MASTERING Unreal TECHNOLOGY

The Art of Level Design

SAMS

EPIC GAMES

Welcome to
MASTERING UNREAL TECHNOLOGY:
The Art of Level Design

Creating Your First Map

Now that you know all these important aspects of level design, it's time to do some real level construction. The following tutorials introduce you to a variety of fundamental concepts and tasks that you will need to understand before you're ready to complete your own levels. You'll begin simply by subtracting out a box-shaped room, and then "paint" it with texture, add some lights, and go on from there. **FIGURE 3.21** shows the completed level you will end up with after completing the tutorials in this chapter.

3
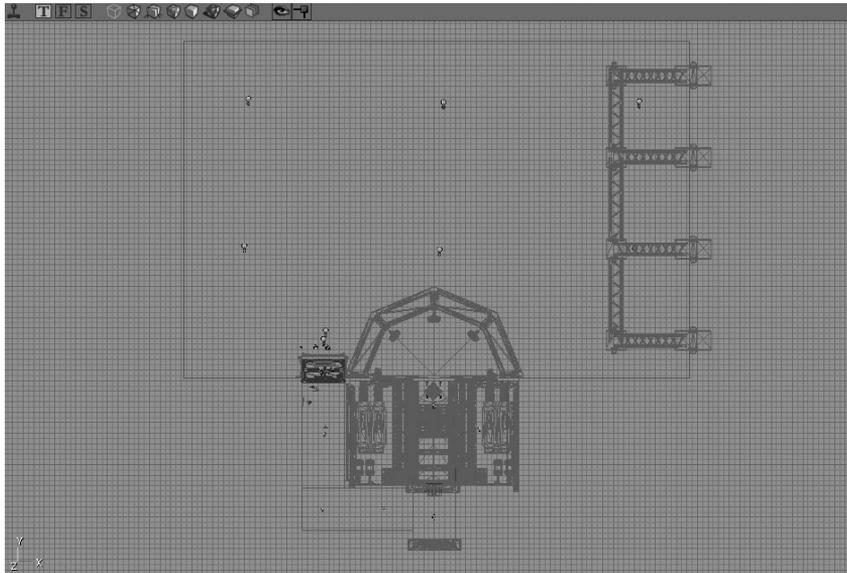
FIGURE 3.21 A completed level.

Subtracting the First Room

TUTORIAL 3.2 shows you what you need to know to create your first open space from Unreal's world of infinite solid mass:

TUTORIAL 3.2: Subtracting a Simple Room

1. Start UnrealEd and begin a new scene by choosing File > New from the menu.

2. You need to define the shape and size of your Builder brush so that you can create a subtractive brush of the correct dimensions. Open the CubeBuilder dialog box by right-clicking on the Cube primitive in the CSG section of the toolbox.
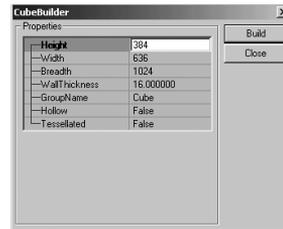
3. In the CubeBuilder dialog box, enter the following settings (see **FIGURE 3.22**), and then click the Build button. When you do, you'll notice that you can see the Builder brush as a red cube of the dimensions you selected. You can then close this dialog box.
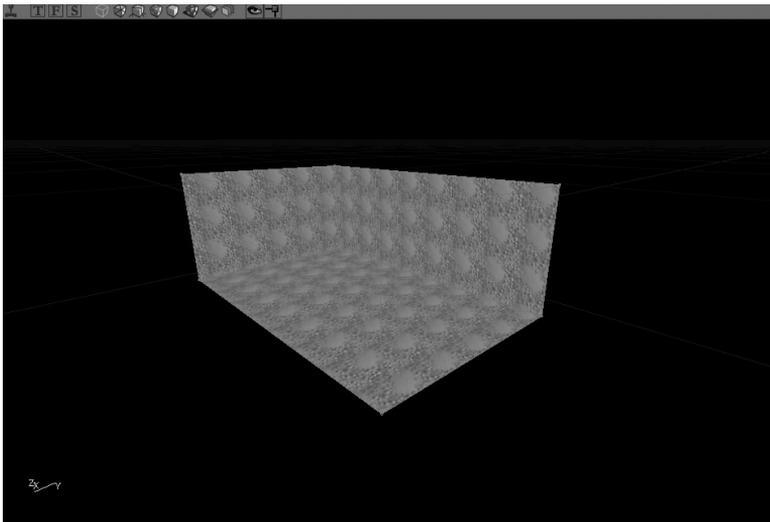
> Height: 384
>
> Width: 636
>
> Breadth: 1024

