

**CS39N**  
**The Beauty and Joy of Computing**  
**Lecture #2 : Video Games**  
**2009-08-31**

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**VENEZUELA BANS VIOLENT GAMES**


In an effort to curb rampant crime, Venezuelan lawmakers have put forth a bill to ban violent video games and toys.



[en.reuters.com/article/lifestyleMolt/idINTR57P55R20090826](http://en.reuters.com/article/lifestyleMolt/idINTR57P55R20090826)

**Video Games : Overview**

- History
  - Inventors & Games
- How
  - Design
  - 2D & 3D graphics
  - Motion Capture
  - Artificial Intelligence (AI)
- Good, Bad, Ugly
  - GWAP, RSI, Violence
- Future



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**Documentaries on Video Games**


- History: Video Games: Behind the Fun (2000)**
  - Available on Netflix
- PBS: The Video Game Revolution (2004)**
  - [video.google.com/videoplay?docid=-4729348985218842392](http://video.google.com/videoplay?docid=-4729348985218842392)
- Discovery: History of Video Games (2006)**
  - [video.google.com/videoplay?docid=3637639460474263178](http://video.google.com/videoplay?docid=3637639460474263178)
- ON Networks : Play Value (2009)**
  - [www.onnetworks.com/videos/play-value](http://www.onnetworks.com/videos/play-value)
- History of Video Games (WWW)**
  - [en.wikipedia.org/wiki/History\\_of\\_video\\_games](http://en.wikipedia.org/wiki/History_of_video_games)

[en.wikipedia.org/wiki/List\\_of\\_films\\_based\\_on\\_video\\_games#Documentaries\\_on\\_video\\_games](http://en.wikipedia.org/wiki/List_of_films_based_on_video_games#Documentaries_on_video_games)

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**The Beginning : Spacewar!**


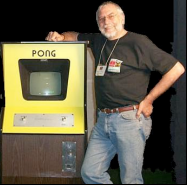

- First to gain recognition**
  - Others had games before
  - "Conceived in 1961 by Martin Graetz, **Stephen Russell**, & Wayne Wiitanen"
  - Written for PDP-1 @ MIT
  - Inspired lots, widely ported
- Can still play this!**
  - 1 Working PDP-1 ... in CHM
  - Java version available
  - [www3.sympatico.ca/maury/games/space/spacewar.html](http://www3.sympatico.ca/maury/games/space/spacewar.html)
  - [en.wikipedia.org/wiki/Spacewar!](http://en.wikipedia.org/wiki/Spacewar!)
  - [www.computerhistory.org/spacewar\\_oversigma.com](http://www.computerhistory.org/spacewar_oversigma.com)



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**The Founding Fathers**

- Ralph Baer**
- Nolan Bushnell**






[www.onnetworks.com/videos/play-value/the-founding-fathers](http://www.onnetworks.com/videos/play-value/the-founding-fathers)  
 (also on iTunes in HD 720p)

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**Shigeru Miyamoto**

- The "Walt Disney" of computing gaming**
  - Chief Game designer at Nintendo
  - 1<sup>st</sup> elected to Hall of Fame
- Designed (among others):**
  - Donkey Kong
  - Super Mario Bros
  - The Legend of Zelda
  - Super Mario 64
  - Nintendo DS, Wii



[www.onnetworks.com/videos/play-value/shigeru-miyamoto](http://www.onnetworks.com/videos/play-value/shigeru-miyamoto)  
[www.time.com/time/asia/2006/heroes/bl\\_miyamoto.html](http://www.time.com/time/asia/2006/heroes/bl_miyamoto.html)  
[en.wikipedia.org/wiki/Shigeru\\_Miyamoto](http://en.wikipedia.org/wiki/Shigeru_Miyamoto)

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## History of Video Games : 1970s

- **Golden age of video arcades**
  - Pong, Space Invaders, Asteroids, Pac Man
- **1<sup>st</sup> gen consoles (1972–1976)**
  - Magnavox Odyssey
- **Mainframe computers**
  - Hunt the Wumpus, Rogue
- **Home computers**
  - Type the program in!
  - Floppies, Tapes, Zork, others.
- **2<sup>nd</sup> gen consoles (1977–1984)**
  - Atari 2600, Intellivision, Colecovision, Activision



[en.wikipedia.org/wiki/History\\_of\\_video\\_games](http://en.wikipedia.org/wiki/History_of_video_games)  
[www.thegameconsole.com](http://www.thegameconsole.com)

