History of Computer Games

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Derived from The Ultimate Game Developer’s Sourcebook
The First Quarter: A 25 year history of video games, S.Kent
and sources on the WWW
Pre-historic
First “games”

• 1952
  – TicTacToe:
  – A.S.Douglas on a EDSAC vacuum-tube computer

• 1958
  – Tennis for Two:
    • Willy Higginbotham on an oscilloscope connected to analog Donner computer
1960’s and Early 1970’s

- 1961-1962 SpaceWar! developed at MIT using vector graphics on PDP-1
- Sega releases Periscope:
  - electronic shooting game - first arcade game
Classical Age
1971-1974

Birth of Commercial Games

- **1971:**
  - Nolan Bushnell [Nutting] develops Computer Space
    - First commercial arcade game
    - Based on SpaceWar
    - Vector graphics, but really cool real-time space game
    - Too sophisticated for market. Fails
- **1972:**
  - Bushnell starts Atari
    - Named after a move in GO
  - Odyssey by Magnavox – “Hockey”
    - First home TV game – analog not digital
    - 100,000 sold - $100/console
- **1973:**
  - Pong in Arcades by Atari
    - Sued by Magnavox
    - A huge hit in bars, pinball arcades, …
- **1974:**
  - Kee releases Tank
    - Fake spinoff from Atari
    - First game to use ROM
  - Atari:
    - First racing game (*Trak 10*) & maze chase game (*Gotcha*).
1972-1976

• Adventure: The Colossal Cave
  – William Crowther and Don Woods
  – First text-based adventure game
  – Ran on DEC mainframes (PDP-10)
Late-70’s: Atari Expands

• 1976: Bushnell sells Atari to Warner for $26 Million
  – Warner markets Pong to home as a single game
  – BREAKOUT designed by Steve Wozniak, “commissioned” by Steve Jobs
• 1977: Atari introduces the 2600 VCS
  – First home game console with multiple games
  – 2K ROM, 128 Bytes of RAM
  – Very successful – 6M sold by 1980
• 1977: Apple starts selling the Apple II
• 1978:
  – Adventure for Atari comes out
    • Sold 1M copies, first Easter Egg
    • first graphical action/adventure game
  – Space Invader developed by Taito in Japan
• 1979:
  – Activision is formed by Atari developers
    • Third party development houses start up
  – Atari 800 introduced - 8-bit
  – First MUD by Trubshaw & Bartle
    • First online multiplayer game
Medieval Times
1980-1981: Rise

• 1980:
  – Phillips Odyssey2 (1978) and Mattel Intellivision
    • Mattel had better graphics, but terrible controller
  – Namco has Pac-Man
    • >$1 billion ($2.3 in 1997 dollars)
    • 300,000 arcade units sold since introduction
  – Atari doing $1 billion:
    • Asteroids & Battlezone released
  – Williams releases Defender
  – Zork released by Infocom, Ultima released

• 1981:
  – Game industry > $6 billion in sales
  – Nintendo: Donkey Kong [converted Radarscope]
  – Galaxian, Centipede, Tempest, Ms. Pac-Man
  – IBM introduces the IBM PC
1982: Clouds ahead

- Atari sales down 50% -- starts to lose $$’s
  - Releases 5200
  - But it still controlled 80% of the market
  - Atari buys rights to ET for $22 Million
  - Produced more PacMan cartridges than systems

- Activision releases Pitfall

- ColecoVision gets Donkey Kong

- Game companies start just for home computers
  - Sierra On-Line, Broderbund, BudgeCo

- Electronic Arts is formed
1983: The Dark Ages

- Mattel losses $225 million from Intellivision
  - Doesn’t ship the Aquarius
  - Loses as much as it had made the four prior years.
- Atari loses money
  - Market flooded with poor quality games:
    - Fox, CBS, Quaker Oats, Chuck Wagon dog food
- Coleco crashes
  - Saved by Cabbage Patch Kids
- Commodore 64 - home computer
  - 17-22 million total sold
- Dragon’s Lair released
  - Laserdisk
  - 6 years to make - Bluth Studios
Crash & Resurgence

• 1984:
  – Industry drops to below $800 M
  – Apple introduces the Macintosh
    • Birth of modern computer: good resolution, sound
    • Games not a priority
    • 100,000 sold in first six months
  – King’s Quest is released by Sierra On-Line

• 1985:
  – Nintendo introduces Nintendo Entertainment System
    • Strict control on software
      – Lockout chip, and restricts companies to 5 games/year
      – Nintendo sells cartridges to software distributors
  – Atari tries to come back with 16-bit 520ST
    • Computer and Game system
  – Carmen Sandiego released by Broderbund
Failed Competition

