

History of Computer & Video Games

CSCI 130 – 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

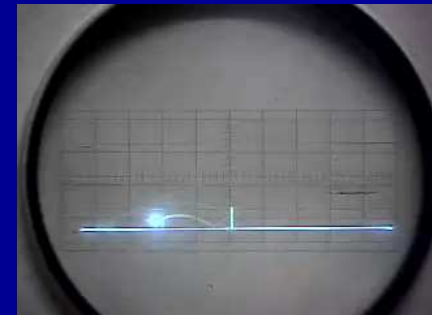
Coin-Operated Amusement Games

- Pinball machines (1931+)
- Jukeboxes (1931+)
- Mutoscopes (1885-1920)
 - “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*



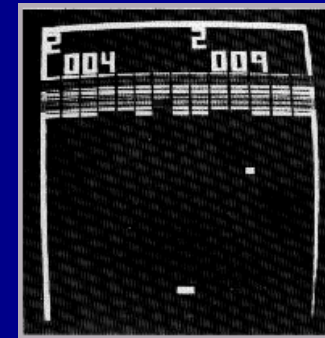
Early Popular Arcade Games & Companies

■ 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**



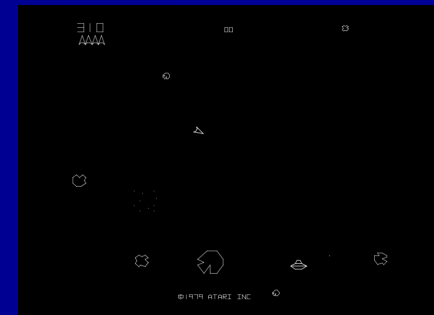
Space
Invaders

■ 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



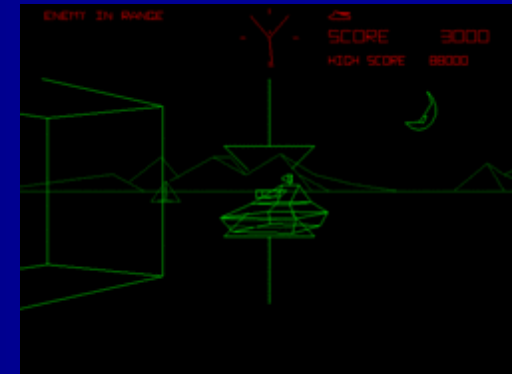
Q*bert

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

Battlezone



■ 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*



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 its 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 Famicom 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, including 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
- Nintendo 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 – present)

- 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
- Nintendo 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



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
- **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
- **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

Tandy
TRS-80



Apple II



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
- **Apple Macintosh (1984)**
 - first user-friendly GUI
 - only black & white graphics until 1987
- **Atari ST ('85), Commodore Amiga ('85), and IBM PS/2 ('87)**
 - first home computers capable of 256-bit VGA graphics



IBM PC/AT



Apple
Macintosh

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 always work on consoles**
 - gamers know 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