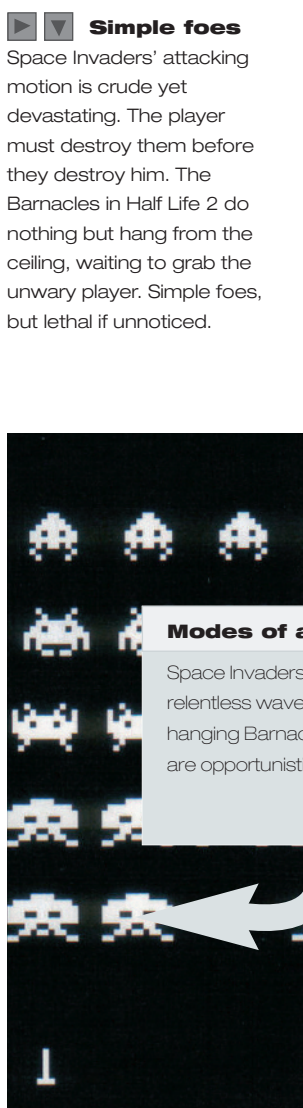
DOOM. In the multiplayer game of DOOM each player is given identical marines, which, to begin with, have an equal amount of health (equipment and power). Play balance is altered slightly by picking up certain weapons that suit particular situations and level designs.

### Simple foes

Space Invaders' attacking motion is crude yet devastating. The player must destroy them before they destroy him. The Barnacles in Half Life 2 do nothing but hang from the ceiling, waiting to grab the unwary player. Simple foes, but lethal if unnoticed.

### Modes of attack

Space Invaders advance in relentless waves. By contrast, the hanging Barnacles in Half Life 2 are opportunistic attackers.





### Deathmatch

DOOM coined the term “deathmatch” which has become a multiplayer standard. A deathmatch is a multiplayer game in which all players are enemies and each one killed is added to a kill total. When a player is killed there is a short time penalty—and sometimes a kill-total penalty as well—before the player is “respawned.” (Spawning refers to something being created in the game. Respawning is when something is recreated.) Usually players, enemies, and items are spawned when the game begins so that it looks as if the game was “alive” before the player joined it. In multiplayer mode, respawning is a simple way of keeping players playing even though they have been killed.

### Development time

There are differences between developing a single-player and a multiplayer game. Multiplayer games rarely require any AI because the opponents are all controlled by people. They often center on short, intense action between a few players at a time. Single-player games typically require much more design time in order to create exciting gameworlds and opponents.



### ◀ Demonic enemy

The enemies in Doom 3 are demonic and bestial. Sophisticated AI makes them challenging foes.



### ▶ ▶ Unpredictable

Whether controlled by another human player online, or the in-game AI, the characters the player encounters in World of Warcraft (a MMORPG) make for a challenging game. Friends and foes have the potential to be equally unpredictable.



### MMORPGs

Massively Multiplayer Online Role-Playing Games (MMORPGs) such as World Of Warcraft and City of Villains are exceptions to many of the previous rules. Often players have characters with different abilities and powers. Character power is in part influenced by how long a gamer has been playing, as well as depending on tactical skill. Computer-controlled AI characters are needed to fill the world up, issue quests, trade, and provide other opponents.



# Case studies

## Multiplayer/single-player

### Case study 1: Multiplayer

**World of Warcraft and Counter Strike are different types of games in some ways, but are equally good examples of the multiplayer genre, with particular features in common.**

World of Warcraft, initially released in 1994, is a MMORPG, with millions of subscriptions from players around the world.

Players control characters and can explore the gameworld and fight monsters, either individually or as part of a team or “guild.” They seek to improve their skills and power through gameplay. As their ranking improves they can buy equipment to help them in the game.

Players can select “realms” to play in—this influences the mode of play. For instance, PvE—Player versus Environment; or PvP—Player versus Player.

Counter Strike may be the world’s most widely-played online FPS ever. First released in 2000, it has remained popular despite gathering criticisms of certain key features.

Players can choose between two teams—the terrorists or counter-terrorists—and play rounds in order to win money to upgrade weapons. Different game types exist, presenting the teams with different objectives depending on the option chosen.

One major problem with Counter Strike’s gameplay is that whilst players are injured, they cannot play the game but are still able to observe the action. They are then able to communicate to “live” players the whereabouts of enemy positions, by telephone for example—though this is thought of as cheating and is generally discouraged by the gaming community.

#### GAMEOGRAPHIES

**Title** World of Warcraft  
**Developer** Blizzard Entertainment

**Key features**

- Departure from RTS style of other MMORPGs
- Attainment levels influence gameplay

**Title** Counter Strike  
**Developer** Valve Software

**Key features**

- Varied missions; team-based adversarial
- Large number of tactical variations possible



#### 1 Interaction

World of Warcraft has been a multiplayer phenomenon. Players enter the mythical world and find many, varied creatures to interact with.

#### 2 Teamwork

Counter Strike is an old multiplayer game that has seen several updates. The degree of teamwork necessary defines it as a classic multiplayer.



## Case study 2: Single-player

**Ico, released in 2001 for PlayStation 2, is a wonderful and emotive single-player game designed by Fumito Ueda. It draws upon many design ideas from early single-player games and combines them with innovation and modern expectations.**

In Ico, the player takes the role of a young boy with horns who must escape from an elaborate castle with a young girl, Yorda, whom he must protect. The castle is essentially a huge collection of puzzles, traps and hazards which must be overcome. Yorda is a computer-controlled character who follows the player character around. She has limited abilities, requiring the player to perform various actions in order for them both to progress.

Purely from a game mechanics perspective, Ico has two major features which are very common to single-player games—puzzles and sub-class enemies.

Puzzles in games maintain a player's interest because they provide a challenge that the player knows has a solution. They also represent a challenge to the designer. Consistency is important because without this the player will feel cheated by the logic and the game is unlikely to hold interest. It is important also to restrict actions and activities, because every new action complicates the logic of the game, and the code and testing needed. For example—imagine a game designed so that the player character can only push and pull boxes. Later, a decision is taken to

add the ability to climb over boxes. This would mean that all the previously designed puzzles are rendered trivial.

Sub-class enemies are a typical way of adding hazards and challenges to single-player games. The term “sub-class” is used to classify enemies which have fewer actions than the player's character or inferior attributes. An Invader in Space Invaders is a perfect example of a sub-class enemy. In Ico, shadowy forms appear and attempt to capture Yorda. It is up to the player to fight them off and save her. As with many other single-player games the enemies attack in groups, and there are a few different types with different abilities to contend with.

Shadow of the Colossus was also developed by Fumido Ueda, designed as a prequel to Ico. It employs similar features in a sparser, extrapolated form. There are fewer—though massively larger—enemies, and each enemy can be treated as a kind of puzzle. Shadow of the Colossus also uses an equally arresting graphic style to draw the player into the gameworld.

### 1 Responsibility

Yorda, the princess in Ico, follows the player character around. The player must act to save them both.

### 2 Strong aesthetic

Shadow of the Colossus is an aesthetically and mechanically outstanding single-player game.

## GAMEOGRAPHIES

**Title** Ico

**Developer** Sony  
Computer Entertainment

### Key features

- Individual artistic style with washed-out colors
- No head-up display
- Made-up language

**Title** Shadow of the Colossus

**Developer** Sony  
Computer Entertainment

### Key features

- Strong story
- Complex tests of player's abilities





# Platform-specific design

## Targeting your game

As a games designer, when planning your game it is more than likely you will be targeting one of four platforms: console, PC, handheld, and cell phone. Each platform has strengths and weaknesses that need to be considered when planning a successful implementation of your design.

### Console

Console is considered the most “glamorous” of all target platforms. It has the marketing budgets and the big names, and generates the most revenue. But while console games can reap great rewards, it is also the riskiest area of games development.

Consoles also offer a standard input into your gameworld via the controller. While form factors differ from console to console, in essence they all do the same thing. This allows you to tailor the game controls perfectly and be sure that every player is experiencing your game exactly as you intended. The downside to console development is the

spiraling costs of producing a commercially viable game. Development teams increase in size with every hardware innovation. The industry has gone from three-man teams to 12, to 30, to 100-plus in the space of 15 years, yet the cost of the final product has become less expensive for the consumer.

To make console development viable, publishers play safe with killer licenses (Lord of the Rings, 50 Cent) and established characters or brands (Metal Gear Solid, Need for Speed). Radical and very original game design very rarely happens. This can sometimes be frustrating for designers who may feel creatively stifled by the minutely incremental advances in gameplay, or the “Grand Theft Auto meets Halo” pitch sessions.

Ultimately, market forces drive console development. It may be glamorous but if you’re hoping to revolutionize the games industry you might want to rethink your target platform.

### ► Glamorous hardware

The big advantage of console development is that the hardware is static. When a new console is released, the only changes to it over the next five years will be purely cosmetic. Because of this, as a designer you can be sure that the experience you are creating will be viewed in its unadulterated form by everyone who plays your game. Shown here are three rival computer game consoles: Nintendo Wii (left); Xbox 360 (center); Playstation 3 (right).





◀ **Successful format**  
The new PlayStation 3 controller follows a tried and familiar format.



◀ **New generation**  
The Nintendo Wii controller goes beyond the usual button interface, and will recognize the user's gestures.

▲ **Strengths and limitations**  
Games for PCs are often relatively experimental and can reach a huge audience. However, PCs have control limitations and the user experience cannot be accurately predicted.

## PC

PC development often has crossover with console development, with the big franchises being ported to the PC. However the PC is also home to a wide range of original content with equally wide budgets and exposure.

Unlike console games, PC games don't have to be huge cinematic productions. A crazy puzzle game can sit easily alongside the next big-budget FPS, and potentially sell just as many units.

If you want to revolutionize the games industry, consider the PC as your target platform. Innovation is relatively commonplace, with games like The Sims selling an incredible number of units and finding a market far wider than that of a console game.

PCs do have a number of issues that need to be considered. No two PCs are exactly the same—you must consider a huge range of possible target devices. As a designer, you have to compromise. This might be graphical finesse at the cost of frame rate—which in turn will directly affect how your game plays. PC games also have to work with a keyboard and a mouse. Some genres work best with this setup, which is why the PC market is full of FPS and RTS games.