• 1986:
  – Commodore ships Amiga: cool but marketing kills it.
    • Computer system designed to support games – 3D color
    • Developed by Atari hardware engineer Jay Miner.
  – Sega ships Sega Master System 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 ships 7800
  – Nintendo outsells competitors 10 to 1
1987-1989 The Renaissance

• 1987:
  – Electronic Arts releases their first in-house game:
    • Skate or Die.
  – Serious games start to show up for IBM PC’s.
    • VGA and SVGA help

• 1988
  – Tetris imported from Soviet Union
  – Coleco files for bankruptcy

• 1989:
  – Sega Genesis is released: 16-bit
    • Attacks console market with EA sports titles
    • Aggressive marketing at older market (> 13 year old)
  – Nintendo sticks with 8-bit
    • Releases Gameboy
  – Maxis releases SimCity
Console Wars

• 1990:
  – Nintendo releases Super Mario 3 - all-time best-seller 11M
  – Amiga and Atari ST die out
  – 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
  – Civilization released

• 1992:
  – PC gaming explodes: Dune II
  – Nintendo has $7 billion in sales ($4.7B in U.S.)
    • Has higher profits than all U.S. movie and TV studios combined
  – Midway releases Mortal Kombat for arcades – extreme violence
Industrial Age
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)
  – Caesar released

• 1994:
  – Atari ships Jaguar: 64 bit
    • Very expensive for console ~$700, >$100/game
    • Neither 3DO or Jaguar does particularly well
  – DOOM released by id
  – MYST released
    • all time biggest selling PC game until 2002
  – Warcraft: Orcs and Humans released
32-bit Wars

• 1995:
  – Sega ships Saturn (32-bit)
  – Sony ships Playstation (32-bit)
  – Microsoft releases Window 95
    • Includes the Game SDK - Direct-X
    • Bring major game performance to Windows
  – Internet and WWW expanded
  – Command & Conquer released
  – Full-motion video becomes a part of games: 7th Guest
Playstation

- Launched in U.S., Sept. 1995
- 300,000 polygons/sec., 30MIPS processor, 4MB RAM, 2MB VRAM
- 400 U.S. Titles
- 20% penetration in U.S. homes

Analysis:
- Multi-platform games look worse on Playstation
- Playstation-only games look good, but grainy
- Cheap and lots of them for software developers
1996-1998

• 1996:
  – Nintendo ships Nintendo 64
    • Originally promised for 1995
  – Multi-player gaming goes commercial
    • Via modem and internet and network companies
      – TEN, Mplayer, …
    • First commercial MMOG: Meridian59

• 1997:
  – 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 in 3D (isometric view)
  – Age of Empires, Total Annihilation released

• 1998:
  – Lots of good PC games: StarCraft, CivII, Caesar III released
  – Playstation rules consoles
  – NCSoft’s Lineage, most popular MMORPG, launched in S. Korea
Nintendo 64

- Launched in U.S., Sept 1996
- 93.75 MH 64 Bit CPU, 64-bit MIPS co-processor
  - over 500,000,000 16-bit operations/sec
  - Built-in Pixel Drawing Processor (RDP)
- 4.5MB RAM, 150,000 polygons/sec
- Originally aimed at younger market
- Cartridge makes it very expensive
- Very dependent on software
- Legend of Zelda: Ocarina of Time generates more revenue in last 6 weeks of 1998 than any film
Modern Times
1999-2001

• 1999
  – Dreamcast
  – 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
  – EverQuest is launched: first non-wireframe 3D MMORPG
  – SM Alpha Centauri released, BigHugeGames founded

• 2000
  – Development moves from PC to consoles
  – Playstation II
  – Diablo II sells 1 million units in 1 week
  – SIMS sells 2.3 million units ($95M)
    • + 1.4 mill. in expansions
  – Shogun: Total War released

• 2001
  – Gamecube (Nintendo)
  – Xbox (Microsoft)
  – CivIII released
Sega Dreamcast

• Sept. 1999, $299 ($99 -> $49 -> $0), 128 bit
• Hitachi 200 MHz CPU, PowerVR 3D, 16MB RAM
  – But faster than a 400MHz Pentium II for 3D
  – 3M polygons/sec
  – Fast CD-ROM loads
• Moderately successful in U.S.
  – But not in Japan
Sony Playstation 2

• Launched May 4, 2000 in Japan
  – In U.S. on October 26, 2000: $299
  – 90 Million sold world wide by 2005 [2 years < PS1]

• Hardware
  – 128 Bit 300MHz processor
  – 3 Special purpose 150 MHz co-processors
  – 32MB DRAM: 3.2 GB/sec
  – DVD & CD
  – MPEG2 hardware
  – Dual Shock 2 analog controller
  – Chip set will be available for other platforms
  – 66M polygons/sec geometry – 16M polygons/sec curved