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## History of Video Games : 1980s

- **Genre innovation**
- **Gaming computers**
  - Apple II, Commodore 64, Atari 800
- **Early online gaming**
  - Mostly text only, MUDs
- **Handheld LCD games**
- **Video game crash of 1983**
  - Atari buried millions of ETs in dump
- **3<sup>rd</sup> gen consoles (1985–1989)**
  - Nintendo Ent. System (NES)
    - Super Mario Bros, Zelda, FF I
  - Gamepad introduced



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## History of Video Games : 1990s

- **Decline of arcades**
- **Handhelds come of age**
  - GameBoy, Sega Game Gear
- **Mobile phone gaming**
- **Fourth generation consoles (1990–1994)**
  - Sega Genesis, Super NES
- **Fifth generation consoles (1995–2000)**
  - Playstation, Nintendo 64 (with Super Mario 64)
- **Transition to 3D, CDs**
  - Crash Bandicoot, Tomb Raider



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## History of Video Games : 2000s

- **Mobile games**
  - iPhone (games ½ apps)
- **Sixth generation consoles (since 2001)**
  - PS2, Xbox, GameCube
  - Return of alternate controllers (DDR, guitars)
- **Online gaming rises to prominence**
  - WoW, Ultima Online
- **Rise of casual PC games**
  - Bejeweled, The Sims



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## History of Video Games : 2005+

- **Seventh generation consoles (since 2005)**
  - Portables
    - Nintendo DS, PSP, iPhone
  - Consoles
    - PS3, Xbox 360, Wii
  - Increases in development budgets
  - Motion control revolutionizes play
    - Wii controller, iPhone

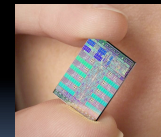


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## Example: Playstation 3 Hardware

- **State-of-the-art system**
  - But SW determines success!
  - (also, cool controllers helps)
- **9 3.2GHz Cores (1PPE, 8SPE)**
  - Power Processing Elt (PPE)
    - Supervises activities, allocates work
  - Synergistic Processing Elt (SPE)
    - Where work gets done
    - During testing, one "locked out"
      - I.e., it didn't work; shut down



[en.wikipedia.org/wiki/PlayStation\\_3](http://en.wikipedia.org/wiki/PlayStation_3)  
[www.us.playstation.com](http://www.us.playstation.com)



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## Design of a *Casual* Video Game

- **Staff requirements**
  - Can be done by one person, ala days of old
  - Bigger teams also (< 10)
  - Lots of new developers
- **Phones great platforms**
  - iPhone dominates field
  - Students are signing up!
- **Time to completion**
  - Often only a few months!



[www.apple.com/iphone/apps-for-everything/fun-and-games.html](http://www.apple.com/iphone/apps-for-everything/fun-and-games.html)  
[blog.entertainment.com/2009/07/7-addicting-casual-games](http://blog.entertainment.com/2009/07/7-addicting-casual-games)  
[en.wikipedia.org/wiki/Casual\\_game](http://en.wikipedia.org/wiki/Casual_game)

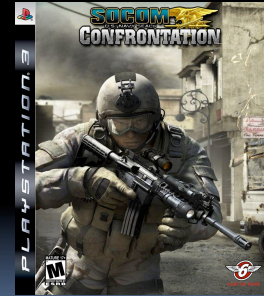


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## Design of a *Core* Video Game

- **Staff requirements**
  - Cross-disciplinary
  - Producer, programmers, game, graphic & sound designers, musicians, testers, ...
  - 100+ person teams
- **Similar to film**
  - Often, games->film, and film->games
  - Lucasfilm, etc. want to tie assets together



[en.wikipedia.org/wiki/Video\\_games](http://en.wikipedia.org/wiki/Video_games)



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## How : 3D Computer Graphics

- **Similar to making a 3D animated film...**
  - *Model* characters, environment in 3D
  - Add *shading + lights + effects + behavior*
  - Let 3D *rendering* engine (on graphics card) do the work of figuring out 2D scene from 3D
- **Limitations**
  - Many things are too "expensive" to do in 30 frames per second
  - Research breakthroughs!