On the upside, PC games can be sold over the web on dedicated portals, distributed as shareware, or sent out on the cover of the latest PC magazine. This means a three-man team can still develop a niche game, distribute it, and make money.

## Cross-platform

Big name games are usually released across all platforms—console, handheld, and PC. Whilst the design and visualization is similar for all, the requirements of different machines mean that a lot of the modeling, texturing, animation, and coding is specific to each platform. This can make the development task even more complicated and requires considerable investment.



## Apple Macintosh

Mainstream games for the Mac have always been the last to be developed, if at all. However, this seems set to change with the move to Intel processors in Macintosh machines. Many new games now come to the Mac platform at the same time as their PC counterparts and the ability of Macintosh machines to run the Macintosh OSX operating system or Microsoft Windows XP opens Macintosh machines to the wider gaming world. The Macintosh platform has always had a reputation for innovation and engaging quirkiness. This may yet have a positive effect on the games developed from the Macintosh platform.





## Handheld

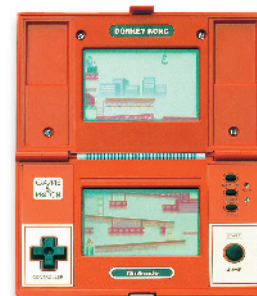
Handheld gaming is very popular, and thanks to the Nintendo GameBoy, gamers everywhere consider computer games as a great way to pass the time.

There are three main handheld platforms, but unlike the console platforms, each one is very different to develop for.

The most established handheld is the GameBoy Advance. The hardware is incredibly basic compared to the PC, consoles, and even other handhelds, yet its strength lies in its vast catalogue of games, simplicity of input, and extremely long battery life. Developing for the GBA is cost-effective and small teams can quickly produce titles. Because the GBA is not the most technically advanced platform, often the best-selling games are examples of excellent games design, not technical prowess. Like all handhelds, the range of games on the GBA spans the quick-fix games like Wario Ware to huge 80-hour-plus RPG epics like Final Fantasy Crystal Chronicles.

Nintendo has a second hugely successful handheld in the Nintendo DS. The DS is a very different device than the GBA, having two screens, one of which is touch-sensitive. This has led to a number of unique games being developed for the device. However, if you are designing a game specifically to work on the DS, be aware that it will be difficult to adapt to any other platform.

Sony entered the handheld arena with the powerful PSP. Development for the PSP is almost



## Nintendo handhelds

A selection of Nintendo handheld games consoles of different ages.

## PSP

The PSP has been sold on the glamor of the hardware. The expectation to deliver games close to PS2-quality in terms of production values is high.

on a par with a smaller console game. All that power allows the PSP to host games that would be impossible on the GBA and DS. Not just graphically—the PSP is endowed with the UMD drive that can store a large amount of game data, as well as music and video.

## Choice of handheld platform

Your choice of development platform for handhelds is truly governed by your idea. If you have a simple game idea that hinges heavily on design, not technology, try the GBA. If your game requires a different form of input than the standard D-Pad, go for DS. If your design requires a large amount of data, look at developing it for the PSP.





### ◀ Gaming device

The line between cell phone and handheld games device is becoming more and more blurred.

## Cell phone

The cell phone platform is the largest growth area in computer games, with all the major manufacturers looking at cell phone games as a way to increase revenue. Cell phone games cover a massive range of products, from SMS-based text games to high-end, console-style titles. They tend to use one of two different development environments: Java or “native.”

## Java games

Java games are small in size (on average 64k) and because of this size limitation are often simplistic in nature. They are usually quick-fix games, ideal for those wishing to fill a little time. They are often inexpensive to buy and can be downloaded from portals provided by the network operator. Because Java games are generally low-cost to develop and to purchase, they are appealing to small development teams since the overall risk for a project is greatly reduced. However this has led to a vast number of Java games being developed and you really need something that will stand out from the crowd to pull in those downloads.

## “Native” games

The alternative to developing a Java game is to produce a “native” game. This is a game that has direct access to the device’s operating system. The main native platforms are Brew, Symbian, Windows

Mobile, and Linux. Going native gives the developer the opportunity to really open up the capabilities of the mobile device. Download sizes are much larger (often as much as 2.5mb). Because of this a lot of operators only offer native games over a 3G network, increasingly with a flat rate for data usage.

## Importance of interface

Whatever platform you choose to develop for, when designing your cell phone game, the interface to the game is of paramount importance.

The phone interface, while standard among most handsets in terms of function, differs widely in both quality and implementation. This means that as a designer you really have to come at the issue of game input from a more abstract approach. There’s no standard analog stick and action keys (yet), and the D-Pads on most phones are not designed with games in mind.

## Potential market

The main reason most publishers are excited about cell phone gaming is simply that most people have a cell phone. The potential market for your cell phone game is huge, yet overall development costs and expectations are still relatively low when compared to other platforms.



### ▲ Graphic quality

Cell phones now include 3D accelerator chips to increase the quality of the graphics.





# Realism and abstraction



Faithful simulations and surreal new worlds

In one respect all games are abstractions of reality—no matter how good the graphics and sound are, you are still sitting in your home playing a simulation via a control pad or keyboard. In game terms though, there are two poles of definition: abstract games and simulation games. In terms of presentation of the game there is a trend, particularly among first-person shooters and role-playing games, for visual and aural realism rather than abstract representation. Yet alongside this there is a strong tradition of games which do not attempt to mimic the real world and rather invite players into their own little areas of existence.

## Modeling reality

Microsoft Flight is a game which gives the player the experience of flying airplanes, particularly commercial planes, as accurately as possible. The player is presented with all of the controls present in a normal plane, and the physics of the game engine require the player to operate the plane as he would in the real world. The views of the plane and the surrounding scenery are accurate portrayals of real-world machinery and places. Still, this game is played on a PC with a standard keyboard and a joystick; its realism is in the way the player interacts with the game in order to achieve a steady flight. These games maintain their popularity and give the player a chance to interact with airplanes in a way that he couldn't in the real world and to master a set of skills not easily gained. The sense of achievement in these games when they play according to your will is considerable.



## Realism

Microsoft Flight Simulator allows the player a huge choice of aircraft, both historical and modern. The player can also select their route. The game features weather effects, with real-life updates when connected to the Internet.



## Sound and vision realism

The introduction of the next-generation consoles has seen the level of detail in the visual and sound modeling of games move to a yet more realistic level. For most of these games you would need a high-density television to see all of the detail. Games such as Far Cry Instincts, Project Gotham Racing 3, and Elder Scrolls IV: Oblivion provide compelling visuals and convincing sound effects, but are still not the same as observing a movie, or actually being there. The attempted realism is undeniably engaging; a player who participates fully in the game, suspending his disbelief, is rewarded with a near-realistic experience. Modern PCs and consoles push the boundaries of realistic representation in an attempt to draw the player ever deeper into the gameworld. These games rely heavily on cinematic tricks such as cut scenes and sophisticated camera angles. Players become used to seeing action scenes presented in this way through film and television. They accept this representation of the real world as reality, when in truth it is just a designer's fantasy.

## Simulating reality

Real-time strategy games seek to provide players with a realistic challenge, by pitting them against the machine's AI, usually through a game of mass combat such as Rome Total War, Civilization IV, or Warhammer 40,000: Dawn of War. In these types of games you are given a godlike overview of either armies or nations and are required to manage the resources and development of your forces in order to overcome your opponent, either by destruction or control of the playing area. Units in these games do not always explicitly follow your orders and the information you have about any given situation is not always complete. These game mechanics aim to mimic reality in that, despite a leader's best planning and intentions, things often do not go to plan due to factors beyond your control. The realism here lies in



## Surreal

In Katamari Damacy, the player is given the surreal aim of creating a giant rolling ball of objects.

the fact that it is impossible to completely know or control a situation; it also happens in real time, so if you sit back and ponder a situation the machine's forces will defeat you. This type of realism challenges the player with a clever opponent and complex, ever-changing situations.

## Abstract games

Abstract games present the player with a make-believe world; a surreal representation of somewhere else. Zelda Windwaker, Oddworld: Abe's Oddysee, Pikmin, Katamari Damacy, Darwinia, and Vib-Ribbon (to name but a few) are all examples of gameworlds that are abstracted to a greater or lesser degree. Characters, places, game mechanics, and aims of the game are all different than we might expect in normal life. All of these games have received positive critical reaction from players, who find their twisted and surreal worlds exciting and engaging. In one respect they are pure games because they do not rely on a representation of the real world; rather they invite the player into their world and make him assume contrary viewpoints in order to play them. These games are compelling due to their contrary nature; players delight in mastering these dream worlds and seeking out all of their challenges.

## Abstract or real?

Do you attempt to model realistic situations and present the player with experiences he might not otherwise get? Or do you invite him into a different gameworld of your creation, where some aspects might be unique? The expectations of the player are very important in this design consideration: to present

him with a realistic game you must convince him of this reality with subtle tricks and visual sophistication. Realism in game mechanics is important too. In reality the player might not be able to fly a plane or drive a high-performance car at speed, but a finely crafted game will provide him with that illusion. Some players may seek harsh game mechanics where vehicle controls are complex and difficult, or the requirement to make quick decisions and master complex and fluid situations is necessary for success.

