



Game Programming

(A Chronology of Game Programming)

2024. Spring



한신대학교



I. Before Spacewar



■ Nintendo

- (1889) Fusajiro Yamauchi establishes the Marufuku Company to manufacture and distribute Hanafuda (flower cards), Japanese playing cards.
- (1951) Changes name to The **Nintendo** Playing Card Company. "Nintendo" means "leave luck to heaven."



■ Sony

- (1947) Akio Morita and Masaru Ibuka establish Tokyo Telecommunications Engineering Company.
- (1952) Licensed transistor from Bell Labs. The transistor radio is a success in Japan, and Ibuka and Morita begin looking at marketing their products in the United States and Europe. **Sony** was born (from Latin word sonus (sound)).



I. Before Spacewar

■ SEGA

- (1954) Former US Korean War veteran David Rosen starts Service Games to export **coin-op machines** to Japan.
- (1960s) Rosen made his own coin-operated games, so he purchases a Tokyo jukebox and slot-machine company. The name **SEGA**, short for "SErvice GAmes," is stamped on the games.

■ Ralph Baer

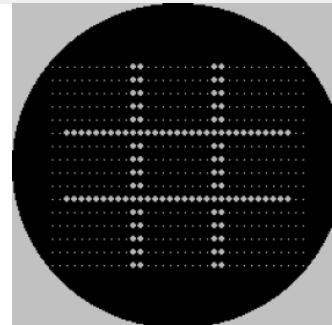
- (1951) Ralph Baer, an engineer with Loral, company that develops and manufactures complex military airborne electronics, is instructed to "build the best TV set in the world." **Baer suggests they add some kind of interactive game to the TV set to distinguish it from other companies' TVs, but management ignores the idea.**
- (1966) second try : Magnavox Odyssey (first home console)



I. Before Spacewar

■ TicTacToe

- (1952) A.S.Douglas on a EDSAC vacuum-tube computer

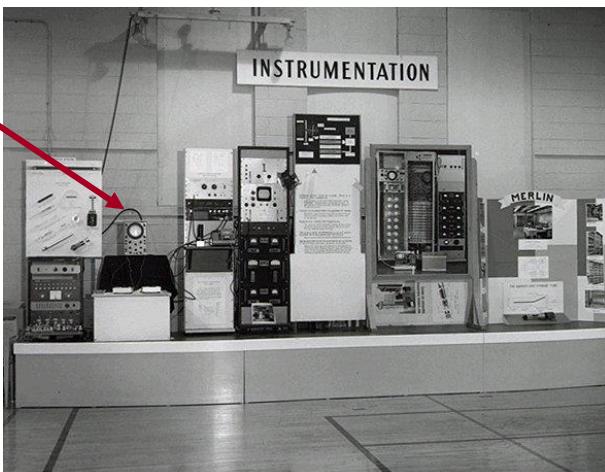


■ Tennis for two

- (1958) Brookhaven National physicist William Higinbotham invents interactive table-tennis-like game on an oscilloscope connected analog Donner computer to keep visitors from getting bored.



Oscilloscope



<one of the first video games >

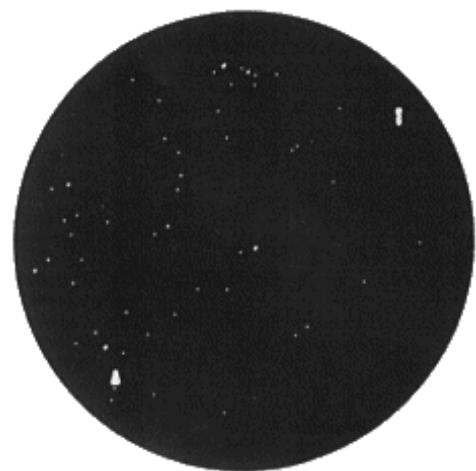
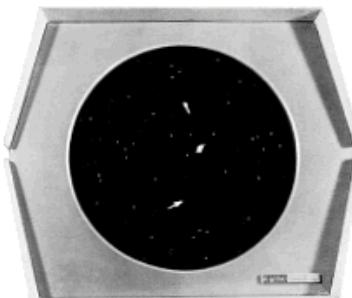
[YouTube Video of table tennis](#)



II. Spacewar to Atari

■ Spacewar

- (1961) MIT student Steve Russell creates Spacewar, **the first interactive computer game**, on a Digital PDP-1(Programmed Data Processor-1) minicomputer
- Spacewar used new teletype terminals with CRT screens to display the graphics. Program is 9K.



Game structure

- Competition between two peers
- Rules of action
- A clear victory condition



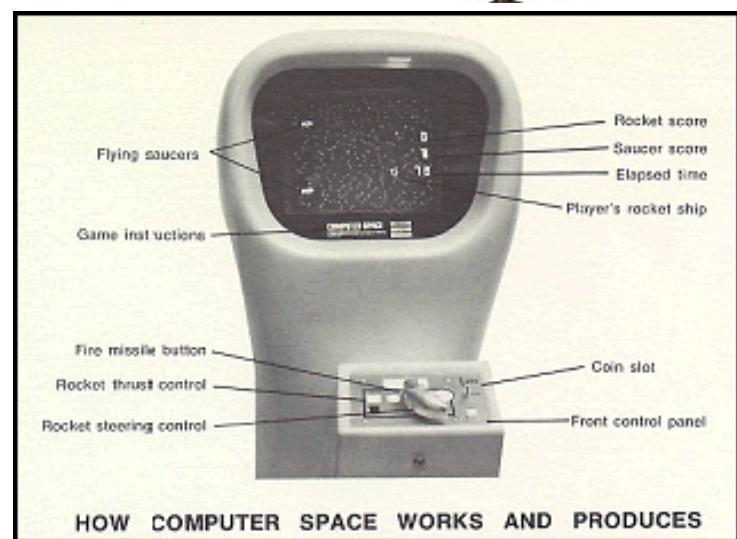
II. Spacewar to Atari



Nolan Bushnell

(1962) enrolls in engineering school at the University of Utah, where he is first exposed to Russell's Spacewar.

- (1971) Arcade-game manufacturer Nutting Associates purchases **Computer Space** and hires Bushnell to oversee the building of it.
 - First commercial arcade game
 - Based on SpaceWar
 - Vector graphics, but really cool real-time space game
 - It is too difficult to play
 - Too sophisticated for market. **Fails (1,500 coin-op machines)**
- (1972) Bushnell starts **Atari**
 - Named after a move in GO "check" in chess



Arcade games : paid per play



II. Spacewar to Atari



Ralph Baer

- (1966) rekindles his idea for a **secondary use for television sets**. He begins researching interactive television games. The defense contractor he works for, Sanders Associates, is interested and gives him the latitude needed to develop it.
- (1967) Baer and his team succeed in creating an **interactive game that can be played on a television screen**. They develop a chase game (two squares chasing each other) and follow it up with a video tennis game. They also modify a toy gun so it can distinguish spots of light on the screen.
- (1970) Magnavox licenses Baer's **TV game** from Sanders Associates.
- (1972) the **Magnavox Odyssey** was introduced



Brown Box – Sanders

II. Spacewar to Atari

■ Odyssey

- (1972) First home video game console – analog not digital
- Many people buy it because it is the closest thing they can get to a home version of Pong
 - Magnavox sold 100,000 units
- **home systems : could be purchased and played repeatedly**



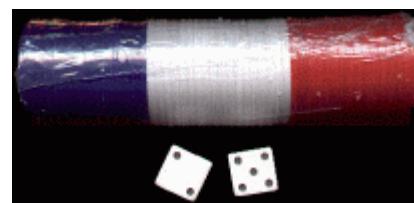
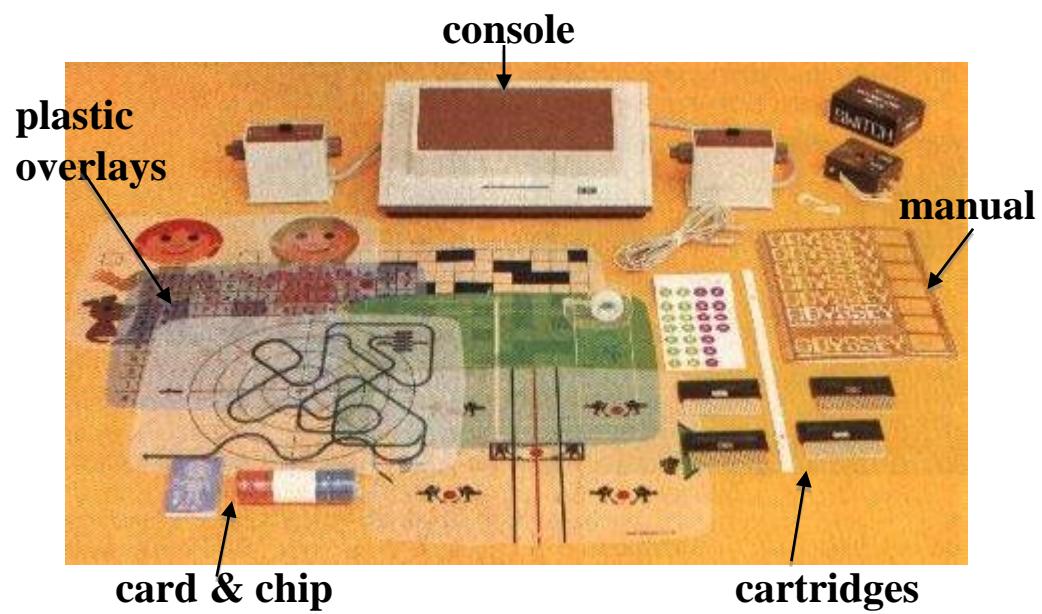
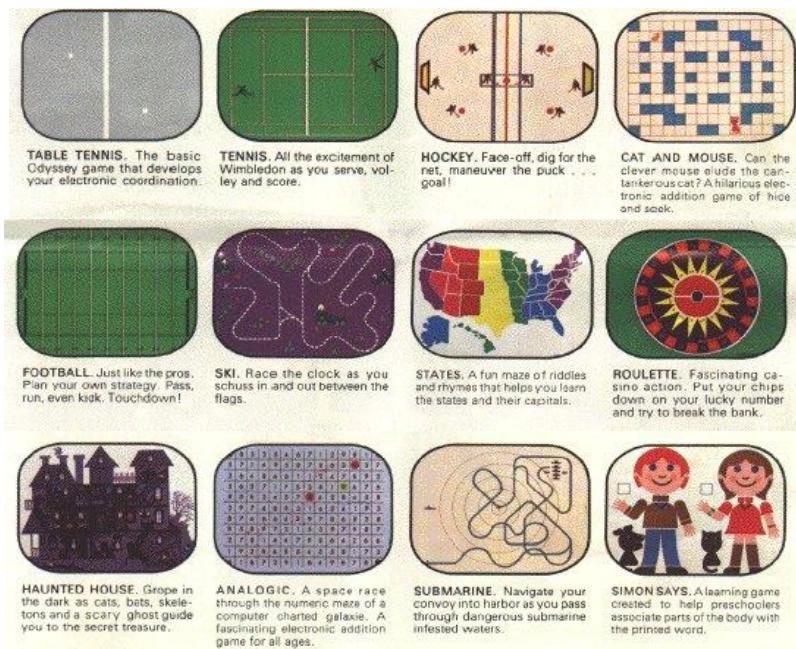
The Magnavox Odyssey
(console & control)