• Software development is tough
Nintendo GameCube

• Launch in Japan, Fall 2001
  – U.S. Nov. 2001

• Hardware
  – IBM Gekko processor 405 MHz
  – Geometry Engine
  – Mini-DVD
  – 6-12M polygons/sec (fully textured)
  – 24MB Main memory
  – 16MB A-memory

• Emphasis on easier development
  – High memory bandwidth 3.2 GB/sec
  – Fast frame buffers (5ns.)
Microsoft Xbox

- November 2001
- Software
  - Direct X API
- Hardware
  - Pentium IV 733 Mhz
  - Custom 3-D 300Mhz GPU
  - 64MB Ram – 6.4 GB/sec
  - 8GB hard drive
  - DVD
  - 100 MBps Ethernet
- Performance
  - 150 million transformed and lit polygons per second
  - 100+ million polygons per second sustained performance (shaded, textured)
  - 300 million micropolygons/particles per second
  - 4 simultaneous textures
  - Full-scene anti-aliasing
  - 1920x1080 maximum resolution
  - HDTV support
PC 2002

- Americas Army released as free game
- SIMS becomes the best-selling PC game of all time (March 2002)
PC 2003

- **PC**
  - SIMS continues to grow
    - Unleashed, Superstar
    - But SIMS Online fails
  - Star Wars Galaxies
    - > 275,000 Registered Users
    - Second biggest MMOG, fastest growing
  - WarCraft III, UT 2003, GTA, ports from console
  - Second Life and There.com launch
    - Different approach to MMOG
  - EA grosses $2.5B in 2003
  - Rise of Nations released
Games 2004

- $7.3 B sales
- Madden sells 1.3M copies in one week
- Sequels rule: SIMS 2, Halo 2, Half-life 2, Doom 3, Rome: Total War
- Consoles: 2004
  - Stables of slow growth - lower prices
  - 1,000,000 GBAs sold
  - Nokia Ships >1,000,000 N-Gages
- Nintendo Launches DS
  - >5 million units worldwide by March 2005
  - Ninetendogs – 250K in one week – best handheld?
- Sony Launches PSP
  - 5 million units shipped by July 2005
  - Where are the games
- Shifting away from PC (15% sales) to Consoles
Games 2005

- World of Warcraft
  - 4 Million Subscribers ($700M/year subscriptions)
- EA rolls along:
  - *Madden NFL 2006*, sold 1.7M in first week
- Gamestop and EB games merge
- CivIV released
- Next Gen Consoles coming
  - Difficult software development
  - Very expensive for development (teams twice size)
- US Top selling PC Games
  1. *World of Warcraft* - 957,000
  2. The Sims 2: University - 574,000
  3. The Sims 2 - 559,000
  4. Guild Wars
  5. Roller Coaster Tycoon 3
  6. *Battlefield 2*
  7. The Sims 2: Nightlife
  8. Age of Empires III
  9. The Sims Deluxe
  10. Call of Duty 2

- US Top selling console games
  1. *Madden NFL 06* (PS2) - 2,900,000
  2. *Pokemon Emerald* (GBA) - 1,700,000
  3. *Gran Turismo 4* (PS2) - 1,500,000
  4. *Madden NFL 06* (Xbox) - 1,200,000
  5. *NCAA Football 06* (PS2) - 1,100,000
  6. *Star Wars: Battlefront II* (PS2) - 1,000,000
  7. *MVP Baseball 2005* (PS2) - 970,000
  8. *Star Wars Episode III: Revenge of the Sith* (PS2) - 930,000
  9. *NBA Live 06* (PS2) - 820,000
  10. *LEGO Star Wars* (PS2) - 800,000
XBOX 360

- Available: November 2005
- Custom IBM PowerPC CPU
  - 3 symmetrical cores: 3.2 GHz each
  - 2 threads/core
  - VMX-128 vector unit/core
  - 1MB L2 cache
  - CPU Game Math: 9.6B dot product/sec
- Custom ATI Graphics Processor
  - 10MB DRAM
  - 48-way parallel floating point
  - Unified shader architecture
  - 500 million triangles per sec
  - 16 gigasamples/sec
  - 48 billion shader operations/sec
  - Supports 16:9, 720p or 1080i – HD output
- 512 MB of 700MHz GDDR3 RAM – unified memory architecture
  - 22.4 GB/s interface bus bandwidth
  - 256 GB/s memory bandwith to EDRAM
  - 21.6 GB/s front-side bus
- Overall system floating-point: 1 teraflop
- Detachable and upgradeable 20GB harddrive
- 12x dual-layer DVD ROM
Games 2006

