

Course Mechanics



Credits: Brown's cs123

The CS1566 Staff

- Professor:
 - Liz Marai (marai@pitt.edu) SENSQ 6115
- Graduate TA:
 - Adrian Maries (amaries@cs.pitt.edu)
 - SENSQ 6512, SENSQ 6510

This week only, for help installing OpenGL & GLUT (SENSQ 6512 & 6510) under

- Windows: see Adrian Maries
- OSX: see Tim Luciani (tbl8@pitt.edu)
- Unix: see Becca Hachey (reh59@pitt.edu)

Recitations:

- once a week; mandatory (for your own good)
- section enrollment limited by fire code regulations and grad TA workload regulations

Who Should Take CS1566?

- Juniors or higher
 - with CS445 and CS447; CS449 recommended
 - or equivalent, with good software engineering skills (OO design and programming, debugging)
- Sophomores
 - did well in intro sequence
 - consider themselves good programmers
 - willing to put in extra time
- Masters welcome too
- **If you don't know C, you CAN take this class** (but get ready to invest some time early on)
 - read Java to C++ transition document on webpage
- some Linear Algebra (vector and matrix arithmetic, dot and cross product) required after 2nd week
 - use class/webpage link to learn/review these concepts

What to NOT Expect

www.insomniacgames.com/blogcast/

Ratchet & Clank: 10 Years of Concept Art

by John Florio

10 this year and to celebrate the anniversary Sony will release the *Ratchet & Clank HD*. Ever since the first Ratchet & Clank game hit the streets fans have written us wanting to see concepts are just one of many pieces we used to put our games together, they are a great story of the series. So I searched around the studio and pulled together a collection of way back to 2002 when Insomniac started working on a new game...

2000. We were wrapping up *Spyro: Year of the Dragon* and looking ahead to the ending a year developing a new game code-named "I-5" and later known as "*Girl with a Stick*". That left us with only a few months to present a new Full Moon Show podcast #49 here). That left us with only a few months to present a new ed working on a game set in an alien galaxy that featured lots of crazy gadgets. Right p (about 40 of us) focused on bringing this idea to life. We started to develop our tech, mation, story, design, sound... everything! On the concept art front, Insomniac character ted these early sketches of our heroes:



Image of Ratchet. "ndo traversal abiliti characteristics in place: ally his reptilian bod



What to Expect

www.insomniacgames.com/blogcast/

Research & Development

Mike Day: Vector length and normalization difficulties

Posted on July 16, 2012

Here's a short account of an easily overlooked difficulty with vector length and vector normalization functions, together with one way of solving the problem. We'll use 3-component vectors by way of illustration, but the idea is easily extended to longer or shorter vectors, quaternions, etc. Single-precision floating point is assumed.

[vector-length-and-normalization-difficulties.pdf](#)

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Research & Development

Mike Day: Extracting Euler Angles from a Rotation Matrix

Posted on July 11, 2012

This article attempts to fix a problem which came up when implementing Ken Shoemake's Euler angle extraction in the context of a single-precision floating point library. The original Shoemake code uses double precision, which presumably maintains sufficient precision for the problem not to arise.

[euler-angles.pdf](#)

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Research & Development

Mike Day: Overlap test for spotlight cone vs sphere

Posted on July 3, 2012

A 'spotlight cone' can be pictured as an ordinary right circular cone, the base of which has been inflated outwards to form part of a spherical surface centred on the cone's apex. This shape is useful in lighting systems for finding all the objects which could be influenced by a given spotlight. This document shows a stripped-down calculation for testing whether a given spotlight cone overlaps a sphere, typically the bounding sphere of an object which may be lit. The calculation can be used as the basis for an optimized SIMD test for checking a batch of several spheres against a given spotlight cone.

