Video Games: Overview

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

Documentaries on Video Games

- History: Video Games: Behind the Fun (2000)
  - Available on Netflix
  - video.google.com/video/play?docid=47293494952188422392
- Discovery: History of Video Games (2006)
  - video.google.com/video/play?docid=3637639460474263178
- ON Networks: Play Value (2009)
  - www.onnetworks.com/videos/play-value
- History of Video Games (WWW)
    en.wikipedia.org/wiki/Documentaries_on_video_games

The Beginning: Spacewar!

- First to gain recognition
  - Others had games before
  - "Conceived in 1961 by Martin Graetz, Stephen Russell, & Wayne Witanen"
  - Written for PDP-1 @ MIT
  - Inspired lots, widely ported

- Can still play this!
  - 1 Working PDP-1... in CHM

Website: www3.sympatico.ca/maury/games/space/spacemurk.html
www.computerhistory.org
spacewar.oversigma.com

The Founding Fathers

- Ralph Baer
- Nolan Bushnell

Website: www.onnetworks.com/videos/play-value/the-founding-fathers
(also on iTunes in HD 720p)
Shigeru Miyamoto

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

Design of a Casual/Video Game

- Staff requirements
  - Can be done by one person, all ages 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!

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

% of Parents “Games positive for kids”

- a) 34%
- b) 44%
- c) 54%
- d) 64%
- e) 74%

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!

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” feel
  - UC Berkeley Research!
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/sep2008/id20080820_123140.htm](http://www.businessweek.com/innovate/content/sep2008/id20080820_123140.htm)
[en.wikipedia.org/wiki/Game_artificial_intelligence](http://en.wikipedia.org/wiki/Game_artificial_intelligence)
[queue.acm.org/detail.cfm?id=971593]

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 Guess
  - Popvideo: label video
  - Matchin: pick best images

[en.wikipedia.org/wiki/Game_based_learning](http://en.wikipedia.org/wiki/Game_based_learning)
[gwap.com](http://gwap.com)

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


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


Conclusion : Future of Video Games

- **Media producers connecting assets**
  - Disney, Lucas big players
- **Controllers and sensors expand**
- **Games on Demand**
  - OnLive
  - Brain-Computer Interface (BCI)
    - Invusive and Non-


Glenn Sugden : My Story

- **Started game development in 1991**
  - Worked until 1999 for Presage
  - Design and developed games for LucasArts, Interplay, Sierra Dynamics, Bradurbund,
    - "The Incredible Machine for mac"
    - "Quake 2 for mac"
- **Started own game development company..."**
### History of Video Games: 1970s

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

### 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 EIs in dump
  - Nintendo Ent. System (NES)
  - Super Mario Bros, Zelda, FF I
  - Gamepod introduced

### 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
  - PlayStation, Nintendo 64
  - (with Super Mario 64)
- **Transition to 3D, CDs**
  - Crash Bandicoot, Tomb Raider

### History of Video Games: 2000s

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

### 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
  - Wi controller, iPhone

### Example: PlayStation 3 Hardware

- **State-of-the-art system**
  - But SW determines success!
  - (also, cool controllers helps)
- **9 3.2GHz Cores (IPPE, 8SPE)**
  - Power Processing EII (PPE)
    - Supervises activities, allocates work
    - Synergistic Processing EII (SPE)
    - Where work gets done
    - During testing, one “locked out”
    - i.e., it didn’t work, shut down
    - …even if everything DID work!