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First Person Shooter Game

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Abstract

3D game development is an exciting activity for many students. But getting a handle on 3D game development for novices may be a daunting task. We take this opportunity to present a quick introduction to 3D game development through a few tutorials. For the next few columns a set of tutorials for a 3D first person shooter game developed by graduate and undergraduate students under the guidance of a faculty member from the University of West Florida will be presented. These tutorials were developed with **3D game Studio** by *Conitec*. To follow along, download the software from www.conitec.com. These tutorials include all elements of game development such as modeling and animation, lighting, collision detection, sound and scripting. Each tutorial will focus on one or more of these aspects. This week we start out with creating a room and adding some objects to the room. The instructions for this are presented below.

1 CREATING WAD FILES

Q: What *is* a WAD?

A: WADs are basically *a gallery of textures*.

However; these textures can be used to make many things – such as windows, doors, walls, ceilings, etc. Each WAD file can hold as many textures as you import. WAD files are really important when you are trying to customize your game. You can use the default WADs provided by 3D Game Studio, but doing so will only get you to a certain level of customizability.

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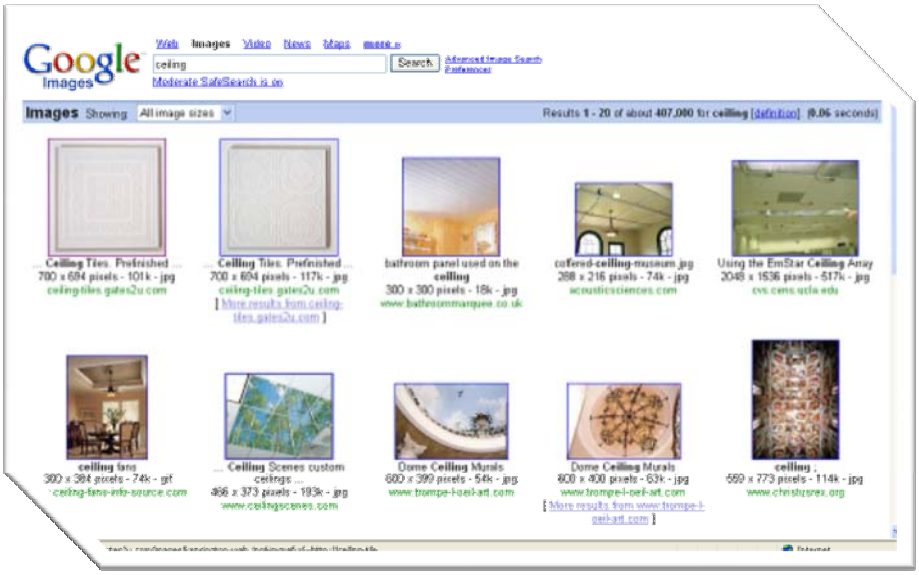
Step 1: Collecting Textures for your WAD file

Textures can be made from any picture as long as you're willing to modify them, so **create a folder and save any pictures you want to use as a texture to that location**

Note: The name of the picture will appear inside the WAD file so try to make it descriptive as possible (Example: BlueRug01, CeilingTile01, WoodenDoor04, RedPaint02)



Step 2: Converting Textures to the Proper Format

Textures for WAD files have to meet a few requirements

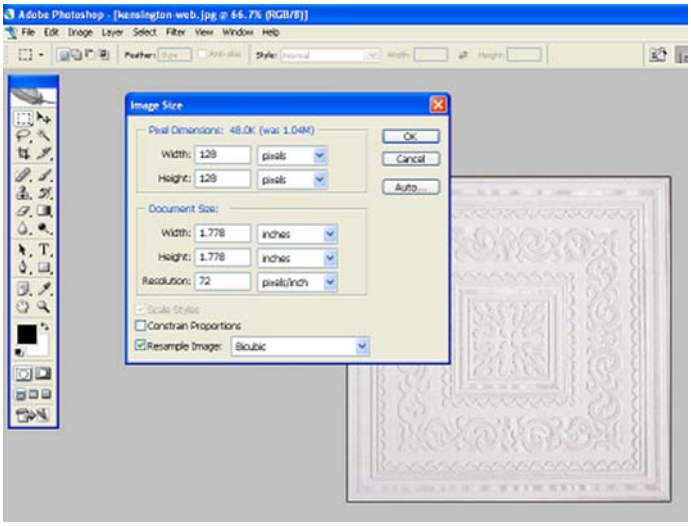
- The picture has to be a ".bmp" or ".pcx"
- The picture shouldn't be *too* detailed
- If the texture is going to be used as a pattern (paint, brick, tile) the sizes we can use are powers of 2 (128x128, 256x256, or 512x512 are a few examples)
- If the texture is going to be used for doors or windows, the dimensions will depend on your personal preferences, so it may take some experimenting to find the size you're looking for

Open up any paint program (preferably a paint program with advanced features – such as Photoshop or GIMP)