FIGURE 3.22 Dimension settings in the CubeBuilder dialog box.

4. Click the Subtract button in the toolbox. You have just created the first subtracted space of your map (see **FIGURE 3.23**).

**FIGURE 3.23** A subtracted room.

END TUTORIAL 3.2

Adding Textures

Right now, the textures on your room's surfaces look rather bland because they're covered with the default texture. If you don't select a texture from the Texture browser before adding or subtracting mass in your map, the surfaces of the resulting brush are covered with the default

texture—a greenish bubbly surface. Selecting a texture from the Texture browser *before* adding or subtracting is a good idea. If you forget to do this, you can still change those textures by using the Texture browser.

To open the Texture browser, click its icon on the toolbar of the UnrealEd window. You can use this browser to view textures included in texture packages and to filter the number of displayed packages by selecting specific groups (see **FIGURE 3.24**). You can find out more about the menus and features of the Texture browser in Appendix A.
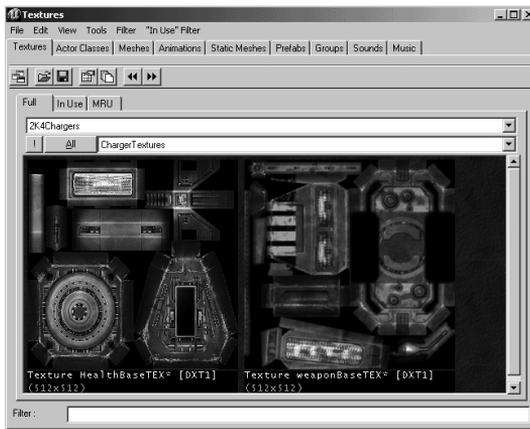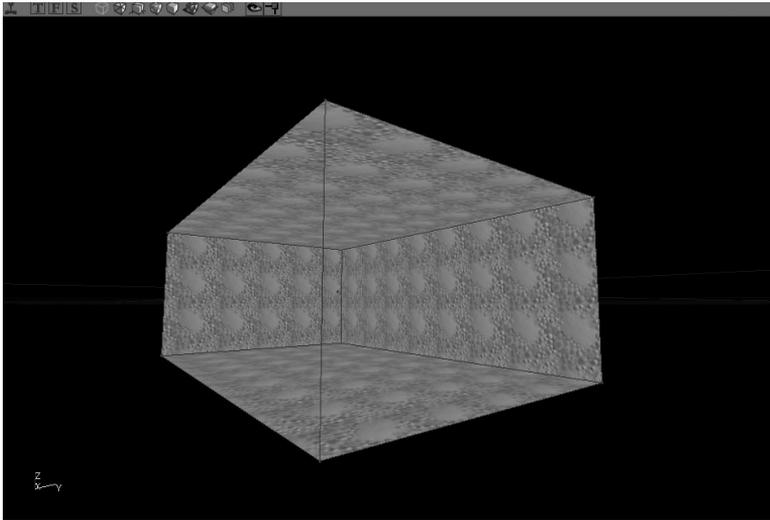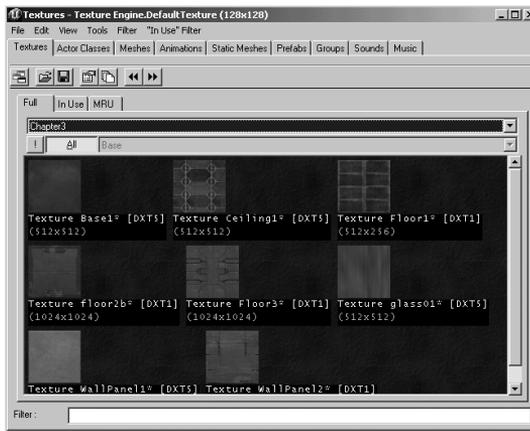