[www.nytimes.com/2009/07/08/arts/television/08fight.html](http://www.nytimes.com/2009/07/08/arts/television/08fight.html)  
[en.wikipedia.org/wiki/Portal:Computer\\_graphics](http://en.wikipedia.org/wiki/Portal:Computer_graphics)  
[www.siggraph.org](http://www.siggraph.org)

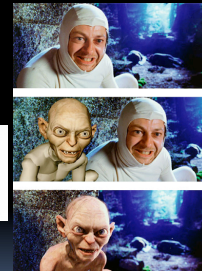


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## How : Motion Capture

- **Actors in MoCap suits**
- **Motions recorded, put in "motion libraries"**
  - E.g., running, throwing, passing, tackling
  - Can be edited/cleaned
  - Motion *synthesis* also
- **Challenges**
  - Motion "blending"
  - Non-"sliding" feet
  - UC Berkeley Research!



[en.wikipedia.org/wiki/Motion\\_capture](http://en.wikipedia.org/wiki/Motion_capture)  
[www.phasespace.com](http://www.phasespace.com)

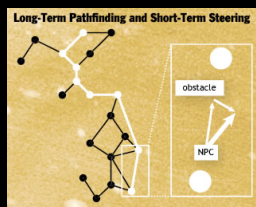


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## How : Artificial Intelligence

- **Range of intelligence**
  - Low: simple heuristics
  - High: Learns from player
- **Dynamic difficulty**
  - Must hold interest
  - "Simple to learn, difficult to master is the holy grail of game design."
  - Cheating AI (e.g., racing)



[www.businessweek.com/innovate/content/aug2008/id20080820\\_123140.htm](http://www.businessweek.com/innovate/content/aug2008/id20080820_123140.htm)  
[en.wikipedia.org/wiki/Dynamic\\_game\\_difficulty\\_balancing](http://en.wikipedia.org/wiki/Dynamic_game_difficulty_balancing)  
[en.wikipedia.org/wiki/Game\\_artificial\\_intelligence](http://en.wikipedia.org/wiki/Game_artificial_intelligence)  
[queue.acm.org/detail.cfm?id=971593](http://queue.acm.org/detail.cfm?id=971593)



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## Video Games : Good (Serious Games)

- **Simulations for training**
  - Flight simulations, combat, medical training
- **Games w/a Purpose**
  - A game to do useful stuff, hard for computers
  - Luis von Ahn ... gwap
    - ESP : Label images fastest
    - Gender Guesser
    - Popvideo : label video
    - Matchin : Pick best images



[en.wikipedia.org/wiki/Serious\\_games](http://en.wikipedia.org/wiki/Serious_games)  
[en.wikipedia.org/wiki/Game\\_based\\_learning](http://en.wikipedia.org/wiki/Game_based_learning)  
[gwap.com](http://gwap.com)



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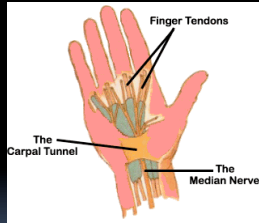
## Video Games : Bad (RSI, addiction)

### ▪ Gamers Thumb

- Caused with too much use of gamepad
- I suffered this in 1980s!
- Solutions?
  - Break timers, rest

### ▪ Video game addiction

- Impulse control disorder
- Stanford: yes, addictive!
- "Gamers Wife"
- Online gamers anon



[en.wikipedia.org/wiki/Video\\_game\\_addiction](http://en.wikipedia.org/wiki/Video_game_addiction)  
[en.wikipedia.org/wiki/Repetitive\\_strain\\_injury](http://en.wikipedia.org/wiki/Repetitive_strain_injury)



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## Video Games : Ugly (Violence)

### ▪ Violent video games

- Increase aggression, decrease "helping"
- Others found no link

### ▪ High-profile incidents

- Columbine kids loved the Doom video game

### ▪ Ratings help

### ▪ Games "folk devil"

- Billions \$, kids at stake



[en.wikipedia.org/wiki/Video\\_game\\_controversy](http://en.wikipedia.org/wiki/Video_game_controversy)  
[www.apa.org/science/psa/eb-anderson.html](http://www.apa.org/science/psa/eb-anderson.html)



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## Future of Video Games

### ▪ Media producers connecting assets

- Disney, Lucas big players

### ▪ Controllers and sensors expand

### ▪ Games on Demand

- OnLive

### ▪ Brain-Computer Interface (BCI)

- Invasive and Non-



[www.pbs.org/kcts/videogamerevolution/impact/future.html](http://www.pbs.org/kcts/videogamerevolution/impact/future.html)  
[en.wikipedia.org/wiki/Brain-computer\\_interface](http://en.wikipedia.org/wiki/Brain-computer_interface)



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