Step-By-Step Procedure using Adobe Photoshop

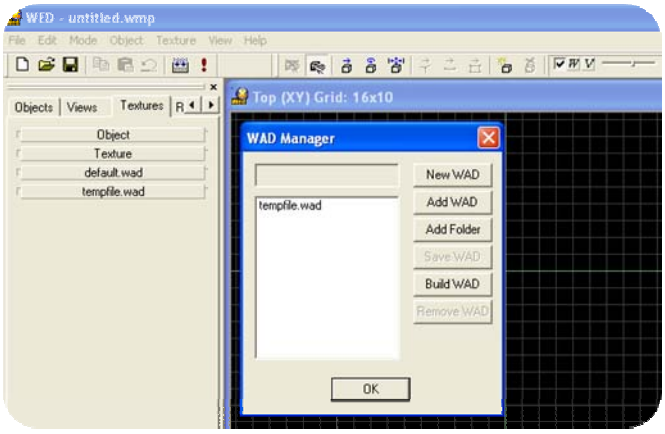
1. Crop the image if necessary to make the image a square
2. Click **Image -> Image Size** to change the image size

3. Save your picture as a ".bmp" or ".pcx" inside the folder you created

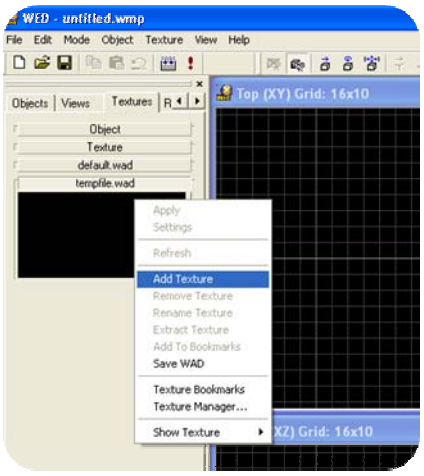


Step 3: Creating a WAD File

1. Open your level (in the WED)
2. Click **Texture** -> **Texture Manager**
3. Click New WAD
4. Pick a file name and select OK
5. Select OK again to exit the WAD Manager



Step 4: Importing Textures to a WAD File



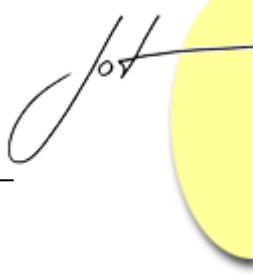
1. Click the **Textures Tab** on the left menu bar
2. Click on the name of your WAD
    a. This should open an empty black box
    b. When we are done you can view thumbnails of your textures here
3. Right-Click the black box and select **Add Texture**
4. Navigate to wherever you saved your textures and import them one at a time

Step 5: Saving your WAD file

Simply Right-Click and select **Save WAD** and save it as the same name you used to create the WAD File in Step 3

Step 6: Adding the new WAD file to Future Game Projects

1. Open the level you want to add the WAD file to
2. Click **Texture** -> **Texture Manager** and select **Add WAD**
3. Find your WAD file and select Open
4. Click OK to exit the WAD Manager



2 TEXTURING OBJECTS

Q: Why are textures important?

A: Every object in 3D Game Studio is textured

Even if you don't texture an object, then when your game is compiled, 3D Game Studio will textures it for you using default.wad

3D Game Studio also provides you with many prefabricated objects that are fully textured, such as trees and furniture. However; you don't have to be stuck with a prefabricated object if you don't like the way it's textured. You can retexture any object - including prefabricated ones - as often as you like.

Step 1: Import your WAD files

Note: if you already have access to your WAD file, then feel free to skip this step

1. Click **Texture -> Texture Manager**
2. Click **Add WAD**, find your WAD file and select **Open**
3. Find your WAD file and select **Open**
4. Click OK to exit the WAD Manager

Step 3: Texturing your Object

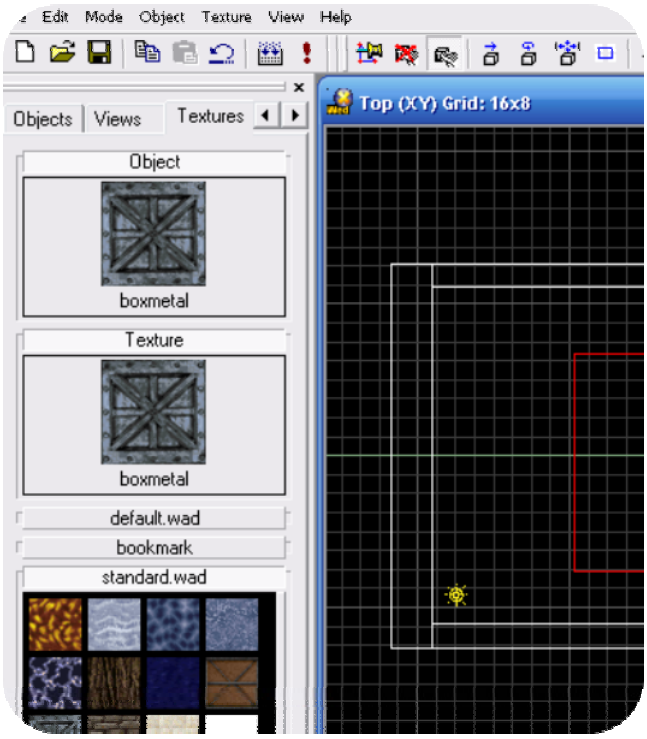
There are two ways to texture an object in the Level Editor. It really all depends on what the object is and what you are trying to do. You may only want to texture only one side or a face of the object. You may, however, want to texture the entire object.

