

CS 325  
Intro to Game Design



---

Spring 2014

# Name that game

---

# Personnel

---

- Professor: Yotam Gingold
  - [ygingold@cs.gmu.edu](mailto:ygingold@cs.gmu.edu)
  - <http://cs.gmu.edu/~ygingold/>
  - Office: ENGR 4427
  - Office hours: Wednesdays 2–4pm
  
- GTA: Hao Sun
  - [hsun2@masonlive.gmu.edu](mailto:hsun2@masonlive.gmu.edu)
  - Office: ENGR 4456
  - Office hour: Mondays 12–1pm

# Preamble

---

- **Meets:** Tues. and Thurs. from 3–4:15pm in Art and Design 2026
- **Prerequisites:** Grade of C or better in CS 211
- **Piazza:** <https://piazza.com/gmu/spring2014/cs325/home>
  - Discussion
- **Blackboard:** <http://mymason.gmu.edu/>
  - Assignments
  - Grades

# More Preamble

---

- **Textbook:** *Game Design Workshop* by Tracy Fullerton
- **Topics:**
  - Principles of Game Design
  - The Structure of Games
  - Formal and Dramatic Elements
  - System Dynamics
  - Prototyping
  - Playtesting
  - Teams
  - Development

# Course Outcomes

---

- An ability to employ a variety of data structures in a game development and design context.
- An ability to identify the issues involved in the core mechanics and design of a game and how to solve them with appropriate techniques.
- An ability to design and implement simple games from the ground up.

# Grading

---

- Mid-term and final exams (40%)
  - **Mid-term Thursday March 20th**
- Quizzes and class participation (10%)
  - Reading assignments, design workshops
- Assignments and presentations (50%)
- Late policy:
  - 3 grace days that can be used with programming assignments
  - Otherwise no exceptions or excuses

# Assignments

---

- Analog assignments
- Digital assignments
  - Javascript
  - Phaser
    - <http://phaser.io/>
- Writing game design documents
- Critical thinking about gameplay
- Prototyping games
- Testing other people's games
- Final group project implementing a game

First assignment posted

# Rules and Regulations

---

- Come to class on time
- No chatting during class
- No laptops or phones in class
- Show up to meetings (and office hours) on time
- Be considerate of your classmates (and me)
- Put forth effort! You get out what you put in
- Prefix emails with “CS325”

# IP & Copyrights

---

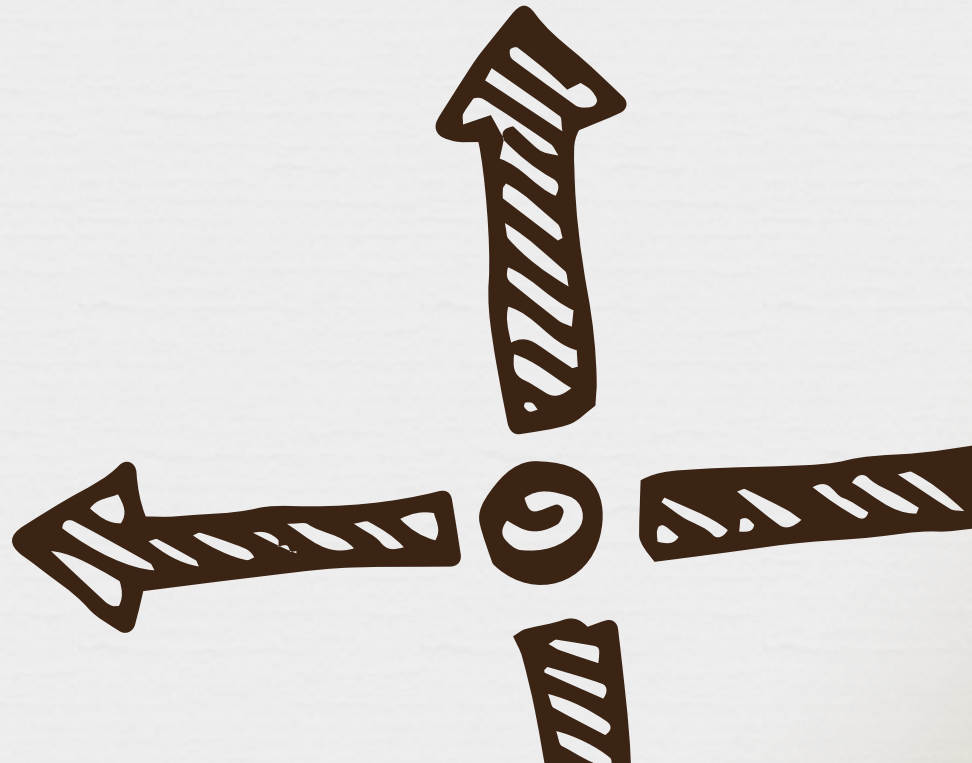
- Copyright applies to work, not ideas.
- Students own their work, not GMU.
  - ☞ In a student group, the copyright is shared amongst the members\*.