II. Spacewar to Atari

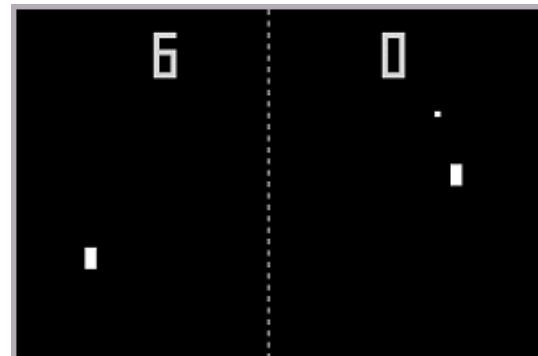
■ Odyssey



II. Spacewar to Atari

■ Pong

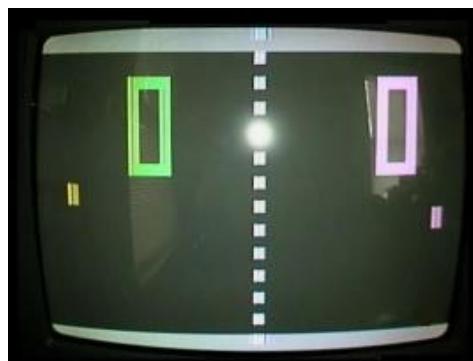
- (1972) The first Atari game becoming the first successful example of a coin-op machine (Bushnell: Atari)
- They call the game Pong, for two reasons:
 - "pong" is the sound the game makes when the ball hits a paddle or the side of the screen
 - the name Ping-Pong is already copyrighted.
- Arcade games : paid per play



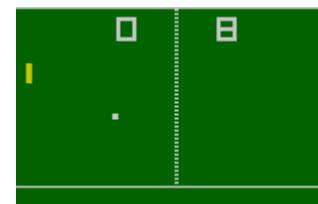
II. Spacewar to Atari

■ Pong

- (1976) Atari released its own home version of PONG



Third trend (PC Game)
games needn't be played on dedicated H/W



PONG for your PC
[Play it](#)



PONG (model C-100)
Atari's first system (1976).

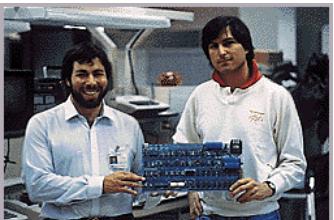


Atari PONG circuit board (C-100)



II. Spacewar to Atari

- Tank, Kee Games/Atari Inc.,
 - (1974) the first videogame to use ROM (Read Only Memory) chips to store graphic data.
 - ROM chips allowed TANK's on-screen characters to be more detailed, rather than simple blocks like Pong, or collections of dots as in Computer Space
- Breakout <http://www.atari.com/arcade>
 - (1976) Designed by Atari's 40th employee **Steve Jobs**, aided by videogame enthusiast **Steve Wozniak**.



The two later went on to found **Apple** Computer, using parts "borrowed" from Atari to build their first prototype





III. Game Consoles & Personal Computers

- the first programmable home game console
 - (1976) Fairchild Camera & Instrument releases its Video Entertainment System(later renamed Channel F).
 - Cartridges are born.
- Atari
 - (1976) Bushnell sells Atari to Warner for \$28 Million
 - (1977) Atari introduces the **Atari 2600**
 - First programmable (cartridge-based) game system
 - 2K ROM , 128 Bytes of RAM
 - Very successful – 6M sold by 1980 (\$249)
 - (1978) Atari releases the arcade game Football.
 - The game features a revolutionary new controller called the **trackball**.
- Atari developers
 - (1979) **Third party** development houses start up



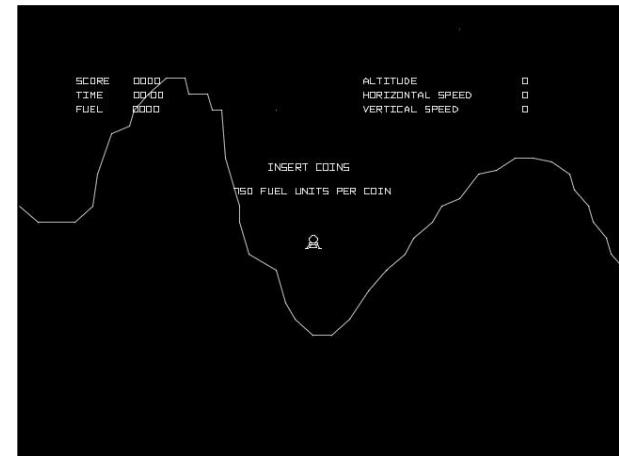


III. Game Consoles & Personal Computers

The Golden Age (Late 1970s ~ early 1980s)

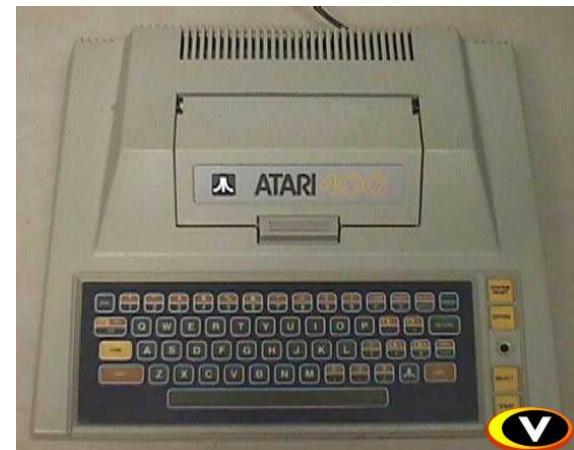
■ Vector Game Released

- (1978) Cinematronics releases [Space Wars](#), a game similar to Bushnell's Computer Space.
- (1979) Atari releases [Lunar Lander](#), its first vector graphics game. [Demo](#)



■ Personal Computer

- (1977) Apple starts selling the Apple II
- (1979) Atari begins selling its line of 400 and 800 computers to compete against Apple.
 - the 1st Personal Computer with a Graphics Processor
 - The public associates Atari with games, and the computers are never taken seriously.

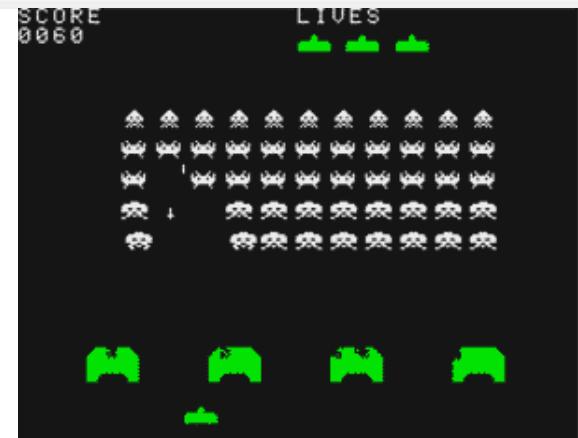




III. Game Consoles & Personal Computers

■ Space Invader

- (1979) Space Invader developed by Taito in Japan
- Space Invaders gives you a goal by displaying the current high score for you to beat.



■ Pac-Man

- (1980) Namco releases Pac-Man, the most popular arcade game of all time. (Originally named Puck Man)
- Pac-Man becomes the first video game to be popular with both males and females.



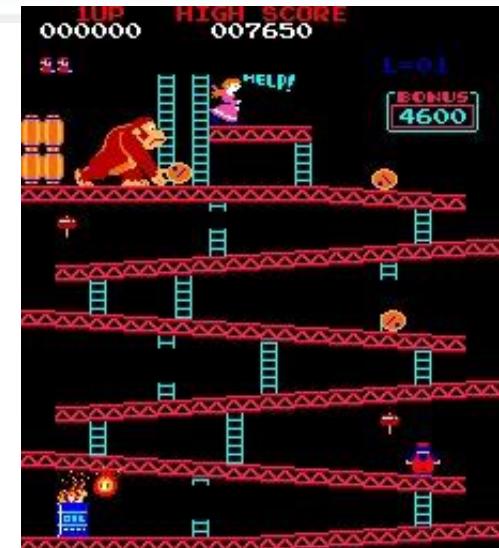


III. Game Consoles & Personal Computers

■ Donkey Kong

- (1981) Nintendo artist Shigeru Miyamoto creates

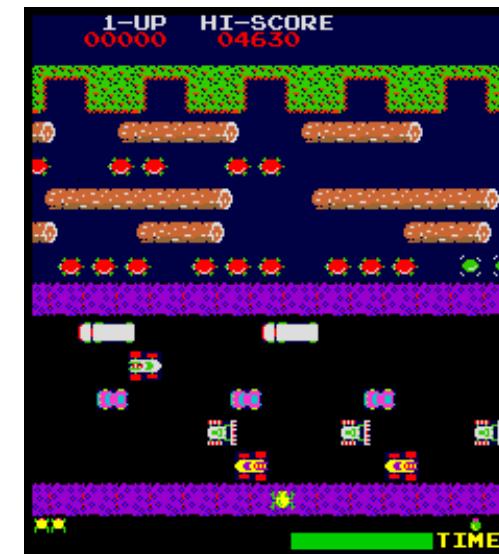
- Jumpman (game character) is later named **Mario** by Nintendo of America's staff, in honor of his resemblance to their landlord Mario Segali.



■ Frogger

- (1981) Konami/Sega

- Frogger is a favorite of many with its attractive graphics, theme song, and gameplay of navigating through moving obstacles.