• US Top 10 best selling console games (May):
  1. New Super Mario Bros-Nintendo (DS)
  2. Kingdom Hearts II-Square Enix (PS2)
  3. Brain Age: Train Your Brain In Minutes-Nintendo (DS)
  4. God of War-Sony Computer Entertainment (PS2)
  5. Tom Clancy's Ghost Recon Advanced Warfighter-UbiSoft (Xbox 360)
  6. Elder Scrolls IV: Oblivion-Bethesda Softworks (Xbox 360)
  7. MLB ’06: The Show-Sony Computer Entertainment (PS2)
  8. Guitar Hero (with Guitar)-RedOctane (PS2)
  9. Grand Theft Auto: San Andreas-Take Two Interactive (PS2)
  10. Kingdom Hearts-Square Enix (PS2)

• US Top 10 best selling PC games (August):
  1. World of Warcraft - Blizzard
  2. The Sims 2 - Electronic Arts
  3. Nancy Drew: Danger By Design - Her Interactive
  4. Civilization IV: Warlords - 2K Games
  5. The Sims 2 Open For Business - Electronic Arts
  6. Roller Coaster Tycoon 3: Gold - Atari
  7. Cars - THQ
  8. The Sims 2 Family Fun Stuff - Electronic Arts
  9. Civilization IV - 2K Games
  10. Sim City 4 Deluxe - Electronic Arts

• CivIV: Warlords, Rise of Legend released, Medieval 2: TW Nov release date
Playstation 3

- Cell processors (1 PowerPC PPE, 8 SPE) @3.2 GHz each
- Graphics: Nvidia 550 Mhz GPU 1.8 TFlops
  - 100 billion shader ops/sec
  - 51 billion dot products/sec
  - More powerful than Geforce 6800 Ultra?
  - Full HD (1080p)
- Floating point performance: 2 TFlops
- 512MB RAM
  - split between CPU and graphics
- 512KB L2 cache
- 7 AltiVec vector processing units
- Blu-ray DVD may make it very expensive
  - Don’t be surprised by delay (Nov 17, 2006 release date)
- Removable hard drive
PC Games All Time Best Sellers (2006)

- By genre:
  - *Sandbox* - The Sims (16 million)
  - *Adventure* - Myst (11 million)
  - *RTS* - StarCraft (9 million)
  - *FPS* - Half-Life (8 million)
  - *MMORPG* - World of Warcraft (6 million)
  - *RPG* - Diablo II (7 million)
  - *TBS* - Civilization III (2.5 million) (CivIV catching up?)
  - *Action/Adventure* - Tomb Raider II (2.24 million)

- Others at 3 million and above:
  - *The Sims 2* (4.5 million)
  - *Morrowind* (4.5 million) (includes Xbox release)
  - *Diablo II* (4 million)
  - *Half-Life 2* (4 million)
  - *StarCraft: Brood War* (3 million)
  - *Warcraft II* (3 million)
  - *Warcraft III* (3 million)
  - *Age of Empires* (3 million)
Console Games All Time Best Sellers (2006)

• By genre (unbundled, more than 5 million):
  • *Platformer* - Super Mario Bros. 3 (NES - 17.28 million)
  • *Racing* - Gran Turismo 3: A-Spec (PS2 - 14.36 million)
  • *Sandbox* - Grand Theft Auto: Vice City (PS2 - 13.70 million)
  • *Kart Racing* - Mario Kart 64 (N64 - 9.87 million)
  • *RPG* - Final Fantasy VII (PS1 - 9.72 million)
  • *Adventure* - Legend of Zelda: Ocarina of Time (N64 - 8.6 million)
  • *FPS* - GoldenEye 007 (N64 - 8.09 million)
  • *Action* - Metal Gear Solid 2 (PS2 - 7 million)
  • *Fighting* - Super Smash Bros. Melee (GC - 6.95 million)
  • *Sports* - Tony Hawk's Pro Skater 2 (PS1 - 4.56 million)

• By franchise:
  • *Mario* (190 million+)
  • *Pokémon* (143 million)
  • *Final Fantasy* (60.9 million)
  • *Sonic the Hedgehog* (50 million)
  • *Grand Theft Auto* (48.4 million)
  • *The Legend of Zelda* (47 million)
  • *Tetris* (44.1 million)
  • *Donkey Kong* (44 million)
  • *Gran Turismo* (43.7 million)
  • *Dragon Quest* (35.5 million)
Mobile Gaming

Age of Game Downloaders

Source: The NPD Group, July 2006

Payment Method

Source: The NPD Group, July 2005

THQ wireless revenues

Source: Screen Digest analysis of company data