# Announcement

---

- Global Game Jam this weekend!!!
  - 5pm Friday - 5pm Sunday
  - <http://globalgamejam.org/2014/jam-sites/george-mason-university>



---

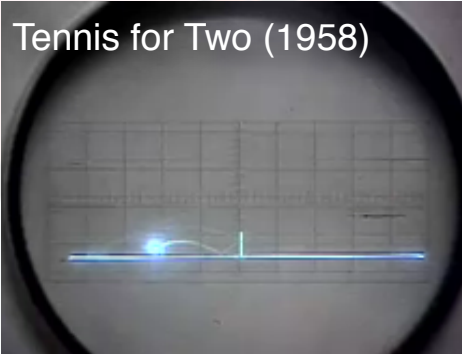
Questions?

# What games are you playing?



# Video Games

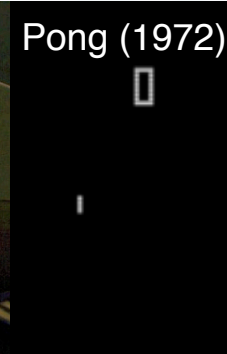
Tennis for Two (1958)



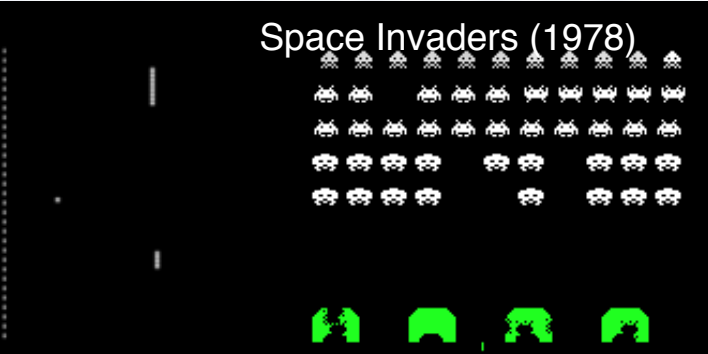
SpaceWar! (1961)



Pong (1972)



Space Invaders (1978)



Super Mario Brothers (1985)



Sonic the Hedgehog (1991)



Super Mario 64 (1996)



Final Fantasy VII (1997)



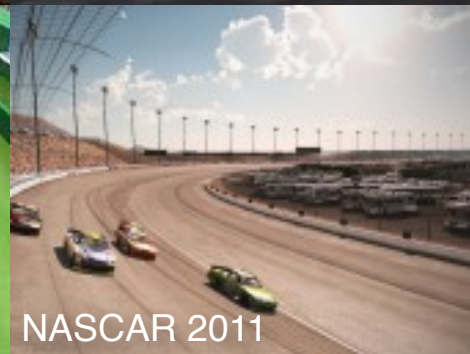
Halo (2001)



