

TRAINER PREPARATION GUIDE 4.1: ANIMATE BASIC CHARACTERS

Lesson Objective 4.1:

Animate basic characters. *Topics:* movement, frames per second (FPS), apply sprite animation.

Required materials to teach 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. 98-374-ENU-4.1-LP
5. 98-374-ENU-4.1-IC
6. 98-374-ENU-IC-4.1_Key
7. 98-374-ENU-IC-4.1_Key.zip
8. 98-374-ENU-4.1-PC
9. Jumpingjacks.png, located 98-374-ENU-4.1-IC_resources.zip

Preparation Tasks

Technical preparation activities:

1. Install Visual Studio Express C# and XNA.
 - a. Windows XP users: Download Visual C# 2010 Express and XNA Game Studio 4.0 separately at App Hub (<http://create.msdn.com/en-US/>).
 - b. Windows Vista or Windows 7 users: Download Windows Phone 7 Developer Tools (<http://go.microsoft.com/fwlink/?LinkID=189554>), which includes Visual Studio C# 2010 Express and XNA Game Studio 4.0.
2. Unzip the JumpingJacks solution file located in 98-374-ENU-IC-4.1_Key.zip.

3. Vocabulary:

animation: a simulation of movement created by displaying a series of pictures, or frames.

pixel: a single small area of the display screen. The more pixels that a screen contains, the higher the picture quality will be.

sprite: a small bitmap image, often used in animated games but also sometimes used as a synonym for the word *icon*.

sprite sheet: A single graphic file that contains many sprites that can be used by specifying a source rectangle to determine which sprite to draw. This is much more efficient when you need multiple images.

translation: the process of moving an object. We translate an object from one point to another point by moving each point inside the object correctly.

4. **Additional readings and resources:**

MSDN®:

XNA Game Studio: <http://msdn.microsoft.com/en-us/library/cc178930.aspx>

Animating a Sprite: <http://msdn.microsoft.com/en-us/library/bb203866.aspx>

Other resources (books, e-reference):

Miles, Rob. Microsoft XNA Game Studio 4.0: Learn Programming Now! (Redmond, Wash.: Microsoft Press, 2011).

Instructor computer setup:

1. Open the JumpingJack solution file to preview for the students.

Instructional preparation activities:

1. Review the instructor notes in the notes pane of Microsoft PowerPoint® presentation 98-374-ENU-4.1-LP.
2. Make copies of student documents available as needed.

Lesson sequence (50 minutes)

Activating prior knowledge/lesson staging (5 minutes):

Direct students to answer each question in the “Guiding questions” section of the In-class Activity document, or in their personal class notes.

Guiding questions:

1. **How do characters (sprites) move across the screen?** Movement is based on the speed, direction, and rotation of an object. All movement and measurements are in pixels. To move sprites accurately, you need to know their current coordinate position (in 2-D, it would be the upper-left coordinate point in (x,y) format, and for a 3-D game, it would be (X,Y,Z) format.
2. **How does the FPS rate affect the animation?** The faster the FPS, the smoother the animation appears.
3. **What is a sprite sheet?** A single graphic file that contains many sprites that can be used by specifying a source rectangle to determine which sprite to draw. This is much more efficient when you need multiple images.

Lesson activity (40 minutes):

1. Teacher instruction (15 minutes)
 - a. Use the included PowerPoint presentation to review basic animation.

2. In-class activity (20 minutes)
 - a. Students are to complete ERK-98-374-ENU-4.1-IC.
 - b. Provide the students with the following coordinates for each stick figure if they do not have access to a graphics program:

```
Rectangle image1 = new Rectangle(30, 0, 91, 182);  
Rectangle image2 = new Rectangle(137, 0, 116, 186);  
Rectangle image3 = new Rectangle(266, 0, 121, 200);  
Rectangle image4 = new Rectangle(31, 198, 107, 200);  
Rectangle image5 = new Rectangle(138, 198, 60, 200);  
Rectangle image6 = new Rectangle(266, 200, 61, 200);
```
 - c. The completed project is provided in 98-374-ENU-IC-4.1_Key.
3. Post-class activity (5 minutes)
 - a. Provide instruction for the post-class activity as needed. Establish a completion date.

Lesson review (5 minutes):

1. Discuss the guiding questions.
2. Instruct students to write and submit any questions they have or any topics about which they would like more assistance.
3. After class, look through the student responses and follow up with any student requiring additional help.