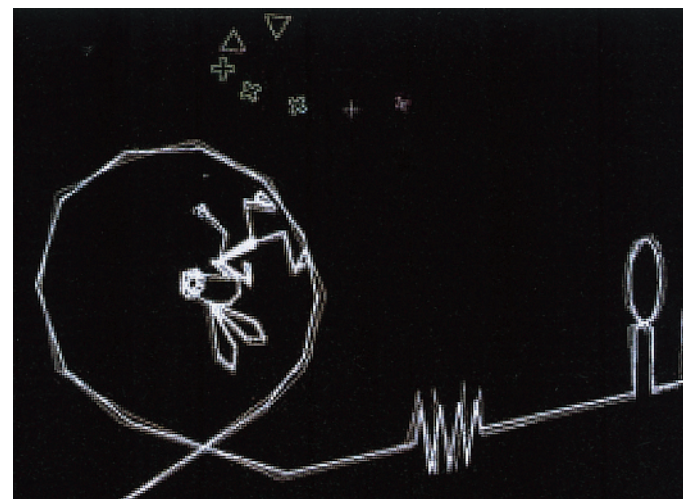
Abstract games remove the need to model reality; often a difficult task, and demanding on the machine. They reward the player with novel and entertaining experiences. The designer faces the challenge of a scriptwriter—if many people like your material then you may be successful, if not then your game is doomed to obscurity. It is therefore of the highest importance when working on game concepts to identify at the outset whether the game is going to be realistic or not and consider this in all your planning.

## Abstract inspirations

- Magnify absurd activities into compelling tasks.
- Give animals and objects personalities and aspirations.
- Imagine the real world from a different viewpoint.
- What if fairy tales and nursery rhymes were real?
- What if the intangible became tangible?
- Think of the pointless activities you do while you are waiting and daydreaming.

## Abstract

In Vib-Ribbon, the player must move Vibri the rabbit in time to the beat and help her evolve into a winged princess.





# 2D and 3D games

## Into the third dimension

Gameworlds have developed in sophistication as technology has improved. Early games were flat, with the action being up and down or left and right. The third dimension was not present. As processing power became greater, three-dimensional gameworlds became possible, with the player having to consider the possibilities of that extra dimension. However, in the rush for technological advancement, designers should not forget that some games still work better in two dimensions, and that the limitation of a flat playing area can provide inspiration and challenges.



### ▲ Cinematic 2D

The exuberant cartoon nature of Viewtiful Joe™ makes it ideal for 2D.

### ▶ Complex 2D

Mutant Storm draws inspiration from the oldest 2D shoot-'em-ups and incorporates 3D graphics to deliver complex, demanding gameplay.

### What is a 2D game?

A 2D game simply has actions and activities that work in two dimensions—but that's quite an ambiguous answer. It's sometimes difficult to tell from screenshots as there are many 2D games which use 3D graphics, such as Mutant Storm and Viewtiful Joe™. Animal Crossing could easily be categorized as a 3D game as it has a colorful, three-dimensional environment but, with very few exceptions, all the activities within the game are essentially two-dimensional in nature. Perhaps the best test to categorize a game is to consider whether it could be played using 2D graphics and simple 2D camera movement with little or no changes to game mechanics. Certainly Animal Crossing could be played in this way. Games such as Zelda: The Minish Cap and Grand Theft Auto 2 confuse the issue by including representations of playfields at different heights which overlap each other.







### What is a 3D game?

A 3D game takes place in three dimensions. Elite, Descent, and Homeworld all fit this definition as they have full 3D movement and game mechanics. FPS games, such as Half Life 2, are also 3D games as they require full three-dimensional movement and views. It would be impossible to represent these games in two-dimensional worlds without major changes to the rules and mechanics.

### Implications of 3D

The introduction of 3D games highlighted the role of the camera in the game experience. Designers faced the problem of having to place and control a camera so that it didn't interfere with the player's actions, but at the same time allowed him to see what he wanted to see. Early 3D games made use of the first-person camera perspective which means the player is essentially seeing through the eyes of the character he is controlling. This meant that the controls naturally moved the view, and that the player's character didn't have to be shown on-screen, which saved on asset production and processing time.

### Other perspectives

Second-person perspective is almost never used as it means seeing your character from the subjective viewpoint of another character. Third-person has become the standard in most games—it means seeing the character you control from an objective viewpoint; not through the eyes of another character. 3D games with third-person views are often plagued with camera problems as there is rarely any perfect solution to balancing flexibility of camera control with a minimal input control system.

Deciding between character-relative or camera-relative controls can be complicated. Character-relative controls can be confusing when the character is facing the camera, as pushing left

will make the character move right on the screen. Camera-relative controls ignore the orientation of the player's character and use screen-space to direct the character. This is more immediate but can get confusing if cameras switch to different views, or move significantly.

### 3D reinterpretations

There are many people who have tried to make a 3D Tetris game. Some of these have been released, but the results are often confusing when compared to the purity of the original. Grand Theft Auto is widely considered to have made the jump from 2D to 3D successfully, although many feel that the police chases fall short of the excitement of the 2D versions.

3D games can be easier to market—the screenshots and box covers of 2D games tend to be less visually appealing. In a market where looks and licenses seem to have more impact than gameplay, 3D quickly became a priority for companies wanting hits. But with the rapidly growing casual gamer market, the industry is rediscovering what can be done in 2D.

### Virtual city

City 17 is just one grim location in Half Life 2. The gameworld is as twisted and challenging as a real city would be.



### Exploration

In Sentinel: Descendants in Time, the player must solve puzzles to succeed. The game allows for a slow, methodical exploration of a beautiful 3D gameworld.





# Case study

## 2D and 3D games

### Case study: **Worms**

This case study focuses on the transition of **Worms** from 2D to 3D. **Worms** was originally created using **BlitzBasic** by **Andy Davidson**, for a competition in 1994. He won the competition, and **Team17** made a deal with him to create a commercial title for the **Commodore Amiga**. It became a hugely popular game and was successful in a 2D format for years. However, when it later made the transition into 3D, this highlighted considerations associated with such a move.

The premise of the original 2D game is that the player has control over a number of worms, each of which has access to a vast range of weaponry. The players take turns to move their worms around and attack. The aim of the game is to destroy all the opponent's worms before they destroy yours. It is particularly good in multiplayer mode as it encourages alliances and negotiation (rarely honored) between players—even when it isn't their turn.

#### Simple mechanics

The mechanics of **Worms** are quite simple, in that each worm can move left or right or fire a weapon. Most weapons have to be aimed and different weapons are useful in different situations. The 2D view supports the game mechanics perfectly, because at any time you can see most of the playfield and opponents and so work out a strategy. It's also quite easy to predict where things will go and how they will behave which is important to the strategy you use.

#### Winning formula

The combination of simple 2D view, variety of weapons, destructible scenery, simple but skill-based mechanics, silly graphics and replayability made **Worms** extremely addictive. Many follow up games were made and a few other companies copied the formula with different themes—pigs, snails, and so on—and less success.

#### 3D game

In 2003, **Worms 3D** came out. It excited a fair amount of interest in the games industry because



dedicated gamers were fascinated to see how such a simple, yet almost endlessly compelling 2D game could be reimagined as a successful 3D game. But many critics considered that the **Worms** franchise lost some of its charm following its transition into 3D.

#### Challenges

There are two main problems with **Worms 3D**. First is the controls—to navigate a 3D environment and fire at targets requires either a clever design, or lots of fiddly controls and compromises. Anyone who loads the **Worms 3D** demo is likely to struggle with the controls at first because they just aren't intuitive enough. There is not nearly enough action for the effort.

The second problem is the camera view—a camera in a 3D environment can only see so much. This means that it is much more difficult for the

player to know where he is in the gameworld, and where everything else is. Even a relatively simple task such as finding the best target to attack is quite difficult. Because the direction of the camera is controlled by only one player, the other players can no longer negotiate with each other about future moves. This means that a multiplayer game on one computer isn't really an option. This problem is compounded by the fact that the camera can rotate independently of the worm and the direction it will fire, so the camera is decoupled from the aiming. Sometimes, the camera collides with the scenery, making it impossible to set up a valid shot.

Finally, shooting is far more difficult than in the original game, as shooting at a point on a highly varied 3D environment using projectile weapons is very difficult.

## Design exercise: Discussion

Following on from the ideas put forward in this case study, discuss with a group of friends whether Mario, Zelda, or Grand Theft Auto could be considered to have made the transition to 3D effectively, and the reasons for your conclusions. Which is the most successful, and why? Or, analyze and compare other examples of games that moved from 2D into 3D.

### Considerations

Worms 3D has been enjoyed and praised by many people, but successful as it is, it does highlight the difficulties associated with transferring a game from 2D to 3D, and some of the main considerations that need to be made from the outset.

#### 1 Strange objects

The cartoon world of Worms makes the player access to many strange objects to cause mayhem with.

#### 2 Movement modification

A can of energy drink can be used to modify the movement abilities of the player's worm.

#### 3 Surreal gameworlds

The combat takes place in many surreal gameworlds, each with their unique twist on reality.

#### 4 Saturated color

The saturated color of the cartoon world of Worms makes it instantly recognizable.

#### 5 Shooting in 3D

As a counter-example to the problems of aiming and firing a weapon in a 3D game environment, Wild Metal Country manages this very well.

### GAMEOGRAPHIES

**Title** Worms

**Developer** Andy Davidson

#### Key features

- Turn-based strategy
- Seamless game objectives and mechanics
- Huge array of weapons

**Title** Worms 3D

**Developer** Team 17

#### Key features

- Deformable 3D landscapes
- Detailed and humorous graphic style





# First person v. third person

## The player's point of view

The terms “first person” and “third person” are used to describe the view of the gameworld the player has. A first-person viewpoint simulates the world as if seen through the eyes of the player-character. A third-person viewpoint gives the player a distanced perspective on the entire scene—including their own character—as if seen through a camera. *Half Life* and *Halo* are examples of first-person games; *Grand Theft Auto* and *Prince of Persia* are typical third-person games.

When designing your game, the type of experience you are intending to deliver to the player directly governs your choice of perspective. If you are planning a platform game with perilous drops and a dexterous lead character it would be a brave designer who would suggest this be done as a first-person game. Similarly, if you are planning a game that involves pinpoint accuracy of shooting in an immense universe, a first-person view will undoubtedly offer you the best perspective on your gameworld.

### Controls

Controls play a part in your choice of perspective. A PC's mouse and keyboard are not suited to third-person games but provide the perfect interface for a first-person game, in which the player is constantly in control of both movement and view. In a classic PC setup the mouse controls view (or head rotation) while the keyboard handles movement. This has become the standard control configuration for first person shooters on the PC.

