intro to 3D

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homework

- make an AgenCubes project
  - submit via Gorp (no applet)
- points: 100
- extra: 50
- deadline: monday april 24, 11:59pm

AgentCubes

- *opportunity:* even cheap PCs now have video boards that have unparalleled power to visualize (2D/3D) & compute (GPU)

- *vision*: Interactive 3D Cyberinfrastructure for end-users

- *problem*: the creation of 3D simulations is prohibitively expensive and complex for end-users

- *goal*: low threshold and high ceiling end-user development for 3D including programming, modeling, and AI

architecture

|	
Applications	Games + Computational Science
Patterns	Components & Templates *Transformers*
End-User Development	**End-User Programming** *Visual AgenTalk*	**2D/3D modelling** *Inflatable Icons*	**Artificial Intelligence** *Collaborative Diffusion*
Engine	simulation engine *AD3D*
Media	files, network, knowledge representation *<XMLisp)*	2D/3D Graphics *OpenGL*	sound, images, movies *QuickTime & iTunes*

AgentCubes

existing AgentCubes applications

Mr. Vetro: a human physiology simulation cyberinfrastructure

*Mobility Agents*: a location aware services cyberinfrastructure
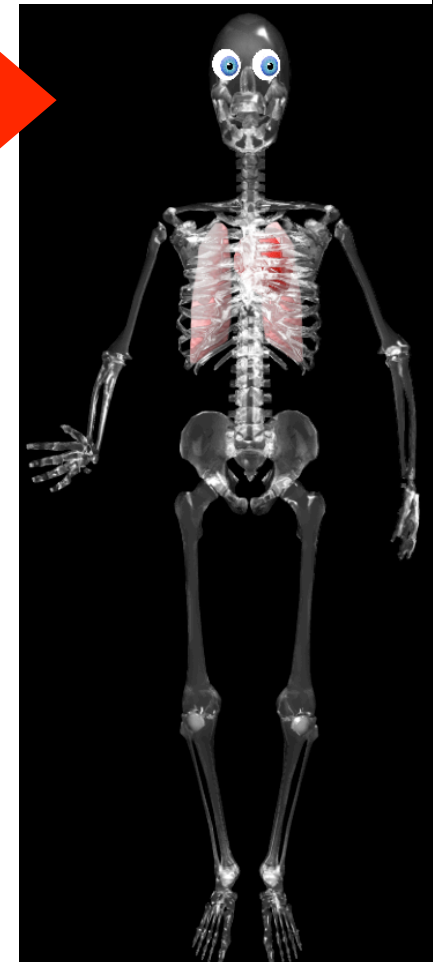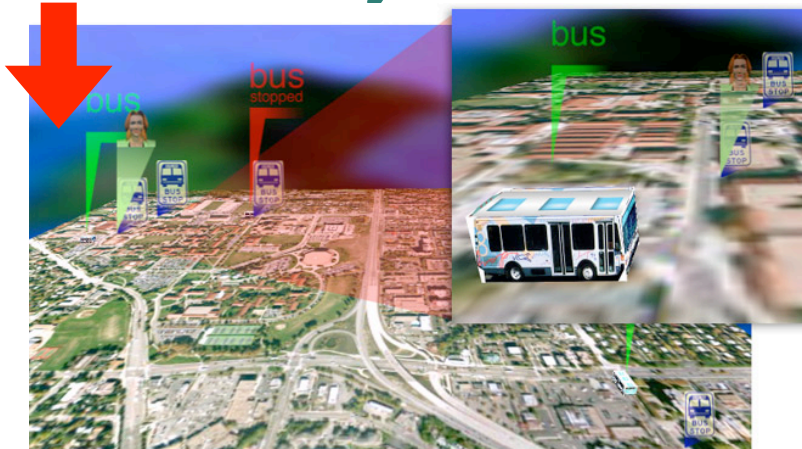
incremental 3D

The fundamental idea of Incremental 3D is that a user should be able to suspend important design decisions to the point in time of the design and development process when the decision really needs to be made. For instance, many game and simulation applications can start as simple 2D applications that may or may not be turned into 3D applications.
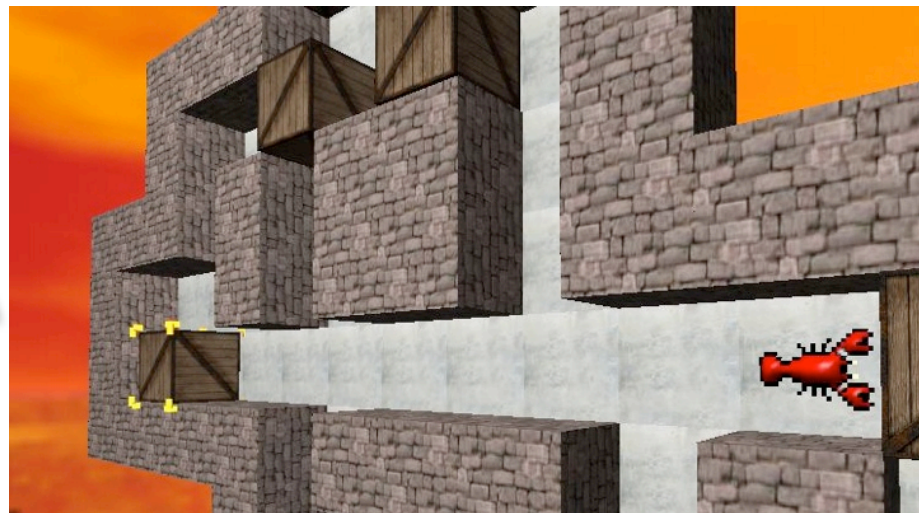
incremental 3D models
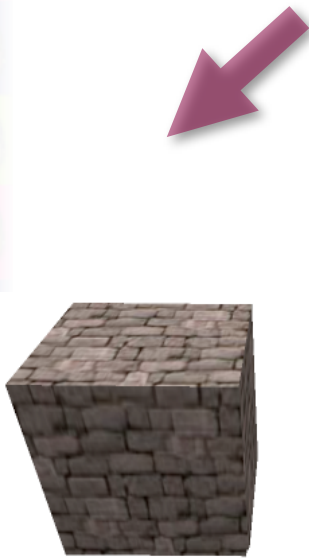
2D scene

