# History of Computer & Video Games

CSCI 1030 – Computer Game Design

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# Outline

- Origins
- Arcade Games
  - Early Arcade Games
- Console Systems
  - Early Console Systems
  - Video Game Crash of 1983
  - Return of Console Systems
- Computer Games
  - Early Computer Games
  - 1990s – The “hay day” of PC games
  - 2000s – Consoles take over

# Origins

- Computer Games sprang from two independent sources:
  - Electro-mechanical coin-operated games
    - late 1800s+
    - pinball machines
    - jukeboxes
    - mechanical games (e.g. baseball)
  - Mainframe computers
    - 1937 – 1945:  first computers
    - early computer programmers designed games for personal challenges and enjoyment

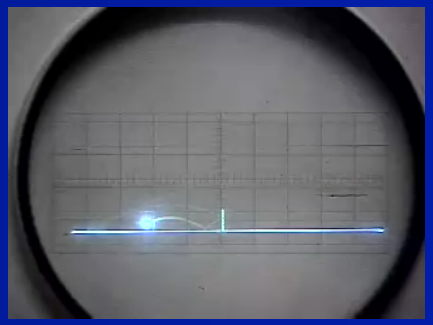
# Coin-Operated Amusement Games

- Pinball machines (1931+)
- Jukeboxes (1931+)
- Mutoscopes (1985-1920)
  - "flip book" style image animation devices
- Mechanical Games
  - baseball
  - skee ball

# First Computer Games

- First electronic game (1948)
  - "CRT Amusement Device"
  - simulated a missile firing at a target
- First two games to run on a computer
  - checkers (1951)
  - "OXO", a tic-tac-toe game (1952)
- First computer for games
  - NIMROD computer (1951)
  - Played the "Nim" game
- First non-board, non-pencil/paper game
  - "Tennis for Two" (1958)
  - run on an oscilloscope

Tennis for Two



# Arcade Games

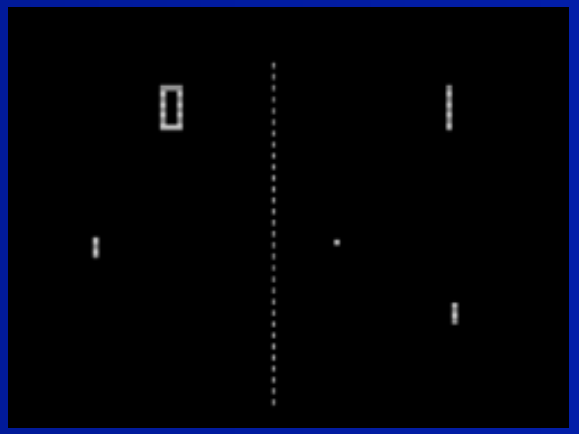
# *Spacewar!* – First Video Game

- 1961 – developed by MIT students
  - Steve Russell, W. Witanen, and J.M. Graetz
- 1971 – commercialized as *Galaxy Game*
  - Stanford students placed in student union
  - Games were 10 cents each
- 1971 – commercialized as *Computer Space*
  - Nolan Bushnell and Ted Dabney
    - founders of Atari in 1972
  - sold 1500 units
- 1978 – commercialized as *Space Wars*

First video game, but gameplay was too simple to be very successful

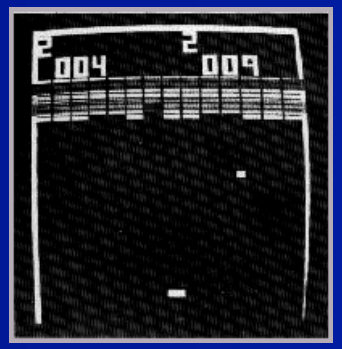
# First Arcade Games

- *Spacewar!* clones
  - First Arcade Games
    - *Galaxy Game* (1971)
    - *Computer Space* (1971)
- *Pong* (1971)
  - First Successful Arcade Game
  - Atari sold over 6000 units
    - more than most popular pinball games of that time
  - Magnovox Odyssey had similar *Table Tennis* game
    - companies settled out of court, and Atari became official distributor of *Pong*



# Early Popular Arcade Games & Companies

- **Atari**
  - *Quadra Pong* (1974)
    - First four-player game
  - *Gran Trak 10* (1974)
    - First driving/racing game
  - *Hi-way* (1975)
    - First scrolling playfield
    - First sit-down cabinet game
  - *Night Driver* (1976)
    - First scrolling playfield
  - *Breakout* (1976)
    - Atari's 2nd big hit; sold 11,000 units
    - Very popular
- **Kee Games** (spinoff of Atari)
  - *Tank* (1974)
    - First one-on-one dueling game
    - Very popular