Mapping this configuration to a “dual-shock” controller means placing movement on the left analog stick and view on the right. Generally there are also tweaks and assists going on in the code to make this configuration as comfortable as possible. First-person games on console live or die by their control implementation. Good examples are *Halo 2* on Xbox and *Metroid Prime* on GameCube. Since the launch of the N64, players have enjoyed the subtlety of analog controls. These allow precise control, and most games function perfectly with the left analog stick controlling the primary player navigation.

### The playing experience

Beyond the technical implementation of first- and third-person games, there is one consideration that overrides all: what kind of experience do you want to give the player?

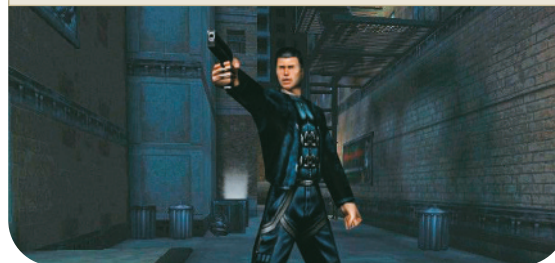
If you have a very character-centric game with a lead character who can perform a huge range of varied and cool-looking moves, you'll almost certainly want the player to see these moves in action. However, if you want the player to feel like he *is* the lead character, first-person games offer an absorbing perspective into your gameworld.

There are a few games that combine both first-person and third-person perspectives to great effect. Using third-person for the environmental puzzles and first-person for exploration and combat, *Chronicles of Riddick* is an excellent example of how these two very disparate perspectives can be brought together through clever, thoughtful game design.

#### First-person view



#### Third-person view



#### ▲ Different views

These two contrasting illustrations show the difference between a first-person viewpoint and the equivalent third-person view. The most obvious difference is perhaps that in the first person, the player character is not visible. Both types of view have advantages and disadvantages—the trick is to make the view you decide on work in the context of your game.

▶ Case study 1: **First-person****GAMEOGRAPHY****Title** Half Life 2**Developer** Valve Corporation**Key features**

- Incredible storytelling
- Realtime gameplay
- Detailed facial animation
- Superb game physics

**The original Half Life was a breath of fresh air in the world of the first-person shooter when it was originally released. It brought immersive storytelling and puzzle-solving to a genre that had been almost exclusively about firepower.**

The promise of Half Life 2 made it one of the most anticipated PC games of all time. Half Life 2 created a gritty, dystopian world for the player to explore. It was some way into the game before you even had a weapon—a decision that distanced

the series even further from the shoot-'em-up roots of the FPS genre. The first-person perspective brought the player directly into the action. Story sequences were played out with characters looking at the player-character while they were talking, drawing the player deeper into the perfectly pitched atmosphere of the game.

Half Life 2 innovated in all areas—even its distribution through the “Steam” download system—and was a fine example of just how far first-person game design can be pushed.

▶ Case study 2: **Third-person****GAMEOGRAPHY****Title** Devil May Cry™**Developer** Capcom**Key features**

- Array of fight styles and moves
- Gothic tone complemented by music

**Capcom's Devil May Cry™ series was about one thing from day one: kick ass and look cool doing it. The game even rated you on how cool you were at kicking ass. Because of this it was a perfect example of a game that excelled in the third person.**

When you're being cool you want to see yourself being cool. Devil May Cry™ used a filmic approach to its camera system, cutting the camera to the best angle for the environment instead of a simple “follow cam.” The lead character,

Dante, had a huge range of attacks that allowed him to switch effortlessly between a katana and a firearm. This gave the player a wonderful sense of achievement when viewed from a dramatic third-person viewpoint.

All that jumping, weapon-switching, evil hordes attacking from all sides, and—most importantly—looking cool, would simply have been too much information to handle from a first-person perspective, making Devil May Cry™ a perfect example of a game that could only work in the third person.





# Real world to gameworld

## Replicating reality

In transferring the features of a real-world activity to a computer or console, game designers are transposing physical activity and codifying it, in order to replicate it on a game controller or keyboard.

### Sporting games

Running around or kicking a soccer ball is not the same as moving an analog controller; skateboarding requires a skateboard not a keyboard; and even with a steering wheel controller, driving a real Formula 1 car at 200mph is a very different experience from “driving” one in the comfort of your own home. Though games developers use words like “realistic” the truth is that soccer, skateboarding, and racing games are far removed from the actual experiences.

So what are designers trying to achieve by creating these games? And what are they giving the player that he cannot have if he is actually taking part in the sport? If you ignore the advertising hyperbole for a minute you can see what these games deliver is a representation of the real-world experience translated into a digital medium. The player is not physically engaging in the sport, but rather playing a digital game which embodies the activity.

### Embodiment of spirit

If you are actually skateboarding then your mind and body are working on several levels, and you are not conscious of many of them. You are flexing your muscles in an exact fashion in order to keep your balance and guide the board. Your mind is constantly plotting where you intend to go and how to use the terrain for your next trick. This delicate and intuitive balance is the experience of skateboarding.

In the Tony Hawk series of skateboarding computer games there is a demand for quickness of thought and manual dexterity—slightly different skills than actual skateboarding demands. But this is still considered a good skateboard game. This is

### Challenges

The complex control sets in Tony Hawk's Skateboarding (far left) aim to give the player comparable physical challenges to those he would experience were he skateboarding for real (left).

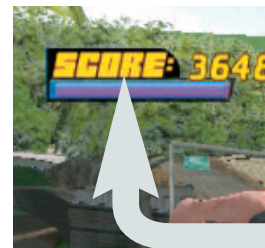
He must master these controls to achieve complex stunts.

### Scoring

Scoring does not generally take place in real-life skateboarding. In the digital version the score gives the player positive feedback on his performance, such as he might receive from his friends if he were actually skateboarding.

### Stunt information

Faithful to the language of skateboarding and the potential repertoire of stunts, on-screen information provides commentary and targets to achieve.





### ◀ Adding realism

The Nintendo Wii (far left) has innovative controllers that allow the player to use gestures as well as pressing buttons. This is used to add realism in *The Legend of Zelda: Twilight Princess* (left), but an aiming HUD is still used to help show the player their target.



because the game designers have embodied the atmosphere and attitude of skateboarding within the game. However, this on its own is not enough. If it were simply the controls and the gamespace, it would be a pale imitation. The games work well because they include other aspects of skateboarding that are peripheral yet important. They feature extensive soundtracks from bands associated with skate culture. The characters are not simply representations of real-life skaters but also larger-than-life skater caricatures. Finally, in these games you are also offered the opportunity to skate where skateboarding is not normally allowed or even conceivable. The reason why these games and other sporting games work is that they not only provide the player with a representation of the sport, but they accurately embody the spirit and the culture of the activity within the game.

### First-person games

In first-person games the representation of reality is an important issue. The designer is faced with the challenge of representing movement through a representation of a physical world in a digital gamespace. What happens, for instance, when the player character runs, jumps, or falls? How should the designer portray the character getting hurt or ill? How should the player character interact with the

environment, equipment, and other people around him? Whatever game mechanic is used, it can only ever be a representation of the real world, and not an actual action.

### What's going on?

There are many tools and methods available to enable a designer to get around the problems of replicating reality. Constantly improving technology allows for better graphics and sound, which both make a huge difference to the realistic effect. But one of the most important factors in making any game appear more realistic is a mechanic that allows the player to keep account of his character's actions and status. This feedback to the player is commonly referred to as the head-up display, or HUD for short. The HUD often appears on-screen as if magically superimposed over the player's view. A shortening bar or a percentage number might tell you the player how well—or wounded—he feels. An icon in one corner might tell him what type of gun is in his hand and how many rounds are left in the magazine. A superimposed map might be available to show the surrounding areas, possibly with markers for enemies. These user-interface devices make up for the real-world feelings or knowledge that a player would have if he were taking part in the scene for real. Usually, the removal of them, for whatever reason, makes the game considerably more difficult as the player effectively loses a "sense." These game mechanics are not a literal representation of a real-world situation, but are a contrivance to deliver the atmosphere and drama of a situation within the confines of a game.

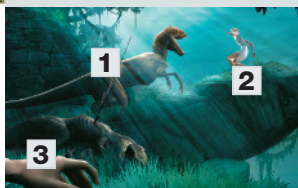


### Ranking

To push the player to even greater heights of achievement, goals are set and the player's skill in reaching them is ranked.



## KING KONG



**1** The action occurs all around the character; they are not just watching from a distance.

**2** Other computer-controlled characters play an active role in the action.

**3** True to life, if the player has a weapon they have no magic aiming point (or sights) to shoot.



### Realism

Though the story of King Kong is fantastic, the game developer has attempted an air of realism in what the player sees on the screen and how they have to interact with the game. The usual on-screen scores, maps and so on are absent.



### Head-up display

The HUD in a computer game may appear superimposed over whatever action is taking place on-screen. This follows the precedent of fighter jets or advanced cars, in which information, such as speed, is displayed on the windscreen. This allows the pilot or driver to access critical information instantly, without taking their eyes off where they are going. In a real-life context, this type of interface can save lives.

It is interesting to note that at least one game makes a notable attempt to explain the HUD and that is Metroid Prime, which has the HUD projected on the inside of the helmet of the character named Samus. As the game is set in the future this is an easily acceptable feature, more so than with a World War Two game which should not (in theory) have such a help. Recently some games, notably Peter Jackson's King Kong, have begun to eschew the HUD as a game mechanic, making the player rely on his wits in interpreting character dialogue and the game environment for the clues to his status.

### More realistic than ever

One of the effects that improved technologies have on games is their greater processing power. This is the ability of the PC or console to undertake the high level of computing needed to present detailed visuals, complex sounds, and credible artificial intelligence for opponents.

As a result of this power, designers can make greater use of real-world references for the game visuals. Textures on game models become almost photo-realistic. The locations can be real-world locations or can be fictional yet convincing hybrids of

real places. While visual realism is not always the defining mark of a great game, when it is used in conjunction with stunning design it maximises the player's suspension of disbelief and immersion into the game.