III. Game Consoles & Personal Computers

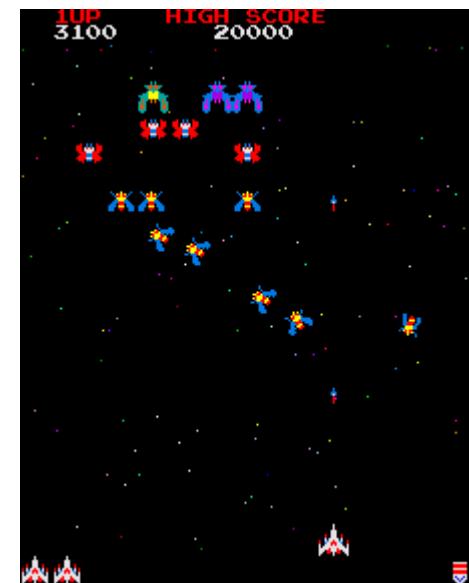
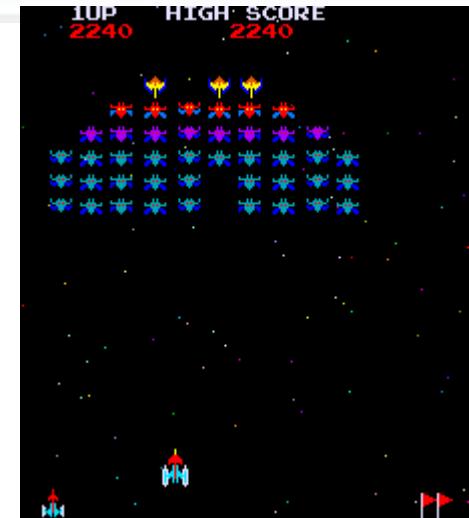
■ Galaxian (1979) Namco

- After the phenomenal success of Taito's **Space Invaders** in 1978, Namco wanted to cash-in on the craze and develop their own game based on the winning Space Invaders formula.
- Galaxian used a display that was capable of rendering graphics in full-color
 - While Galaxian was moderately successful, it never reached the popularity of Space Invaders..

■ Galaga (1981) Namco

- A galaxian sequel, 'galaga', aside from more detailed graphics
- Galaga further refines the Space Invaders formula by recycling the gameplay variations added by Galaxian and incorporates several unique elements that make it stand out, and in some ways, overshadow its predecessors

(1981) Game industry > \$6 billion in sales





III. Game Consoles & Personal Computers

■ Stock Drop

- (1982) On December 7, [Atari](#) announces that VCS(Video Computer System) sales did not meet predictions.
- Warner Communications stock drops 32% in a single day.

■ The Crash!

- (1983) With too many products on the shelves from a multitude of publishers, many third-party companies go out of business.
 - The games from these companies are then discounted heavily. Companies that are still in business cannot compete against the cheap games, so they wind up losing money because of unsold inventory.

1977 - 1981
("Golden Age")

1981 - 1984
("Dark Ages")



III. Game Consoles & Personal Computers

- Famicom(in Japen) to America
 - (1985) Nintendo test-markets its **Nintendo Entertainment System (NES)** in New York.
 - Retailers are so skeptical about video games that Nintendo has to agree to buy back all unpurchased inventory.
 - Armed with a large number of Nintendo-developed original titles and arcade games, the NES is a hit in a limited market release.
- Russian Conquers World With Puzzle Game
 - Russian programmer Alex Pajitnov designs Tetris, a simple but addicting puzzle game that can be played on PCs.

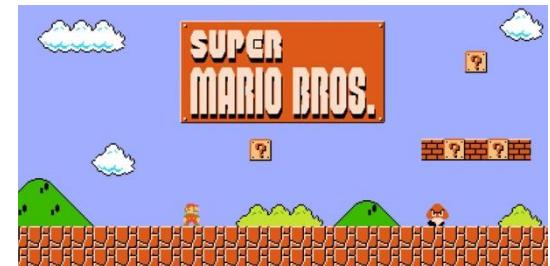


NES Zapper : light gun



III. Game Consoles & Personal Computers

- Nintendo Releases the [NES](#) Nationwide (1986)
 - The system debuts with [Super Mario Bros.](#), an arcade conversion, which becomes an instant hit. ([Play!](#))
- Failed Competition(1986)
 - Sega ships [Sega Master System \(SMS\)](#) console.
 - **Technically superior to Nintendo, but it ignores third-party developers and fails because of lack of games (and maybe Nintendo pressure on developers).**
 - Atari Reintroduces Game Consoles ([Atari 7800](#))
 - Commodore ships [Amiga](#): cool but marketing kills it.
 - Nintendo outsells competitors 10 to 1



III. Game Consoles & Personal Computers

■ Electronic Arts

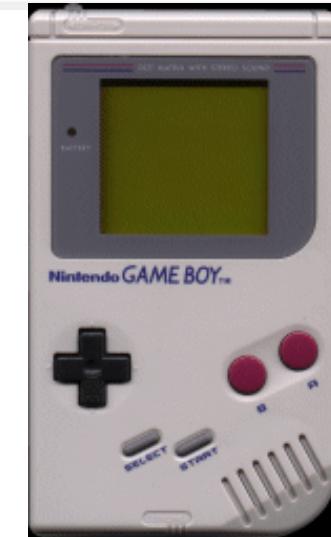
- (1987) releases Skate or Die, jumping into the **sports simulation market**

■ Game Boy (portable)

- (1989) Nintendo releases its handheld Game Boy (\$109).
 - The system comes with Tetris, and despite a tiny monochrome screen, it begins to build a historic sales record. A Game Boy version of Super Mario (Super Mario Land), a Breakout clone (Alleyway), and a baseball game are quickly released.

■ 16-bit Genesis

- (1989) Sega releases the 16-bit Genesis in the United States after limited success in Japan. \$249





III. Game Consoles & Personal Computers

■ Console Wars

➤ (1990)

- Nintendo releases Super Mario 3 - all-time best-seller 11M
- PC's and Consoles are major game platforms
- Electronic Arts starts to acquire other game publishers

➤ (1991)

- Nintendo launches Super-NES (16-bit)
- S3 introduces first single chip graphics accelerator for PC
- Capcom releases Street Fighter II for arcades – big hit
- id releases Wolfenstein 3D

➤ (1992)

- Sega releases the Sega CD (\$299)
- PC gaming explodes
- Nintendo has \$7 billion in sales (\$4.7B in U.S.)
 - ✓ higher profits than all U.S. movie and TV studios combined
- Midway releases Mortal Kombat for arcades
 - ✓ extreme violence





III. Game Consoles & Personal Computers

■ More Wars

➤ (1993)

- Pentium chip is launched
- Consoles (**Sega and Nintendo**) are 80% of game market
- Panasonic ships **Real-3DO**: 32-bit (now out of business)

➤ (1994)

- Atari ships **Jaguar**: 64 bit (bypass the 32-bit)
 - ✓ Very expensive for console
~\$700, >\$100/game
 - ✓ Neither 3DO or Jaguar does particularly well
- [DOOM](#) released by id [Play!](#)
- **MYST** released by Cyan
 - ✓ all time biggest selling PC game until 2002
 - ✓ having sold over 5.5 million copies worldwide since its initial release in 1994



III. Game Consoles & Personal Computers

■ ESRB Is Established

➤ (1994) The Entertainment Software Rating Board (ESRB) is established to rate video games.

- Large letter icons appear on game boxes to let consumers know the recommended age of players for each game and whether the game is violent or risqué.

	Early Childhood Titles rated "Early Childhood (EC)" have content suitable for children ages three and older and do not contain any material that parents would find inappropriate.
	Kids to Adults Titles rated "Kids to Adult (K-A)" have content suitable for persons ages six and older. These titles will appeal to people of many ages and tastes. They may contain minimal violence, some comic mischief (for example, slapstick comedy), or some crude language.
	Everyone As of January 1, 1998, the new "Everyone" designation will replace the "Kids to Adults" rating. Titles rated "Everyone (E)" have content suitable for persons ages six and older. These titles will appeal to people of many ages and tastes. They may contain minimal violence, some comic mischief (for example, slapstick comedy), or some crude language.
	Teen Titles rated "Teen (T)" have content suitable for persons ages 13 and older. Titles in this category may contain violent content, mild or strong language, and/or suggestive themes.
	Mature Titles rated "Mature (M)" have content suitable for persons ages 17 and older. These products may include more intense violence or language than products in the Teen category. In addition, these titles may also include mature sexual themes.
	Adults Only Titles rated "Adults Only (AO)" have content suitable only for adults. These products may include graphic depictions of sex and/or violence. Adults Only products are not intended to be sold or rented to persons under the age of 18.
	Rating Pending Product has been submitted to the ESRB and is awaiting final rating.



■ 게임물 관리 위원회(2013)

게임물 등급에 관한 사안을 심의·의결하기 위해 설립된 문화체육관광부 산하의 기타공공기관.^[2] 미국의 ESRB, 유럽의 PEGI, 일본의 CERO와 업무 내용이 유사하나, 대부분의 국가의 게임 심의 기구와는 다르게 법적근거에 기반하여 게임물을 심의, 검열하여 유통을 제한하거나 차단할 권한을 가진다.

등급	GRAC	CERO	ESRB	PEGI	내용
	전체 이용가	A	E, E10+[10]	3, 7	누구나 이용할 수 있는 게임들.
	12세 이용가	B	E10+, T ^[11]	12	12세 ^[12] 미만은 이용할 수 없는 게임들.
	15세 이용가	C	T	16	15세 ^[13] 미만은 이용할 수 없는 게임들.
	청소년 이용불가	D ^[14] , Z ^{[15][16]}	M	16, 18	청소년(18세~19세 ^[17] 미만)은 이용할 수 없는 게임들.
	등급분류거부	거부 ^[18]	AO ^[19]	18 ^[20]	등급분류 받을 수 없는 게임들



III. Game Consoles & Personal Computers

■ 32-bit Wars

➤ (1995)

- Sega ships [Saturn](#) (32-bit)
- Sony ships [Playstation](#) in U. S. (32-bit)
 - ✓ 300,000 polygons/sec., 30MIPS processor, 4MB RAM, 2MB VRAM, 400 U.S. Titles
 - ✓ 20% penetration in U.S. homes
 - ✓ Analysis: Cheap and lots of them for software developers
- Microsoft releases Window 95
 - ✓ Includes the Game SDK (Direct-X)
 - ✓ Bring major game performance to Windows
- Internet and WWW expand
- Full-motion video becomes a part of games
- Mortal Kombat- the film is released.
 - ✓ First time an arcade game had created a film.





III. Game Consoles & Personal Computers

■ 1996-1998

➤ (1996)

- Nintendo ships [Ultra 64](#)
 - ✓ More than 1.7 million units are sold in three months
- Sony(the number-one next-generation game console)
 - ✓ sales are said to top \$12 million per day through the Christmas shopping season
- Multi-player gaming goes commercial
 - ✓ Via modem and internet and network companies

➤ (1997)

- Bandai released the [Tamagotchi](#) in Japan (\$16)
- 3D acceleration starts to standardize on 3D-FX
 - ✓ Games start to assume 3D acceleration
- Pentium II's at 200Mhz make “serious” game machines
- [Ultima Online](#) launches – first **MMORPG(Massively Multi-player Online Role Playing Game)** in 3D

(1998)

- Lots of good PC games
- Playstation rules consoles
- [Dance Dance Revolution](#) was released in Japan





III. Game Consoles & Personal Computers

■ 1999-2001

➤ (1999)

- [Dreamcast](#) is released
 - ✓ On September 10, Sega of America reports earnings of \$98 million within the first 24 hours of launching the Dreamcast in the United States.
- Maximum Score for Pac-Man Achieved
 - ✓ Billy Mitchell achieves the highest possible score for Pac-Man when he completes every board and winds up with a score of 3,333,360.