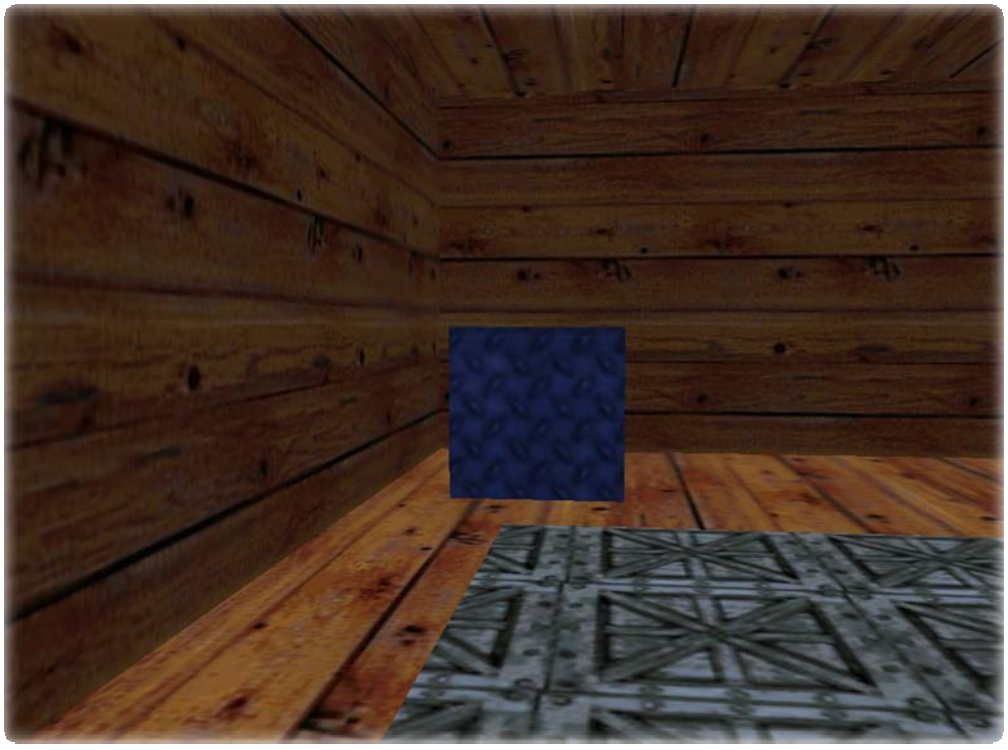
Texturing All of an Object at once

1. Click **Texture -> Texture Lock**
   - This will make it so when you apply the texture it will cover all sides of the object
2. Click **View -> Texture**
   - This will allow you to see all textures that you have applied your objects inside the Level Editor

3. Select the Object and click the **Textures Tab** on the left menu bar
4. Click on the name of the WAD holding your textures
5. Hover the mouse over the texture you want
   - Notice that this texture now appears in the *texture window*, along with its name
   - This gives you a chance to confirm that the selected texture is what you want before you use it
6. Click **Texture -> Apply to Object**

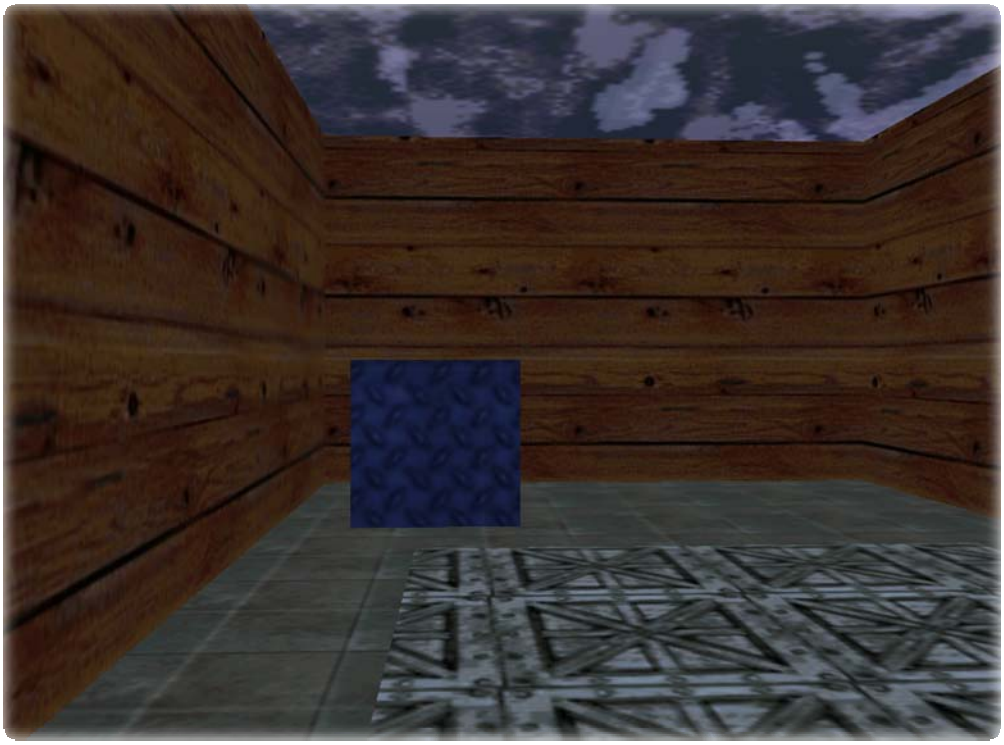
Your object has now been completely textured!





