

# Space Invaders

For other uses, see [Space Invaders \(disambiguation\)](#).

***Space Invaders*** (Japanese: スペースインベーダー *Hepburn: Supēsu Inbēdā*) is an [arcade](#) video game created by [Tomohiro Nishikado](#) and released in 1978. It was originally manufactured and sold by [Taito](#) in Japan, and was later licensed for production in the United States by the [Midway](#) division of [Bally](#). *Space Invaders* is one of the earliest [shooting games](#) and the aim is to defeat waves of aliens with a laser cannon to earn as many points as possible. In designing the game, Nishikado drew inspiration from popular media: *Breakout*, *The War of the Worlds*, and *Star Wars*. To complete it, he had to design custom hardware and development tools.

It was one of the forerunners of modern video gaming and helped expand the [video game industry](#) from a novelty to a global industry (see [golden age of video arcade games](#)). When first released, *Space Invaders* was very successful.

The game has been the inspiration for other video games, re-released on numerous platforms, and led to several sequels. The 1980 [Atari 2600](#) version quadrupled the system's sales and became the first "[killer app](#)" for [video game consoles](#). *Space Invaders* has been referenced and parodied in multiple television shows, and been a part of several video game and cultural exhibitions. The [pixelated](#) enemy alien has become a [pop culture](#) icon, often used as a [synecdoche](#) representing video games as a whole.

## 1 Gameplay

*Space Invaders* is a [two-dimensional fixed shooter game](#) in which the player controls a [laser](#) cannon by moving it horizontally across the bottom of the screen and firing at descending aliens. The aim is to defeat five rows of eleven aliens—some versions feature different numbers—that move horizontally back and forth across the screen as they advance towards the bottom of the screen. The player defeats an alien, and earns points, by shooting it with the laser cannon. As more aliens are defeated, the aliens' movement and the [game's music](#) both speed up. Defeating the aliens brings another wave that is more difficult, a loop which can continue without end.<sup>[3][7][8][9]</sup>

The aliens attempt to destroy the cannon by firing at it while they approach the bottom of the screen. If they reach the bottom, the alien invasion is successful and the game ends. A special “mystery ship” will occasion-



*The player-controlled laser cannon shoots the aliens as they descend to the bottom of the screen.*

ally move across the top of the screen and award bonus points if destroyed. The laser cannon is partially protected by several stationary defense bunkers—the number varies by version—that are gradually destroyed by a numerous amount of blasts from the aliens or player. A game will also end if player's last laser base is destroyed.<sup>[3][7][8][9]</sup>

### 1.1 Scoring

- **Alien invaders:** 10 (bottom two rows), 20 (middle and second from top rows), or 30 points (top row).
- **Mystery ship:** 50, 100, 150, or 300 points.

Points earned for shooting mystery ship varies.

Players earn an extra life at either 1,000 or 1,500 points. No extra lives thereafter. The high score is maxed at 9,990 points.

## 2 Development

*Space Invaders* was created by [Tomohiro Nishikado](#), who spent a year designing the game and developing the nec-

essary hardware to produce it.\*[10] The game's inspiration is reported to have come from varying sources, including an adaptation of the mechanical game *Space Monsters* released by Taito in 1972, and a dream about Japanese school children who are waiting for Santa Claus and are attacked by invading aliens.\*[3]\*[11] However, Nishikado has cited Atari's arcade game *Breakout* as his inspiration. He aimed to create a shooting game that featured the same sense of achievement from completing stages and destroying targets, but with more complex graphics.\*[10]\*[12] Nishikado used a similar layout to that of *Breakout* but altered the game mechanics. Rather than bounce a ball to attack static objects, players are given the ability to fire projectiles at their own discretion to attack moving enemies.\*[13]

Early enemy designs included tanks, combat planes, and battleships.\*[10] Nishikado, however, was not satisfied with the enemy movements; technical limitations made it difficult to simulate flying.\*[10]\*[14] Humans would have been easier to simulate, but Nishikado considered shooting them immoral.\*[14]\*[15] After seeing a magazine feature about *Star Wars*, he thought of using a space theme.\*[10]\*[12] Nishikado drew inspiration for the aliens from H. G. Wells' *The War of the Worlds*—he had watched the 1953 film adaptation as a child—and created initial bitmap images after the octopus-like aliens.\*[10]\*[12]\*[14] Other alien designs were modeled after squids and crabs.\*[10]\*[14] The game was originally titled *Space Monsters*, inspired by a popular song in Japan at the time ( “Monster” ), but was changed to *Space Invaders* by Nishikado's superiors.\*[10]\*[12]