[spotlight-cone-vs-sphere.pdf](#)

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Bird's Eye View of the Course

- Basic 3D scene management
 - tessellation of curved surfaces
 - transformation (translation, rotation, scale)
 - virtual camera model
 - scenegraph traversal
- 2D raster graphics
 - basic image transformations
- Modeling and Rendering
 - intersecting rays with simple solids
 - ray tracing
 - lighting and shadowing of polygonal models
 - photorealistic rendering
- Other Topics
 - animation
 - user interfaces
 - video games

Handouts and Handins

- <http://vis.cs.pitt.edu/teaching/cs1566/>
 - Course syllabus (online)
 - assignment deadlines and lecture topics are subject to changes
 - mandatory recitations
 - Course missive (online)
 - textbook, grading, late policy, extra-credit
 - Collaboration policy
 - read collaboration policy carefully before you sign because it is a contract
- First assignment: warm-up exercise in C, OpenGL & GLUT
 - program handin – Thursday, Sept 6th, 11:59pm

Items Close to Our Hearts

- Class starts on time: fair-play skit policy
- Laptops/tablets/phones: special seating;
 - Think: Why did you trek to 5129?
 - Not for the awesome free wi-fi in the room.
 - Youtube *Gorilla-basketball experiment* (50% viewers blind regarding gorilla);
- Asking questions: if I don't notice a raised arm, please say "Question" and point to the person with the raised arm
- Grading-questions: ask w/in one week of grading, or forever hold your peace
- 5-minute student presentations at start of each class; mandatory

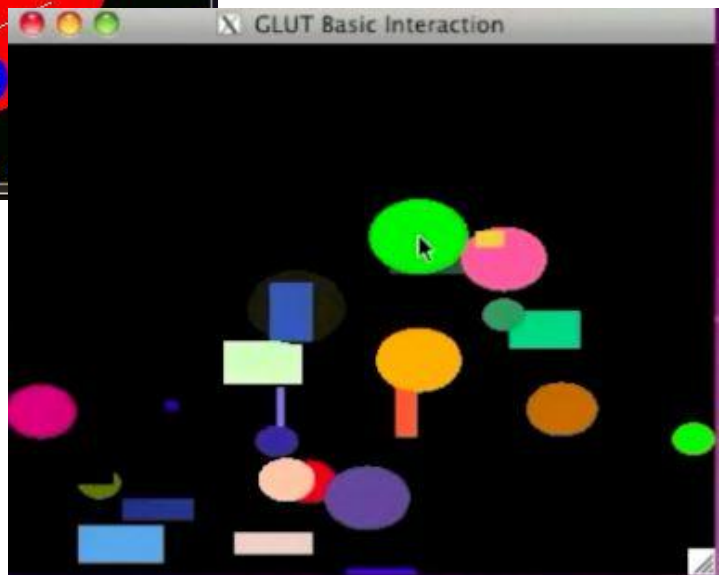
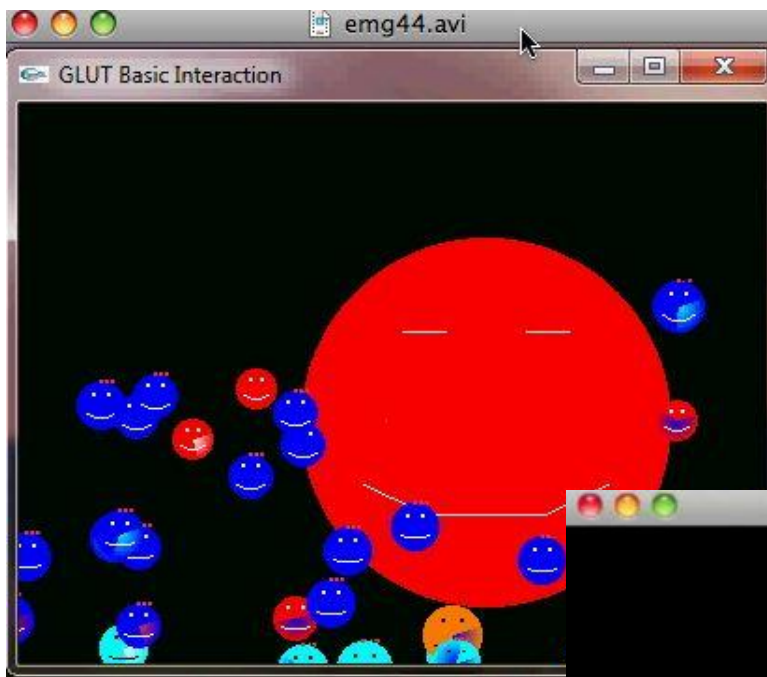
See course missive on-line for absences, late, EC policy etc.