Texturing Part of an Object

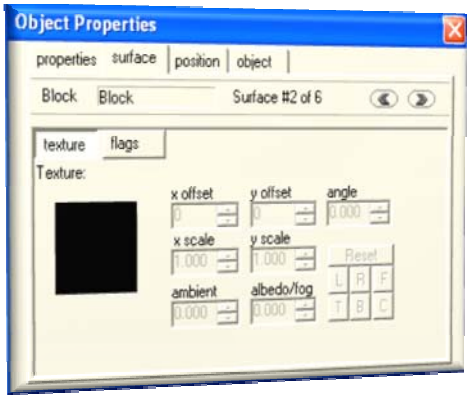
1. Select the Object
2. **Scope Down** the Object
   - For this example, we will use a room
3. Select a wall
4. Click **Textures** on the left menu bar
5. Click on the name of your WAD holding your textures
6. Mouse over the texture you want
7. Click **Texture -> Apply to Object**
8. Repeat as necessary



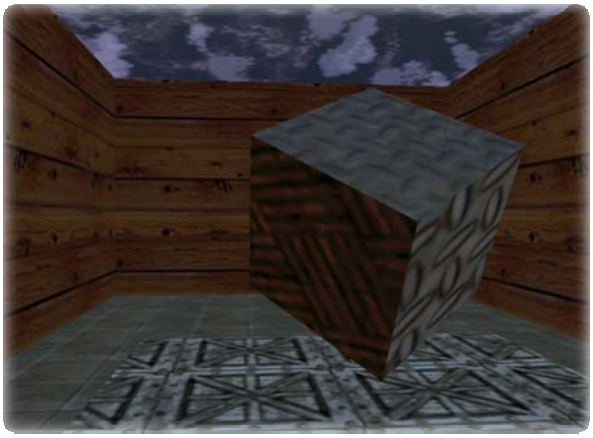
Even though it's not shown, the outer walls also have the same texture that was applied to the inner walls. This is alright if you will never leave the house - but if you do, you will have to change the way your rooms are textured. The way to achieve this is to go back and texture the faces of the wall one at a time. Prefabricated objects can have many sides – sometimes ranging into the hundreds. Texturing each face can become thoroughly tedious, so many professionals save this detailed texturing for later. This isn't a complicated process, but it *is* time consuming.

Texturing one Surface of an Object

1. Select the Object
2. **Scope Down** the Object
   - Remember that not all objects can be **Scoped Down**
3. Right Click on the Object and Select **Properties**
   - Notice Surface #2 of 6, the arrow keys, and the texture preview
   - This means that we're on face 2 of 6 and the face has not been previously textured
4. Use the arrow keys to select a surface face you want to texture



5. Click **Textures** on the left menu bar
6. Click on the name of your WAD holding your textures
7. Mouse over the texture you want
8. Click **Texture -> Apply to Object**
9. Repeat for as many surfaces as you wish

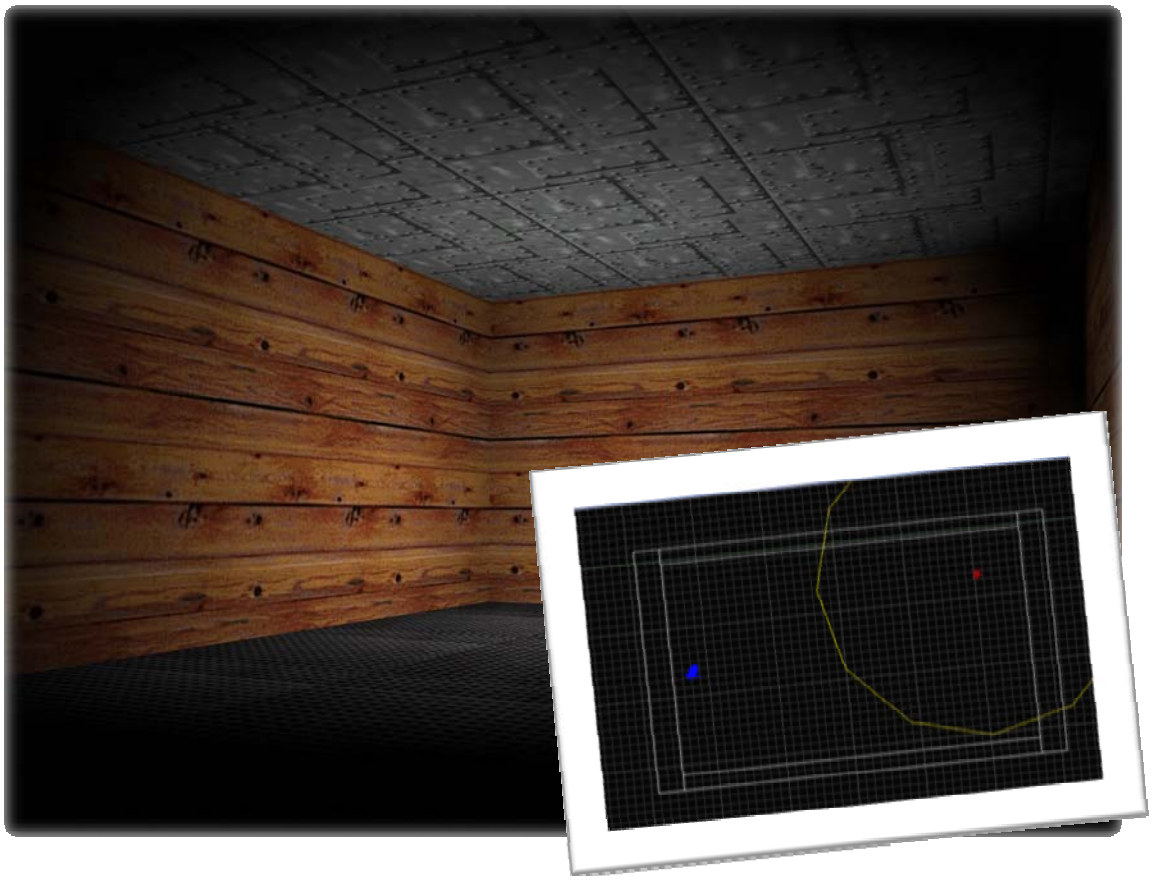


3 LIGHTING

Though 3D Game Studio is a somewhat less professional-grade engine (when compared with engines like Unreal™, it *does* have some impressive lighting that features great ease of use and quality development. In essence, this engine renders images that look *so much better* with proper lighting.