## 2.1 Hardware

Because microcomputers in Japan were not powerful enough at the time to perform the complex tasks involved in designing and programming *Space Invaders*, Nishikado had to design his own custom hardware and development tools for the game.\*[10]\*[14] He created the arcade board using new microprocessors from the United States.\*[12] The game uses an Intel 8080 central processing unit, features raster graphics on a CRT monitor and monaural sound hosted by a combination of analog circuitry and a Texas Instruments SN76477 sound chip.\*[4]\*[15]\*[16] Despite the specially developed hardware, Nishikado was unable to program the game as he wanted—the Control Program board was not powerful enough to display the graphics in color or move the enemies faster—and he considered the development of the hardware the most difficult part of the whole process.\*[10]\*[14] While programming the game, Nishikado discovered that the processor was able to render the alien graphics faster the fewer were on screen. Rather than design the game to compensate for the speed increase, he decided to keep it as a challenging gameplay mechanism.\*[12]\*[17]

*Space Invaders* was first released in a cocktail-table format with black and white graphics, while the Western re-

lease by Midway was in an upright cabinet format. The upright cabinet uses strips of orange and green cellophane over the screen to simulate color graphics. The graphics are reflected onto a painted backdrop of a moon against a starry background.\*[8] Later Japanese releases used rainbow-colored cellophane,\*[8] such as *T.T. Space Invaders* in 1978, followed by a version with a full-color display.\*[8] The cabinet artwork features large humanoid monsters not present in the game. Nishikado attributes this to the artist basing the designs on the original title, *Space Monsters*, rather than referring to the in-game graphics.\*[10]

## 2.2 Music

Despite its simplicity, the music to *Space Invaders* was revolutionary in the gaming industry. Videogame scholar Andrew Schartmann identifies three aspects of the music that would have a significant impact on the development of game music:

1. Whereas video game music prior to *Space Invaders* was restricted to the extremities (i.e., a short introductory theme with game-over counterpart), the alien-inspired hit featured continuous music—the well-known four-note loop—throughout, uninterrupted by sound effects. “It was thus the first time that sound effects and music were superimposed to form a rich sonic landscape. Not only do players receive feedback related directly to their actions through sound effects; they also receive stimulus in a more subtle, non-interactive fashion through music.”\*[18]
2. The music interacts with on-screen animation to influence the emotions of the player. “That seemingly pedestrian four-note loop might stir us in the most primitive of ways, but that it stirs us at all is worthy of note. By demonstrating that game sound could be more than a simple tune to fill the silence, *Space Invaders* moved video game music closer to the realm of art.”\*[18]
3. The music popularized the notion of variability—the idea that music can change in accordance with the ongoing narrative. The variable in *Space Invaders* (tempo) is admittedly simple, but its implications are not to be underestimated. “Over the years, analogous strategies of variation would be applied to pitch, rhythm, dynamics, form, and a host of other parameters, all with the goal of accommodating the nonlinear aspect of video games.”\*[18]

At the deepest of conceptual levels, one would be hard-pressed to find an arcade game as influential to the early history of video game music as *Space Invaders*. Its role as a harbinger of the fundamental techniques that

would come to shape the industry remains more or less unchallenged. And its blockbuster success ensured the adoption of those innovations by the industry at large.

