

IN-CLASS STUDENT ACTIVITY 4.2: TRANSFORM OBJECTS

Lesson Objective 4.2:

Transform objects. *Topics:* translation, scale, and rotation.

Resources, software, and additional files needed for this lesson:

1. A workstation with Windows 7®, Windows Vista®, or Windows XP®
2. Microsoft Visual Studio® or Microsoft Visual C# Express® (2008 or 2010)
3. XNA® Game Studio 2.0, 3.0, 3.1, or 4.0
4. Image.png, located in 98-374-ENU-4.2-IC-resources.zip

Guiding questions:

1. **How are objects transformed?** Change the texture of a shape, the size, and the rotation.
2. **Where is translation (scale and rotation) applied within the code?** Apply scaling and rotation in the *Draw* method.
3. **Describe each of the following in the context of animation: moving, point distances, planes.** Objects are moved by changing the position where they are drawn on the screen [changing the (x,y) values; point distances provide information about the distance between two objects, and planes are the 2-D representation of a 3-D world].

Student Activity:

Directions to the student:

Read the following scenario. Create an XNA project to complete the described tasks. Request assistance from the instructor as needed. Verify your solution with the instructor.

Scenario:

You are making great strides in your new position as a student intern at Tailspin Toys. The supervisor has a new assignment for you involving rotating, flipping, and scaling images. It has been some time since you have tried those techniques; fortunately, you found a short tutorial to refresh your skills.

The animation tutorial provides directions for creating code to rotate an image left or right, flip it horizontal or vertical, and scale it smaller and larger.

Content:

Use this *Draw()* method to create the following animation:

```
Public void Draw(Texture2D texture, Vector2 position, Nullable<Rectangle>
    source Rectangle, Color color, float rotation, Vector2 origin, Vector2
    scale, SpriteEffects effects, float layerDepth)
```

For each statement below, change the values to modify the image. Include the comment code for documentation.

Create the code to respond to keyboard commands as follows:

1. `//if you press the 'M' key, it will move the origin to the middle of the image`
2. `//Rotate right 20 degrees (hit R)`
3. `//Rotate left 20 degrees (hit L)`
4. `//Scale the image to twice the size (hit 2)`
5. `//Scale the image to ½ of the size (hit H)`
6. `//Scale the image to flip it horizontal (hit F for flip)`

Answer:

The code solution is located in 98-374-ENU-4.2-IC_Key.zip.