Resident Evil 4 (2005)



Wii Tennis (2007)



NASCAR 2011

# Video Game Hardware

Generation:

1st



2nd



3rd



# Video Game Hardware

Generation:

2nd

3rd

4th

5th



# Video Game Hardware

3rd



4th



5th



6th



7th



# Video Game Hardware

4th



5th



6th



7th



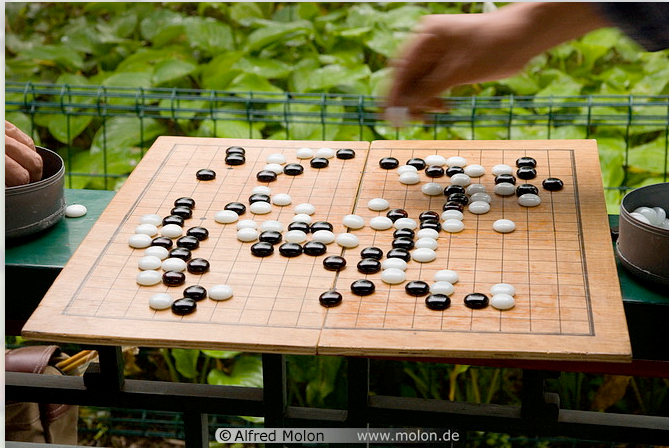
8th



# Video Game Hardware



# Video Game Hardware





# What do we want from our game technology?

Simulate and display an interesting, complex world

Responsive

Networked play

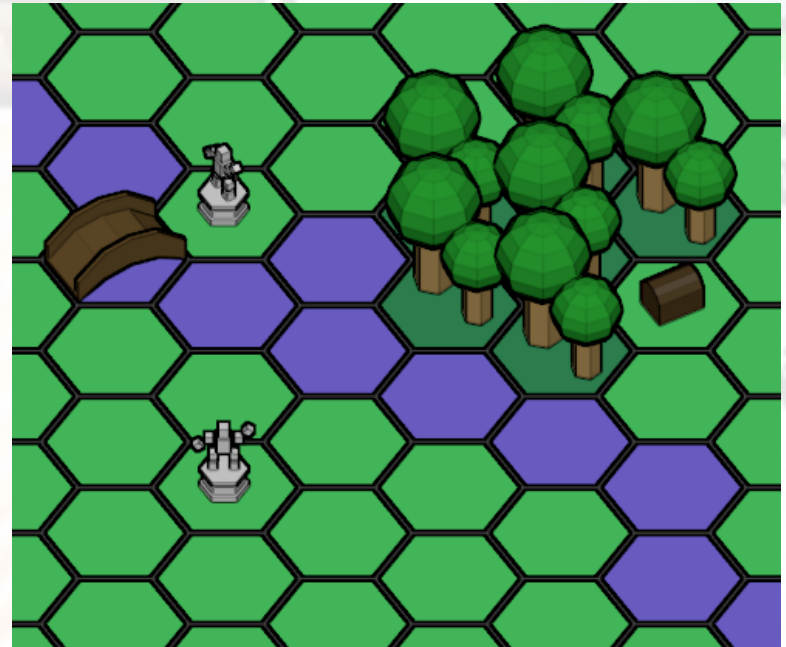
Not buggy

# Programming languages

Run gameplay code in a language easy to program in

- allow designers to try ideas
- safely allow MODs

Parallel programming

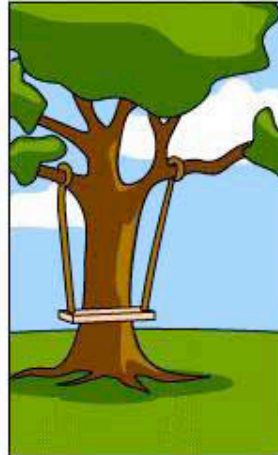


# Software engineering

www.oper.ru



How the client described what he wants



How the project manager understood the client



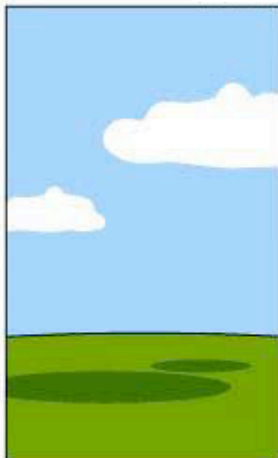
How the project analyst described the project