### Enhancing experience

Sound designers can provide incredibly detailed sound. Not only the noise the character and equipment makes, but ambient sound such as wind and rain or the echoing of footsteps all add to the realistic experience. It is an interesting experiment to watch a horror movie with no sound—usually it stops being scary. However, if you leave the sound on but close your eyes and listen to the sounds, particularly the sound effects, it may be even more frightening as your imagination fills in the images to the sounds you are hearing. This experiment underlines the importance of sound in a computer game.

### Complex situations

One of the most effective uses of processing power in the newest machines (in game terms) is the increased ability to run advanced programs which enable the game to model complex situations. An obvious manifestation is the game physics (how inanimate objects act in the gameworld), for example how gravity works or how things can be broken. The closer in behavior these are to our own world, the more realistic they seem. The apparent intelligence and abilities of the opponents provided by the game is helped by new technologies. In the best examples, opponents do not stand idly until the player is in front of them; rather they seek the player out and track him by noise or movement in order to confront him. Some game characters might even appear to engage the player in a “conversation,” which is dependent on how the game has played so far and gives the illusion of a conscious person talking to the player.



### The designer's role

In achieving all of this the designer is faced with two problems: how to design a game which captures the spirit of the sport or situation in question and seeks to provide the enjoyment and challenges of the sport; and what game mechanics to develop to allow the player to experience the sport or situation features through the traditional medium of a controller or keyboard interface.

Remember that the game you are working on is an emulation of a real situation, and that it can never be a replacement for the real thing. This need not be a limitation, though—as a designer you can work this to your advantage. Aim to add features that enhance the experience in a positive manner for the player, whilst continuing to embody the spirit of the original activity.

Above all remember that the player wants to engage in a fantasy—he may not actually want to be a professional skateboarder, or battling for the safety of humanity in real life, but he would like to feel that he is doing this for the space of time in which he plays the game—and that he is having a rewarding time doing so. All games should be enjoyable; if they are too literal in the interpretation of reality they may not be satisfying to your players. Fail to strike this balance and your game risks being a critical and commercial failure.



### ▲ Sensory assault

Silent Hill not only assaults players with terrifying images, but juxtaposes these with a soundtrack that is equally disquieting. Together, sound and vision make for a convincing, frightening game.



# Storytelling in games

## Narrative structures and implications

A major factor in the evolution of computer games—after obvious technological improvements—is the increasing importance of storytelling. While storyline implementation may have stumbled and tripped along the way, the sheer ambition to progress interactive storytelling in games has pushed designers to become ever more inventive.

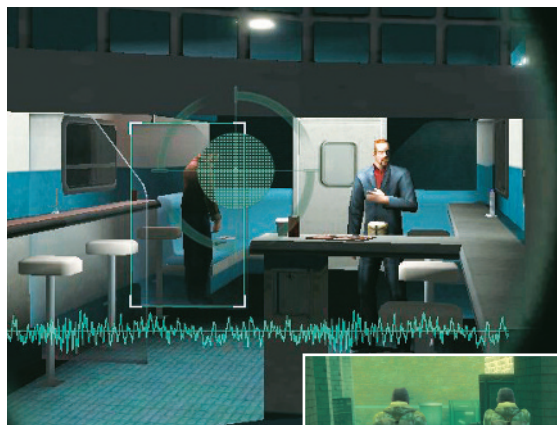
The earliest computer games had no narrative as such, but still had scenarios. Space Invaders, for example, is a “story” of an alien invasion, while Mappy is a cat-and-mouse “tale” about theft. But only with the arrival of home computers and games consoles did storytelling in games begin to be explored. Early text adventures such as Infocom’s Zork introduced interactive fiction, and soon all games had a backstory at the very least.

### “Does my game need a story?”

If you’re planning a sports game, Virtua Tennis for example, little or no story is needed—yet even sports games usually have a “career mode” where your route to stardom is plotted with rival players. Your game may not need a story, but it does at least need context. All but the most abstract of games need some kind of justification for their existence.



© Sega



### No story

As Virtua Tennis focuses on a series of professional tennis matches, no story is needed. The game is all about the players’ skill.

### “My game needs a story”

The big question is: how much? This has a direct effect on the design of your game. Some games, like Metal Gear Solid and the Final Fantasy series, are often more story than game—which is what attracts fans of these games. Other games simply use basic mission introductions to get the story moving and allow it to play out in the action.

A good “compare and contrast” exercise is to play Metal Gear Solid and Splinter Cell. Both are sneaky, mission-based games (Splinter Cell is even “endorsed by Tom Clancy”) yet the level and style of storytelling is completely different.

### Comparison

Tom Clancy’s Splinter Cell (left) and Metal Gear Solid (below) belong to the same genre, yet their level of narrative is very different. Metal Gear Solid is much more story-centered.





### “I don’t want a lot of story”

This decision will save you millions on your budget.

The simplest structure for a game with a basic storyline is the same as for many movies, with a three-act structure. Act 1 sets up the story; act 2 is the main action; act 3 is the resolution. In a game, “stage intro” is act 1, “game” is act 2, and “Boss” is act 3. Simple game story structure usually differs from movie structure in that it is essentially made up of lots of three-act “movies” strung together to provide a stream of action.

Some movies can be re-imagined easily as computer games. For example, whenever James Bond flies off to his next exotic location, a new “stage” is “loaded.” An even better example is a movie like *Kill Bill*, which is effectively a series of boss battles.

This simple structure gives players a sense of progression and achievement. Imagine a game with no bosses and one location played out over 20 hours. The player would lose the will to live.

### ◀ Boss battles

*Kill Bill* is a movie structured like a computer game that was based on the structure of a typical three-act movie. In other words, rather than following the typical movie

structure of “Act 1, act 2, act 3,” it is a series of three-act parts joined end to end. Each part contains a “Boss battle” in which the heroine takes her merciless revenge on a character.

### “I want lots of story”

If you’re planning a heavily story-based game, be sure that you have a great story to tell, as well as the budget to back it up. Games such as *FINAL FANTASY* are all about the story. Every action taken, every battle fought, is designed for one thing—to find out what happens next.

“Plot points” in story-based games are sections of story that progress the stage. For example, if the story for Stage 1 is to break into a museum and steal a diamond, Plot Point 1 might be when you’ve got into the museum and are checking out the security system. Plot Point 2 might be finding the room with the diamond, and so on.

Games with lots of story can polarize players. Ask around and see how many people like *Metal Gear Solid* and how many don’t—the story divides opinion. Yet the sales figures prove that there are a large number of players who enjoy story-based games. Like them or loathe them, stories in games are here to stay.

### ▼ Must-play narrative games

- Broken Sword: The Sleeping Dragon (Revolution Software)
- FINAL FANTASY XII (Square Enix)
- Deus Ex (Eidos Interactive)
- Max Payne (Gathering of Developers)
- Metroid Prime (Nintendo)
- Tomb Raider Legend (Eidos Interactive)
- Lego Star Wars 2 (Lucas Arts/TT Games)



### ◀ Complex story

There is a rich and detailed storyline to all the *FINAL FANTASY* games. Not only the stories experienced by the player; the backstories of other characters and creatures met in the game are included as well.



# Cut scenes

Telling the game's story

A cut scene is part of a game that progresses the game's storyline and is non-interactive. Some games are cut-scene heavy. The FINAL FANTASY and Metal Gear Solid games often employ lengthy cut scenes. Other games, like Grand Theft Auto, use short story sections to give the player mission briefings or status updates.

A useful rule of thumb for using cut scenes is "play action—show story." This means not using a cut scene to show the hero defeating the boss, which would cheat the player of action. Instead, use the cut scene to introduce the boss; get the player really involved so he can't wait to jump in and defeat it.

## Boss death scenes

Boss characters are often placed between a "boss intro" cut scene and a "boss defeated" outro. Sometimes these cut-scene boss deaths contain a large amount of action. Be careful—there are games where, after attacking a boss with a limited number of moves for five minutes, the boss-death cut scene kicks in and the player character is jumping around the screen and pulling off moves that are inaccessible during normal play. This cheapens the experience and exposes holes in the game mechanics.

## Intro cut scenes

There is one exception where action can be used successfully in a cut scene—the intro. At this stage, you want to engage the player by showing off the awesome gameworld and the possibilities of the main character. Onimusha 3 has an amazing intro cut scene that still accurately reflects the main character's abilities.



## Intro cut scene

This scene, from the intro of Onimusha 3, is not controlled by the player, but develops the game's story and adds important information.

## Cut scene methods

There are two main ways cut scenes are played back in computer games—either dropping to video for a pre-rendered scene, or using the in-game renderer to produce a real-time cut scene.

## Video cut scenes

A video cut scene is usually an animated sequence rendered out and encoded as a video stream to be played back during the game. There are two main advantages of using video. The artists can generate a scene using all the rendering techniques available with a package such as 3D Studio Max or Maya. They are not restricted by the number of polygons, lights, or particle effects that the game engine might have, so video cut scenes can have a quality akin to cinema. The FINAL FANTASY games are great examples. In addition, the scene will look the same on all hardware. Video playback is easily achievable on everything from a cell phone to the latest-generation console.

However, the downside is that there may be a jarring of quality between game and video assets. Video scenes will always look better than the real-time game. Producing high-quality video can also cost a lot of money. Often, video cut scenes are outsourced to specialist studios to ease the pressure on the development team.



### ▲ Story overview

Cut scenes may borrow from cinema and have multiple points of view, to give the player a better impression of a critical part of the story, as this scene from Metal Gear Solid demonstrates.

### Real-time cut scenes

Real-time cut scenes are played back using the same renderer and assets as the main game. As a result there is no jarring of quality between the game and the cut scenes. A game like Metal Gear Solid uses real-time cut scenes for all its story sections, and this is one of the main reasons why the game feels so consistent. Production of real-time cut scenes is more complex than video and usually relies on in-house tools to allow animation data to be exported directly from the animation package of choice for direct playback in the game engine.

The big disadvantage of this is that what the animator sees in Maya, for example, will not be exactly what is seen in the game. A lot of time can be spent tweaking animation data to get the desired results, exporting and re-exporting the data until it's just right. Because the rendering of the cut scene is all handled by the game engine the quality and frame rate may change based on the target platform. This can be something of an unknown variable with PC development where the player's PC spec may be significantly different from the spec desired.