—Andrew Schartmann, *Maestro Mario: How Nintendo Transformed Videogame Music into an Art*, Thought Catalog (2013)

### 3 Impact and legacy

After the first few months following its release in Japan, the game became very popular.\*[15] Specialty arcades opened with nothing but *Space Invaders* cabinets,\*[10]\*[15] and by the end of 1978, Taito had installed over 100,000 machines and grossed over \$600 million in Japan alone.\*[25] Within two years by 1980,\*[26] Taito had sold over 300,000 *Space Invaders* arcade machines in Japan,\*[27] in addition to 60,000 machines in the United States,\*[26]\*[28] where prices ranged from \$2000 to \$3000 for each machine,\*[29] within one year.\*[30] The arcade cabinets have since become collector's items with the cocktail and cabaret versions being the rarest.\*[31] By mid-1981, more than four billion quarters, or \$1 billion, had been grossed from *Space Invaders* machines,\*[32] and it would continue to gross an average of \$600 million a year\*[33] through to 1982, by which time it had grossed \$2 billion in quarters\*[34]\*[35] (equivalent to \$7.34 billion in 2017),\*[36] with a net profit of \$450 million\*[35] (equivalent to \$1.65 billion in 2017).\*[36] This made it the best-selling video game and highest-grossing entertainment product of its time,\*[34] with comparisons made to the then highest-grossing film *Star Wars*,\*[34]\*[37] which had grossed \$486 million\*[37] in movie tickets (costing \$2.25 each on average)\*[34] with a net profit of \$175 million.\*[37] *Space Invaders* had earned Taito profits of over \$500 million.\*[10]\*[38] The 1980 Atari 2600 version was the first official licensing of an arcade game and became the first "killer app" for video game consoles by quadrupling the system's sales.\*[8]\*[39] It sold over two million units in its first year on sale as a home console game,\*[40] making it the first title to sell a million cartridges.\*[41] Other official ports of the game were made for the Atari 8-bit computer line and Atari 5200 console. Taito released it for the NES in 1985 (Japan only). Numerous unofficial clones were made as well, such as the popular computer games *Super Invader* (1979)\*[42] and *TI Invaders* (1981), which was the top-selling computer game for the TI-99/4A through at least 1982.\*[43]

An oft-quoted urban legend states that there was a shortage of 100-yen coins—and subsequent production increase—in Japan attributed to the game,\*[10]\*[44]\*[45] although, in actuality, 100-yen coin production was lower in 1978 and 1979 than in previous or subsequent years.\*[46]\*[47] The claim also doesn't hold up to logical

scrutiny; arcade operators would have emptied out their machines and taken the money to the bank, thus keeping the coins in circulation.\*[47] Reports from those living in Japan at the time indicate “nothing out of the ordinary ... during the height of the *Space Invaders* invasion.”\*[47]

Game designer Shigeru Miyamoto considers *Space Invaders* to be the game that revolutionized the video game industry; he was never interested in video games before seeing it.\*[48] Hideo Kojima also described it as the first video game that impressed him and got him interested in video games.\*[49] Several publications ascribed the expansion of the video game industry from a novelty into a global industry to the success of the game. *Edge magazine* attributed the shift of video games from bars and arcades to more mainstream locations like restaurants and department stores to *Space Invaders*.\*[50] Its popularity was such that it was the first game where an arcade machine's owner could make up for the cost of the machine in under one month, or in some places within one week.\*[30]

Technology journalist Jason Whittaker credited the game's success to ending the video game crash of 1977, which had earlier been caused by *Pong* clones flooding the market, and beginning the golden age of video arcade games.\*[51] According to *The Observer*, the home console versions were popular and encouraged users to learn to program; many who later became industry leaders.\*[45] 1UP.com stated that *Space Invaders* showed that video games could compete against the major entertainment media at the time: movies, music, and television.\*[15] IGN attributed the launch of the arcade phenomenon in North America in part to *Space Invaders*.\*[52] *Electronic Games* credited the game's success as the impetus behind video gaming becoming a rapidly growing hobby and as “the single most popular coin-operated attraction of all time.”\*[53] *Game Informer* considered it, along with *Pac-Man*, one of the most popular arcade games that tapped into popular culture and generated excitement during the golden age of arcades.\*[54] IGN listed it as one of the “Top 10 Most Influential Games” in 2007, citing the source of inspiration to video game designers and the impact it had on the shooting genre.\*[55] *The Times* ranked it No. 1 on its list of “The ten most influential video games ever” in 2007.\*[24] 1UP ranked it at No. 3 on its list of “The 60 Most Influential Games of All Time,” stating that, in contrast to earlier arcade games which “were attempts to simulate already-existing things,” *Space Invaders* was “the first video game as a video game, instead of merely a playable electronic representation of something else.”\*[56] In 2008, *Guinness World Records* listed it as the top-rated arcade game in technical, creative, and cultural impact.\*[7] *Entertainment Weekly* named *Space Invaders* one of the top ten games for the Atari 2600 in 2013.\*[57] In 2015, the World Video Game Hall of Fame selected *Space Invaders* as one of the finalists for its 2015 induction class.\*[58]