Projects and Exams

- 5 or 6 Programming Projects (2 parts)
 - programming-intensive class, nuts-and-bolts
 - some math and algorithms
 - platform of your choice, BUT your handin must build and run on either
 - Windows PC in SENSQ 5505
 - Mac in SENSQ 6110
 - Linux elements.cs.pitt.edu
 - assignments build on each other
- 1 Mid-term in class
 - we *really* want to make sure you understand this material.
- 1 Final Exam in class
 - ditto
- 1 Final Project
 - most rewarding assignment in CS1566
- *Expect 15-20 hours of work every 2 weeks and an intense push the week before exam week*

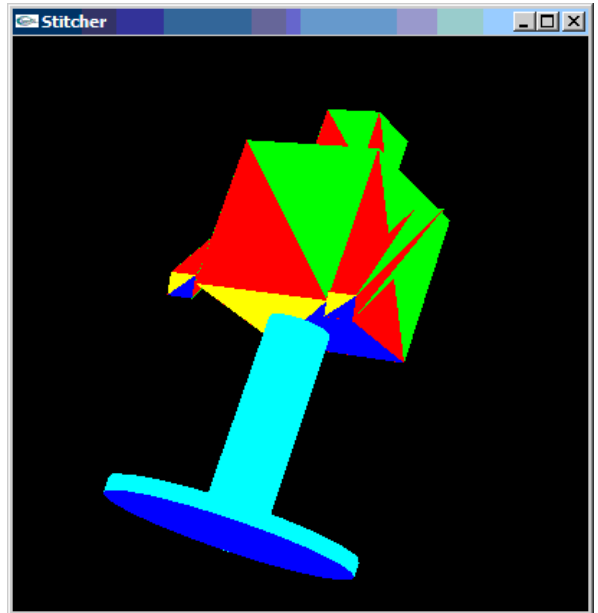
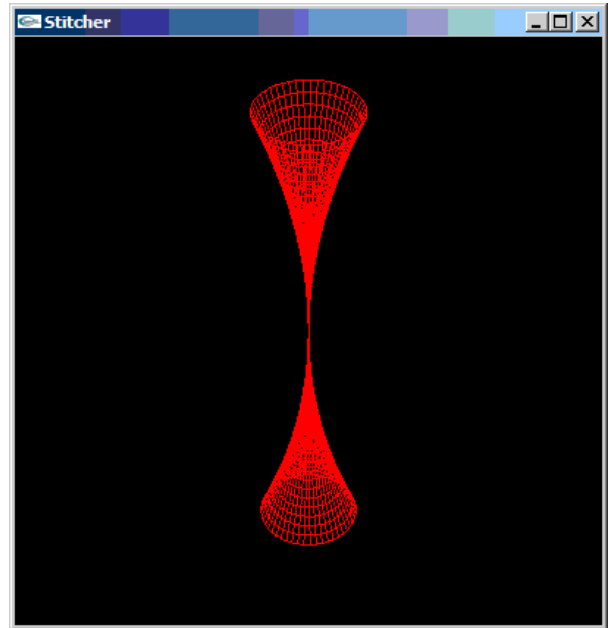
Assignment 1