### ▲ Dialog

Cut scenes provide an opportunity to present spoken or written dialog, which enhances the player's experience, as in these screenshots from DRAGON QUEST.

### Scripted cut scenes

There is one other, simpler type of cut scene that many games rely on—the scripted cut scene. If you simply want two game characters to meet and exchange some dialog, it is often simpler, easier, and more cost-effective to use a scripted cut scene. These are scenes played back using the game engine and are created using the same scripting language that is controlling your game. Here is an example of the code for a scripted cut scene:

```
SetCamera CameraIntro, player
PlayAnim player, Idle
Print "How's it going?"
Wait 30
SetCamera CameraIntro, enemy
PlayAnim enemy, angry
Print "I'M GONNA KILL YOU!" ...and so on
```

With a sophisticated scripting system in your game engine—and a lot of patience—you can actually build up reasonably complex sequences using this system. Even elaborate games like DRAGON QUEST use this technique a lot when the player chats with the other characters in the game. DRAGON QUEST actually uses a combination of all the techniques discussed here and is a great example of where and how to use video, real-time, and scripted cut scenes. Play it and try to spot which sections are which.



# Motivation and objectives

## Analyzing the need to win

All games, not just computer games, are driven by motivation and objectives. In sports, people are motivated to be the best, to become legendary for their talent; while their objective is to win the current match. These principles translate directly to the world of computer game design.

### Why play?

**Motivation:** the need to get the girl, kill the baddies, and save the entire planet because some invading force is threatening you.

**Objectives:** the challenges, stages, mini-bosses, bosses, and so on along the way.

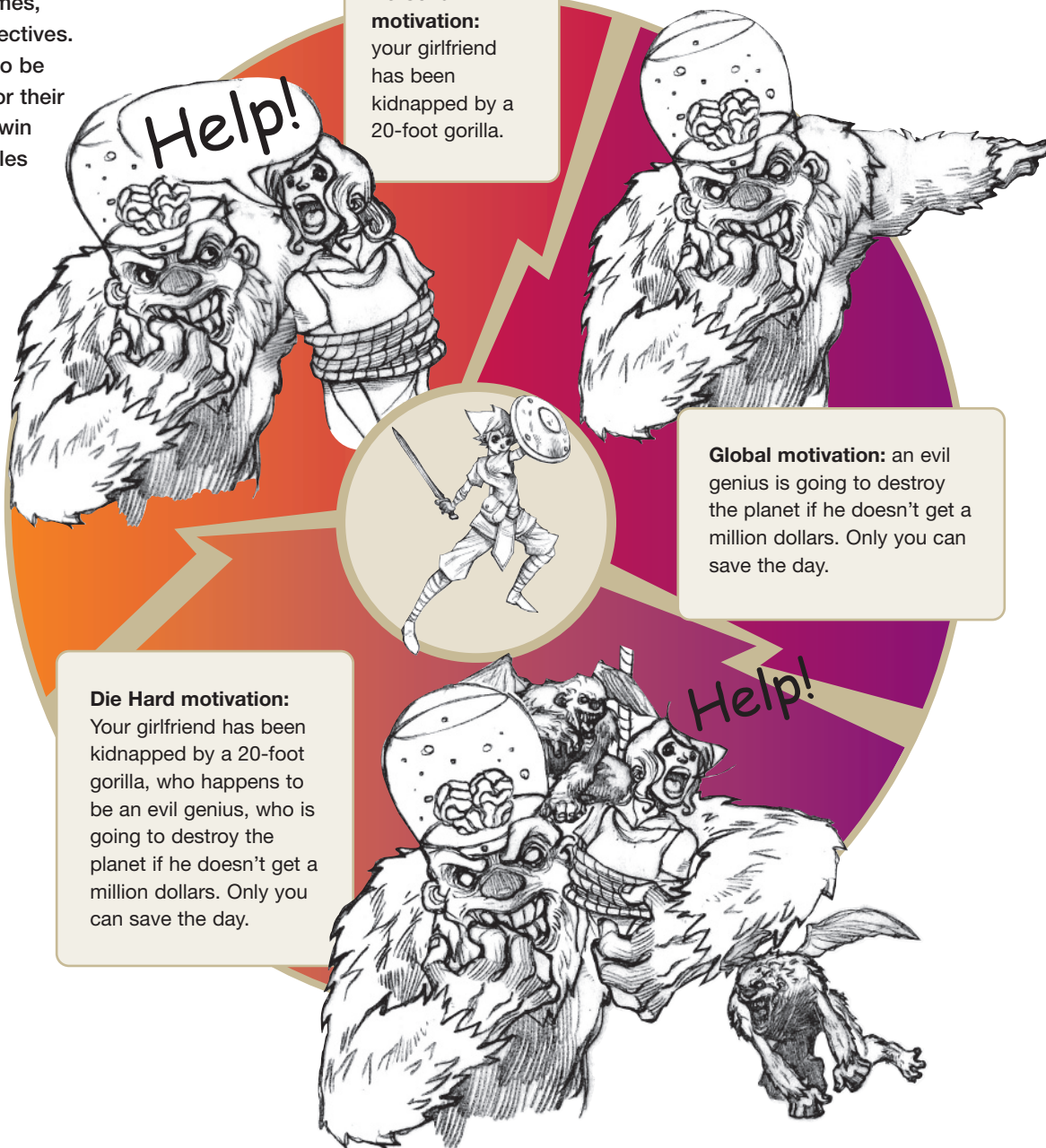
### Motivation types

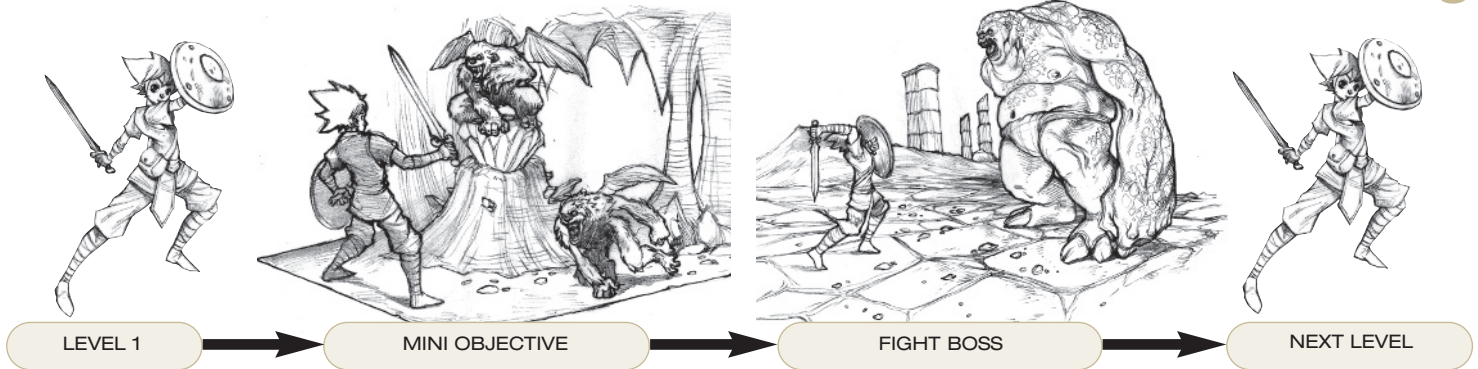
Motivation in a game can be split into distinct types, with the emphasis placed on the main character (personal motivation), or the planet (global motivation), or both ("having a really bad day" or "Die Hard" motivation). The threefold illustration (right) demonstrates some examples.

**Personal motivation:** your girlfriend has been kidnapped by a 20-foot gorilla.

**Global motivation:** an evil genius is going to destroy the planet if he doesn't get a million dollars. Only you can save the day.

**Die Hard motivation:** Your girlfriend has been kidnapped by a 20-foot gorilla, who happens to be an evil genius, who is going to destroy the planet if he doesn't get a million dollars. Only you can save the day.





### Die Hard motivation is the best

Make the motivation personal and global (Die Hard) and you create a great impetus for your character to act. Nearly all successful action films follow the Die Hard motivation pattern. But even supposing the planet is about to be destroyed and your girlfriend is being held captive by a giant simian; what's to stop you from just going back to bed and not even trying to face these insurmountable odds? Well, as in many great stories, your character is forced into action.

### Forced action

Your character wakes up after being drugged to find his girlfriend gone. Initially confused, he finds in his hand a TV remote with a note attached to it with the words "Press me" written in terrible handwriting. Your character pushes the "play" button, and on a TV at the other end of the room a DVD plays. It turns out that a 20-foot gorilla has kidnapped your girlfriend and is going to destroy the planet if he does not get a million dollars. Oh, and just for fun, he has surgically implanted a thermonuclear device in your stomach that will go off in 12 hours unless you personally deliver the money.

Your character gets out of bed. Self-preservation is the ultimate motivation.

### Objective types

Objectives are the obstacles between the player and his ultimate goal. A structure for game objectives developed early on: reach the end of a level, kill the boss. This basic structure prevails, though it may be masked by complex storytelling and graphical finery.

Players need to feel a sense of progression.

The boss-battle is a sign to the player that he has successfully completed part of the game. In Greek mythology terms, a computer game boss would be called a "gatekeeper." These gatekeepers would try to stop the hero from progressing on his worthy mission. Defeating the gatekeeper allowed him to continue his mission and prove he was up to the task. In modern computer games the gatekeeper (or boss) does not have to be human; it could be environmental. However, people do tend to respond to and remember characters best.

### Mini-objectives

Within game levels, a useful device is to have mini-objectives. Mini-objectives help to maintain the player's interest by offering intermediate challenges before the eventual face-off with the boss. These mini-objectives could be as simple as "break into the museum," "steal the diamond," or "get out of the museum." These examples are fine, but as with the motivation example, the more incentive you can throw at the player the better.

For example: Maybe the kidnapping gorilla has an army of mind-controlled monkeys who have been sent out to stop you getting the diamond. They let you get into the museum, but then start to trigger the alarms and generally cause chaos. Just as you are about to retrieve the diamond, a monkey swings down from the ceiling and steals it from your grasp. The mini-objective switches to getting the diamond back from the mind-controlled monkey, and so the play progresses at a high level of excitement.