➤ (2000)

- Development moves from PC to consoles
- [Playstation II](#)
 - ✓ (in Japan on March 4) In two days, the company sells 1 million consoles
 - ✓ gamers begin lining up outside stores two days in advance
- [Diablo II](#) sells 1 million units in 1 week
- [SIMS](#) sells 2.3 million units (\$95M)
 - ✓ + 1.4 mill. in expansions

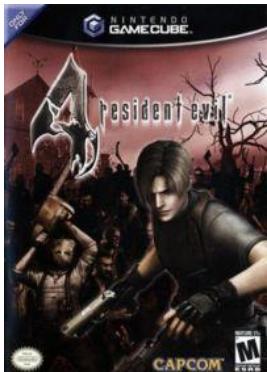




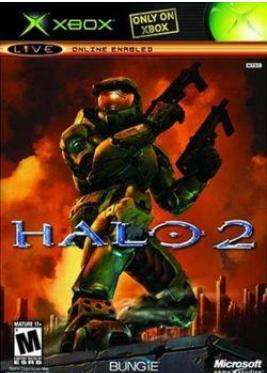
III. Game Consoles & Personal Computers

➤ (2001)

- **Playstation 2** (Sony)
 - ✓ Sony has sold 10 million units of the console worldwide, a feat accomplished more than three times faster than the original PlayStation (\$299)
- Gamecube is released (Nintendo)
 - ✓ in Japan on September 13 and North America on November 18
 - ✓ priced at \$199, \$100 less than the Xbox and PS2
- Xbox (Microsoft)
 - ✓ On November 15
 - ✓ Based on PC architecture, the \$299 console
- Grand Theft Auto III is released.



GameCube(2005)



XBox(2004)



GTA III (2001)



III. Game Consoles & Personal Computers

■ 2002

- *The Sims* overtakes *Myst* as all-time best-selling computer game, having sold 6.3 million units

■ 2003

- Infogrames, owner of the Atari intellectual properties, changed its name to Atari.
- Nintendo released the improved Game Boy Advance SP in March.
 - 1,000,000 Game Boy Advance(GBA)s sold (**Portable**)



- Nokia entered the handheld market with its N-Gage game-phone hybrid on October 7.



2004-Future



■ 2004

- Counter-Strike: Source and Half-Life 2 are officially released on PC (new era for the First Person Shooter genre of video game)

■ 2005

- 
- Sony PlayStation Portable (PSP) is released to the U.S. market on March 24.
 - Sony demonstrates the capabilities of the PlayStation 3 during a pre-E3 press conference.
 - Nintendo reveals early details of their next-generation video game console, the Nintendo Revolution (Wii) during E3.
 - The PlayStation 3 was unveiled by Sony during a pre-E3
 - Microsoft releases their second video game console, the Xbox 360 on November 22. (Xbox 360 Wireless Controller)



2004-Future



■ 2006

- January 26, 2006 — [Nintendo](#) announces its newly redesigned handheld, the [Nintendo DS Lite](#). The new model is lighter, smaller, has configurable brightness and features an improved [user interface](#)
- Sony releases the **Playstation 3** on November 17
 - chaos erupts at several locations in the US due to high demand and extremely limited retailer supply.
 - Two men were shot, and many others were injured.
- Nintendo launched the **Wii** on November 19
 - boasting an 800,000 unit launch across the United States and relatively fewer injuries.
 - Wii sounds like 'we', which emphasizes that the console is for everyone ([Wii remote](#): motion sensing)





2004-Future



■ 2007

- May 19: [Blizzard Entertainment](#) announces [StarCraft II](#) at [Seoul, South Korea](#)
- As of mid-January,
 - **Wii** remains in high demand and has been perpetually out of stock at many retailers,
 - but PS3 supply now outstrips demand.
 - Nintendo has also been having supply problems with its **DS Lite** console due to its popularity.



■ 2008

- June 28 - [Blizzard Entertainment](#) announces [Diablo III](#) in Paris
- November 13 - [Blizzard Entertainment](#) releases the anticipated [World of Warcraft: Wrath of the Lich King](#) expansion set for the popular [World of Warcraft](#) computer game ([MMORPG](#)) to critical acclaim.
 - It sold 2.8 million copies within the first 24 hours of availability.
 - This makes it the fastest selling computer game of all time





2004-Future

■ 2009

- Sep 9 - Apple launched the [iPod Touch 3G](#).
- Oct 1 - Launch of the new Sony [PSP Go](#) which was met with mixed reviews due to its high pricing in comparison to its predecessor the [PSP-3000](#).



■ 2010

- [PlayStation Move](#) was launched in North America, Europe and various Asian countries.
- [Microsoft's Kinect](#) launched worldwide, starting in North America.



Kinect (2010)



Kinect 2 (2013)



2004-Future

■ 2011 ~ present

- February 26, 2011 - The [Nintendo 3DS](#), Nintendo's newest handheld console, released ([stereoscopic 3D effects without 3D glasses](#))
- February 22, 2012 - [PlayStation Vita](#) was released in Japan. (handheld game console)



NINTENDO **3DS**™



PSVITA
PlayStation®Vita

[Eight generation consoles \(2012-present\)](#)



2004-Future

■ 2011 ~ present

- Nintendo has announced its home console successor, the Wii U, to be released in 2012. (\$299.99)
- The **PlayStation 4** was released on November 15, 2013 in North America (\$399.99)
- The **Xbox One** was released in North America, Europe and Australia on November 22, 2013 (\$499.99 → 349.99)



[http://en.wikipedia.org/wiki/History_of_video_game_consoles_\(eighth_generation\)](http://en.wikipedia.org/wiki/History_of_video_game_consoles_(eighth_generation))



2004-Future



■ 9 Generation

- **PlayStation 5:** November 2020 (\$399.99~499.99)
- **Xbox Series X/S :** November 2020 (\$299.99~499.99)
- **Nintendo Switch:** March 2017. (\$299.99)
 - Nintendo Labo is a gaming and construction toy platform



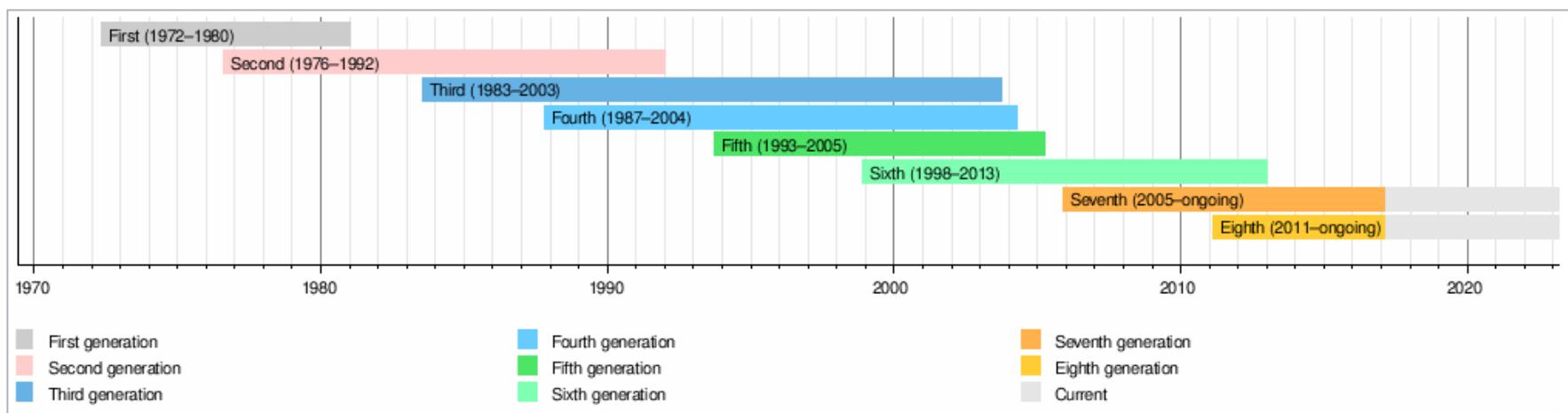


Game Expo

- [The Game Developers Conference](#) (GDC) : The largest annual gathering of professional [video game developers](#), focusing on learning, inspiration, and networking (1988)
- [The Electronic Entertainment Expo](#) (E3) : an annual [trade fair](#) for the [computer and video games](#) industry presented by the [ESA](#). (1995)
- The Tokyo Game Show (TGS) : a [video game expo / convention](#) held annually in the [Makuhari Messe](#), in [Chiba, Japan](#) (1996)
- [G-Star](#) : an annual [trade show](#) for the [computer and video games](#) industry presented by [KOTRA](#) in November. (2005)



Video Game Console



Video Game Console



■ Video Game Consoles

- First-generation : The Magnavox Odyssey was the first video game console, released in 1972
- Second-generation (early 8 bit era) : The Atari 2600 became the most popular game console (1977)
- Third-generation (late 8 bit era) : The NES made video games popular again after the 1983 crash (1983)
- Fourth-generation (16 bit era) : Nintendo could release the Super Nintendo Entertainment System (SNES) (1990)

Video Game Console



- Fifth-generation (32 and 64-bit era)
 - The Sony [PlayStation](#) became the most popular system of the fifth generation consoles, eventually selling over 100 million systems. (1994)
- Sixth-generation (128-bit era)
 - Sony's [PlayStation 2](#) was released in North America on October 26, 2000 (first home game console to be able to play [DVDs](#))
 - Microsoft's [Xbox](#), released on November 15, 2001 in North America (similar hardware specifications to a low-end desktop computer)





Video Game Console



➤ Seventh-generation

- The release of the Xbox 360 began the seventh generation (2005)
 - ✓ four controllers connected to the console wirelessly
 - ✓ The motion gaming capabilities of this console is named "Kinect."
- Sony's PlayStation 3 was released (2006)
 - ✓ play Blu-ray Disc games and Blu-ray Disc movies out of the box
 - ✓ Up to seven controllers can connect to the console using Bluetooth
 - ✓ The motion capabilities of this console "PlayStation Move."
- The Nintendo Wii was released (2006)
 - ✓ Wii does not support an internal hard drive (512 MB of internal Flash memory and removable SD card storage)
 - ✓ Along with its lower price, the Wii is notable for its unique controller, the Wii Remote (The latest addition 'Wii Motion Plus')



Video Game Console

➤ Eighth-generation (2012-present)

- Nintendo's next home console, the [Wii U](#) has been officially announced, on June 7, 2011 [Nintendo Switch, 2017](#)
- Sony announced the [PlayStation 4](#). released on November 15, 2013 in North America
- The Xbox One was released in North America, Europe and Australia on November 22, 2013