- OpenGL & GLUT warmup
- 2D shapes, interaction and animation



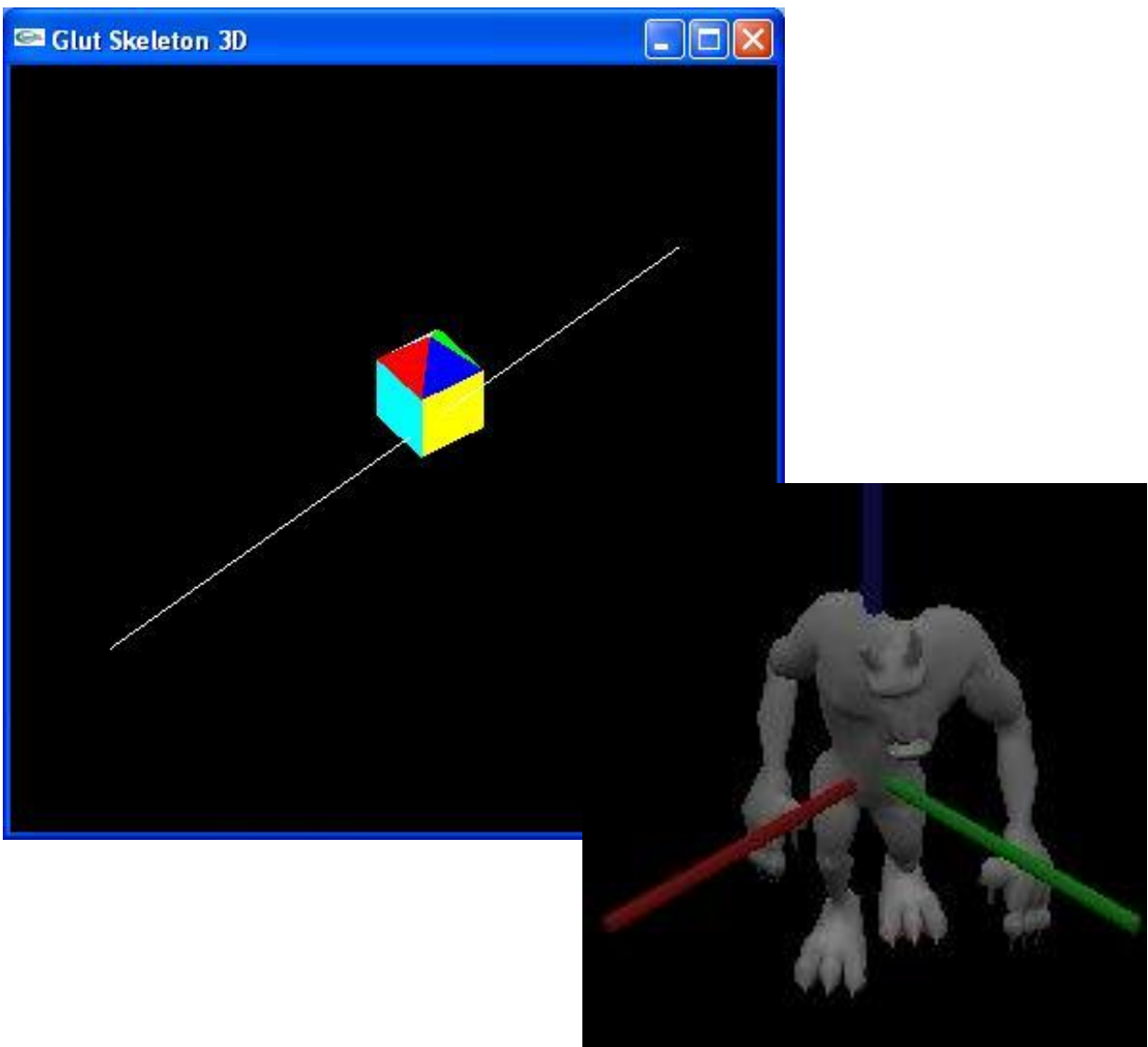
Assignment 2

- 3D modeling



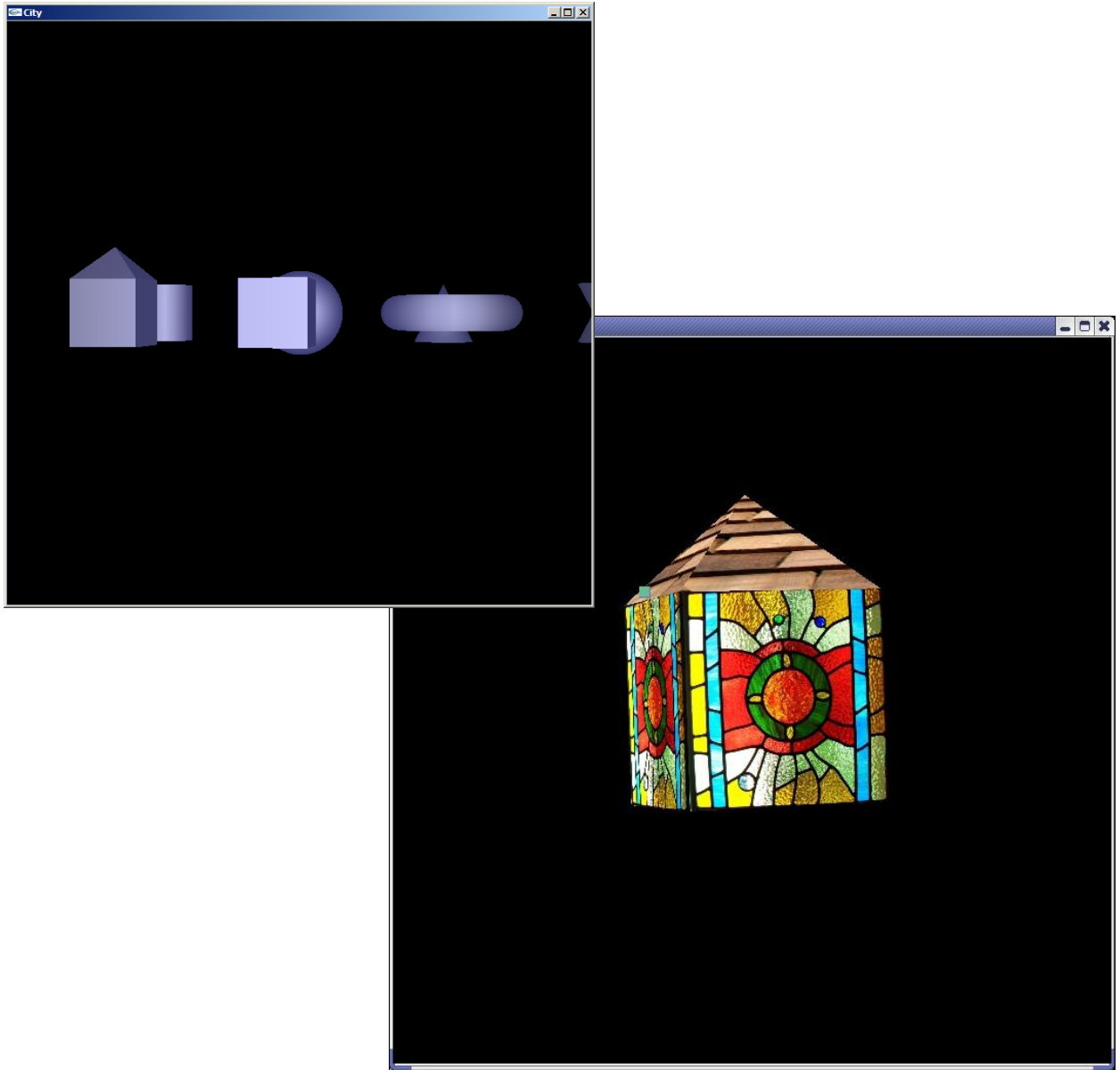