### Checklist

- Make the mission personal to force the player to act.
- Bosses help players feel a sense of progression.
- Mini-objectives maintain the player's interest.
- Combine both personal and global threats for maximum effect.





# Players' roles



## Hero, anti-hero, or god?

The player's role in general is to re-balance a world that has fallen into chaos—he is the “hero.” This archetype is true of the majority of games, the exception being pure sports or simulation games. In titles such as FIFA, Gran Turismo, or Microsoft Flight Simulator, the player's primary role is personal development. As the player you want to get the better car, be top of the leader board, or win the World Cup. The player is still the hero in these games, but there is no external pressure beyond the need to win driving the player's progress—his world is not in complete disarray.



### Heroes and anti-heroes

In Super Mario Sunshine, Mario's holiday island is in chaos. Mario has been accused of defacing the island with graffiti. He must clean up the island and find the real culprit, in order to restore normality. He does this selflessly, risking life and limb. This makes Mario a hero.

The Grand Theft Auto series is an excellent example of a different type of “hero” scenario. The technological and artistic achievements of this series have been recognized by millions of fans worldwide. The freedom with which gamers can play within GTA's interactive environment enables them to explore increasingly sophisticated and immersive virtual worlds.

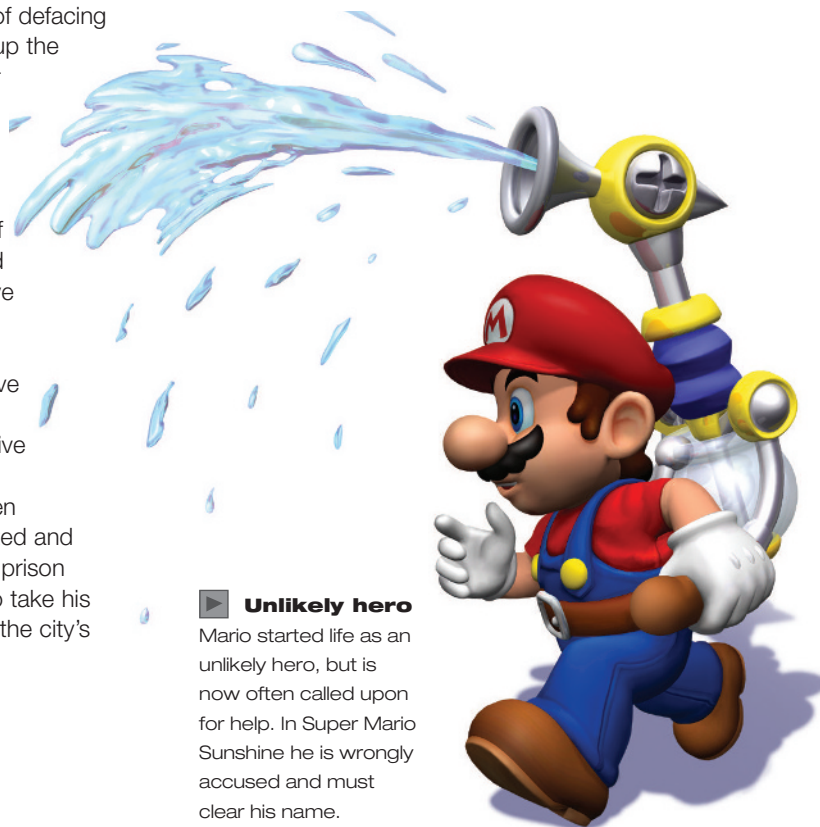
After the player's character has been betrayed and left for dead, he is arrested and locked away, until he gets caught in a prison break. While on the run, he sets out to take his revenge and rise through the ranks of the city's criminal underworld.

### Anti-hero

In GTA the player plays a hero, but one with a criminal mission.

### Chaos dynamic

It's possible to apply the “world in chaos” dynamic to sports and simulation games too. For example, you are the driver for a NASCAR team which is down on its luck. If the results don't improve, the team is going to be bought out by Hyperglobal Evil Corp. You're the fresh-faced rookie, and the team's last hope. If you win all the races, the team will be saved. Any sports movie worth its salt exploits this model. It adds an additional dynamic to the piece and cements the player as the true hero.



### Unlikely hero

Mario started life as an unlikely hero, but is now often called upon for help. In Super Mario Sunshine he is wrongly accused and must clear his name.





### Godlike view

With a godlike overview and the capability to affect the world on a massive scale, Sim City allows players to exercise their whims and fancies over the urban landscape. Styles of management result in differing outcomes—grimy, industrial dystopia (left) or gleaming, well-run metropolis (right).

### FLIGHT SIMULATOR

In simulators, the player's role is to be "himself," but engaged in an activity he may never have access to.

#### 1 Difficulty

The difficulty level affects the degree of satisfaction the game provides.

#### 2 New pilot

Create and save pilot details based on existing parameters.

#### 3 Career path

The player can plot his career path, with implications for goals and level of difficulty.

### Playing god

There is another genre of game that uses the idea of restoring balance to a world in chaos, but approaches it from a slightly different angle. In a "god game" the world starts in balance and it is your job to maintain this balance or restore order if the world becomes chaotic. In Sim City, for example, you are constantly balancing multiple variables to make sure your citizens are a happy bunch. You battle everything from power outages, natural disasters, and even an occasional random attack by Godzilla. If you maintain order and refuse to let chaos reign, you're successful.

Taking this one stage further, there is no real reason why this dynamic of balance couldn't be applied to a game like Super Mario Sunshine. Instead of the player reacting to events, you could twist the Mario game into a proactive game. In Super Mario Sunshine, the damage has already been done—the graffiti is already on the walls. If this were twisted slightly you could change the dynamic, so Mario had to stop the island from becoming a mass of spray paint. If you managed to stop all the graffiti artists, balance would be maintained. However, if the street art got out of hand, the island's inhabitants might turn on Mario, shifting the challenges of the game from policing to protection.

Whatever your scenario, one thing stays true—even for Microsoft Flight Simulator. The player is the most important person in the gameworld and the center of all the action.





# Difficulty curves



## Testing the player over time

When considering how to pace the level of difficulty in a game, the general rule is “start easy and end hard.” This means that most players will be able to play most of the game. It also means that the player is given time at the beginning to learn all his character’s moves. It also means that the game will have some longevity, as it may take many attempts to complete the final stages.

### Varying the approach

A simplistic approach to pacing the difficulty level in a game is to gradually increase it as the game progresses; this is quite often successful, but there are alternatives. One simple variation is to introduce dips in the difficulty curve to give the player some time to relax and prepare for the next rise. This can increase the tension and drama in the game, especially if the player begins to recognize the pattern—introducing an anticipatory feeling of calm before the storm.

### Quality Assurance

When designing a game it will probably feel like a fairly natural process to increase the difficulty as the game progresses, adding more features and harder challenges toward the end of the game. It is often common for designers to make early levels too hard though, because as they develop a game they often get very good at it. This is where Quality Assurance (QA) becomes invaluable. QA is the team of people who test the game for bugs, inconsistencies, and for how well it plays. They provide the development team with constructive criticism and feedback from an objective point of view.

The QA testers log their findings on a questionnaire, an example of which is shown on the right. The details are important to provide consistent, comparable feedback.

#### QA test sheet

##### Tester

Who found the problem? They may need to demonstrate it to others in the team if it is hard to spot.

##### Developer/Publisher contact

A tester may be working for more than one developer or publisher. The developer or publisher might specify a point of contact.

#### QA test sheet

##### Name

The name of the game. The team may be involved in testing several.

##### Date

The date is particularly important in relation to the development milestones of the game.

#### QA test sheet

##### Issue

A brief description of the problem.

##### Location

Where it occurs in the game.

##### Severity

What level of seriousness is the bug?

##### Explanation

A full explanation of the fault.

##### Resolution

The tester may record a suggestion as to how the problem may be fixed.

##### Refer to

The tester may record whose responsibility it is to fix this problem.

**Game:** Relentless

**Tester:** C. Ryan

**Developer contact:** E. Smith/Imagination Games

**Publisher contact:** R. Kostos/Gamevision

**Issue:** The player character becomes stuck and cannot complete a level resulting in the game being unfinished.

**Location:** Beginning of level 5.

**Severity:**  
Critical / Severe / Minor / Cosmetic

**Explanation:** The player character is required to place objects in such a way that they can escape a room. By moving these objects they inevitably become blocked in.

**Resolution:** The positioning of the objects needs to be re-thought.

**Refer to:** M. Clinton



## Choices

Non-linear games such as *Grand Theft Auto* and *Elite* offer a differing difficulty experience, because they give the player more choice in how they play the game and what they do. To a lesser degree, level-based non-linear games, such as *Burnout 3*, give the player choice too, by allowing him to select one of a small number of levels to play. However, *Grand Theft Auto 2* is particularly interesting in this area as it allows the player to choose the difficulty of the missions by selecting different telephones within the game itself. This complete integration of difficulty choice into the gameworld really opens up opportunities for the player in terms of how he wants to play the game. It forces the player to question himself about how skilful he actually is, and how much effort he wants to put in. This self-questioning element could be considered a game on its own—but is lacking from the more recent *GTA* titles.

## ▲ ▶ Dips in the difficulty curve

*Shadow of the Colossus* takes the concept of pacing play through dips in the difficulty curve to extremes, as the game consists entirely of a few huge “boss” opponents, and the rest is almost empty, but beautiful, scenery. The player has little to do but ride around until he finds a Colossus. This then leads to a period of intense, kill-or-be-killed action between the player character and the much larger Colossus.