As one of the earliest shooting games, it set precedents



and helped pave the way for future titles and for the shooting genre.\*[55][59] *Space Invaders* popularized a more interactive style of gameplay with the enemies responding to the player controlled cannon's movement,\*[12] and was the first video game to popularize the concept of achieving a high score,\*[3][44][55] being the first to save the player's score.\*[55] While earlier shooting games allowed the player to shoot at targets, *Space Invaders* was the first in which targets could fire back at the player.\*[60] It was also the first game where players were given multiple lives,\*[61] had to repel hordes of enemies,\*[15] could take cover from enemy fire, and use destructible barriers,\*[62] in addition to being the first game to use a continuous background soundtrack, with four simple diatonic descending bass notes repeating in a loop, which was dynamic and changed pace during stages,\*[63] like a heartbeat sound that increases pace as enemies approached.\*[64]

It also moved the gaming industry away from Pong-inspired sports games grounded in real-world situations towards action games involving fantastical situations.\*[65] Whittaker commented that *Space Invaders* helped action games become the most dominant genre on both arcades and consoles, through to contemporary times.\*[66] Guinness World Records considered *Space Invaders* one of the most successful arcade shooting games by 2008.\*[44] In describing it as a “seminal arcade classic”, IGN listed it as the number eight “classic shoot 'em up”.\*[52] *Space Invaders* set the template for the shoot 'em up genre.\*[65] Its worldwide success created a demand for a wide variety of science fiction games, inspiring the development of arcade games, such as Atari's *Asteroids*,\*[67] Williams Electronics' *Defender*, and Namco's *Galaxian* and *Galaga*, which were modeled after *Space Invaders*'s gameplay and design.\*[68][69] This influence extends to most shooting games released to the present day,\*[15] including first-person shooters such as *Wolfenstein*,\*[70][71] *Doom*,\*[72] *Halo*\*[73] and *Call of Duty*.\*[74] *Space Invaders* also had an influence on early computer dungeon crawl games such as *Dungeons of Daggorath*, which used similar heartbeat sounds to indicate player health.\*[64]

### 3.1 Remakes and sequels

Main article: List of *Space Invaders* video games

*Space Invaders* has been remade on numerous platforms and spawned many sequels. Re-releases include ported and updated versions of the original arcade game. Ported versions generally feature different graphics and additional gameplay options—for example, moving defense bunkers, zigzag shots, invisible aliens, and two-player cooperative gameplay.\*[8] Ports on earlier systems like the Atari home consoles featured simplified graphics, while later systems such as the Super Nintendo Entertainment System and PlayStation featured updated graphics. Later titles include several modes of gameplay and integrate



In Japan Epoch released a *Space Invaders* clone that could be played at home, the Epoch TV Vader, in 1980.

new elements into the original design. For example, *Space Invaders Extreme*, released on the Nintendo DS and PlayStation Portable, integrated musical elements into the standard gameplay.\*[75][76] A spin-off for WiiWare, *Space Invaders Get Even*, allows players to control the aliens instead of the laser cannon.\*[77]

In 1980, Bally Midway released a pinball version of the game. However, few elements from the original game are included, and the aliens instead resemble the xenomorphs from the film *Alien*; Bally Midway was later sued over the game's resemblance to designs by H. R. Giger.\*[78] Different ports have been met with mixed receptions; the Atari 2600 version was very successful while the Nintendo Entertainment System version was poorly received.\*[8]

