

## Actors and Interaction

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*"Stories are about the most fascinating thing in the universe: people."  
- Chris Crawford*

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## "People" Archetypes

- Hero
- Mentor
- Threshold Guardian
- Shadow
- Herald
- Trickster
- Shapeshifter

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Lead Roles in Games

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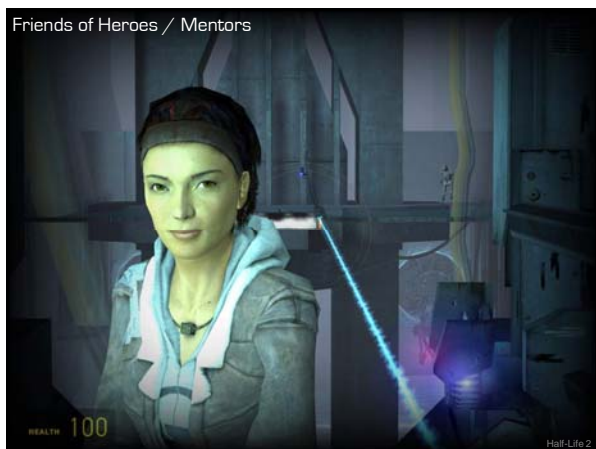
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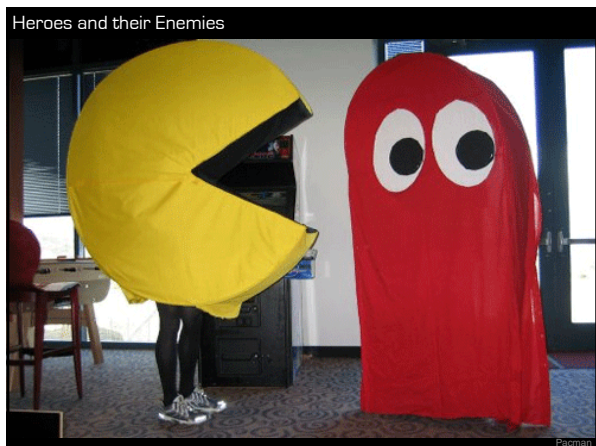