FIGURE 3.24 The Texture browser.

TUTORIAL 3.3 demonstrates how to select textures for the walls, floor, and ceiling of your room. The textures you need are stored in a package, so first you need to load that package.

TUTORIAL 3.3: Texturing the Room

1. Notice that if you click on any surface in your room, it turns blue to indicate it is selected. Before you begin texturing, make sure no surfaces are selected (see **FIGURE 3.25**). If a surface is selected, click it again to deselect it.

2. Open the Texture browser using the method described at the beginning of this section.

3. From the browser's menu bar, choose File > Open and select the `Chapter3.utx` file (see **FIGURE 3.26**). This package contains several textures divided into the following groups: Base, Ceilings, Floors, Wall, and Glass. You can switch between these groups by using the drop-down list next to the All button. Click the All button to see all textures in the package, regardless of what group they're in.

FIGURE 3.25 The room before texturing.

FIGURE 3.26 The Texture browser with the `Chapter3.utx` file loaded.

4. Click the list arrow next to the Add button, select the Walls group, and click the **WallPanel1** texture. The selected texture isn't applied to any surfaces in the level because no surfaces are selected.

5. Select the four walls in the room by Ctrl-clicking each one in the 3D viewport.

6. Click the **WallPanel1** texture again in the Texture browser. Notice that the texture is then applied to all walls (see **FIGURE 3.27**).
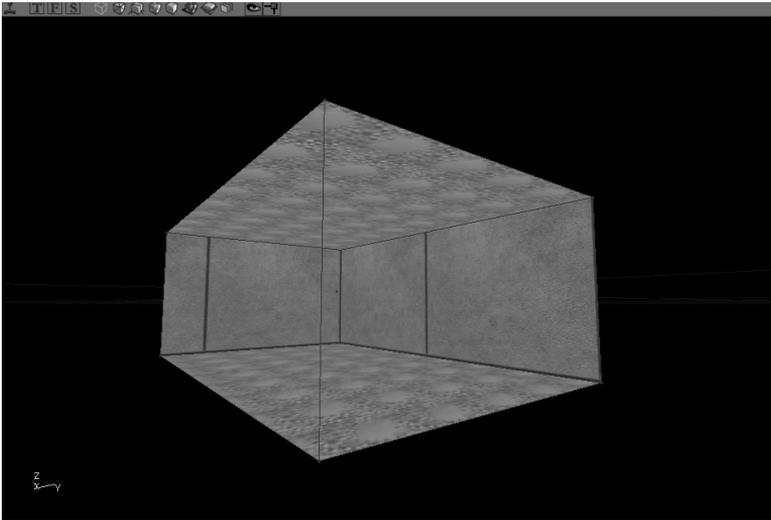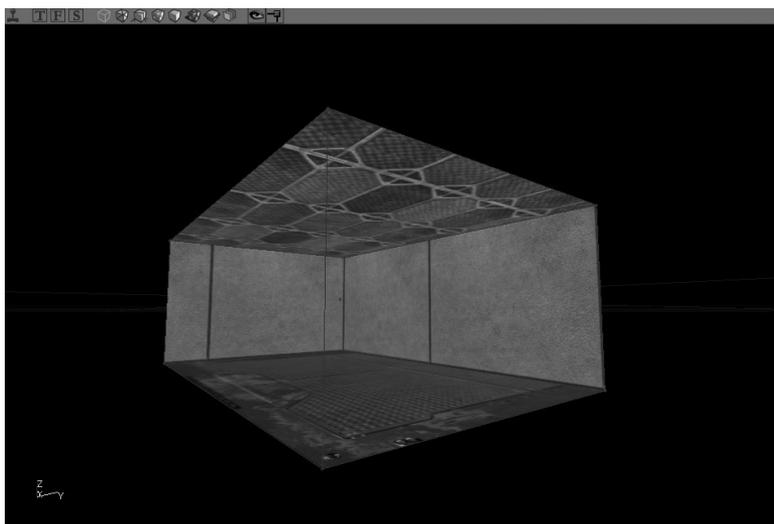
FIGURE 3.27 Walls with the `WallPanel1` texture applied.