Taito has released several arcade sequels that built upon the basic design of the original. The first was *Space Invaders Part II* in 1979,\*[79][80] it featured color graphics, an attract mode, and new gameplay elements, and added an intermission between gameplay.\*[81] According to the *Killer List of Video Games*, this was the first video game to include an intermission.\*[44][81] The game also allowed the player with the top score to sign their name on the high score table.\*[82] This version was released in the United States as *Deluxe Space Invaders* (also known as *Space Invaders Deluxe*) but featured a different graphical color scheme and a lunar-city background. Another arcade sequel, titled *Space Invaders II*, was released exclusively in the United States. It was in a cocktail-table format with very fast alien firing and a competitive two-player mode. During the summer of 1985, *Return of the Invaders* was released with updated color graphics, and more complex movements and attack patterns for the aliens.\*[8] Subsequent arcade sequels included *Super Space Invaders '91*, *Space Invaders DX*, and *Space Invaders '95*. Each game introduced minor gameplay additions to the original design. Like the original game, several of the arcade sequels have become collector's items, though some are considered rarer.\*[31] In 2002, Taito released *Space Raiders*, a third-person shooter reminiscent of *Space Invaders*.\*[83][84]

The game and its related games have been included in

video game compilation titles. *Space Invaders Anniversary* was released in 2003 for the PlayStation 2 and included nine *Space Invader* variants.\*[85] A similar title for the PlayStation Portable, *Space Invaders Pocket*, was released in 2005.\*[86] *Space Invaders*, *Space Invaders Part II* and *Return of the Invaders* are included in *Taito Legends*, a compilation of Taito's classic arcade games released in 2005 on the PlayStation 2, Xbox, and PC.\*[87]\*[88] *Super Space Invaders '91*, *Space Invaders DX*, and *Space Invaders '95* were included in *Taito Legends 2*, a sequel compilation released in 2006.\*[89]

### 3.2 In popular culture

Many publications and websites use the pixelated alien graphic as an icon for video games in general, including video game magazine *Electronic Gaming Monthly*, technology website *Ars Technica*, and concert event *Video Games Live*.\*[15] There have also been *Space Invaders* themed merchandising, including necklaces and puzzles.\*[90] The trend continues to this day, with handmade sites like *Etsy* and *Pinterest* showcasing thousands of handmade items featuring *Space Invaders* characters.



*A pixelated alien graphic used at the concert event Video Games Live*

The game—and references to it—has appeared in numerous facets of popular culture. Soon after the game's release, hundreds of favorable articles and stories about the emerging video game medium popularized by *Space Invaders* aired on television and were printed in newspapers and magazines. The Space Invaders Tournament, held by Atari in 1980 and won by Bill Heineman,\*[91] was the first electronic sports event and attracted more than 10,000 participants, establishing video gaming as a mainstream hobby.\*[67] The Arcade Awards ceremony was created that same year to honor the best video games, with *Space Invaders* winning the first Game of the Year award.\*[23] The impact of *Space Invaders* on the video game industry has been compared to that of *The Beatles* in the pop music industry.\*[92] Considered “the first blockbuster video game,” *Space Invaders* became synonymous with video games worldwide for some time.\*[93]

Within a year of the game's release, the Japanese PTA unsuccessfully attempted to ban the game for allegedly inspiring truancy.\*[25] In North America, doctors identified a condition called the “Space Invaders elbow” as a complaint,\*[94] while a physician in *The New England Journal of Medicine* named a similar ailment the “Space Invaders Wrist”.\*[95] *Space Invaders* was also the first game to attract political controversy, when a 1981 Private Member's Bill called the “Control of Space Invaders (and other Electronic Games) Bill” drafted by British Labour MP George Foulkes attempted to allow local councils to restrict the game, and those like it, by licensing for its “addictive properties” and for causing “deviancy”.\*[96] Conservative MP Michael Brown defended the game as “innocent and harmless pleasure” which he himself had enjoyed that day, and criticized the bill as an example of “Socialist beliefs in restriction and control”.\*[97] A motion to bring the bill before Parliament was defeated by 114 votes to 94 votes; the bill itself was never considered by Parliament.\*[96]\*[97]\*[98]

#### 3.2.1 Music

Musicians drew inspiration for their music from *Space Invaders*. Video Games Live performed audio from the game as part of a special retro “Classic Arcade Medley”.\*[99]

The pioneering Japanese synthpop group Yellow Magic Orchestra reproduced *Space Invaders* sounds in its 1978 self-titled album and its hit single “Computer Game”.\*[100] the latter selling over 400,000 copies in the United States.\*[101]