Breakout

Tank

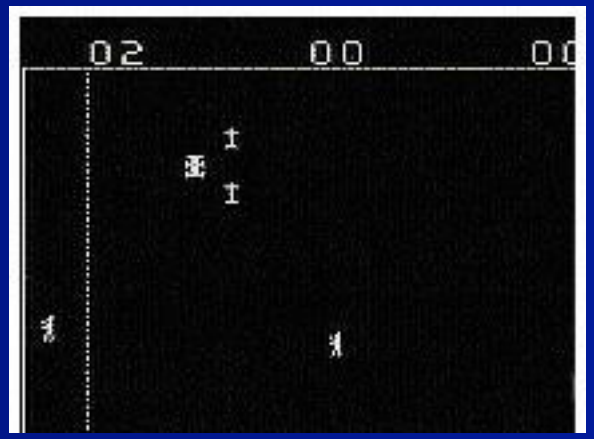
# Early Popular Arcade Games & Companies cont.

- **Midway/Bally/Taito**
  - *Gun Fight* (1975)
    - First Japanese video game imported to US
    - First microprocessor in an arcade game
    - Midway's first hit (created by Taito, licensed by Midway/Bally)
    - Very popular
  - *Sea Wolf* (1976)
    - Midway's second hit – sold 10,000 units
    - Very popular
- **Sega**
  - *Heavyweight Champ* (1975)
    - First boxing game
  - *The Fonz* (1976)
    - First motorcycle driving game

Gun Fight

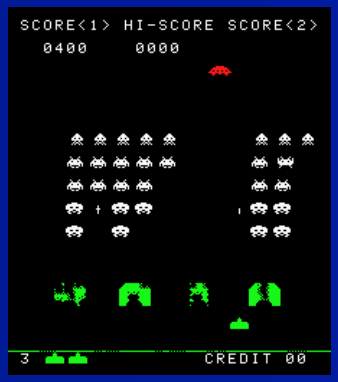
# First Protest against Violence in a Video Game

- *Death Race* (1976)
  - Exidy released game inspired by the *Death Race 2000* movie
  - Gameplay involved player running over "gremlins" that resembled human stick-figures.



# Golden Age of Arcade Games: Space Shooters

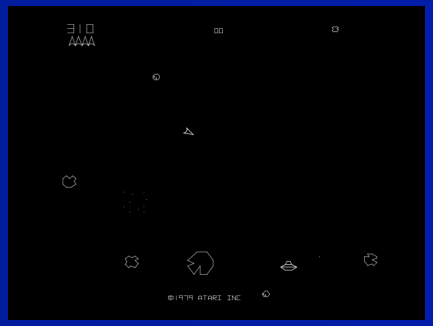
- **Midway/Bally/Taito**
  - *Space Invaders* (1978)
    - First high-score board
    - Sold over 100,000 units
    - Caused a shortage of 100 Yen coins in Japan
    - Very popular




Space Invaders

- **Atari**
  - *Asteroids* (1979)
    - First high-score board with players initials
    - Used vector graphics display
      - also used by *Lunar Lander in 1979*
    - Very popular

Asteroids



- **Exidy**
  - *Star Fire* (1979)
    - First high-score board with players initials

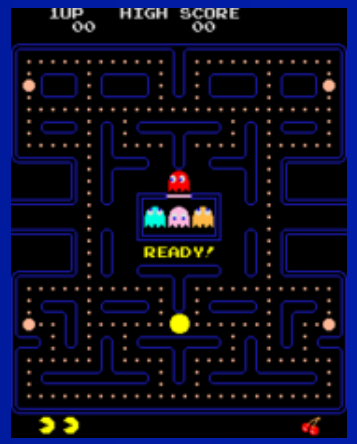
- Also: *Galaga* (1981), *Defender* (1980), *Zaxxon* (1982), and others

Space shooters were the hottest arcade game genre into 1980

# Golden Age of Arcade Games: Pac-Man !!!

- **Namco**
  - *Pac-Man* (1979)
    - Non-violent game targeted at both sexes
    - Originally titled *Puck-Man*
    - First identifiable video game character/mascot
    - Sold over 100,000 units
    - Very popular

