

# Lines

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## Overview

Lines draws a number of connected lines whose endpoints bounce around randomly within a view. The slider regulates the number of endpoints (you can select from 2 to 20). Lines uses PostScript user paths to speed its drawing. Note that Lines isn't the best example of how to write a fast animation program in OpenStep; it simply shows off the use of user paths and some techniques for speeding up drawing.

## Theory of Operation

The LinesView maintains an array of points and their velocities. When you press the `Go` button, the LinesView starts an NSTimer which calls the `animate:` method as fast as possible. The `animate:` method repeatedly takes each point and moves it according to its velocity (changing its velocity if it hits a side). It then uses PostScript user paths (via a UserPath object; see below) to draw lines between the points.

## UserPaths Made Simpler

The code in UserPath.[hm] makes user paths easier to use. Instead of having to allocate space for the points and operators, maintain the bounding box, etc., you create a UserPath, add points to it, and send it to the window server. The UserPath methods construct the userpath, allocate more memory for a UserPath based on how many points you've asked it to contain, adjust the bounding box to encompass all points, etc.