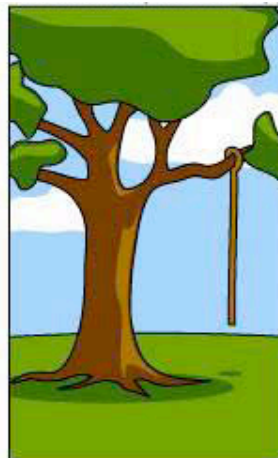
How the programmer implemented it



How the biz consultant presented the project



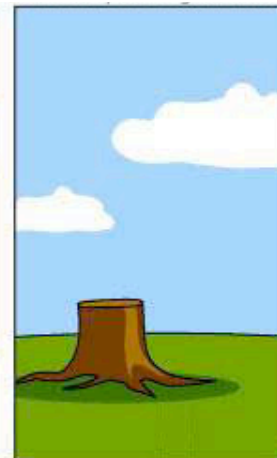
How the project was documented



Which features were implemented



How the client was paying



How the tech support worked



What the client needed

# Networking & Security

Efficiently share state of the game with other players

Detect “bots” or cheaters

Copy protection



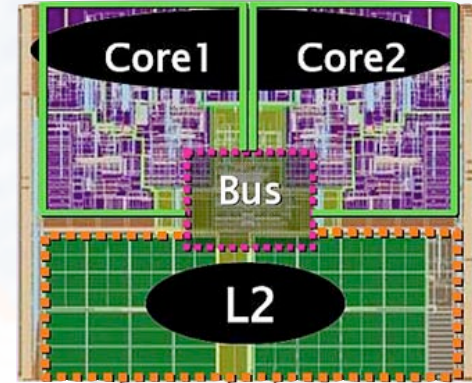
# Operating Systems

## Resource allocation

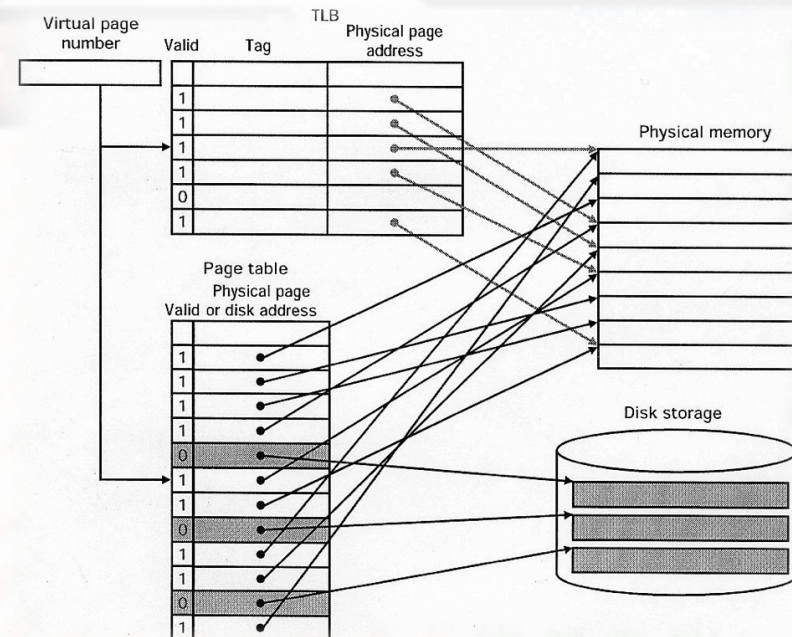
- RAM, caching

## Scheduling CPU time for the subsystems

- graphics,  
physics,  
networking, AI,  
button presses



Intel Core Duo



# Game Design



The rules of the world and the game

- Thinking in Systems (Donella H. Meadows)
- game theory
- Playing to win (David Sirlin)