Assignment 3

- 3D camera and interaction



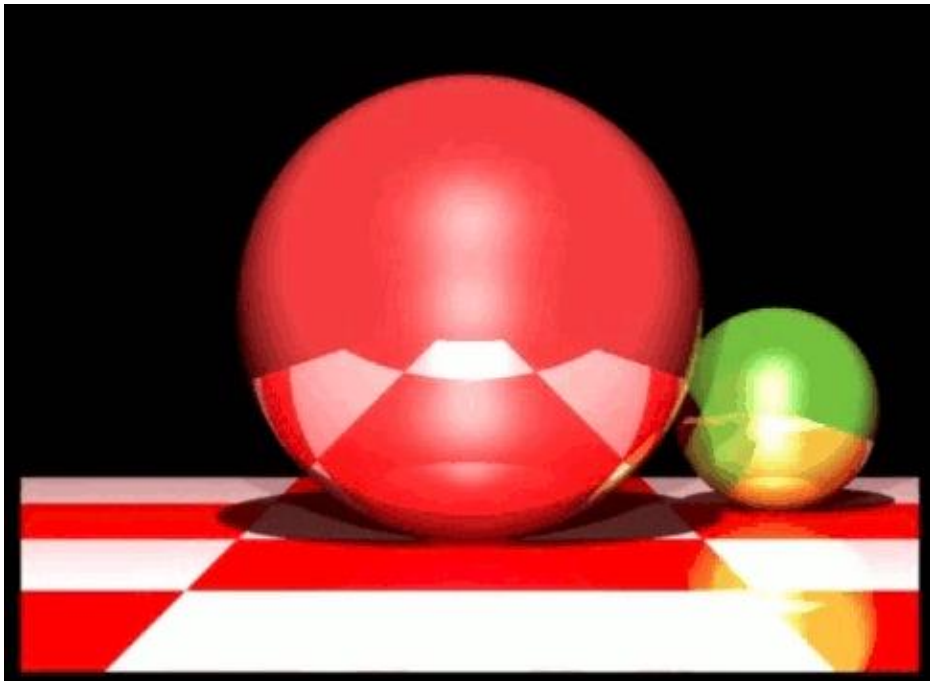
Assignment 4

- Lighting and object interaction

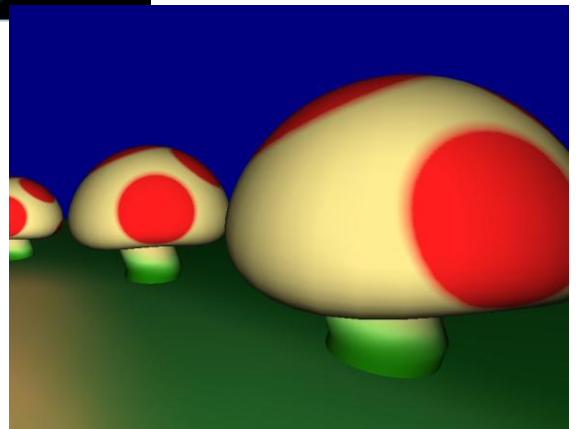
