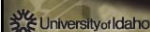


Building Your Virtual CS Department

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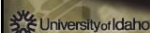
<http://www.cs.uidaho.edu/~jeffery/ccsc07-jeffery.pptx>



What is a Virtual CS Department?

My definition for purposes of this talk

- **3D, video game-like**
- **Multi-user, collaborative environment**
- **Persistent “virtual world”**
- **Based on a real academic space**
- **Where students can learn to do CS stuff**



Why Build a Virtual CS Department?

- CVE's are the killer app of the decade
- Better remote support than e-mail or IM
- Augment regular teaching methods/tools
- Offload certain tutorial tasks
- Be the hippest CS program in your peer group (or connect with your peer group!)
- A game-like environment may aid colossally for recruitment and retention

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But Why a Virtual CS Department ?

- **Cons**
 - Real space unnecessarily constrains virtual space
 - CS is not as exciting as pretending you are an elf?!
 - Virtual space capable of reflecting intellectual domains of study better than real spaces
- **Pros**
 - Familiarizes future students
 - Already familiar to locals / faculty
 - Allows *augmentation* of real and virtual spaces
- **Real and imaginary spaces are not mutually exclusive**
 - Build real places, connect them with abstract space

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Challenges

Given \$0, how do I...

- **Create a 3D world that is cool enough**
 - “make or buy” ? “make” sounds hard
 - Collect lots of textures
 - Build a detailed 3d model of my world
- **With enough stuff to do to be interesting**
 - Stuff that is CS education-relevant
 - Implies CS domain-specific tools
 - What you can “buy” won’t have these

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Textures

- 2D image, to be drawn on a 3D surface
- Harder than I thought it would be
- Start with digital photos of everything...
 - each room needs 3-300 photos
- Tedious manual editing process!
 - crop dimensions to power of 2
 - remove irregularities
 - scale them down to fit more in
 - most textures need to be tileable
 - may need GIMP or Photoshop

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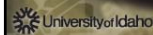
Texture Example



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3D Model

- If CAD/blueprint data is available, use it... if you can read/understand/convert it
- Otherwise, start from floor plans
 - Give (x,z) coordinates; add your y's
- Decide on a coordinate system
 - Where is 0,0,0? Feet or meters?



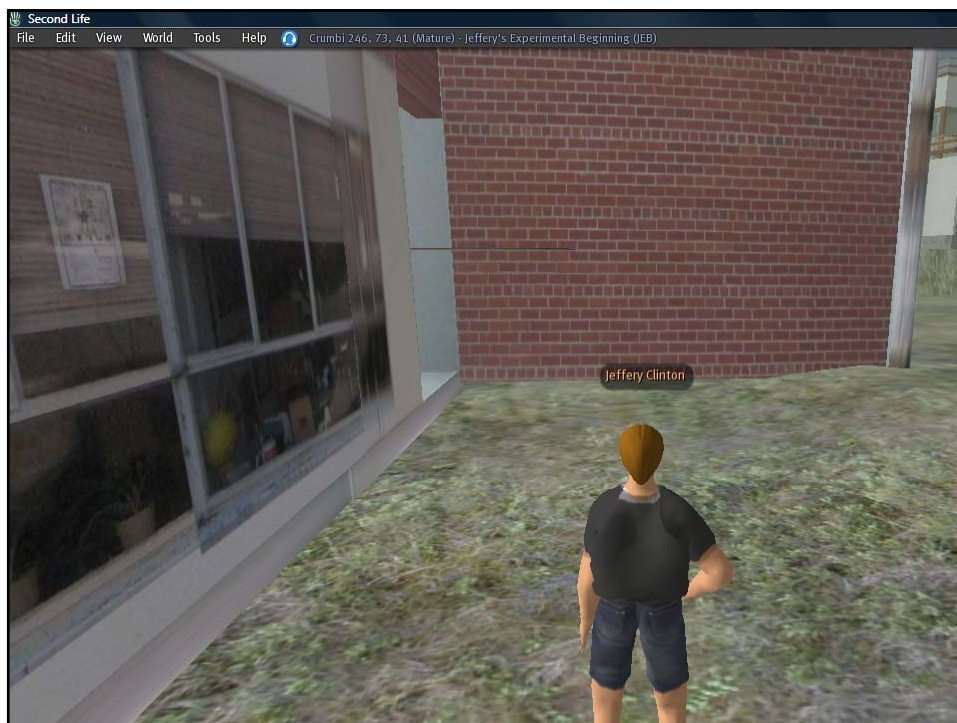
Modview



Second Life

- www.secondlife.com
- Focus: user-created virtual world content
- Basic use is free; you get an avatar
- Land ownership requires a pay account PLUS monthly rent (e.g. \$57 + \$18/month)
- Linden released second life source code!
 - But main point of SL is to be in *their* world?
- (Launch second life [demo](#) here)