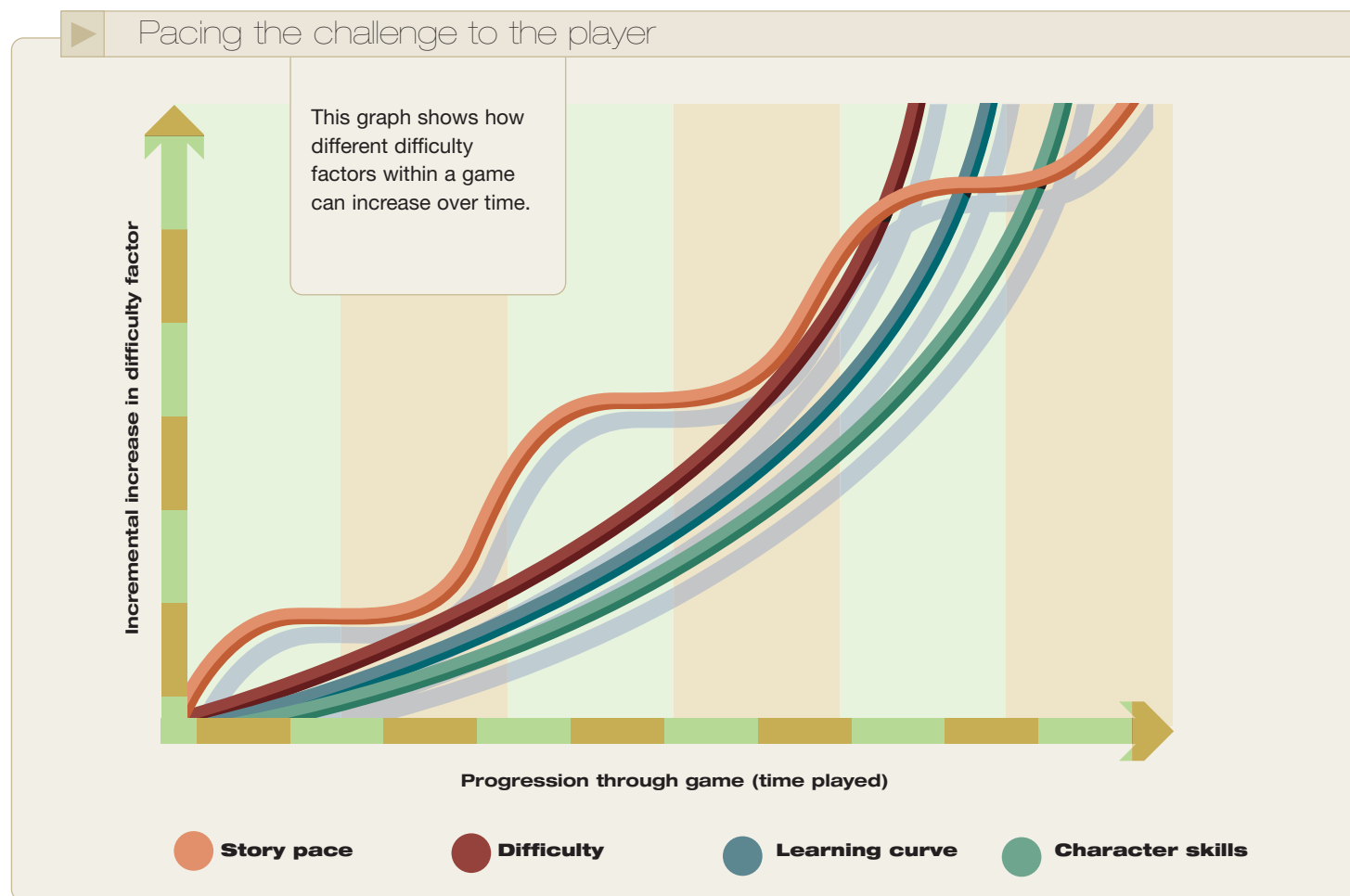




### Adaptive play

A good way to play with difficulty curves is by monitoring what the player is doing and how well he does at particular tasks. If he seems to be particularly bad at one activity then it may be possible to make it easier. If he excels at an activity it can be made more challenging. This process is sometimes known as the adaptive difficulty system and has been used in games such as *Rainbow Islands*. It is a neat idea in theory and has many advantages for the player. For the developer it is trickier because all games need to

be tested thoroughly, and adaptive play means that comprehensive testing of all permutations is difficult or even impossible. Developers have to be very careful; the parts of the game the player enjoys most must not be too hard, and the parts the player enjoys but isn't good at must not be too easy (the challenge of these parts may be the enjoyable aspect). Less importantly, but still something to consider, is that players comparing progress may feel cheated if the system isn't very obvious or carefully explained.



## BURNOUT 3



**1** Player position—as the player gains experience he learns that being first is not always the best position.

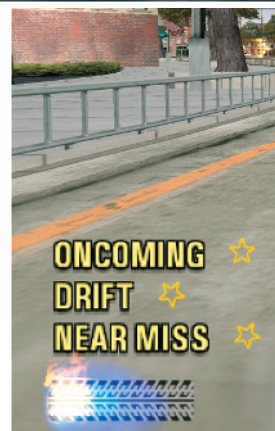
**2** Lap counter—the player must interpret when in the race to make his move against his opponents.

**3** The boost-meter is a reward for driving skilfully. Players can accumulate boost to accelerate faster.

**4** Speed influences the outcome of maneuvers. The player learns to judge when moves are viable.

### Mastering the game

Burnout 3 is a racing game that encourages you not only to race as an individual, but to actively drive dangerously and cause you opponents to crash. As well as mastering car-racing, the player must learn high-speed maneuvering stunts in order to win, and cause massive pile-ups among his opponents. In mastering this game, the player must make extensive use of the on-screen help provided in the form of an HUD. The player uses valuable information built up as the game progresses in order to succeed.







# Game design catchwords



## Exploiting industry standards and clichés

There are many possibilities facing a game designer. The challenge is to learn not to become overwhelmed by these possibilities and end up developing a confused and unsatisfactory game. In order to maintain clarity, a designer should always be aware of three useful catchwords to aid his gameplay design—simplicity, consistency, and fairness.

### Internal logic

Though the strange environment in *Shadow of the Colossus* (left) is populated by giant fantasy creatures, the game has its own internal logic. *Oddworld: Munch's Oddyssey* (right) is set in a bizarre world, yet the player can quickly accept this as the norm as the game makes sense on its own terms.

### Simplicity

A phrase that may be familiar to you is K.I.S.S. or “keep it simple, stupid”—a little insulting perhaps, but good advice. When designing games there can be a tendency to over-complicate issues, quite often with the best intentions. However, it is highly likely that a simple solution will be the most satisfactory one.

Consider the following example. Why force the player to go into his inventory, select a key, use the key, and then go back from the inventory to open a door? The player has the key, he wants to go through the door, so let him! In this case simplicity translates directly as “interface ergonomics.”

### Consistency

Players will immerse themselves in any type of behavior, no matter how bizarre or ridiculous, within a gameworld, as long as it is consistent. Two important concepts for maintaining consistency are verisimilitude and suspension of disbelief.

### Verisimilitude

When applied to games, verisimilitude means that once you have created a story or setting with its own internal logic, players will accept what is “real” in your created world but will sense a fault if something unexpected appears. For example, players accept the existence of giant creatures in *Shadow of the Colossus*. These giants must be scaled by the player to find their weak points and defeat them, equipped only with a horse, bow, and sword. But if a laser pistol were introduced—essentially another fantasy item—it would not seem right as it would be a technological item in a primitive game. Yet the whole thing is fantasy. It is the designers’ skill in maintaining consistency when developing the story and the world the game takes place in that makes it seem real.



## Suspension of disbelief

Suspension of disbelief refers to the readiness of the player to put aside his critical faculties and accept fantastic creations. Many games concern fantasy events—in terms of science fiction or surreal themes, or in allowing us to play in a familiar world but without societal constraints. If the player could not suspend his disbelief, he would not enjoy the troubled adventures of Munch in *Oddworld: Munch's Oddysee*. This world is quite different from our own. The trials Munch faces and how he deals with them are surreal compared to the player's experience.

Designers are therefore free to create quite fantastic worlds that may require extraordinary in-game behavior to master, but as long as they are consistent in applying features to the gameworld, the player will willingly accept the game and enjoy the varied challenges and rewards it presents.

## Fairness

Players should always be able to understand the reasons for things happening to their on-screen persona. As a player there is no worse feeling than being cheated. Whether this is by bad luck, or by the devious actions of an opponent, it usually means that the player becomes so unhappy with the game that he never plays it again. This can be disastrous for a computer game if players feel cheated by poor design or inconsistent in-game opponents. There is a fine balance between a game being fair and being challenging. This balance comes down to the skill of the designer. If the pace and challenge of the game seem too difficult then a player will quickly get the feeling that he cannot succeed no matter how hard he tries. Likewise, if there is an unavoidable pitfall, this could prove to be a disincentive to carry on with the game. Players will delight in challenges of all types depending upon the game, from the hidden sniper to the complex pattern puzzle. It is your job as a designer to make sure that they are entertained by your challenge and not dissuaded from play.

## Game design clichés

**It's always handy to be aware of game design clichés, either to use them, avoid them, or even subvert them. Here are three examples.**

### A key opens a door

This design cliché is seen practically everywhere from very early games right up until now. The basic version is simple: a door prevents you getting any further; to get to the next area, you must find the key to unlock the door. But there may be more than one key and more than one door, each key only opening a specific door. The “door” might not be a door at all—it might be a monster—but to defeat it and progress, you need to find a magic sword and use it on the monster. It's still essentially the same thing.

### Collecting things

A simple way to add longevity to a game is to fill it with things to collect. There will always be a percentage of

people who, if collecting is involved, want to collect everything. The collection mechanic works best if there are rewards for collecting certain percentages of the total in the game and strong information design (see page 118) to encourage it and show progress. Collected items may form an essential part of the game or be a completely separate component. It's a simple, easy, and successful design pattern, but it can be overused and unrewarding.

### Upgrading and power-ups

Improving a character's abilities is an old industry standard. *Pac-Man* used this to great effect with the Power Pill, and *Elite*'s incredible range of ship modifications gave the player reason to play well and allowed them some customization of their ship. Things haven't changed much since then, the only real difference being the range of objects which can be modified and to what extent they can change.



### Collecting

In *Pokemon*, the player must collect all the monsters in order to succeed.