Pac-Man



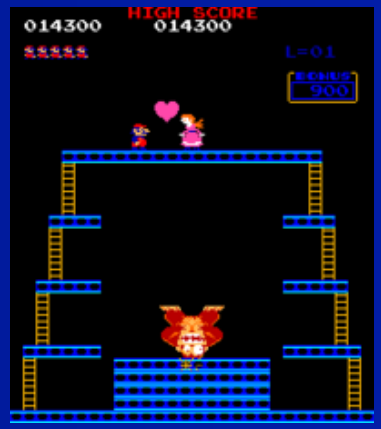

  - *Ms. Pac-Man* (1981)
    - First game to star a female character
    - Four mazes (instead of one)
    - Random enemy movement (instead of fixed)
    - Appealed to both males and females
    - Sold over 115,000 units
    - Very popular

Ms. Pac-Man

# Golden Age of Arcade Games: Platformers

- **Universal Sales**
  - *Space Panic* (1980)
    - First platform game
- **Nintendo**
  - *Donkey Kong* (1981)
    - First successful platform game
    - Kong and Mario became Nintendo's most popular characters
    - Very popular
- **Williams Electronics**
  - *Joust* (1982)
    - First two-person cooperative platform game
- **Gottlieb**
  - *Q*bert* (1982)
    - First isometric platform game
- **Namco**
  - *Mappy* (1983)
    - First smooth-scrolling platform game

Donkey Kong

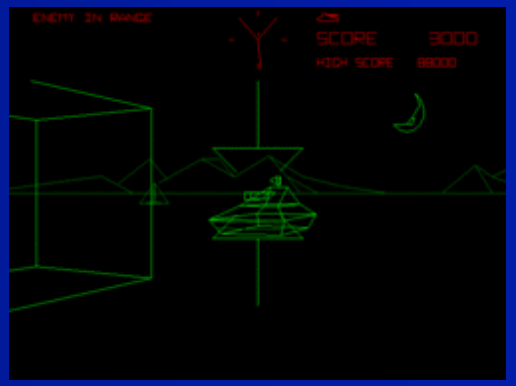




Q*bert

# Golden Age of Arcade Games: Other Influential Games

- **Atari**
  - *Atari Football* (1978)
    - First sports game with smooth-scrolling screen
    - First trackball controller
  - *Battlezone* (1980)
    - First commercial game with 3D graphics
  - *Tempest* (1981)
    - First game with selectable level of difficulty
    - First game to allow player to insert a coin to continue game from point of death
  - *Star Wars* (1983)
    - First successful movie tie-in game
- **Namco**
  - *Galaxian* (1979)
    - First true RGB color graphics
  - *Pole Position* (1982)
    - Considered first "great" racing game
    - First "rear-view racer", which became standard in genre
- **Cinematronics**
  - *Warrior* (1979)
    - First (non-boxing) fighting game
    - Overhead-view sword-fighting game
  - *Dragon's Lair* (1983)
    - First popular laserdisc game
      - first laserdisc game was *Astron Belt*




Battlezone


Galaxian

# Decline of Arcades

- Arcades began to decline in late 1980s
- Reasons:
  - 16-bit and 32-bit console systems enabled graphics nearly as good as arcade games
  - *BlockBuster Video* (and others) began allowing users to rent console games
  - Computer games provided greater depth of gameplay
  - Popular arcade games were being ported to console systems
- Small resurgence in early 1990s
  - Popular fighting games like *Street Fighter II* and *Mortal Kombat*
- Arcades today are primarily large amusement centers
  - Putt-putt, go-cart, & batting cage style amusement centers
  - Adult hangouts like *Dave & Busters*
  - Kids amusement centers like *Chuck E. Cheese*

# Console Systems

# First Generation of Console Systems (1972 – 1977)

- Magnavox Odyssey (1972)
  - First video game console
  - Included a variety of built-in games
    - Used different "circuit cards" for different games
  - Poorly marketed by Magnavox
- Atari's *Pong* System (1975)
  - First successful video game console
  - Offered only one game – *Pong*
- Coleco Telstar System (1976)
  - Offered three variants of *Pong*