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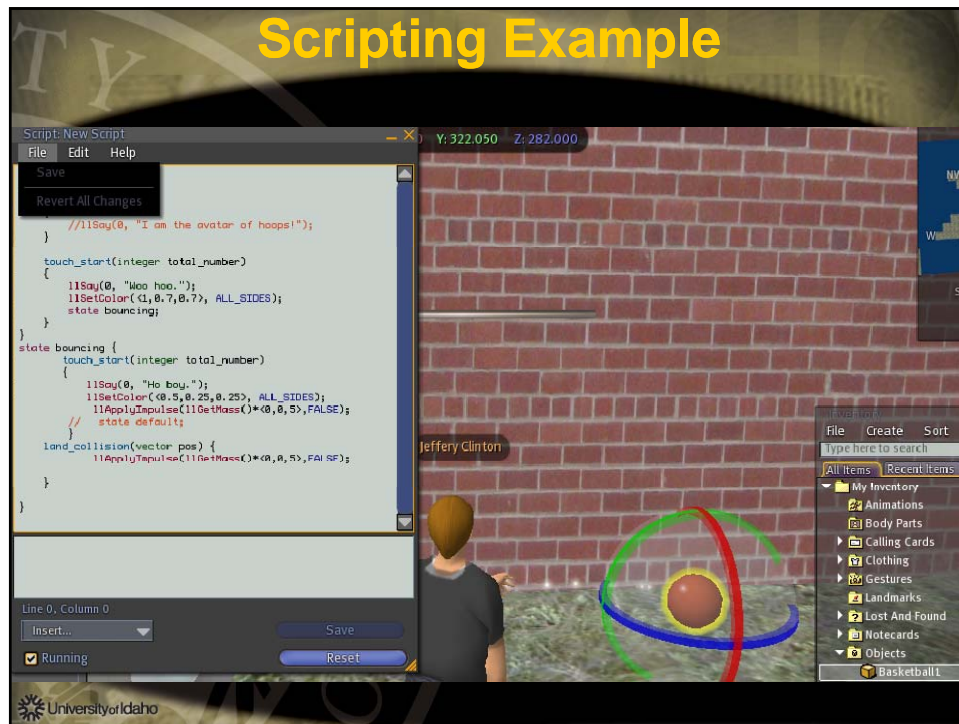


Creating Virtual Stuff in Second Life

- Own land, or find a sandbox
- Land strictly limited in the number of primitives it can support
- Primitives strictly limited in size
- Server-oriented, hard to do stuff locally and then “publish it”
- Pay \$\$ to upload textures, media

Scripting in Second Life

- LindenScript is *event-driven, state-based*
- Server based, local development awkward
- Scripts are associated with objects
- Typical events are user clicks, but there are many event types.
- Limited to 8K per script, multiple scripts/object
- Runs real slow on a timeshared server machine
- <http://secondlife.com/developers/resources.php>