7. In the 3D viewport, select the floor surface.

8. In the Texture browser, select the Floors group and click the Floor2b texture (see **FIGURE 3.28**).
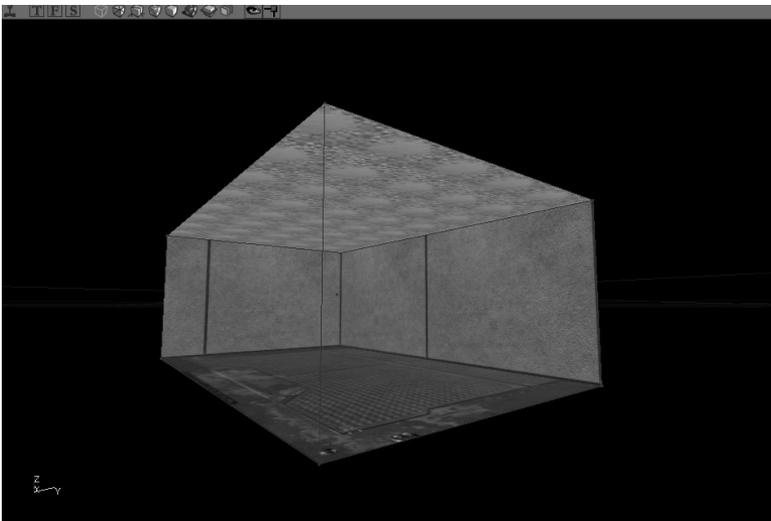
FIGURE 3.28 The floor texture applied.

9. Use the methods in steps 7 and 8 to select the ceiling surface and apply the Ceiling1 texture (see **FIGURE 3.29**).

FIGURE 3.29 A textured room.

Texture Fitting

You have now applied textures to your level, but they don't seem to be placed well. Using the Surface Properties window, you can adjust how the textures appear on each surface by using the surface's UV coordinates. A surface's UVs are a two-dimensional coordinate system for controlling the placement of a texture on a surface. In most cases, U is in the horizontal direction, and V is in the vertical.

You can type numeric values in the Surface Properties window instead of adjusting these coordinates interactively. The Surface Properties window also gives you access to special alignment tools not found in the toolbox. In **TUTORIAL 3.4**, you take a look at how to adjust textures in your level. Note that many of the numeric values given in this tutorial were derived through experimentation.

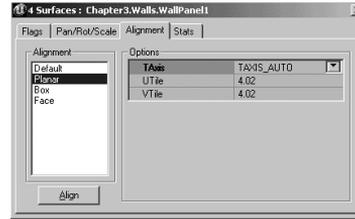### TUTORIAL 3.4: Fitting the Textures

1. Select the four walls in the room.

2. Click the Surface Properties button or press F5.

3. In the Surface Properties window, select the Alignment tab, set the following options (see **FIGURE 3.30**), and then click the Align button:

Alignment (list box at the left side of the window): Planar

UTile: 4.02

VTile: 4.02

FIGURE 3.30 Alignment tab of the Surface Properties window.

4. The wall appears to have tiles, but the alignment is still off because the tiles at the edges of each surface look cut off. To fix this problem, in the Surface Properties window, select the Pan/Rot/Scale tab (see **FIGURE 3.31**).

