

# History of Computer Games

John E. Laird  
Adapted by Matt Evett

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

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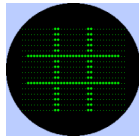
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## First "games"



- 1952
  - Tic Tac Toe:
  - A.S. Douglas on a EDSAC vacuum-tube computer
- 1958
  - Tennis for Two:
    - Willy Higginbotham on an oscilloscope connected to analog Donner computer

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[OXO]
T56K
[M3]
PFGK1FAPROLFUF0FE8A6FG88FE2FF
@6#9!8!7!!!!!!*NOUGETS!AND!CROSSES
@6#6!5!4!!!!!!*!!!!!!BY
@6#3!2!1!!!!!!*A!S!DOUGLAS#N!*C#M1952
@6@*LOADING!PLEASE!WAIT#MM
..PK
T45KP192F [H-parm]
T50KP512F [X-parm]
T46KP352F [N-parm]
T64K
GRT48RP@TZ
[e-sequence]
P4F9F1F2F3F4F5F6F7F8F9F10F11F12F13F14F15F16F17F18F19F20F21F22F23F24F25F26F27F28F29F30F31F32F33F34F35F36F37F38F39F40F41F42F43F44F45F46F47F48F49F50F51F52F53F54F55F56F57F58F59F60F61F62F63F64F65F66F67F68F69F70F71F72F73F74F75F76F77F78F79F80F81F82F83F84F85F86F87F88F89F90F91F92F93F94F95F96F97F98F99F100F101F102F103F104F105F106F107F108F109F110F111F112F113F114F115F116F117F118F119F120F121F122F123F124F125F126F127F128F129F130F131F132F133F134F135F136F137F138F139F140F141F142F143F144F145F146F147F148F149F150F151F152F153F154F155F156F157F158F159F160F161F162F163F164F165F166F167F168F169F170F171F172F173F174F175F176F177F178F179F180F181F182F183F184F185F186F187F188F189F190F191F192F193F194F195F196F197F198F199F200F201F202F203F204F205F206F207F208F209F210F211F212F213F214F215F216F217F218F219F220F221F222F223F224F225F226F227F228F229F230F231F232F233F234F235F236F237F238F239F240F241F242F243F244F245F246F247F248F249F250F251F252F253F254F255F256F257F258F259F260F261F262F263F264F265F266F267F268F269F270F271F272F273F274F275F276F277F278F279F280F281F282F283F284F285F286F287F288F289F290F291F292F293F294F295F296F297F298F299F300F301F302F303F304F305F306F307F308F309F310F311F312F313F314F315F316F317F318F319F320F321F322F323F324F325F326F327F328F329F330F331F332F333F334F335F336F337F338F339F340F341F342F343F344F345F346F347F348F349F350F351F352F353F354F355F356F357F358F359F360F361F362F363F364F365F366F367F368F369F370F371F372F373F374F375F376F377F378F379F380F381F382F383F384F385F386F387F388F389F390F391F392F393F394F395F396F397F398F399F400F401F402F403F404F405F406F407F408F409F410F411F412F413F414F415F416F417F418F419F420F421F422F423F424F425F426F427F428F429F430F431F432F433F434F435F436F437F438F439F440F441F442F443F444F445F446F447F448F449F450F451F452F453F454F455F456F457F458F459F460F461F462F463F464F465F466F467F468F469F470F471F472F473F474F475F476F477F478F479F480F481F482F483F484F485F486F487F488F489F490F491F492F493F494F495F496F497F498F499F500F501F502F503F504F505F506F507F508F509F510F511F512F513F514F515F516F517F518F519F520F521F522F523F524F525F526F527F528F529F530F531F532F533F534F535F536F537F538F539F540F541F542F543F544F545F546F547F548F549F550F551F552F553F554F555F556F557F558F559F560F561F562F563F564F565F566F567F568F569F570F571F572F573F574F575F576F577F578F579F580F581F582F583F584F585F586F587F588F589F590F591F592F593F594F595F596F597F598F599F600F601F602F603F604F605F606F607F608F609F610F611F612F613F614F615F616F617F618F619F620F621F622F623F624F625F626F627F628F629F630F631F632F633F634F635F636F637F638F639F640F641F642F643F644F645F646F647F648F649F650F651F652F653F654F655F656F657F658F659F660F661F662F663F664F665F666F667F668F669F670F671F672F673F674F675F676F677F678F679F680F681F682F683F684F685F686F687F688F689F690F691F692F693F694F695F696F697F698F699F700F701F702F703F704F705F706F707F708F709F710F711F712F713F714F715F716F717F718F719F720F721F722F723F724F725F726F727F728F729F730F731F732F733F734F735F736F737F738F739F740F741F742F743F744F745F746F747F748F749F750F751F752F753F754F755F756F757F758F759F760F761F762F763F764F765F766F767F768F769F770F771F772F773F774F775F776F777F778F779F780F781F782F783F784F785F786F787F788F789F790F791F792F793F794F795F796F797F798F799F800F801F802F803F804F805F806F807F808F809F810F811F812F813F814F815F816F817F818F819F820F821F822F823F824F825F826F827F828F829F830F831F832F833F834F835F836F837F838F839F840F841F842F843F844F845F846F847F848F849F850F851F852F853F854F855F856F857F858F859F860F861F862F863F864F865F866F867F868F869F870F871F872F873F874F875F876F877F878F879F880F881F882F883F884F885F886F887F888F889F890F891F892F893F894F895F896F897F898F899F900F901F902F903F904F905F906F907F908F909F910F911F912F913F914F915F916F917F918F919F920F921F922F923F924F925F926F927F928F929F930F931F932F933F934F935F936F937F938F939F940F941F942F943F944F945F946F947F948F949F950F951F952F953F954F955F956F957F958F959F960F961F962F963F964F965F966F967F968F969F970F971F972F973F974F975F976F977F978F979F980F981F982F983F984F985F986F987F988F989F990F991F992F993F994F995F996F997F998F999F1000
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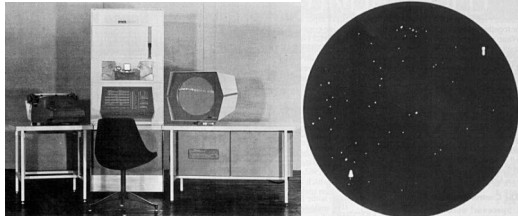
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## 1960's and Early 1970's

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



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## 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*).




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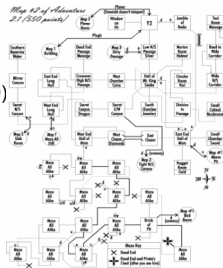
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## 1972-1976

- Adventure: The Colossal Cave
  - William Crowther and Don Woods
  - First text-based adventure game
  - Ran on DEC mainframes (PDP-10)




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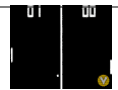
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## Late-70's: Atari Expands

- 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




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## 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 Raderscope]
    - Galaxian, Centipede, Tempest, Ms. Pac-Man
    - IBM introduces the IBM PC



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## 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

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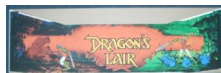
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## 1983: Crash

- 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



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## 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



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## 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



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## 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



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## 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

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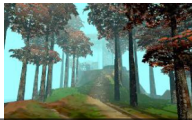
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## More Wars

- 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



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## 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



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## 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



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## 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



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## 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



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## 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)



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## 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



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## 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



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## 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.)



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## 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



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## PC 2002

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

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## 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

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## 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



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## 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)



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## 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



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## 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



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## Future?

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