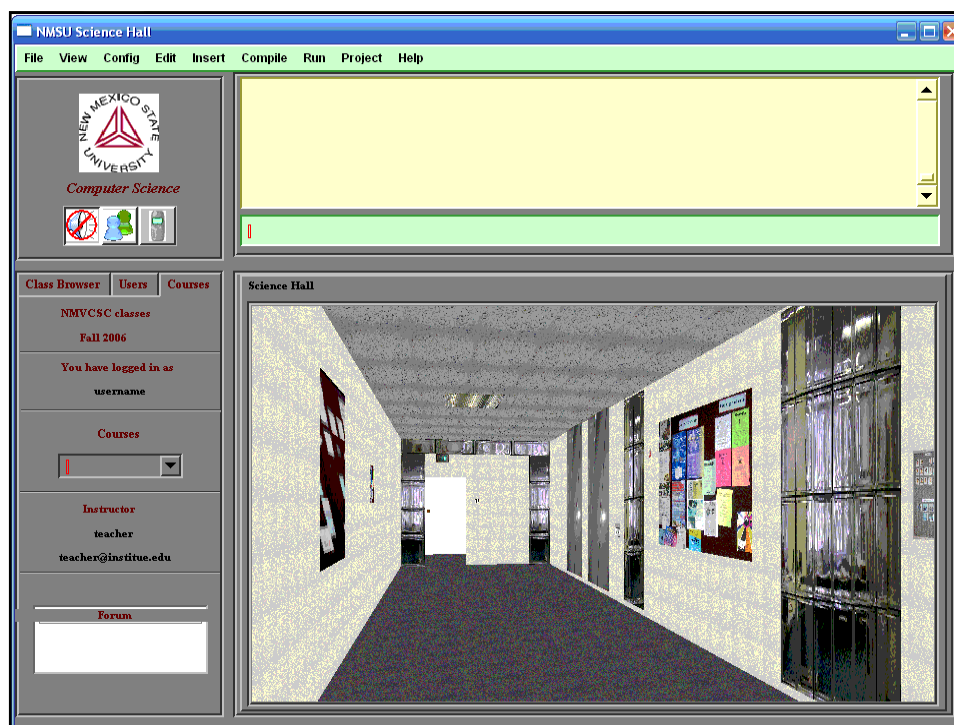
“Issues” in Second Life

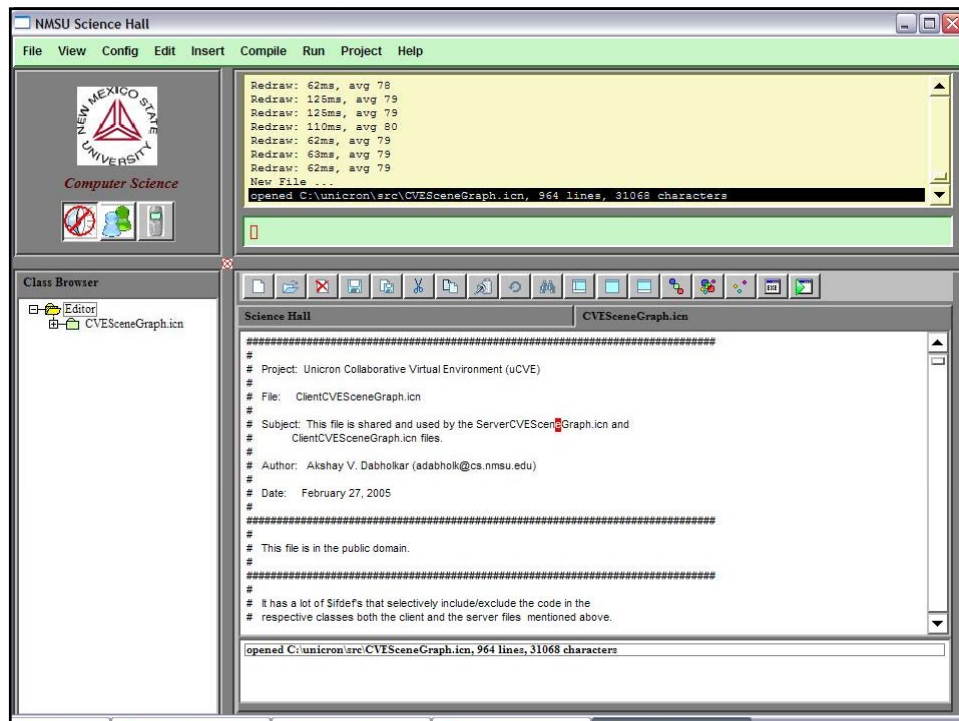
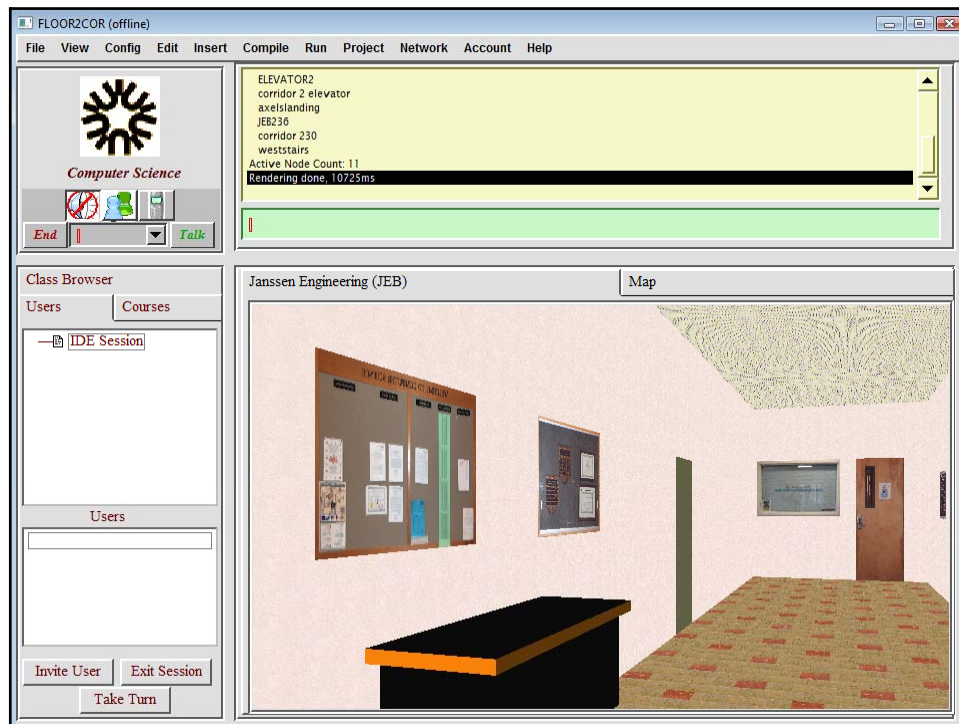
- **It’s mostly empty; see the WIRED article**
 - **Frank Rose, “How Madison Avenue is Wasting Millions on a Deserted Second Life”**
- **It lacks reasonable protections**
 - **No law or cops**
 - **Inadequate property controls**
- **Too “adult”; feels like a bad side of town**
- **Sufficient for social purposes, do-able for lectures, need major customization to support labs/office hours.**