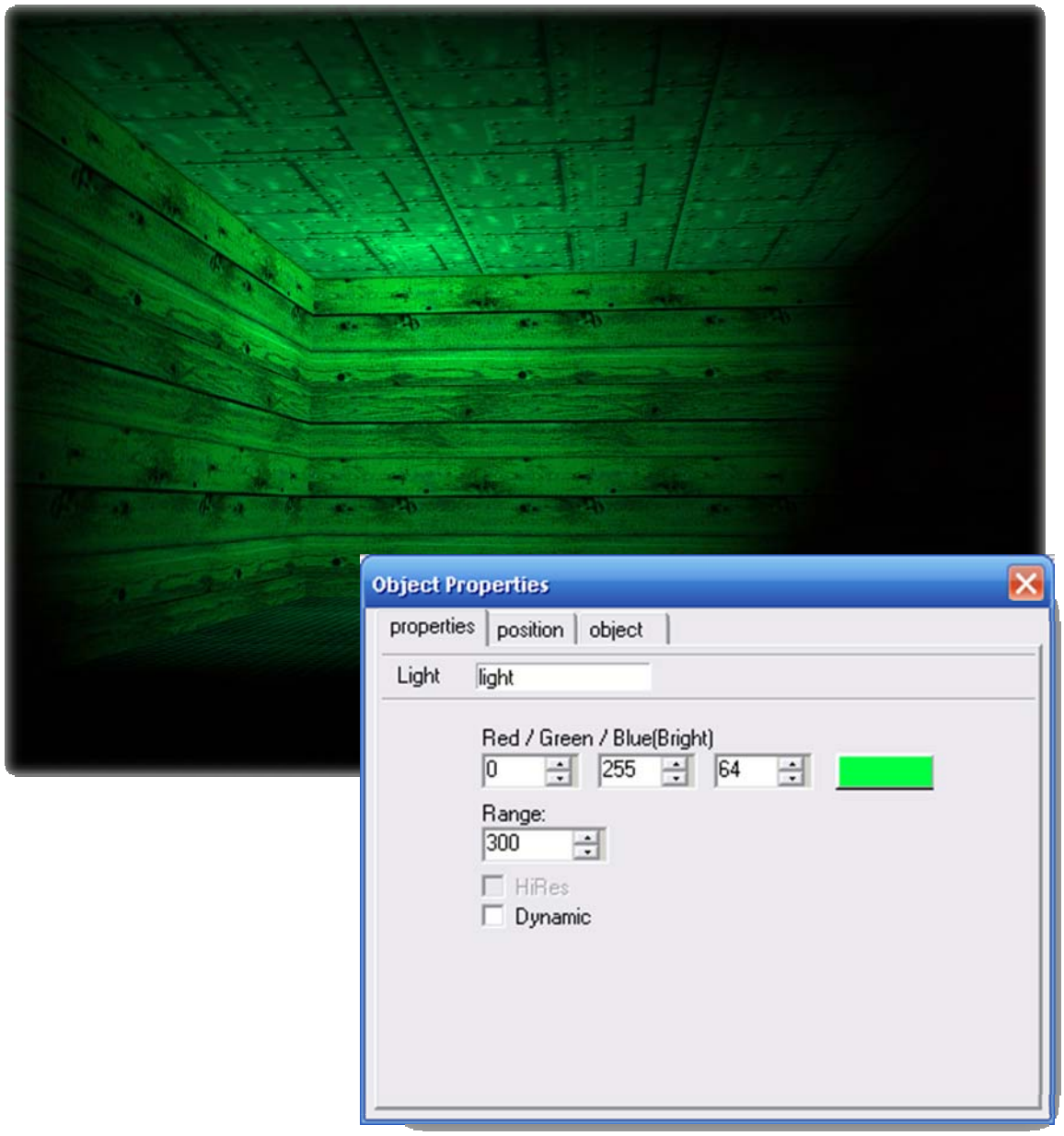
Step 1: Adding a Light Source

1. Add a light by selecting **Object** -> **Add Light**
2. Reposition the light object where you want it
   - Note: The light will not completely illuminate everything within the yellow orb. This orb simply indicates the furthest point at which things are affected by that source.
3. Compile and run to see the effect