➤ Ninth generation (2020–present)

[Playstation 5, 2020](#)

[Xbox Series X/S, 2020](#)

HandHeld Game Console

■ Major Handheld Systems



Game Boy 1989



Game Boy Color 1998



Game Boy Advanced 2001



Nintendo DS
2004–Present



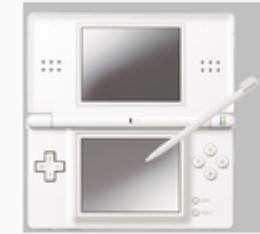
Sony PlayStation Portable
2004–Present



Tiger Telematics
Gizmondo
2005–Present



GP2X
2005–Present



Nintendo DS Lite
2 March, 2006 (in Japan)



Sony PSP Go (2009)



Nintendo DSi (2009)



Nintendo 3DS (2011)



PlayStation Vita 2012

best-selling game consoles

■ best-selling game consoles

➤ Video game consoles

Million-selling game consoles

Platform	Type	Firm	Released ^[2]	Units sold	Ref.
PlayStation 2	Home	Sony	2000	>155 million	[note 1]
Nintendo DS	Handheld	Nintendo	2004	154.02 million	[30]
Nintendo Switch #‡	Hybrid	Nintendo	2017	122.55 million	[30]
Game Boy & Game Boy Color	Handheld	Nintendo	1989, 1998	118.69 million	[30] [note 2]
PlayStation 4 #	Home	Sony	2013	117.2 million	[33]
PlayStation	Home	Sony	1994	102.49 million	[34]
Wii	Home	Nintendo	2006	101.63 million	[30]
PlayStation 3	Home	Sony	2006	>87.4 million	[note 1]
Xbox 360	Home	Microsoft	2005	>84 million	[note 3]
Game Boy Advance	Handheld	Nintendo	2001	81.51 million	[30]
PlayStation Portable	Handheld	Sony	2004	80–82 million (estimate)	[note 1]
Nintendo 3DS	Handheld	Nintendo	2011	75.94 million	[30]
NES/Famicom	Home	Nintendo	1983	61.91 million	[30]
Xbox One	Home	Microsoft	2013	51–58.5 million (estimate)	[42]
SNES/Super Famicom	Home	Nintendo	1990	49.1 million	[30]
Game & Watch †	Handheld	Nintendo	1980	43.4 million	[43]
Nintendo 64	Home	Nintendo	1996	32.93 million	[30]
PlayStation 5 #	Home	Sony	2020	32.1 million	[44]
Sega Genesis/Mega Drive	Home	Sega	1988	30.75 million	[note 4]
Atari 2600	Home	Atari	1977	30 million	[48]
Xbox	Home	Microsoft	2001	24 million	[49]
GameCube	Home	Nintendo	2001	21.74 million	[30]
Xbox Series X/S #	Home	Microsoft	2020	18.5 million (estimate)	[50]
Wii U	Home	Nintendo	2012	13.56 million	[30]

Platform	Sales (million)
PlayStation 2	155
PlayStation	102.49
Wii	99.38
Xbox 360	75.9
PlayStation 3	77
NES	61.91
Super NES	49.10
Mega Drive/Genesis	40
Nintendo 64	32.93
Atari 2600	30
Xbox	24
GameCube	21.74
Master System	10–13
Dreamcast	10.6
TurboGrafx-16	10
Saturn	9.5
Sega CD	6

2012 조사

best-selling game consoles

■ best-selling game consoles

➤ Handheld game consoles

Million-selling handheld game consoles

Platform	Firm	Released ^[2]	Units sold	Ref.
Nintendo DS	Nintendo	2004	154.02 million	[17]
Game Boy, Game Boy Color	Nintendo	1989, 1998	118.69 million	[note 2]
PlayStation Portable	Sony	2004	82 million	[note 1]
Game Boy Advance	Nintendo	2001	81.51 million	[17]
Nintendo 3DS #	Nintendo	2011	74.84 million	[42]
Nintendo Switch #‡	Nintendo	2017	32.27 million	[42]
Sega Game Gear	Sega	1990	10.62 million	[45]
PlayStation Vita	Sony	2011	10–15 million (estimate)	[note 1]
WonderSwan	Bandai	1999	3.5 million	[note 8]
N-Gage	Nokia	2003	3 million	[70]
Atari Lynx	Atari	1989	>1 million ^{GT}	[note 10]

Platform	Released	Sales (million)
Nintendo DS	2004	153.67
Game Boy/ Game Boy Color	1989 and 1998	118.69
Game Boy Advance	2001	81.51
PlayStation Portable	2004	76.3
Nintendo 3DS	2011	29.84
Game Gear	1990	11
PlayStation Vita	2011	2.2

 best-selling video games

Top Rated Game

Games across all platforms that have sold at least 15 million copies^[n 1]

#	Title	Release year	System(s)	Copies sold
1	Tetris	1984	Game Boy, Game Boy Color, NES, Mobile Phone	143 million
2	Wii Sports	2006	Wii	81.99 million
3	Minecraft	2009 ^[n 2]	PC, Mobile Phone, Xbox 360 (XBLM and Retail disc), PlayStation 3 ^[3]	41.9 million
4	Super Mario Bros.	1985	NES	40.24 million
5	Mario Kart Wii	2008	Wii	35.26 million ^[4]
6	Grand Theft Auto V	2013	PlayStation 3, Xbox 360	32.5 million ^[5]
7	Wii Sports Resort	2009	Wii	31.89 million ^[6]
8	New Super Mario Bros.	2006	Nintendo DS	30.38 million ^[7]
9	Call of Duty: Modern Warfare 2	2009	Microsoft Windows, Xbox 360, PlayStation 3	28.5 million ^[8]
10	Wii Play	2006	Wii	28.02 million ^[9]
11	New Super Mario Bros. Wii	2009	Wii	27.88 million ^[10]
12	Grand Theft Auto: San Andreas	2004	PlayStation 2, Microsoft Windows, Xbox, Mac OS X, Xbox 360 (XBLM), PlayStation 3 (PSN), Mobile Phone ^[11]	27.5 million
13	Call of Duty: Modern Warfare 3	2011	Microsoft Windows, PlayStation 3, Xbox 360, Wii	26.5 million ^[10]
14	Grand Theft Auto IV	2008	PlayStation 3, Xbox 360, Microsoft Windows	25 million ^[11]
15	Call of Duty: Black Ops	2010	Microsoft Windows, Xbox 360, PlayStation 3, Nintendo Wii	25 million ^[12]
16	Kinect Adventures!	2010	Xbox 360	24 million ^[13]
17	Nintendogs	2005	Nintendo DS	23.94 million ^[7]
18	Pokémon Red, Blue, and Green	1996	Game Boy, Game Boy Color	23.64 million
19	Mario Kart DS	2005	Nintendo DS	23.34 million ^[7]
20	Pokémon Gold and Silver	1999	Game Boy, Game Boy Color	23 million
21	Wii Fit	2007	Wii	22.67 million ^[9]
22	Wii Fit Plus	2009	Wii	20.86 million ^[9]
23	Super Mario World	1990	SNES	20.6 million
24	Grand Theft Auto: Vice City	2004	Windows, Playstation 2, Xbox	20 million
25	The Sims 2	2004	Windows, OS X	20 million
26	The Elder Scrolls V: Skyrim	2011	Microsoft Windows, PlayStation 3, Xbox 360	20 million ^[14]
27	Battlefield 3	2011	Microsoft Windows, Xbox 360, PlayStation 3	20 million ^[15]
28	Brain Age	2005	Nintendo DS	19 million ^[7]
29	Super Mario Land	1989	Game Boy, Game Boy Color	18.06 million
30	Super Mario Bros. 3	1988	NES	18 million
31	Pokémon Diamond and Pearl	2006	Nintendo DS	17.63 million ^[7]
32	The Sims	2000	Windows, Mac OS	16 million
33	Pokémon Ruby and Sapphire	2002	GBA	16 million
34	Pokémon Black and White	2010	Nintendo DS	15.42 million ^[7]
35	Sonic the Hedgehog	1991	Sega Mega Drive, Sega Genesis, Microsoft Windows ^{[16][17]} and Mobile Phone ^[18]	15 million +
36	Diablo III	2012	Microsoft Windows, OS X, Xbox 360, PlayStation 3	15 million ^[19]



Reference

■ Reference

- [http://dmoz.org/Games/Video Games/History/](http://dmoz.org/Games/Video_Games/History/)
- <http://www.gamespot.com/gamespot/features/video/hov/>
- <http://www.pong-story.com/intro.htm>
- <http://www.atarihq.com/>
- <http://www.icwhen.com/>
- <http://www.emuunlim.com/doteaters/>
- <http://www.geekcomix.com/vgh/main.shtml>
- <http://www.classicgaming.com/features/articles/computergaminghistory/>
- <http://www.consoleclassix.com/>
- <http://www.gamedownloadsonline.com/gamedemos.shtml>
- <http://www.evl.uic.edu/spiff/class/cs426/schedSpr2011.html>
- http://en.wikipedia.org/wiki/History_of_computer_and_video_games
- http://en.wikipedia.org/wiki/History_of_video_games
- <http://www.classicgamesarcade.com/game/21670/tron-game.html>



History of Game Genres

■ Genres

- Action (1st or 3rd person shooter)
- Adventure
- Driving
- Puzzle
- RPG
- Space Simulations
- Simulations
- Sports
- Strategy
 - Empire building
 - Real-time Strategy
- Fighters
- Horror
- Arcade Remakes
- Stealth



Playing Perspectives

- First-Person
 - Popular among action game designers
 - In 3D shooters, seeing through the shooter's eyes (DOOM)
- Third-Person
 - “over-the-shoulder” view (Grand Theft Auto, Lord of the Rings series)
 - some games allow 1st or 3rd (Need for Speed)
- Top-Down
 - Camera hovers over playing area
 - Used by some strategy games (Civilization)
 - Also used in older games (Zelda)
 - *Isometric* top down means camera hovers at an angle (Diablo, The Sims)
- Side-View, also known as “side-scroller”
 - Supplanted by 3D games
 - Sonic, Mario Bros., final projects?
- Text-based games



Game Genre

■ What Were the Top-Selling Game Genres in 2017?