5. As you can see, the textures need to be moved vertically to align correctly with the floor and ceiling. With all four walls still selected, click the Pan V 64 button four times. You can see the textures move downward 64 units each time you click the button. Four clicks should make everything align with the top and bottom of the walls.

6. You're almost finished, but you can see that the two short walls need their textures aligned horizontally. Go ahead and select these two walls now.

7. Click the Pan U 64 button four times. The walls should then be aligned correctly (see **FIGURE 3.32**).

8. For the ceiling and floor alignments, the following are the recommended alignment numbers. Using the technique demonstrated earlier in this tutorial, see if you can get everything aligned correctly. **FIGURE 3.33** shows an example.
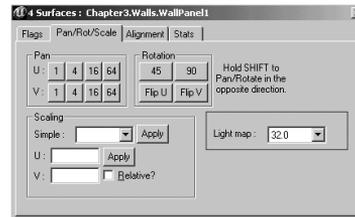
NOTE

You can pan in V in a downward direction simply by clicking any of the incremental buttons. Pressing Shift while clicking pans the texture back up. This is, of course, in relation to the surface you're facing.
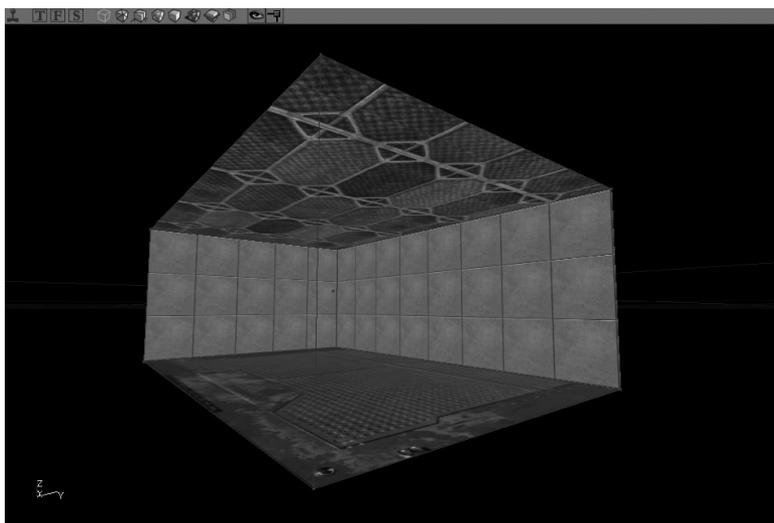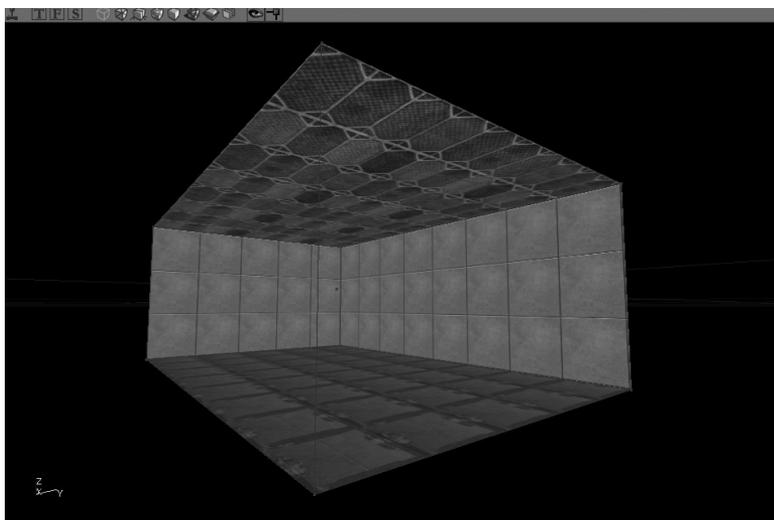

FIGURE 3.31 Pan/Rot/Scale tab of the Surface Properties window.