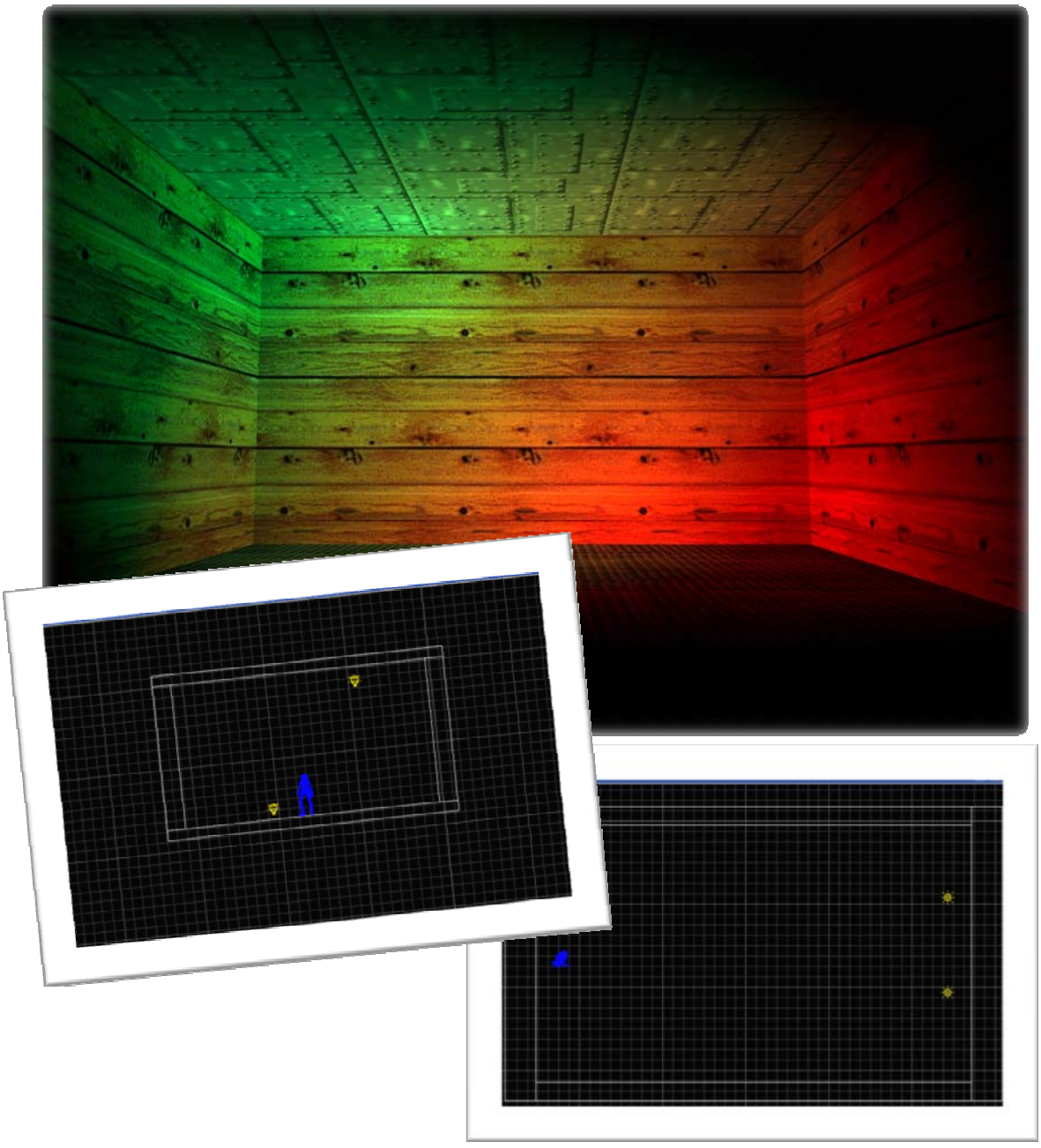
Step 2: Colored Lighting

1. **Right-Click** on the light object and select **Properties**
2. Then go to the **Properties Tab** if you're not already there
3. Notice the Red/Green/Blue number boxes. These will specify the lighting color – feel free to change them and experiment



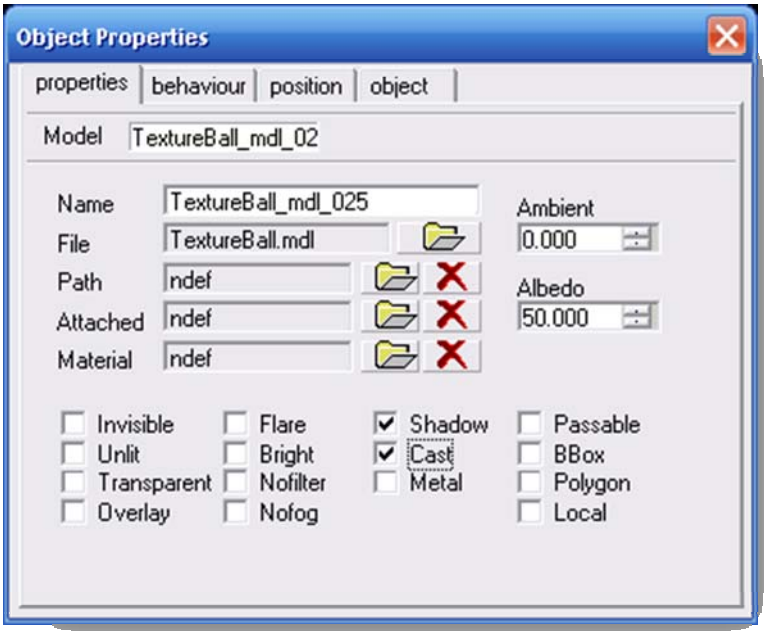
Step 3: Combining Colored Lights

1. Add another light
2. Place the lights near to one another and against a wall or structure of some kind
3. Make the colors different by setting their properties as you did in Step 2