➤ Console Games

- **Shooter (25.9)** 24.5, 21.7, 20, 21.2, 18.4, 15.9)
- **Action (21.9)** 22.9, 28.2, 31.9, 22.3, 19, 21.7)
- **Sport (11.6)** 13.2, 13.3, 12.7, 15.3, 14.8, 16.3)
- **Role-Playing (11.3)** 11.6, 9.5, 7, 6.5, 7.2, 7.7)
- **Adventure (9.1)** 7.7, 6, 6.9, 8.3, 9.5, 7.5)
- **Racing (6.4)** 4.1, 5.2, 4.6, 5.8, 5.8, 5.8)
- **Fighting (6.0)** 6.7, 6, 3.9, 3.9, 3.7, 3)
- **Strategy (4.2)** 3.8, 4.1, 3.4, 2.3, 2.8, 3.8)
- **All Other (3.6)**
 - ✓ Family (3.6, 3.3, 3.5, 8.6, 11.0, 9.1)
 - ✓ Casual (0.9, 1.3, 2.3, 3.0, 4.0, 5.2)
 - ✓ Other (0.8, 1.1, 1.2)

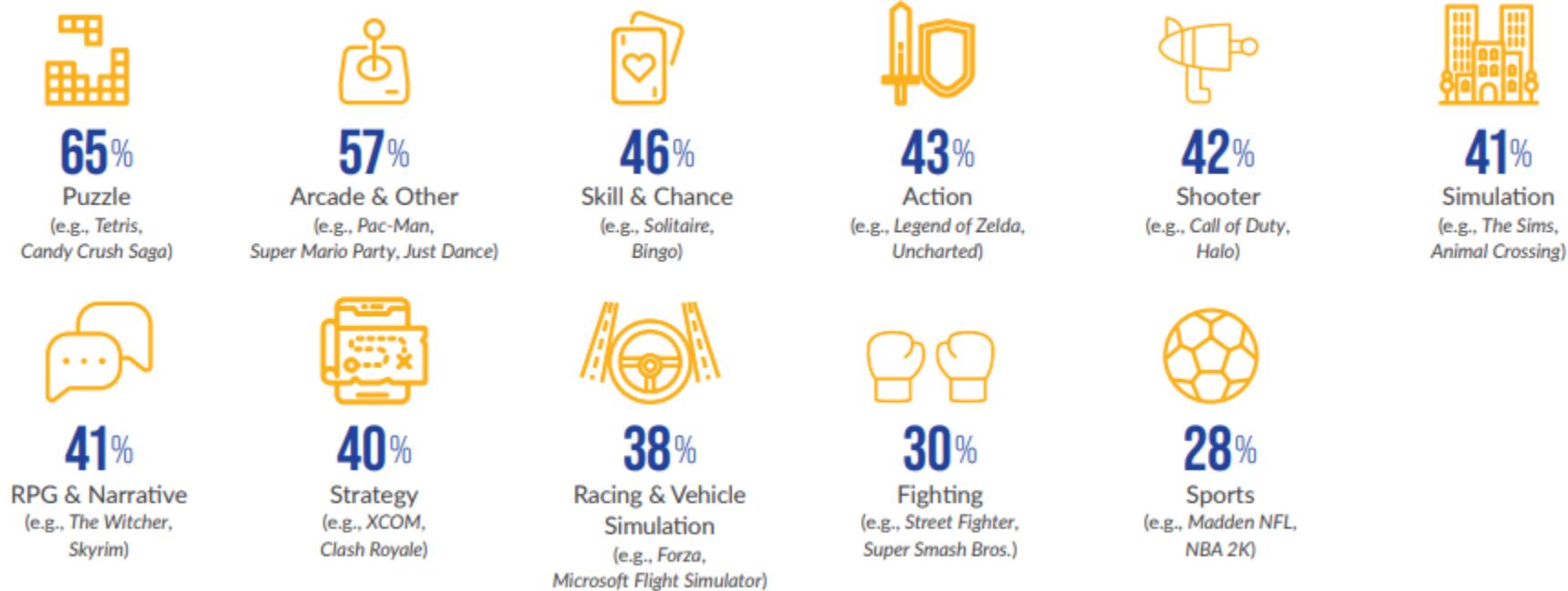
➤ Computer Games (2015) reason? Interface

- **Strategy (36.4)** 37.7, 38.4, 24.9, 27.6, 33.6)
- **Casual (25.8)** 24.8, 28.3, 26.7, 20.6, 19.5)
- **Role-Playing (18.7)** 20.2, 12.3, 28, 21.1, 20.3)
- **Shooter (6.3)** 6.4, 7.1, 6.2, 13, 9.7)
- **Adventure (5.9)** 4.8, 7.1, 7.1, 9.2, 8.7)
- **Action (4.1)** 2.5, 2.3, 2.1, 2.7, 2.7)
- **Flight (0.6)** 0.7, 0.7, 0.7, 1.6, 1.5)
- **Family (0.3)** 0.7, 0.6, 0.1)
- **Racing (0.3)** 0.3, 0.4, 0.5, 0.7, 0.6)
- **Sport (0.2)** 0.2, 0.3, 0.4, 0.6, 0.9)
- **Other (1.3)** 1.6, 2.3)
- **PC 게임 장르는 더 이상 조사하지 않음**



Game Genre

- Most popular genres played regularly according to video gamers in the United States in 2022



Game Genre

Most Popular Mobile Game Genres

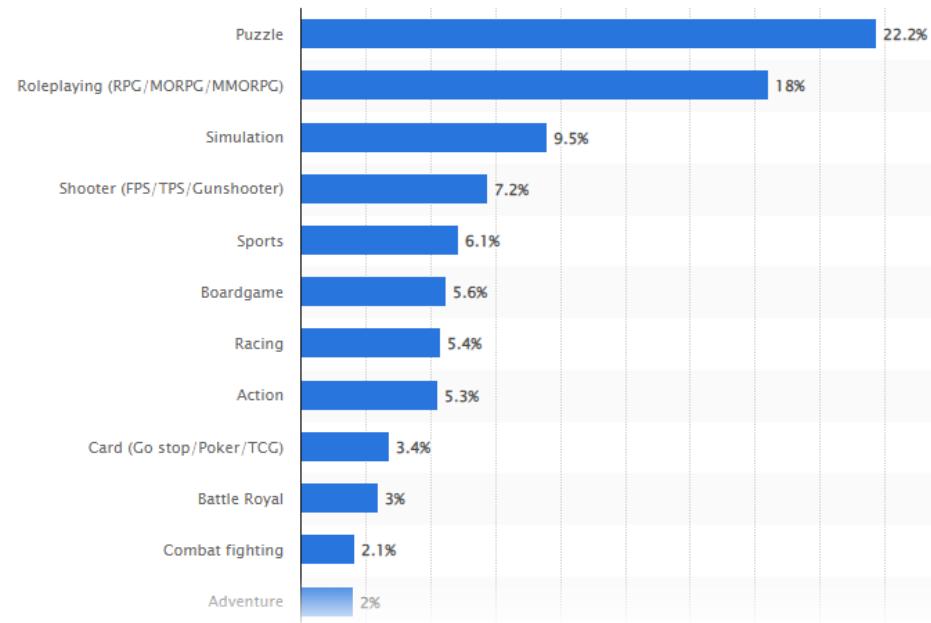
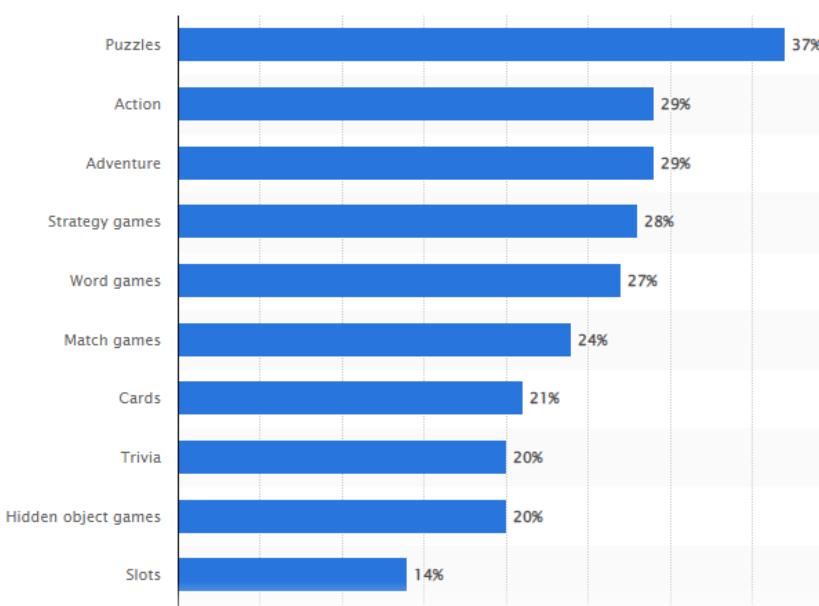


*Find more statistics on video games at
bigfishgames.com/blog/stats/*

Source: ESA: <http://goo.gl/53347S>

Game Genre

■ Most Popular Mobile Game Genre



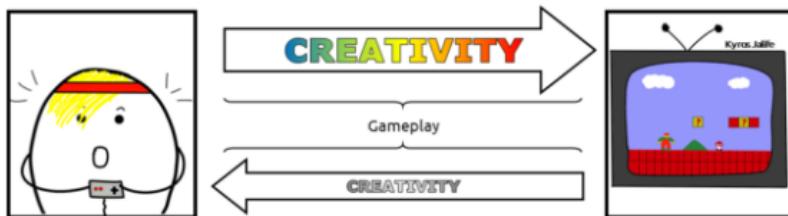


Gameplay

■ Gameplay

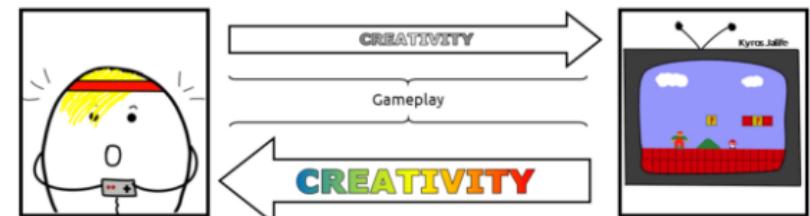
- **Gameplay is the degree and nature of the interactivity that the game includes**
 - How the player is able to interact with the game-world
 - How that game-world reacts to the choices the player makes.

