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
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
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 Jobs and Steve Wozniak
- 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 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
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 loses $’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: Crash

- 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

• 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

- 1992:
  - PC gaming explodes
  - 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
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)
  – Civilization published

• 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
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 expand
  – 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 Ultra 64
    • Originally promised for 1995
  – Multi-player gaming goes commercial
    • Via modem and internet and network companies
      – TEN, Mplayer, …

• 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

• 1998:
  – Lots of good PC games
  – Playstation rules consoles
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 is very expensive
- Very dependent on software
- Legend of Zelda: Ocarina of Time generates more revenue in last 6 weeks of 1998 than any film
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

• 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

• 2001
  – Gamecube (Nintendo)
  – Xbox (Microsoft)
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 worldwide 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
Games 2004

- $7.3 B sales
- Madden sells 1.3M copies in one week
- Sequels rule: SIMS 2, Halo 2, Half-life 2, Doom
- Consoles: 2004
  - Stable 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

- Top selling games May
  - GBA Pokemon Emerald: 882,579
  - PS2 Starwars Episode II: Revenge of the Sith – 490,670
  - XBX Starwars Episode II: Revenge of the Sith – 378,195
  - XBX Forza Motorsport – 184,595
  - PS2 Midnight Club 3 – 150,470

- Top Selling PC Games: July 2005
  - Battlefield 2
  - World of Warcraft
  - Guild Wars
  - The Sims 2: University
  - The Sims 2

- Next Gen Consoles coming
  - Difficult software development
  - Very expensive for development (teams twice size)
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 bandwidth 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
Playstation 3

- 8-9 (?) Cell processors 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?
- Total 2.18 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
- Removable hard drive
Future?