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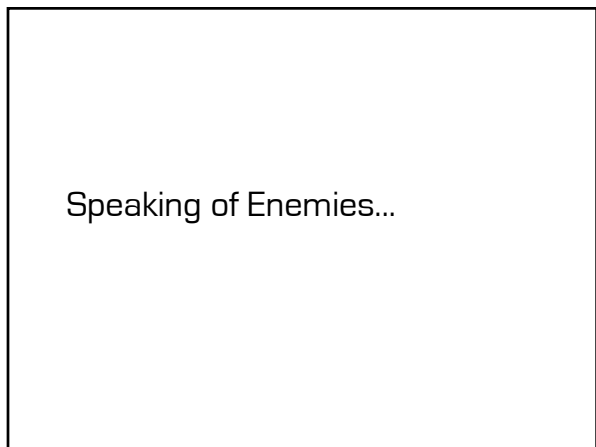
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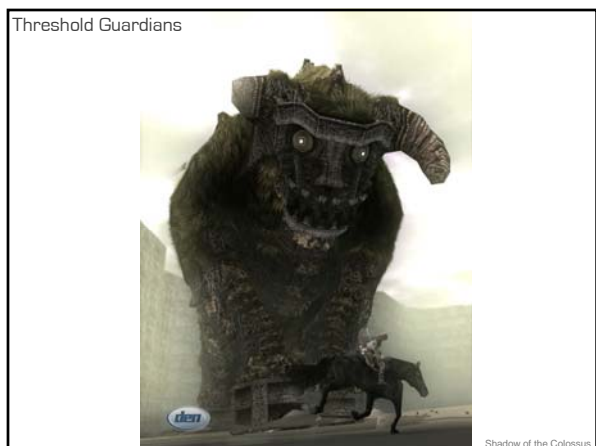
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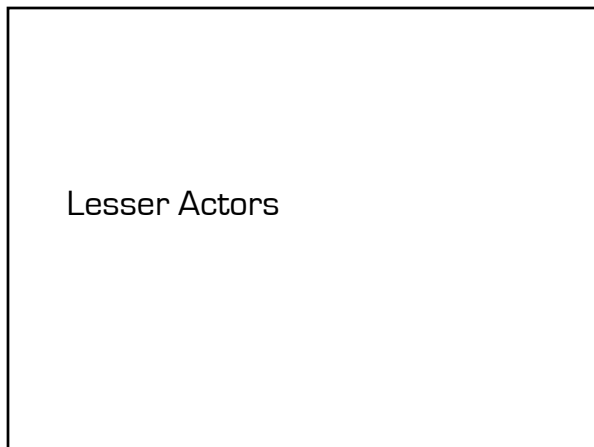
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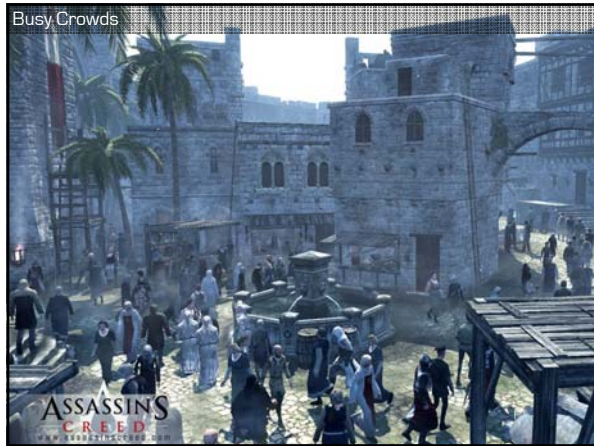
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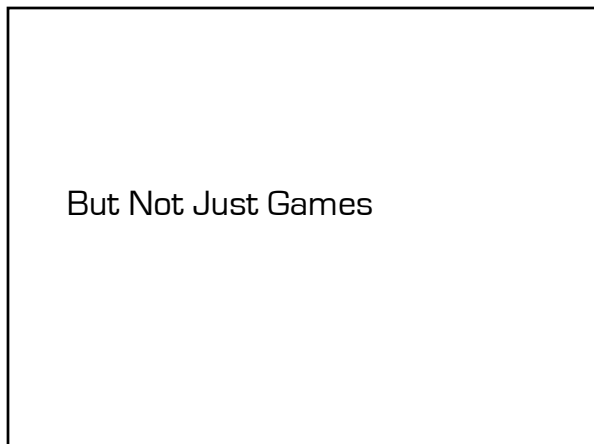
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Tutors and Instructors