CVE

- CS educational virtual environment
- Initial funding from NSF ATE program
- Lives at cve.sourceforge.net
- Runs on X11 and on Windows (OpenGL)
- SIMPLE 3d worlds, needs more tools
- Collaborative IDE
- Under construction
- CS departments so far: UI and NMSU

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Static and Dynamic Model Data

```
#static properties of a room
Room {
  name SH 167
  x 29.2
  y 0
  z 0.2
  w 6
  h 3.05
  l 3.7
  floor Rect { texture floor2.gif }
  obstacles [
    Box { # window sill
      Rect {coords [29.2,0,.22,29.2,1,.22,
                    35.2,1,.22,35.2,0,.22]}
    }
  ]
}
```

```
# static properties of a door
Door {
  x 33
  y 0
  z 3.9
  height 2.3
  plane 3
  rooms [SH 167, corridor 167]
}
```

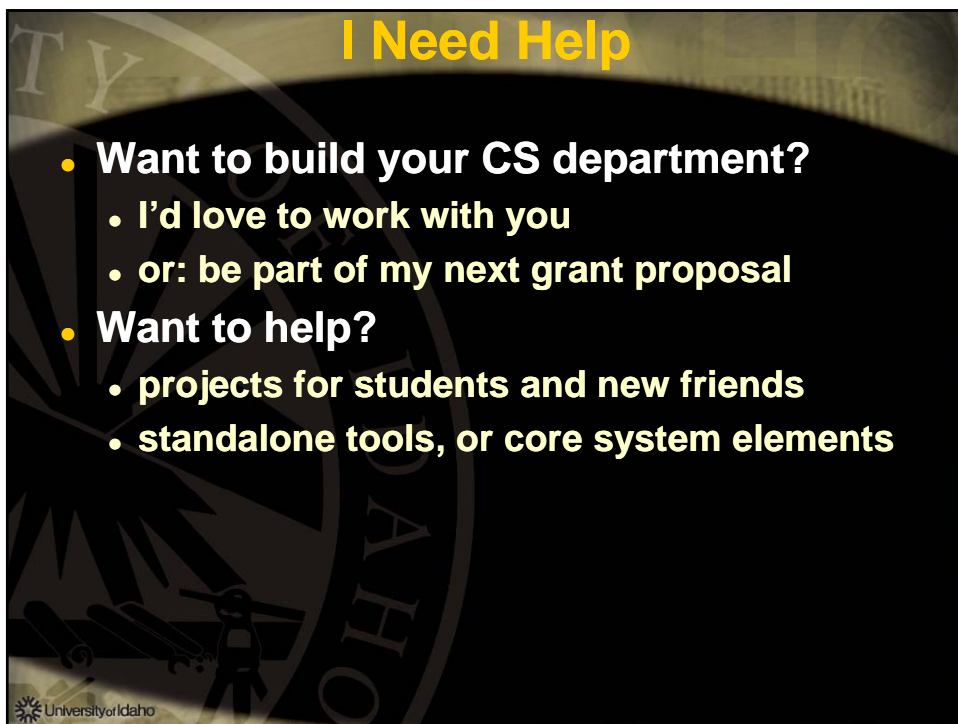
```
#dynamic state of a door
link {
  name link1
  openness 1.0
  delta 0
  direction 1
}
```

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Under Construction


- **3D model imports**
 - better avatars, more virtual objects
- **NPCs and quests**
 - CS/library tutorial content
 - a recruiting tool, will reach grades 4+
- **Collaborative debugger**
- **Collaborative design (UML--) tool**
- **Augmented reality and virtuality**

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The background of the slide features a large, faint watermark of the University of Idaho seal. The seal is circular and contains the text 'THE UNIVERSITY OF IDAHO' around the perimeter. In the center, there is a stylized sunburst or starburst design. The overall color scheme is dark, with the text and bullet points in white and yellow for emphasis.

I Need Help

- **Want to build your CS department?**
 - I'd love to work with you
 - or: be part of my next grant proposal
- **Want to help?**
 - projects for students and new friends
 - standalone tools, or core system elements

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