YOU PLAY THE GAME



The player's creativity dominates gameplay

THE GAME PLAYS YOU



The game's creativity dominates gameplay



- Action: run around and shoot things (gameplay with emphasis on combat)
 - Action-adventure: exploration and usually involve item gathering, simple puzzle solving, and combat Ex) [*The Legend of Zelda*](#)
 - Stealth : "sneakers" or "creepers" to make contrast with the action-oriented "shooter" sub-genre Ex) [*Metal Gear series*](#)
 - Survival horror : focus on fear and attempt to scare the player Ex) [*Resident Evil*](#)
 - Beat 'em up: emphasis on one-on-many close quarters [combat](#) Ex) [*Dynasty Warriors*](#) , [*Final Fight*](#)





video game genres

■ Action

- Fighting: one-on-one combat between two characters
Ex) Street Fighter series and the Tekken series
- Maze : a playing field which is entirely a maze, which players must navigate Ex) Pac-Man
- Platform: games in which the gameplay involves traveling between platforms by jumping Ex) Mario series



video game genres



■ Action (Shooter)

- First-person shooter (FPS) : shooting and combat from the perspective of the character controlled by the player
Ex) Doom , Call of Duty series
- Massively multiplayer online first person shooter (MMOFPS) : a genre of Massively multiplayer online games that combines FPS gameplay with a virtual world in which a large number of players may interact over the Internet Ex) World War II Online
- Third-person shooter : shooting and combat from a third-person perspective of the character the player is controlling Ex) Grand Theft Auto series and Gears of War

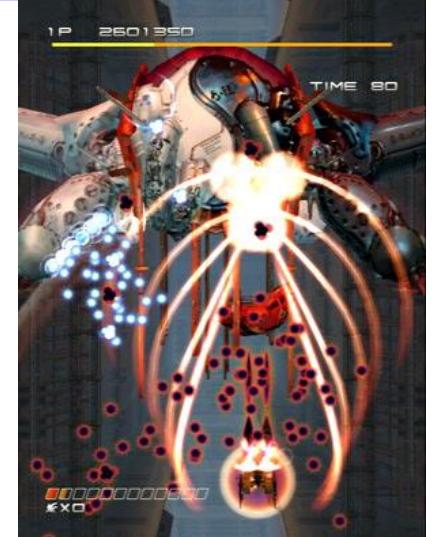




video game genres

■ Action (Shooter)

- Tactical shooter : tactical play such as planning and teamwork (for example, co-ordination and specialised roles)
Ex) Tom Clancy's Ghost Recon series and the SOCOM series.
- Light-gun game : use a pointing device for computers and a control device for arcade and home consoles Ex) Time Crisis and Duck Hunt
- Shoot 'em up : emphasis on shooting, and usually simplify other gameplay aspects of in deference to this Ex) Galaxian and Ikaruga



video game genres

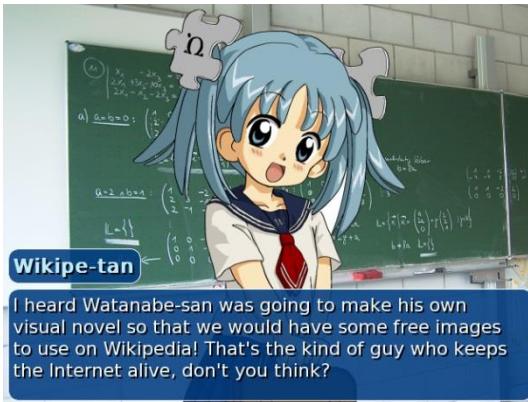
- Adventure : solve puzzles, fight enemies, overcome physical obstacles
 - Text adventure / Interactive fiction : The player uses a keyboard to enter commands such as "get rope" or "go west" and the computer describes what is happening Ex) [Colossal Cave Adventure](#) , [Zork](#)
 - Graphical adventure : begin to supplement and later on replace textual descriptions with visuals (still used text-parsers to input commands) Ex) [King's Quest IV](#)



video game genres

■ Adventure

- Visual novel : an [interactive fiction](#) game featuring mostly static graphics, usually with [anime](#)-style art (commonly called [dating sims](#))
- Interactive movie : contains pre-filmed [full-motion cartoons](#) or live-action sequences, where the player controls some of the moves of the main character Ex) [Dragon's Lair](#), [Space Ace](#) and [Night Trap](#)
- Dialog game : players progress from one level of game play to another depending on what they say. If they answer questions correctly, they progress to the next stage Ex) [Law And Order](#)



video game genres

- **Role-Playing Game(RPG) : the participants assume the roles of fictional characters and collaboratively create or follow stories**
 - **Action role-playing** : a type of computer and console role-playing game which incorporates elements from action games or action-adventure games Ex) *Diablo*
 - **Massively multiplayer online role-playing (MMORPG)** : a genre of online computer role-playing games (CRPGs) in which a large number of players interact with one another in a virtual world
Ex) Lineage, World of Warcraft





video game genres

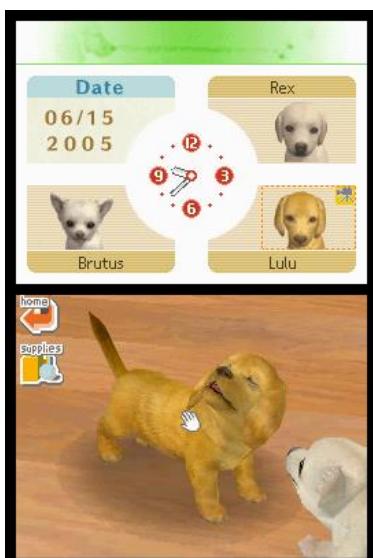
- **Construction and management simulation : build, expand or manage fictional communities or projects with limited resources**
 - **City-building** : acts as overall planner or leader to meet the needs and wants of game characters by initiating structures for food, shelter, health, spiritual care, economic growth, etc Ex) *[SimCity](#)*
 - **Economic simulation** : simulate an economy or business, with the player controlling the economy of the game
 - **God games** : control over the lives of people, anywhere from micromanaging a family to overseeing the rise of a civilization Ex) *[Populous](#)*, *[SimAnt](#)*, *[SimEarth](#)*
 - **Government simulation** : the simulation of the policies, government or politics of a country, but typically excludes warfare Ex) *[Diplomacy](#)*





video game genres

- **Life simulation** : lives or controls one or more artificial lives
 - **Biological simulation** : allow the player to experiment with genetics, survival or ecosystems
 - **Pet-raising simulation** : focus more on the relationship between the player and one or few life forms Ex) Tamagotchi and Nintendogs.
 - **Social simulation** : gameplay on the social interaction between game entities Ex) The Sims or any dating sim.



video game genres

- **Vehicle simulation** : provide the player with a realistic interpretation of operating various kinds of vehicles.
 - Flight : the player with flying an aircraft, usually an airplane, as realistically as possible Ex) [Microsoft Flight Simulator](#) and [X-Plane](#)
 - Racing : place the player in the driver's seat of a high-performance vehicle and require the player to race against other drivers or sometimes just time Ex) [Mario Kart Wii](#), [Gran Turismo](#) and [Need For Speed](#)



video game genres

■ Vehicle simulation

- Space : simulates outer space and/or space flight
Ex) Star Wars: X-Wing
- Train : simulate the vehicles, environments and often economics associated with railway transport Ex) Microsoft Train Simulator
- Vehicular combat : focus on fast-paced action, as the player operates a car or other vehicle and attempts to disable or destroy CPU or human opponents Ex) Spy Hunter





- **Strategy** : focus on gameplay that requires careful and skillful thinking and planning in order to achieve victory
 - Real-time strategy (RTS), which are played in a real-time environment Ex) *Age of Empires* , *Command & Conquer*, *StarCraft* and *Warcraft*
 - Turn-based strategy (TBS), which are played in rounds or turns. Ex) *Heroes of Might and Magic*
 - 4X : Games defined as 4X usually involve four primary phases: eXplore, eXpand, eXploit, and eXterminate Ex) *Civilization II*





Video game genres by purpose

- Advergaming ("advertising" and "gaming")
 - the practice of using video games to advertise a product, organization or viewpoint
- Exergaming ("exercise" and "gaming")
 - term used for video games that are also a form of exercise.
 - Ex) Wii Fit
- Serious game
 - intended to educate or train the player
 - a game designed for a primary purpose other than pure entertainment
- Casual game
 - simple rules or play techniques and a very low degree of strategy.
 - no long-term time commitment or special skills to play, making them easy to learn and play as a pastime.
- Sandbox game
 - a video game with a gameplay element that gives the player a great degree of creativity to complete tasks towards a goal within the game, if such a goal exists.
 - Ex) Minecraft

Action (1st and 3rd person shooters)

Gameplay: run around and shoot things



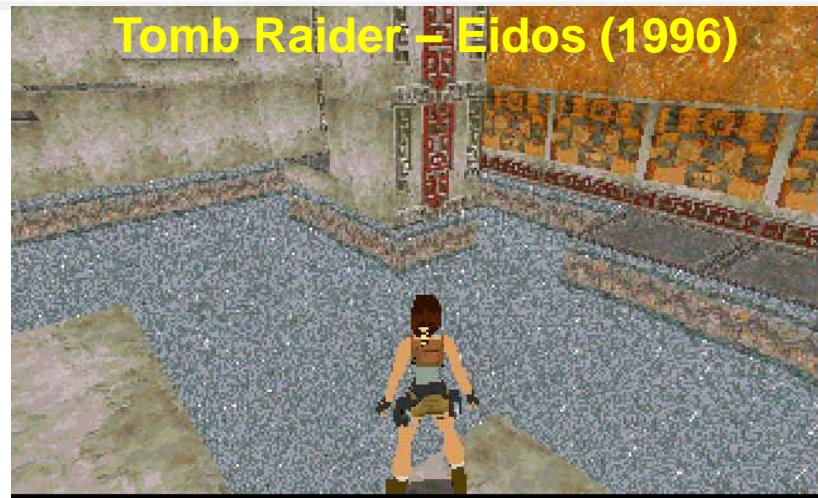
Adventure

**Gameplay: solve puzzles, fight enemies,
overcome physical obstacles**

Mark of Kri – San Diego Studios (2002)



Tomb Raider – Eidos (1996)



West of House Score: 0 Moves: 3
Copyright <c> 1981, 1982, 1983 Infocom, Inc. All rights reserved.
ZORK is a registered trademark of Infocom, Inc.
Revision 88 / Serial number 840726

West of House
You are standing in an open field west of a white house, with a boarded front door.
There is a small mailbox here.

>open mailbox
Opening the small mailbox reveals a leaflet.

>get leaflet
Taken.

>read leaflet
"WELCOME TO ZORK!"

ZORK is a game of adventure, danger, and low cunning. In it you will explore some of the most amazing territory ever seen by mortals. No computer should be without one!"