STEVE Shipboard Training

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Interface Agents



REA - Natural Interface to a Real-estate Database

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Pedagogical Drama



Carmen's Bright IDEAS

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Simulated People



Tactical Iraq

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Guide Characters



Tactical Pashto

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Historic Figures and Story Characters



H.C. Andersen, NICE Project

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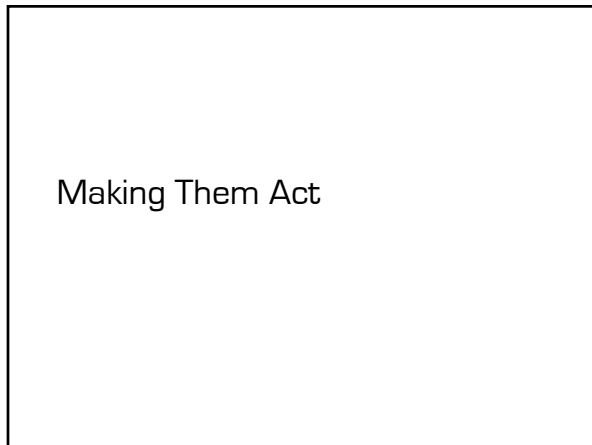
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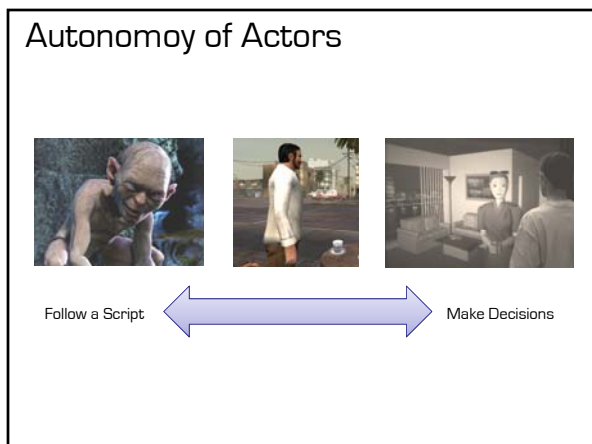
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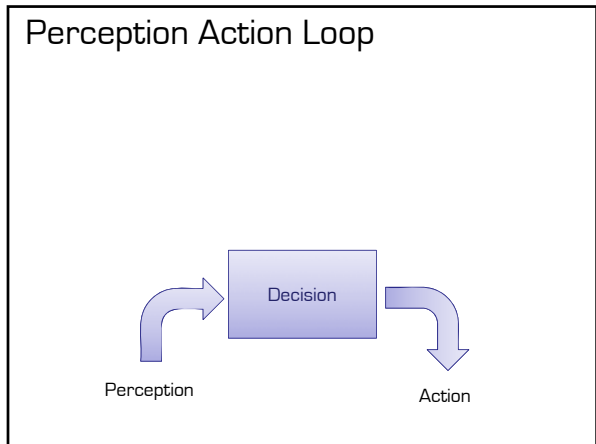
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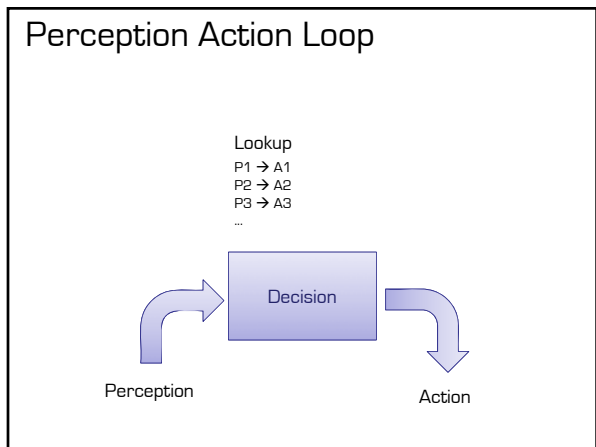
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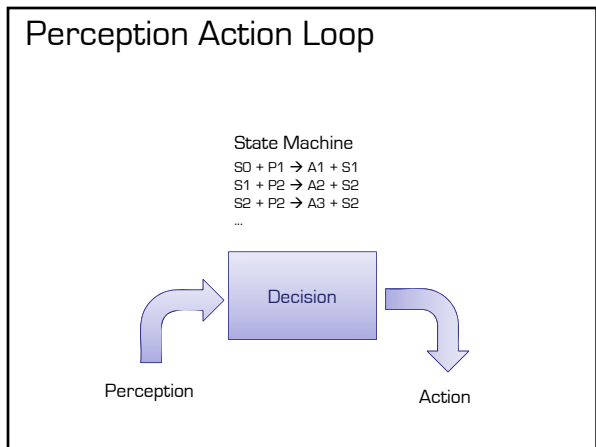
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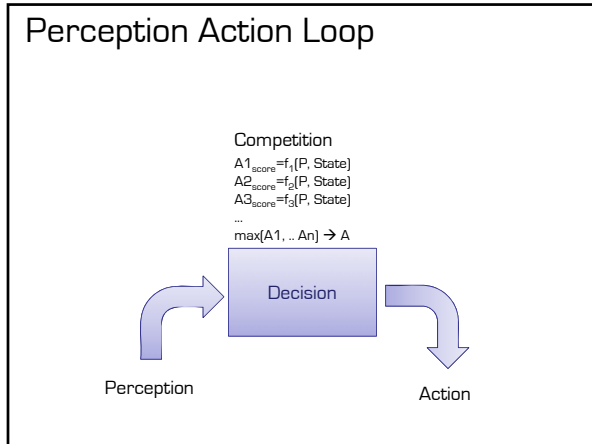
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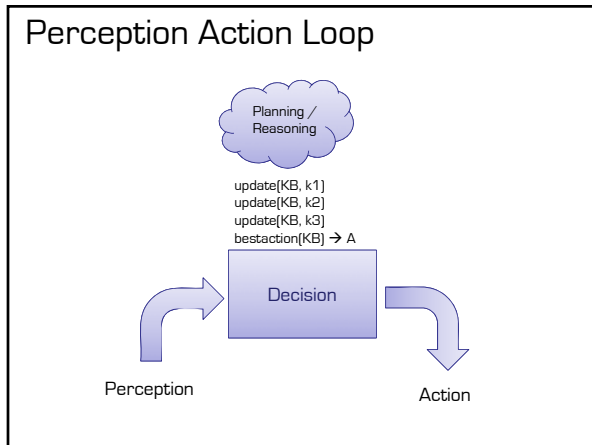
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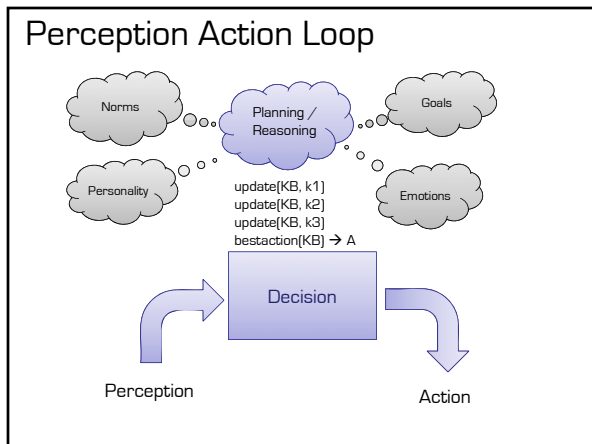
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### Visible Action