NOTE

If all four walls are still selected, you can simply Ctrl-click the two longer walls, thereby deselecting them.

Floor

Alignment: Planar

UTile: 8.0

VTile: 8.0

Ceiling

Alignment: Planar

UTile: 2.0

VTile: 2.0

FIGURE 3.32 Correctly aligned walls.

FIGURE 3.33 Correctly aligned floor and ceiling.

END TUTORIAL 3.4

Making the Level Functional

Lights, as you might imagine, are essential to your levels. Lightless game levels look much like a room with the lights turned off. Obviously, playing a lightless game would be quite difficult. Lights are used not only to allow players to *see* your level, but also to create mood, add color, and control the dramatic "feel" of each area of the map. In the following tutorial, you make your level playable by learning how to place lights and rebuild the level to generate light maps for creating areas of light and shadow.

Before you can jump in and actually run around this map in the game, you need to add a few missing items. The first item, as mentioned, is a light source of some kind. The second is a Player Start Actor, which gives your map a point of entry for any characters that want to play it. Finally, you must rebuild the level to calculate its world geometry and generate the light maps that make surfaces seem to be illuminated.

TUTORIAL 3.5: Making the Level Functional

1. First, add a light. Right-click on the center of the ceiling surface in the 3D viewport, and choose Add Light Here from the context menu. A light bulb icon is displayed to represent the light's position (see **FIGURE 3.34**).
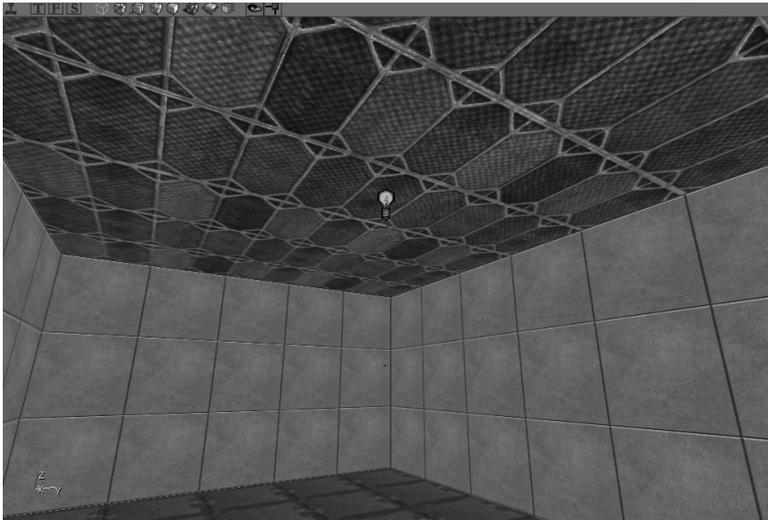
FIGURE 3.34 Newly created light.

2. At first, you probably won't see much change in the level. To see what the light will look like in the room, you must rebuild the level. Click the Rebuild All button on the toolbar.

   You can see some dim lighting with quite realistic softened shadows in the corners (see **FIGURE 3.35**). The lighting conditions in the room are affected by several things:

   > ▶ Light position

   > ▶ Light settings (brightness and color)

   > ▶ Number of lights in the room

   > ▶ Object placement and the shadows created by those objects

CAUTION

Forgetting to rebuild before testing a level often results in your characters dying as soon as they enter the game! If you run into this problem, be sure to rebuild your level's geometry.