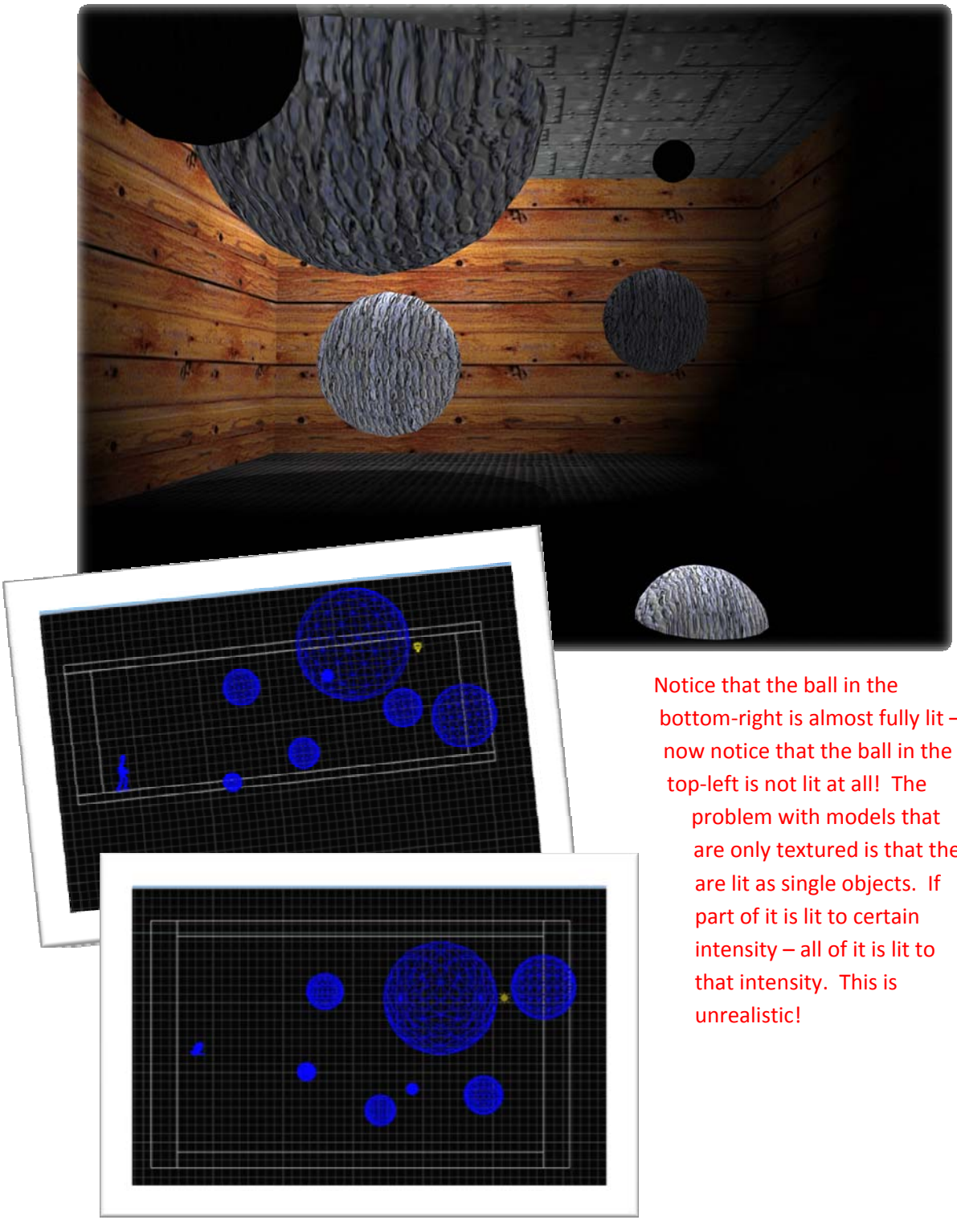
Step 4: Utilizing a Textured Object

1. Add **"TextureBall.mdl"** to the room by accessing **Object -> Load Entity**
2. Resize and adjust the ball as desired
3. Access the ball's Properties by Right-Clicking on it and selecting **Properties**
4. Check the boxes marked *Shadow* and *Cast*
   This will cause the ball to have a shadow on itself and cast one on the ground as well