# Game Design



# Game Design



# Game Design

The rules of the world and the game

- Thinking in Systems (Donella H. Meadows)
- game theory
- Playing to win (David Sirlin)

Interaction design (Human-Computer Interaction)

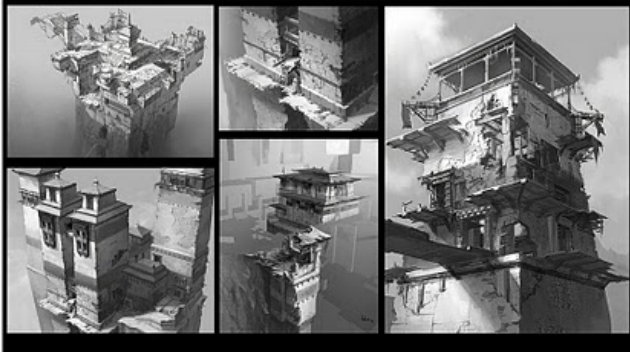
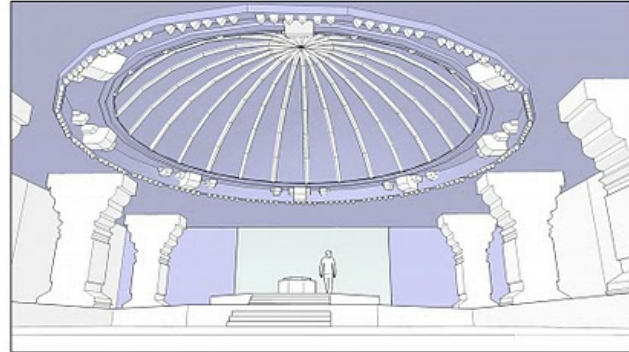
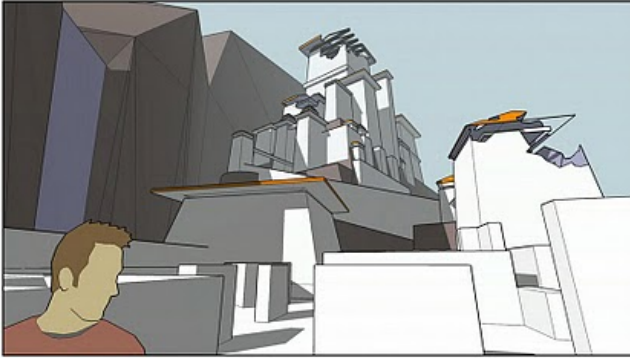
- Game Feel (Steve Swink)

What is the “fun”?

- psychology (e.g. Csikszentmihalyi’s “flow”)
- The Human Play Machine (Chaim Gingold)