Magnavox Odyssey


Atari *Pong* System

# Second Generation of Console Systems (1976 – 1984)

- First generation of games to use a microprocessor
- First generation to feature a third-party game developer
  - Activision – developed games for Atari
- Fairchild Channel F (1976)
  - Originally named Fairfield VES
  - First console system to use  a microprocessor
  - First programmable cartridge-based video game console
    - only 26 different cartridges ever offered for it
- Atari 2600 (1977)
  - Originally named Atari VCS
  - Very popular
    - sold over 30 million units
- Mattel Intellivision (1980)
  - First 16-bit microprocessor
  - Featured a unique 16-direction controller
  - Very popular
    - sold over 6 million units
- Coleco's ColecoVision (1982)
  - Noted for bringing arcade games to the home
  - Very popular
    - sold over 6 million units

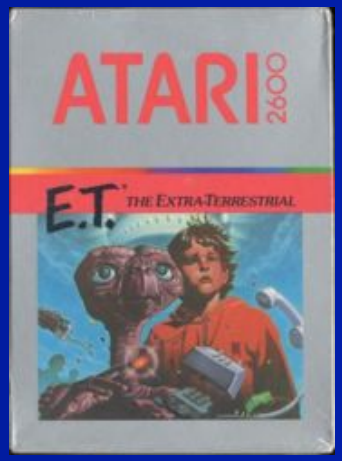
Fairfield Channel F

Atari 2600

# Video Game Crash of 1983

# Reasons behind the Video Game Crash of 1983

- Flood of consoles and games
  - Too many console and games for consumers to choose from
  - Difficult for consumers to determine quality of game without buying the game (no established game review system)
  - Twice as many games were produced in 1982 as in previous years
    - game stores returned excess games to publishers, but publishers didn't have cash or new products to reimburse stores for unsold games
    - prices dropped from $34.95 in 1982 to $4.95 in 1983
  - For example, Atari vastly overproduced the *E.T.* and *Pac-Man* games
    - more E.T. game cartridges were produced than the total number of systems that existed
    - Atari buried millions of E.T. cartridges in a New Mexico landfill



# Reasons behind the Video Game Crash of 1983

- Atari 2600 was beginning to decline
  - Historically, game systems have a lifetime of about 5 years
  - Atari 2600 was in it's 6th year, at the beginning of its natural decline
- Competition from personal computers
  - Personal computer systems were becoming more affordable
    - PCs began a price war in early 1983
  - PCs offered capability for both games and productivity
  - PC games were much easier to copy
  - Commodore's marketing and distribution in particular dramatically hurt video game console market
    - Commodore marketed against video game consoles
    - Commodore was sold in same stores along side game consoles

# Effects of Crash of 1983

- Dramatic drop in game prices led to a rash of low-budget (and low quality) games
  - this further hurt sales and image of the video game industry
- Bankrupted many video game companies
  - many fledgling game companies quickly died
  - many new console development projects shut down
    - delayed 3rd generation of video game consoles
  - even some popular game console companies were affected:
    - Coleco and Magnavox completely abandoned the video game industry
    - Mattel's division for Intellivision closed in 1984
- Led many to believe video games were a fad
  - many retailers refused to have anything to do with video games for several years after the crash
    - this was the Nintendo NES's greatest obstacle in 1985/1986
  - arcades and arcade games began dying out, and never recovered

# Return of Console Systems

# Third Generation of Console Systems (1983 – 1992)

- Nintendo NES (1983/1985)
  - Originally named Famicon in Japan
  - Revitalized console market after crash of 1983
  - Nintendo strongly controlled third-party game developers
  - Set the standard for subsequent console systems in
    - Game design
    - Controller layout
    - Third-party software licensing
  - Very popular
    - sold over 60 million units
- Sega Master System (1986)
  - Only popular in European market
    - sold over 13 million units
- Atari 7800 (1986)
  - More popular than Atari 5200, but not competitive with Nintendo NES or Sega Master System


Nintendo NES

Sega Master System

# Fourth Generation of Console Systems (1987 – 1996)

- NEC TurboGrafx-16 (1987/1989)
  - Originally named PC-Engine in Japan
  - 8-bit CPU and 16-bit GPU
  - First console to offer an optional CD module
  - Popular in Japan, but not in US
    - sold over 10 million units worldwide
    - uncompetitive and unpopular in US
- Sega Genesis (1989)
  - Named Sega Mega Drive outside of US
  - First console supporting 32-bit instructions (but 16-bit architecture)
  - Very popular
    - sold 29 million units worldwide
- SNK's Neo-Geo (1990/1991)
  - Both an arcade platform and costly home console ($649 retail)
  - Notable for bringing arcade-quality graphics into the home
  - Popular with high-end gamers
    - most graphically-superior system of the time
- Super Nintendo (SNES) (1990/1991)
  - Named Sega Mega Drive outside of US
  - 16-bit processor with advanced video and audio chipsets
  - Supported a variety of peripherals and enhancement chips
  - Very popular
    - sold 49 million units worldwide


