CS 134 Game Creation and Design

Topics covered in Lecture
(Intro to midterm)

Introduction

- Basic Overview / Architecture
Spatial Data Structures

- Culling/Clipping
- Quad Trees
  - Height fields
  - Terrain LOD
- Oct Tree
- Potentially Visible Sets
- Portal Rendering
- Binary Space Partitioning
  - Viewpoint independent viewing

Animation

- State machines
- Sprites
- Mesh-driven
- Skeleton-driven
  - Pipeline
  - Storage
- Blending functions
  - Facial Animation - Blend Shapes
- Inverse Kinematics
Artificial Intelligence

- Abstract vs. practical AI
- State Machines
  - Hierarchical
  - Probabilistic
- Cognition Models
- Planning
  - Global vs. Local planning
  - Dijkstra
  - A*, modified A*
- Crowds and Flocking

Lighting

- Basic Phong shading
- Light Maps
  - Diffuse and limited specular
  - Resolution/storage
- Shadow maps
- Shadow volumes
- Ambient Occlusion (AO)
  - Computing
  - Comparison to radiosity
  - Screen-space AO
Texture Maps

- Common Optimizations
  - Mip maps
  - Compression
  - Caching
- Bump Maps
  - Tangent vs. Object space
  - How to “bake”
- Billboards
- Image-based rendering

Physics I

- Basic Introductions
  - Motivations
  - Applications
  - Definitions
- Forward vs Inverse Dynamics
- Common Forces
  - External Forces, Impulses
  - PD-Servos
Physics II

- Basic Integrators
  - Euler
  - Runge-Kutta 4
  - Leap Frog
- Integrator issues
  - Stability vs. Speed
- Adaptive time-stepping
- Control Structure
  - Hierarchical State Machines