# Art

Concept

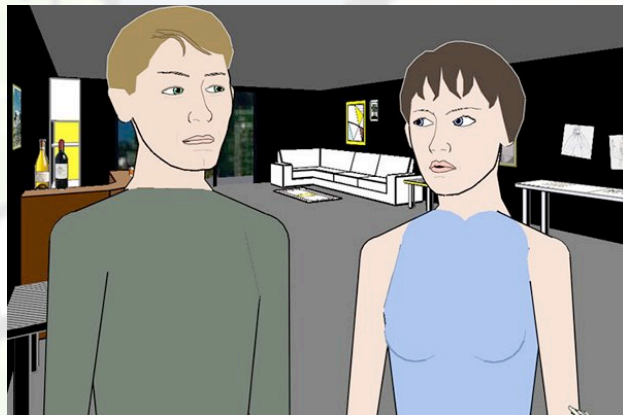


Final



# Story

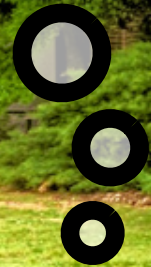
## Façade



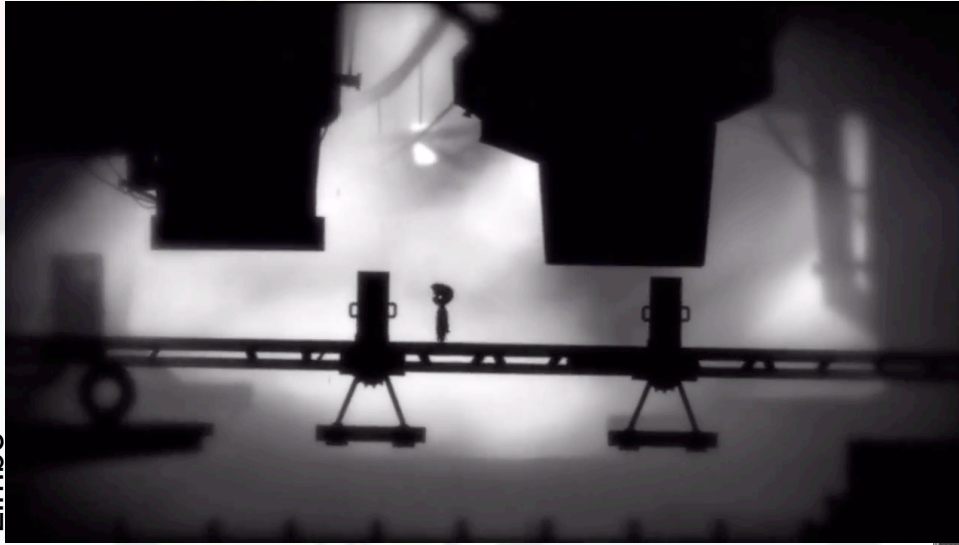
# Artificial Intelligence

An intelligent world

- Characters
- Interactive story



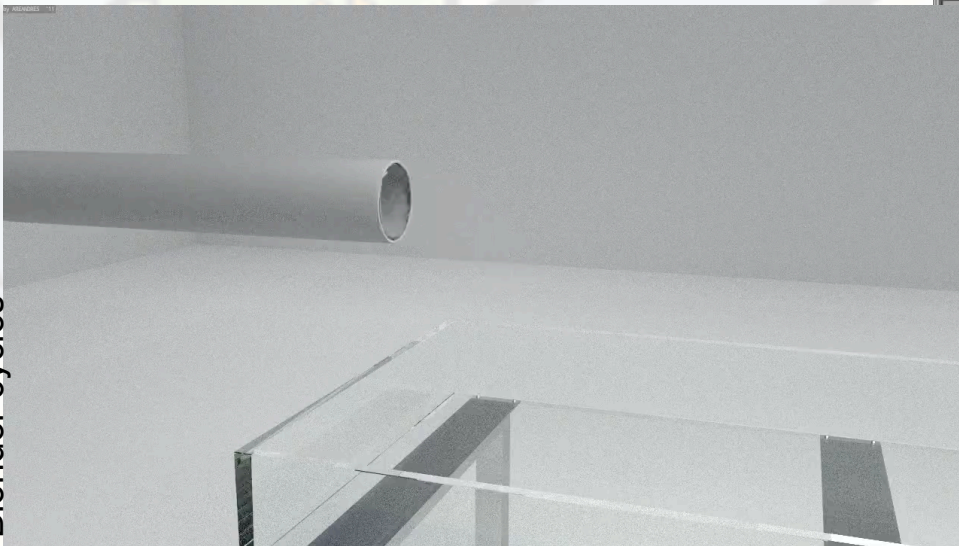