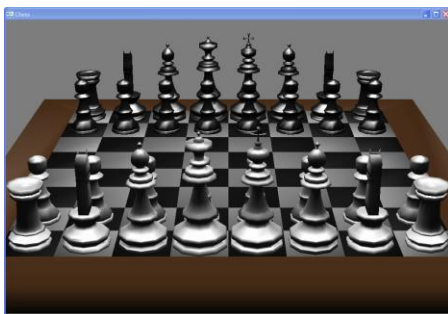
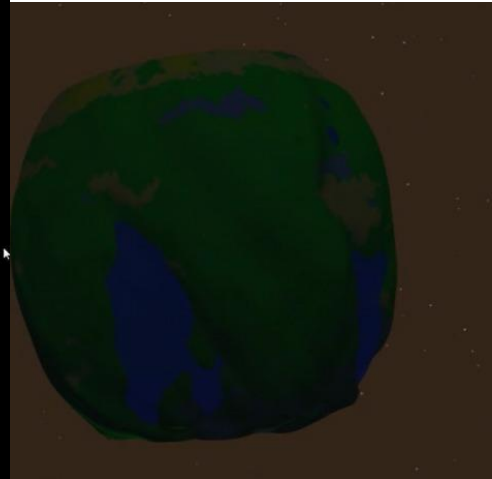
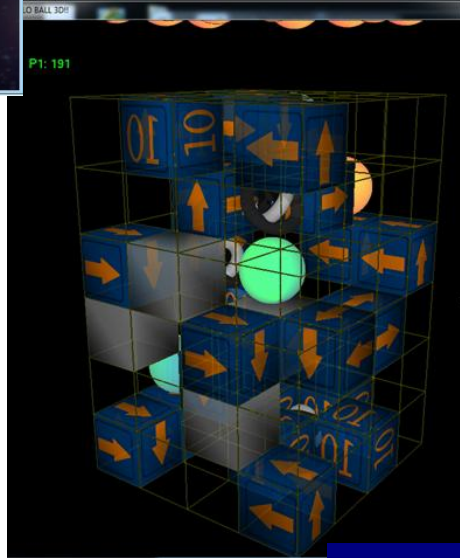
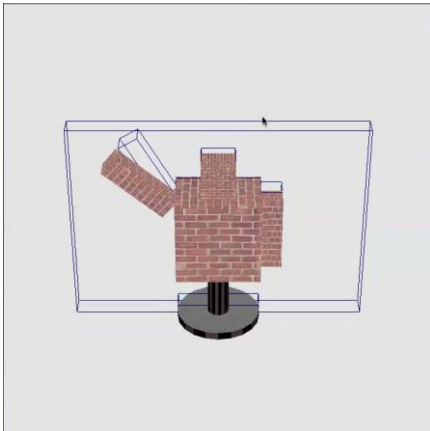
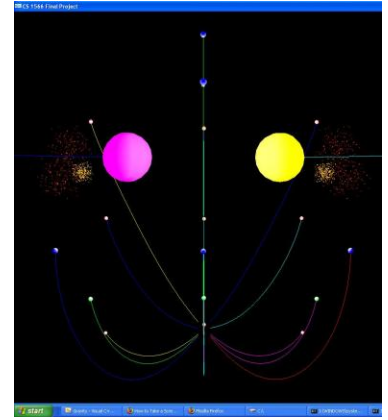