- The chosen action of an actor manifests itself typically as **visible behavior** at some point.
- The behavior will be performed by an **articulated body**, typically human-like in appearance.
- The movements **communicate** the **inner world** of the actor.
- Any movement or lack of movement that is **not consistent** with that inner world, **destroys** the credibility of that actor.

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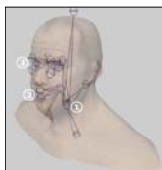
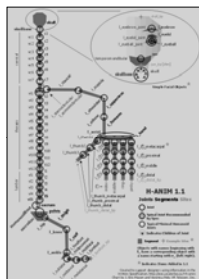
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### But it's very hard to control a visible body



- Over 230 joints
- Over 50 muscles in face
- And we never stop moving!

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### Humans control it with little effort



© Josh Lerner

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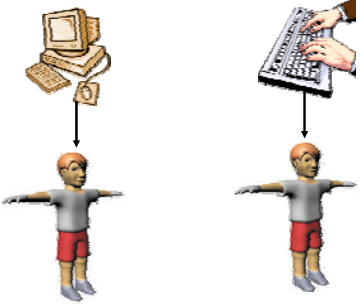
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But hard for computers and "players"



How do we make it easier?

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The answer is a layered approach



Perception

Goal

Intent

Behavior

Motion

Body

Action

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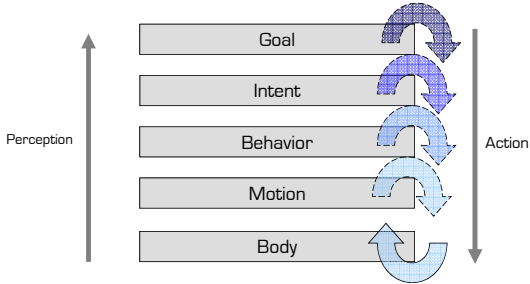
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Layered Control: Many Perception Action Loops



Perception

Goal

Intent

Behavior

Motion

Body

Action

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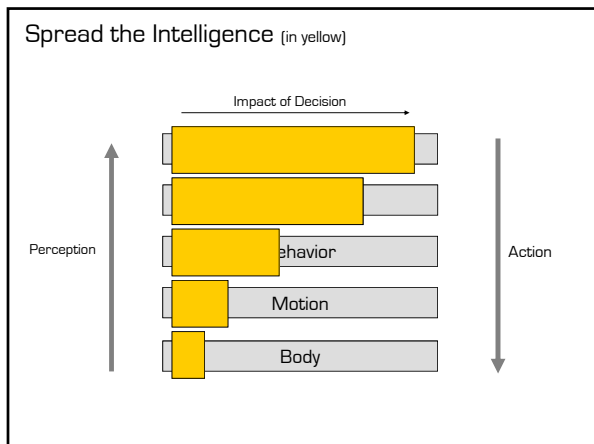
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Body (physics)

- Knows its location and configuration
- Knows its limits
- Knows if it's touching something
- Knows what's perceivable
- Can balance itself

• Example: I bumped into another person!

Goal  
 Intent  
 Behavior  
 Motion  
 Body

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Motion (Dynamics)

- Knows what joints are needed
- Knows how joints can move
- Can maintain itself
- Can blend with other motions
- Can synchronize with environment

• Example: Eyes track an object

Goal  
 Intent  
 Behavior  
 Motion  
 Body

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**Behavior (Performance)**

- Knows what motions are needed
- Knows which motions are most important
- Knows if the behavior succeeded
- Can change if needed

• Example: Point at instruments  
• Example: Nod the head



Goal  
Intent  
**Behavior**  
Motion  
Body

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**Intent (Cognition Level 1)**

- Knows what behaviors help intent
- Knows what behaviors are permissible
- Knows the social context
- Can try something different if behavior fails

• Example: Start conversation  
• Example: Reach the tower



Goal  
**Intent**  
Behavior  
Motion  
Body

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**Goal (Cognition Level 2)**

- Knows what intent is most useful
- Knows intent of others
- Knows needs, desires, emotions, personality...
- Can evaluate progress towards goals

• Example: Tell john about the lottery!  
• Example: Defeat the enemy



Goal  
**Goal**  
Intent  
Behavior  
Motion  
Body

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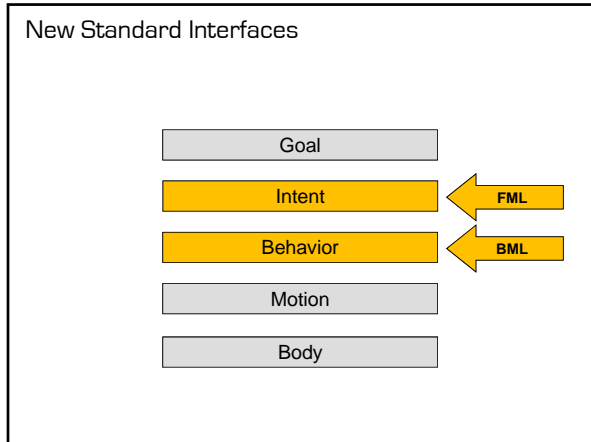
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Summary of layered approach

- **Intelligence** is spread across layers, with higher concentration at the top and lower concentration in the graphics hardware at the bottom.
- **Interfaces** between layers: As well as being the glue holding a character together, they provide
  - scripting opportunities
  - sharing of standard components (e.g. "engines")
  - different levels of control (e.g. Player vs. NPC)

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