CSc-165 Spring 2023
Final Exam Study Guide

- Texture mapping, coordinates, and images
- Skybox/roombox/skydome, texture cube map
- How a skybox works (move box with camera, initialize max depth values, disable depth test, render skybox first, re-enable depth test
- HSR (Z-buffer) algorithm
- Render states (depth testing, transparency…)
- Environment mapping
- Image-based height map for terrain
- Estimating normal vectors
- Terrain following (how to achieve)
- Building islands using terrain plus plane
- Basic OBJ file structure and tags
- Role of a DCC tool + content loader
- What we used Blender for
- UV-unwrapping / seams
- Concepts of skeletal animation
- Rigging
- Keyframing
- Keyframe interpolation (in DCC and in game)
- Linear vs non-linear keyframe interpolation
- Keyframe interpolation vs lots of keyframes
- Concept of 2-phase collision detection
- SAP for broad phase collision detection
- Role of physics engine
- Physics world vs. graphics world
- Setting up a physics world – relationship between physics/graphics objects
- Concept of physics constraints
- What we used JBullet physics engine for
- NPC and concept of NPC control
- Server-side vs client-side NPC control
- Purpose of AI in NPCs
- Common AI methods: FSM, behavior trees, simple path-finding algorithm, "Boids"
- Simple behavior trees – selector, sequence, condition, and action nodes
- Tick and Think
- Sound wave sampling - sample frequency and bits-per-sample
- 3D sound, and the role of a 3D sound API
- Audio direction, distance attenuation, doppler shift, as features of 3D sound
- Sources, Listeners, Buffers (OpenAL/JOAL)
- Sound effects vs. background (music)
- Setup for ear
- Motivation for using Quaternions
- Format of Quaternions vs. Euler Angles
- Gimbal lock, cause and avoiding
- Quaternions for interpolation, why useful

What you <u>don't</u> need to know:

- Memorizing lists of tools
- Java or TAGE classes and coding specifics
- Frustum culling / Quad trees
- Height map generation algorithms (besides image-based)
- Specific tools other than listed above
- Specific Blender controls and steps
- JBullet and JOAL classes and functions
- Bone/Vertex transforms for animation
- Rule-based systems, genetic algorithms, neural networks
- Specific audio file formats

What about earlier topics:

Although I don't plan to test directly on earlier topics, some can't be avoided when they support the topics listed here.

Logistical Details:

- DATE: Wednesday May 10th
- MODE: *IN-PERSON*
- LOCATION: RVR-5029
- CLOSED BOOK / CLOSED NOTES
- LENGTH: 1 hour
- START TIME: at the start of class
- BRING: pencil or pen / eraser