Sega Genesis

Super Nintendo (SNES)

# Fifth Generation of Console Systems (1993 – 2002)

- The 32-bit (and start of 64-bit) era of consoles
- The rise of fully 3D games
- Game media wars:  CDs vs. Cartridges
- Sega Saturn (1994/1995)
  - First console to have two 32-bit (main) processors
    - difficult platform for programmers to develop games
  - Released 4 months early, catching game developers off-guard
  - Only popular in Japan
    - sold less than 10 million units worldwide
- Sony Playstation (1994/1995)
  - First successful use of CD media for games
  - First use of memory cards in consoles?
  - Very popular
    - sold over 100 million units worldwide
- Nintendo 64 (1996)
  - First console with a 64-bit processor
  - Poor hardware design choices limited graphics capabilities
  - Moderately popular
    - sold 33 million units worldwide
- Also:  *Panasonic 3DO* (1993), *Amiga CD-32* (1980), and *Atari Jaguar* (1993)


Sony Playstation

Nintendo 64

# Sixth Generation of Console Systems (1998 – 2006)

- Sega Dreamcast (1998/1999)
  - Several innovations, includin Internet gaming and web browsing
  - Considered out-dated only two years after its release
  - Initially successful, but discontinued early
    - sold over 10.6 million units worldwide
- Sony Playstation 2 (2000)
  - Backwards compatible with Playstation
  - Also played DVDs
  - Secured licensing for many key games, enabling it to outperform competitors' launches
  - Best-selling game console in history
    - sold 140 million units worldwide
- Ninetnedo GameCube (2000)
  - Struggled with the family-friendly image gained in prior generation
  - Very popular
    - sold over 22 million units worldwide
- Microsoft XBox (2001)
  - A very popular console, but had difficulty competing with PS2's strong start
  - Xbox Live became most popular on-line gaming system
  - Very popular
    - sold 24 million units worldwide

Sony Playstation 2


Microsoft XBox

# Seventh Generation of Console Systems (2005 – 2015)

- XBox 360 (2005)
  - Introduced high-definition graphics
  - Initial heat dissipation problems caused many early models of the console to fail
  - Very popular
    - sold over 28 million units worldwide
- Sony Playstation 3 (2006)
  - Included high-definition graphics
  - Included a Blu-Ray disc player
  - New processor and player technology caused early production shortages
  - Very popular
    - sold over 16.8 million units worldwide
- Ninetnedo Wii (2006)
  - Introduced a popular new controller with movement sensors
  - Lack of high-def graphics and harddrive limits interest of hard-core and mature gamers
  - Most-successful console of this generation
    - sold over 34.5 million units worldwide

Xbox 360


Sony Playstation 3

Nintendo Wii

# Eighth Generation of Console Systems (2012 – present)

- Called "most boring" generation to date
  - Nothing really novel in this generation
- XBox One (2013)
  - Initially included Kinect as part of system
  - Now with Blu-Ray support
  - Recently added a 4K version (S model)
  - Very popular
    - sold over 20 million units worldwide
- Sony Playstation 4 (2013)
  - Changed from Cell processor of PS3 to more traditional processing system
  - Recently added a 4K version (Pro model)
  - Most-successful console of this generation
    - sold over 53.4 million units worldwide
- Ninetnedo Wii U (2012)
  - New game pad did not spark much interest
  - Few good games available upon release
  - Still no hard drive
  - Lukewarm reception
    - sold over 13.6 million units worldwide

Xbox One

Sony Playstation 4

Nintendo Wii U

# Early Computer Games

# Early (Mainframe) Computing Platforms of the 1970s

- **PLATO**
  - Popular educational computing environment
  - Designed at University of Illinois
  - Ran on mainframes made by Control Data Corporation
  - Many games were exchanged between different PLATO systems
- **DECUS**
  - User group for computers
  - Made by Digital Equipment Corporation (DEC)
  - Distributed programs, including games, among various DEC computers
- **Hewlett Packard minicomputers**
  - HP2000 was one popular system
  - Many games developed on HP systems