# Physics & Animation



Limbo



Angry Birds



Blender cycles

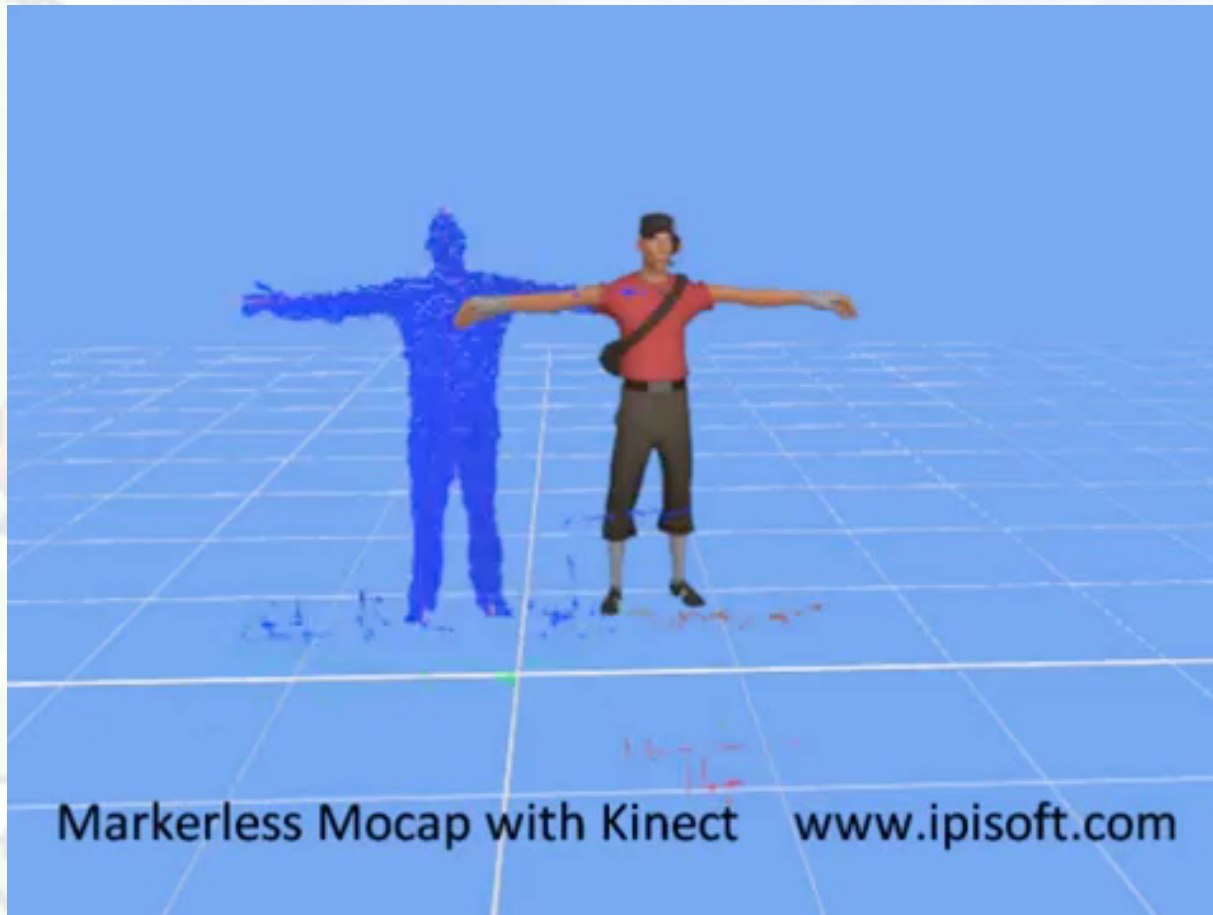


IKinema

# Input

Computer vision

Pattern recognition



Markerless Mocap with Kinect [www.ipisoft.com](http://www.ipisoft.com)

# Rendering

Crysis 3