3. With the light selected, click the Actor Properties button on the toolbar or double-click the light's icon.
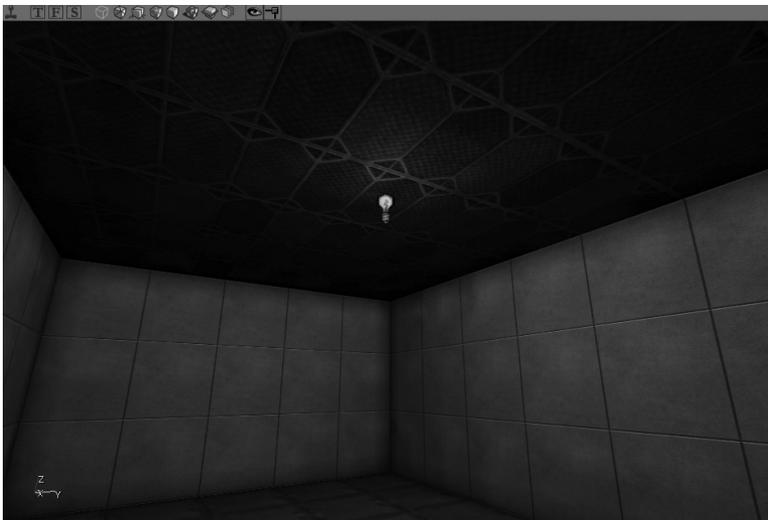
FIGURE 3.35 Room with lighting.

4. In the Light Properties dialog box, expand the LightColor section and set the **LightBrightness** property to **128** (see **FIGURE 3.36**). You'll notice the room get brighter, but this isn't an accurate representation of the new value. To see an accurate representation, you need to rebuild the level again. Do so now.

NOTE

You can also click the Build Lights button or the Build Changed Lights button on the toolbar for the same effect.

5. Now it's time to add a Player Start. Right-click on the floor surface, somewhere near its center, and choose Add Player Start Here from the menu.

   A joystick icon is displayed to represent where the player starts (see **FIGURE 3.37**). When you click the icon, an arrow indicates the direction the player will be facing when he or she spawns into the map.

6. Time to play! There's no need to rebuild a level after adding a Player Start. You can simply click the Play Map! button on the toolbar and check out your new level (see **FIGURE 3.38**). Congratulations! You've finished a basic level!

7. When you're finished playing, press the tilde (~) key to close the console, and type **exit**. This immediately closes the game and sends you back to your desktop.
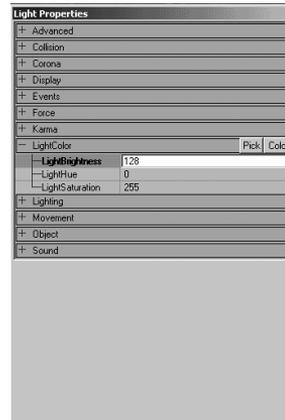
FIGURE 3.36 The Light Properties dialog box.
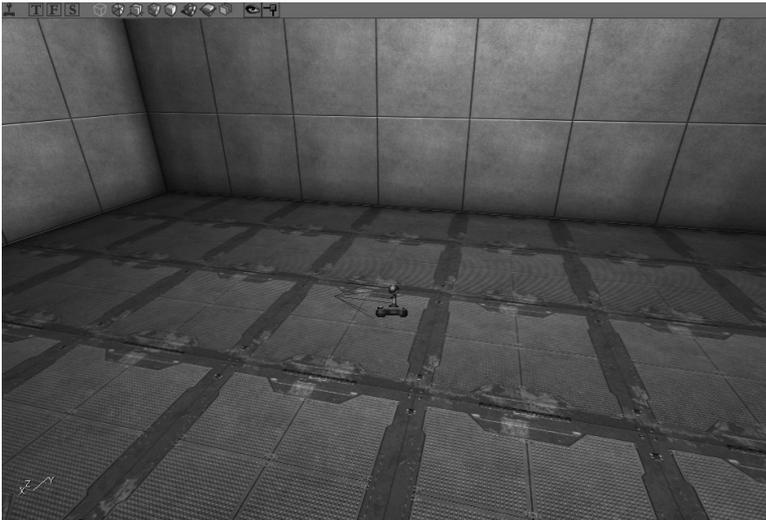
FIGURE 3.37 A Player Start icon with visible arrow.

FIGURE 3.38 A completed level.

END TUTORIAL 3.5