5. Duplicate the ball as many times as desired

6. Test (**Build** and **Run**) the level



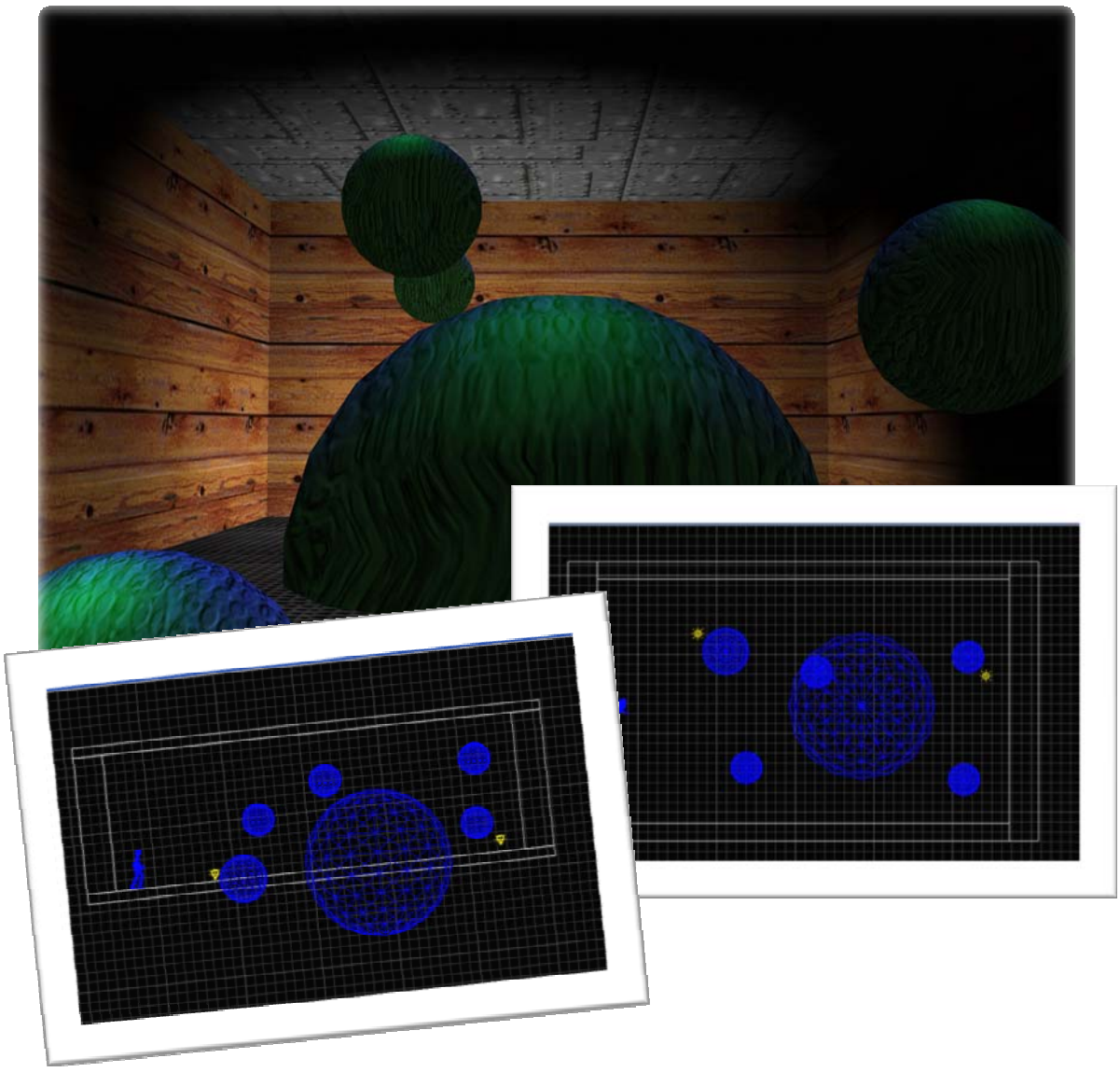
Notice that the ball in the bottom-right is almost fully lit – now notice that the ball in the top-left is not lit at all! The problem with models that are only textured is that they are lit as single objects. If part of it is lit to certain intensity – all of it is lit to that intensity. This is unrealistic!

Step 5: Utilizing a Material Object

Materials fix the "whole object has equal light intensity" problem. They are sort of like a coating over the models and textures. They allow for realistic lighting effects and can be *utterly gorgeous* on the screen!

1. Add **"MaterialBall.mdl"** to the room by accessing **Object -> Load Entity**
2. Resize and adjust the ball as desired
3. Duplicate the ball as many times as desired

Note: Remember to adjust the room lighting to achieve the desired effect



About the authors

Rex Cason II has been working with Dr. Prayaga in the UWF Game Department for the past few semesters. He currently possesses a Bachelor's degree in Computer Science and is working towards a Master's degree in Software Engineering at the University of West Florida. Rex is also an active member in the Association of Information Technology Professionals (AITP). In addition to his studies, Rex works part time at the Institute for Human and Machine Cognition (IHMC), where he is currently working on developing software to coordinate the actions of semi-autonomous robotic vehicles.

Erik Larson has been working with computers since he had purchased a cheap 386 IBM Compatible in 1995. In 1999, he entered the United States Marine Corps and pursued a specialization in computers. Today he is working towards a Master's degree in Software Engineering with the University of West Florida. He currently possesses Bachelor's degrees in Information Technology and Computer Information Systems with minors in Computer Science, Internet Technologies and e-Business also from the University of West Florida. He is a member of the Phi Kappa Phi, Gamma Beta Phi, and Upsilon Pi Epsilon Honors Societies.

Jonathan Robertson currently works at the Game Design Department in the University of West Florida. He hopes to one day have a career designing entertainment software with an emphasis on the quality and involvement of the story being told through the game.

Jonathan Frisch is working for a degree in Digital Media and studying animation/modeling itself and in games and movies. He hopes to get into the animation/modeling field of game development or movie production. His ultimate future goal is to be an independent film writer/director.

George Trice III is an Honors student double-majoring in Interdisciplinary Information Technology: Digital Media and Art with a Digital Specialization. His minor is in Communication Arts. He's been a gamer since age 5. Favorite game of all time: Super Mario World

Dr. Lakshmi Prayaga has recently completed her ED.d program from the University of West Florida. She has been actively working on the influence of games in education. In partnership with Escambia County in Florida, she was awarded a $1.5 million grant from the Florida department of education to develop serious games for 7th and 8th graders for mathematics and its relation to real life careers. These games will be implemented during this fall (2007). She is starting a gaming curriculum at the University of West Florida, and some of her students are working on the tutorials for a first person shooter game that will appear in the next few columns.