Other pop songs based on *Space Invaders* soon followed, including disco records such as “Disco Space Invaders” (1979) by Funny Stuff,\*[100] and the hit songs “Space Invader” (1980) by The Pretenders,\*[100] “Space Invaders” (1980) by Uncle Vic\*[102] and the Australian hit “Space Invaders” (1979) by Player One (known in the US as Playback),\*[103] which in turn provided the bassline for Jesse Saunders' “On and On” (1984),\*[104]\*[105] the first Chicago house music track.\*[106]

*Space Invaders* is referenced in the lyrics to Rush's 1981 hit song “Tom Sawyer,” and the game is singled out for special thanks in the liner notes to the band's *Permanent Waves* album.\*[107]

The game was also sampled in I-F's “Space Invaders Are Smoking Grass” (1997),\*[108] the first electroclash record.\*[109]

In honor of the game's 30th anniversary, Taito produced an album titled *Space Invaders 2008*. The album is published by Avex Trax and features music inspired by the game.\*[110] Taito's store Taito Station also unveiled a *Space Invaders* themed music video.\*[111]

### 3.2.2 Television and film

Multiple television series have aired episodes that either reference or parody the game and its elements; for example, *Danger Mouse*,\*[112] *That '70s Show*,\*[113] *Scrubs*,\*[114] *Chuck*,\*[115] *Robot Chicken*,\*[116] and *The Amazing World of Gumball*,\*[117]

Elements are prominently featured in the “Raiders of the Lost Arcade” segment of “Anthology of Interest II”, an episode of *Futurama*.\*[118]\*[119]

*Space Invaders* appears in the film *Pixels*, and a film version of the game is in the works by Warner Bros with Akiva Goldsman produced.\*[120]\*[121] On February 13, 2015, Daniel Kunka was set to write the script for the film.\*[122] It also made an appearance in James Cameron's 1991 film *Terminator 2: Judgment Day* while its *Deluxe* game made an appearance in Amy Heckerling's 1982 film *Fast Times At Ridgemont High*.

Episode 111 of the second series of *Lupin the Third* features Lupin playing an 'invaders' game.

In the 1982 original pilot of the series *The Powers of Matthew Star*, David Star uses his powers to cheat the game. The game is shown with a colored backdrop of the moon.

### 3.2.3 Books

Various books have been published about *Space Invaders*, including *Space Invaders: An addict's guide to battle tactics, big scores and the best machines* (1982) by Martin Amis;\*[123] *Tomb Raiders and Space Invaders: Videogame forms and Contexts*, by Geof King and Tanya Krzywinska (2006), and *Space Invaders* (1980) by Mark Roeder and Julian Wolanski\*[124]

### 3.2.4 Other

In 2006, the game was one of several video game related media selected to represent Japan as part of a project compiled by Japan's Agency for Cultural Affairs.\*[125]\*[126]

In the same year, *Space Invaders* was included in the London Science Museum's Game On exhibition meant to showcase the various aspects of video game history, development, and culture.\*[127]

The game is also a part of the Barbican Centre's traveling Game On exhibition.\*[128]

At the Belluard Bollwerk International 2006 festival in Fribourg, Switzerland, Guillaume Reymond created a three-minute video recreation of a game of *Space Invaders* as part of the “Gameover” project using humans as pixels.\*[129]

The GH ART exhibit at the 2008 Games Convention in Leipzig, Germany, included an art game, *Invaders!*, based

on *Space Invaders*'s gameplay. The creator later asked for the game to be removed from the exhibit following criticism of elements based on the September 11 attacks in the United States.\*[130]

There is a bridge in Cáceres, Spain, projected by engineers Pedro Plasencia and Hadrián Arias whose pavement design is based on this game. The laser cannon, some shoots, and several figures can be seen on the deck.\*[131]

A French street artist, *Invader*, made a name for himself by creating mosaic artwork of *Space Invader* aliens around the world.\*[15]\*[132]

In 2014, two Brazilian zoologists described a new species or arachnid called *Taito spaceinvaders* Kury & Barros, 2014, inspired in the game because of the resemblance of a fleck in the dorsal scutum of the animal with the typical alien of the game.\*[133]

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## 5 Further reading

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## 6 External links

- Official website
- *Space Invaders* at the Killer List of Videogames

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