**2D textured
3D objects**
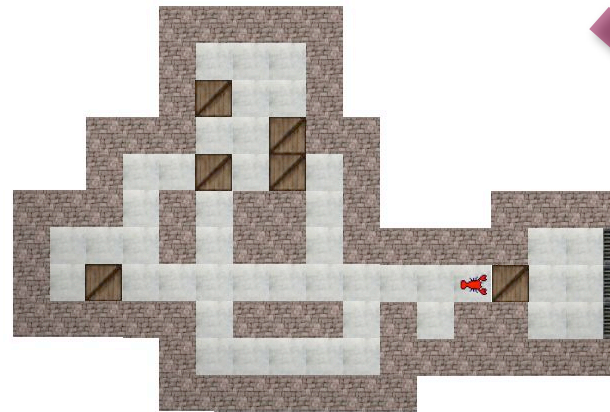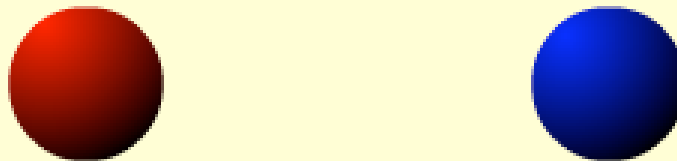
3D scene

inflatable icons
(patent pending)

incremental 3D animation

- ***why animation***? animation is a powerful mechanism to efficiently communicate complex object interaction
  - ◆ not just to make things look nice
  - ◆ "perception of causality" – Michotte, 1962
- ***why incremental?*** make it simple for users to create and control animations

Michotte demonstration 1. What do you see? Most observers report that "the red ball **hit** the blue ball." The blue ball moved "**because** the red ball hit it." Thus, the red ball is perceived to "**cause**" the blue ball to move, even though the balls are nothing more than color disks on your screen that move according to a programme.
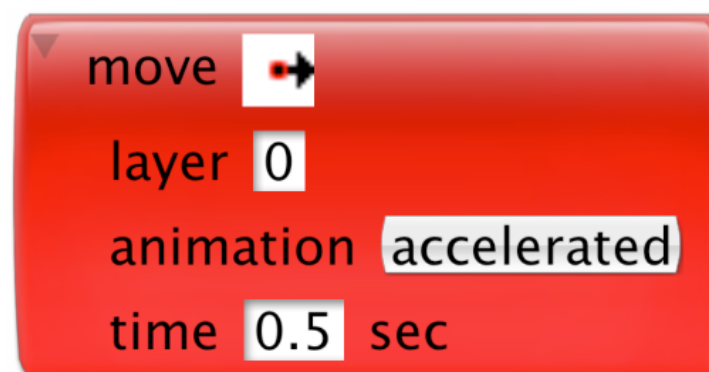
1) Separation of Logic and Animation

most frameworks blur code concerned with logic and programming

- ◆ result is a mess

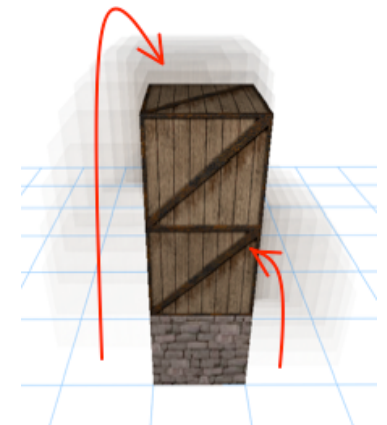- ◆ end-user cannot easily control animation (e.g., on, off, slow, fast, parallel, serial)
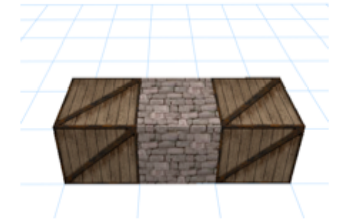
logic only

logic & animation

- Sequential animation is simple but does not work with large numbers of objects

  - e.g., 0.3 sec x 1000 agents = 5 min!

- Parallel animation challenge:

  - apparent contradiction: to compute animation trajectory agents need to know where they end up before they start to move

- Parallel Time Jump

  - compute trajectories by going forward, backward and forward again in time

  - automatically computes complex animation trajectories reducing collisions

  - 1000 agents @ 0.3 sec = 0.3sec

hands-on intro

◆ launch AgentCubes

◆ import project

◆ add shape (cube)

  ◆ textures: http://homepage.mac.com/anaphiel/Artwork/PhotoAlbum36.html

◆ inflatable icon

◆
```
<inflatable-icon pressure="0.04" max-value="3" steps="10" icon="redlobster.png" version="1.0.0"/>
```