Game Engine Programming
Game Engine Components

- Rendering Engine (OGRE)
- Physics Engine (Bullet)
- XML Parser (TinyXML)
- Graphical User Interface (CEGUI)
- Audio Output (OpenAL)
- Input/Output System (OIS)
- Renderer (OpenGL)
Game Components

- Models
- Textures
- Scenes
- Animations
- Images
- Scripts
- GUI Layouts
- Materials
- A.I.
- Saved Data
- GUI Layout
- Sound/Music
- System Config.
- Video
- Keyboard Mapping
configuration();
create_the_scene();
while(!done){
    read_input_state();
    update_game_objects();
    render_scene();
}
//end while

clean_up();
Timing

- Each iteration of the loop varies in time.
- How can we make movement smooth?
Scene Graph

- **Root Scene Node**
  - **Scene Node**
    - **Entity**
  - **Scene Node**
    - **Scene Node**
      - **Entity**
    - **Scene Node**
      - **Entity**
  - **Scene Node**
    - **Entity**

**Transforms:**
- Location
- Rotation
- Scale

**Geometry:**
- 3D Mesh
- Camera
OGRE Demonstration

- Open up a terminal window
- Run the command: `SampleBrowser`
- Try out some samples.
- Move around a scene.
Physics Engine

- Manages collisions.
- Force, torque, velocity.
- Friction and restitution.
- Rigid and soft bodies.
Physics Engine Objects

- Scene Node
- Rigid Body
- Entity
- Collision Shape

Dynamics and Collision Simulation
Bullet Demonstration

• Open a terminal window.
• Run the command: **BulletDemo**
• Commands vary: `h` sometimes brings help.
• Try different demos.
• Right-click often fires blocks at the scene.
OGRE/Bullet Example

- Open eclipse in a new workspace.
- Menu: File->Import
- General->Existing Project into Workspace
- Click “Next”
- Click “Select Archive File” and browse to find: /Courses/cs391/PizzaShooter2.zip
- Click “Finish”
- Switch to C++ Perspective
OGRE Bullet Example

• C++ Classes: Header and implementation files
• PizzaShooterApp
  – FrameRendering Events
  – manageCollisions
• PizzaGOB
  – firePizza
• OgreGOB
  – Animation
Hazards of C++/OpenSource

C++
- Memory management
- Error Messages
- Syntax
- Linking libraries
- Cross platform issues

OpenSource
- Buggy
- Complex
- Version maintenance
CS 391: Spring 2015

- C++ Programming.
- Managing small software projects.
- Writing and testing games!
CS Elective Courses 2014-2015

Fall 2014
• CS 360 Database
• CS 373 Graphics

Spring 2015
• CS 322 Networks
• CS 371 Artificial Intelligence
• CS 391 Selected Topics
• PHY 240 Electronics