Infocom Games - 1981



A voice BOOOOMS out:
"Welcome to Adventure number 1:
"ADVENTURELAND". In this Adventure
you're to find *TREASURES* & store them
away. To see how well you're doing say
SCORE.
Remember you can always say HELP
---TELL ME WHAT TO DO ? ■

Adventureland – Scott Adams (1978)

Stealth: A Sub-Genre of Adventure

Gameplay: Remaining Hidden



Chronicles of Riddick (2004)



Thief: Dark Project (1999) G



Metal Gear Solid (1998)



Tenchu (1998)

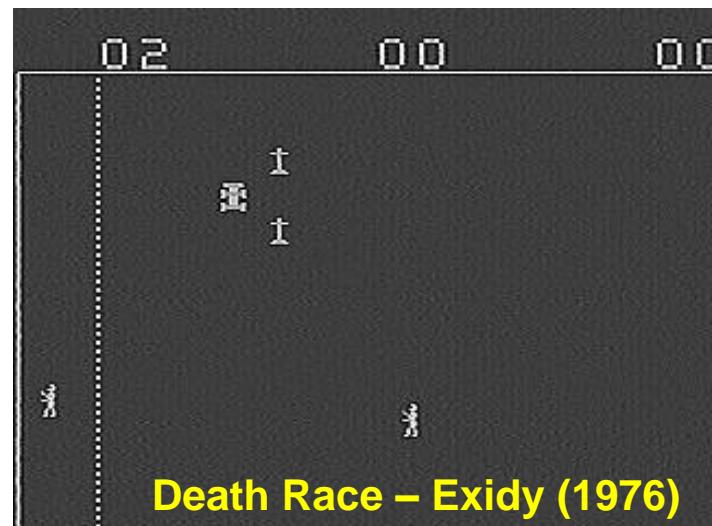
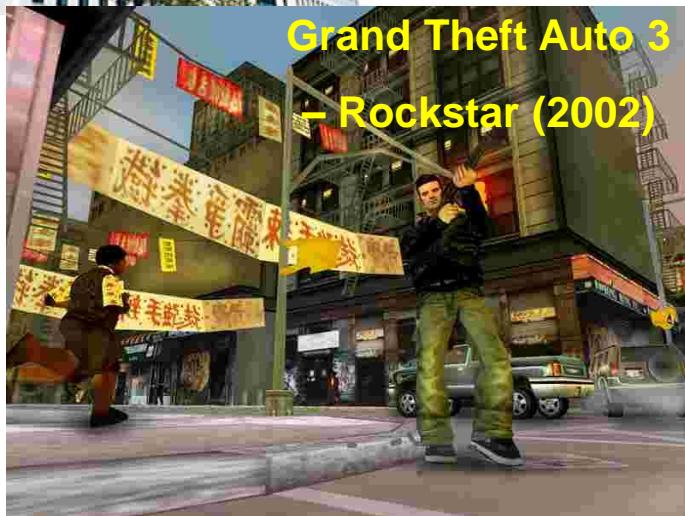
Fighters

Gameplay: Punch & kick until opponent is defeated



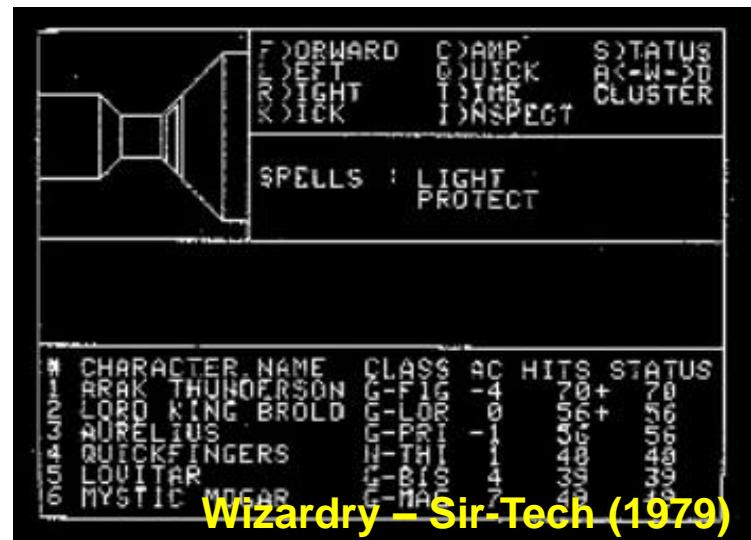
Driving

Gameplay: Drive as fast as you can; stunt driving or run over people for bonus



RPG

Gameplay: Similar to adventure, less emphasis on action, more emphasis on statistical dice rolling to determine outcome



Space Simulations

Gameplay: Fly through space and shoot things



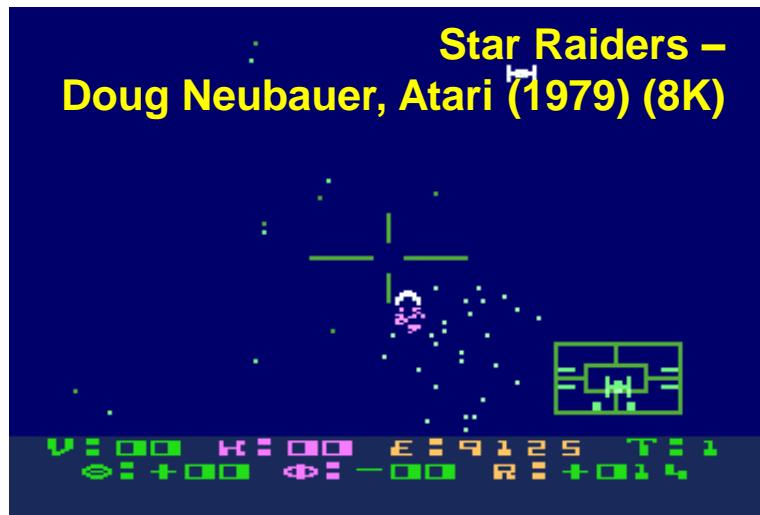
**Darkstar One -
Ascaron Ent. (2006)**



**Wing Commander –
Chris Roberts, Origin (1990)**



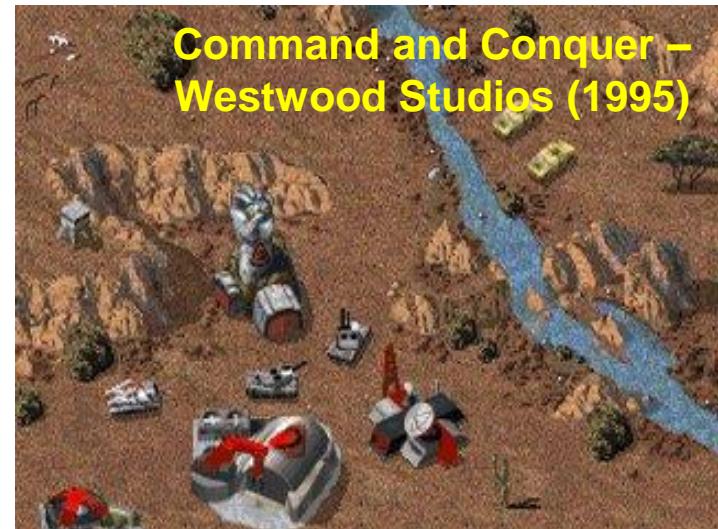
**Rogue Squadron
– LucasArts (2001)**



**Star Raiders –
Doug Neubauer, Atari (1979) (8K)**

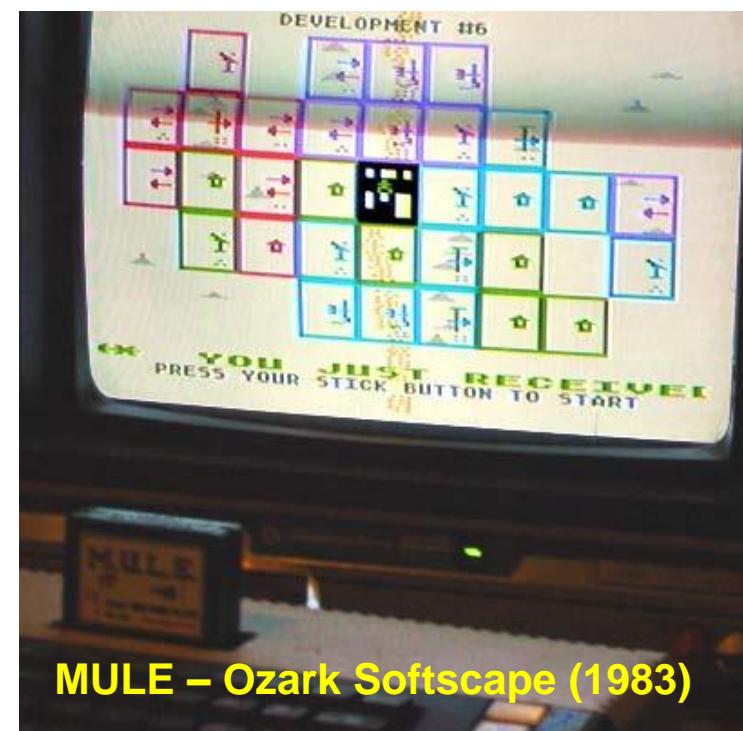
Real Time Strategy (RTS)

Gameplay: Build armies and battle

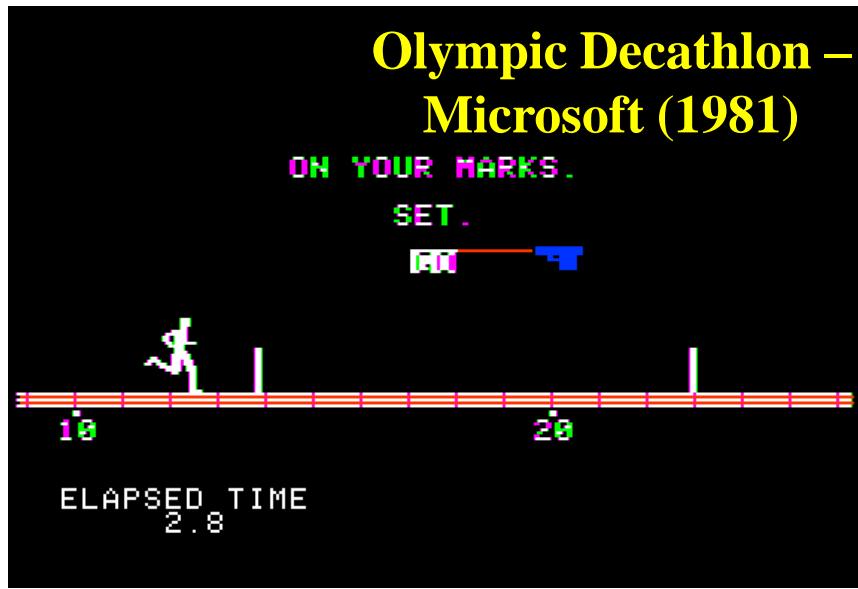


Empire Building

Gameplay: 4X games: Explore, Expand, Exploit, and Exterminate



Sports





Modern Video Game

The Elements of a Modern Video Game

1. Developer & publisher logo screens
2. Opening animation / cutscene to provide context
3. Game configuration screen
 - Select control layout
 - Built-in tutorial
 - Game type – single or multiplayer
 - Cheats
 - Extras
 - Credits
4. Level or Game prep screen and/or cutscene
 - Select attributes of your “character”- choose a person or a spaceship.
5. The Game level (save here)
6. The end-of-level cutscene
7. Save game here
8. Repeat from 4.
9. End of game cutscene.
10. Credits



Reference

■ Trends of Game Industry

- 미국 게임 시장 (**ESA**)
 - [Essential Facts About the Computer and Video Game Industry](#)
- 대한민국 게임 시장 (**KOCCA**)
 - [대한민국 게임백서](#)