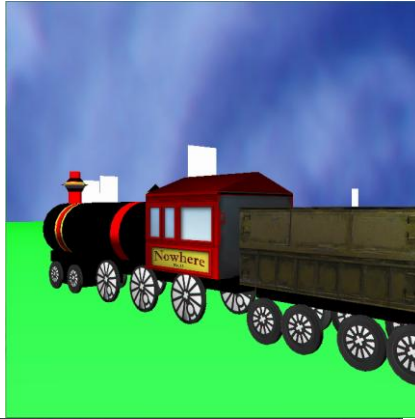
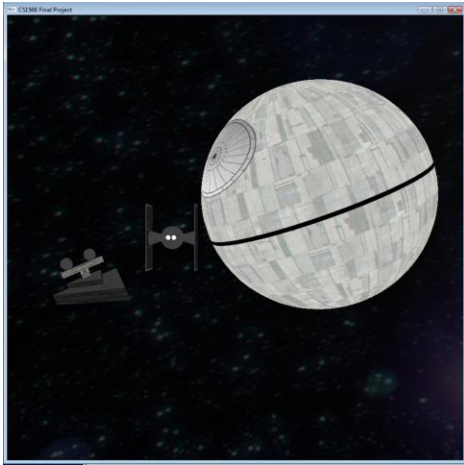


Assignment 5-6

- Photorealism



Final Project



And now for some demos...

