

## Animation

Animation in Java is possible through the drawing of successive frames several times per second.

One way you may want to create animations in Java is through the use of timers. For animation, it is best to use `javax.swing.Timer` rather than `java.util.Timer`. This is because swing timers will automatically execute on the event dispatch thread, so the GUI will update immediately. The util timer is more appropriate for complex processes.

We know that through the use of the `ActionListener` interface, the `actionPerformed` method is called whenever an event occurs. By adding code to the `actionPerformed` method of the timer, these events can be responded to at specific intervals. Swing timers are useful for repeating events or performing tasks after a time delay.

Another way to create animations in Java is to use Threads. When you use a separate Thread for animating, the Thread will be able to continue animating at a regular speed without stuttering or slowing down noticeably when performing operations in the other Threads. If multiple different Threads are used for animating, then different parts of the animations run by different Threads can go at different speeds, allowing for more variation in animation.

If a system does not have sufficient storage to dedicate enough memory to the animation process or as much processing power as the creator of the animation had in mind when creating the animation, it may not animate at the right speed. A step between frames may be set to 15 milliseconds, but with other processes running it may take longer than 15 milliseconds for the timer to count that high, causing the animation to slow down. The most common way to stop this from happening would be to have the process repeatedly query the current system time to determine the elapsed time, and then compare where it is in the process to where it should be after that amount of time elapses, and speed up or slow down to keep closer to where it should be.

When making animations, there a lot of other languages that are used commonly. While Java animations are a distinct possibility, there are many different ways of making animations. The animations online sometimes use Java, but also are commonly done using Flash and Silverlight, which are better integrated with C#, Javascript, Ruby, Python, or C++. A lot of animation done will be made in a program where you do not use any programming language. However, integrating these programs with PHP, HTML, CSS, or XHTML can allow you to control your animation based on user input, and lets the user control the rate of the animation based on what they choose.

Sources:

Big Java

<http://docs.oracle.com/javase/tutorial/uiswing/misc/timer.html>

<http://fivedots.coe.psu.ac.th/~ad/jg/ch1/index.html>