# Notable Mainframe Computer Games of the 1970s

- First Computer Baseball Game (1971)
  - written by Don Daglow on a DEC PDP-10 at Pomona College
- *Star Trek* (1971)
  - written by Mike Mayfield on a Sigma 7 at MIT
  - first major game to be ported across hardware platforms by students
- *Hunt the Wumpus* (1972)
  - written by Gregory Yob on a DEC PDP-10
  - a hide-and-seek game
  - could be considered the first text adventure game
- *Maze War* and *Spasim* (1974)
  - pioneering examples of early multi-player 3D first person shooters
- *Adventure* (1975)
  - originally called *ADVENT* and later called *Colossal Cave*
  - first text adventure game (as we recognize it today)
  - inspired a generation of adventure game developers

# Notable Mainframe Computer Games of the 1970s

- CRTs become main output (mid 70s)
  - up to this point, output was received as text on a printer
  - inspired the start of “graphics” games
- *Dungeon* and *dnd* (1975)
  - the first two *Dungeons & Dragons*-style graphic RPG games with
  - users had top-down view of the dungeon (like NetHack)
- *Zork* (1977)
  - an early extremely popular text adventure game
- *Air* (1977)
  - a text air combat game
- *Rogue* (1980)
  - a very popular D&D-style graphic RPG game for Unix
  - first graphic RPG game with randomly-generated dungeons
  - inspired a generation of *rogue*-like games

# Home Computers

- **Tandy TRS-80 (1977, 1980)**
  - not particularly popular
  - but, helped start the personal computer revolution

Tandy TRS-80

- **Apple II (1977+)**
  - first popular home computer
  - priced affordably ($1000 – $1500) for most middle-class families
  - had an immense impact on the personal computer industry
  - extremely popular
    - the best-known early home computer

Apple II

- **Commodore Vic-20 (1980)**
  - first very inexpensive ($295) personal computer
  - popular
    - first personal computer to sell one million units

- **Commodore 64 (1982)**
  - a very popular inexpensive ($595) personal computer
  - marketed for computer games
  - extremely popular
    - sold over 30 million units

C64

# Home Computers

- **IBM PC/AT (1984)**
  - first IBM PC to be competitive in the game market
  - had 16-bit graphics
    - earlier IBM PCs only had 4-bit graphics
  - still had poor sound quality (resolved in late 80s)
  - appealing combo for home computers
    - parents could use for business
    - kids could use for games

IBM PC/AT

- **Apple Macintosh (1984)**
  - first user-friendly GUI
  - only black & white graphics until 1987

Apple Macintosh

- **Atari ST ('85), Commodore Amiga ('85), and IBM PS/2 ('87)**
  - first home computers capable of 256-bit VGA graphics

# IBM PC – The Game PC for the 90s

- **IBM controlled home computer market**
  - PCs dominated the business market
    - so families often bought PCs at home for compatability
  - PCs now had a decent GUI (Windows)
  - PCs were much cheaper
    - PC compatibles were available from many manufacturers
    - Macs only available from Apple (no competition)
- **Most games available only on PC**
  - Mac and PC hardware not compatible so difficult to also release game for Mac
  - *Myst* was the only popular game only for Mac
- **Computers superior to consoles**
  - Graphics and sound in PCs superior to console systems
  - Little copy protection in early 90s, so easy to copy (pirate) game
  - Computer games offer better processing capability and larger interface
    - much better playability than console systems
    - strategy, simulation, and RPG games were awful on consoles

# PCs for Gaming in 2000 – now a much smaller market

- **Consoles offer same capability at better price**
  - console systems cheaper
    - if you just want a game machine, why buy a PC?
  - console games cheaper to play
    - can rent console games (but not PC games)
    - PC games no longer easy to copy (pirate)
- **Games for consoles <u>always</u> work on consoles**
  - gamers knows that a game designed for a console will run on a console
  - PCs have a wide range of hardware capability, so can be hard to determine whether a game will run on your PC
- **BUT, consoles have a limited interface**
  - console controllers have a limited number of buttons, so complex games don't play well on consoles
    - these games form the basis of the PC's niche game market

# PC Gaming in 2010s – resurgence w/ Steam and VR

- **Better support for low-powered and high-powered gaming systems**
  - most games designed with better support for supporting a wide range of PC systems
- **Valve's Steam**
  - gamers can buy and download games as desired
  - games generally offered at reduced price (vs. retail)
  - purchased games available forever in gamer's library
- **Some games only available on PCs**
  - some games are so complex – especially in their interfaces – that they are not suitable for console systems
  - MMOs in particular are most commonly played on PC systems
- **Virtual Reality (VR)**
  - most console systems unable to support quality VR