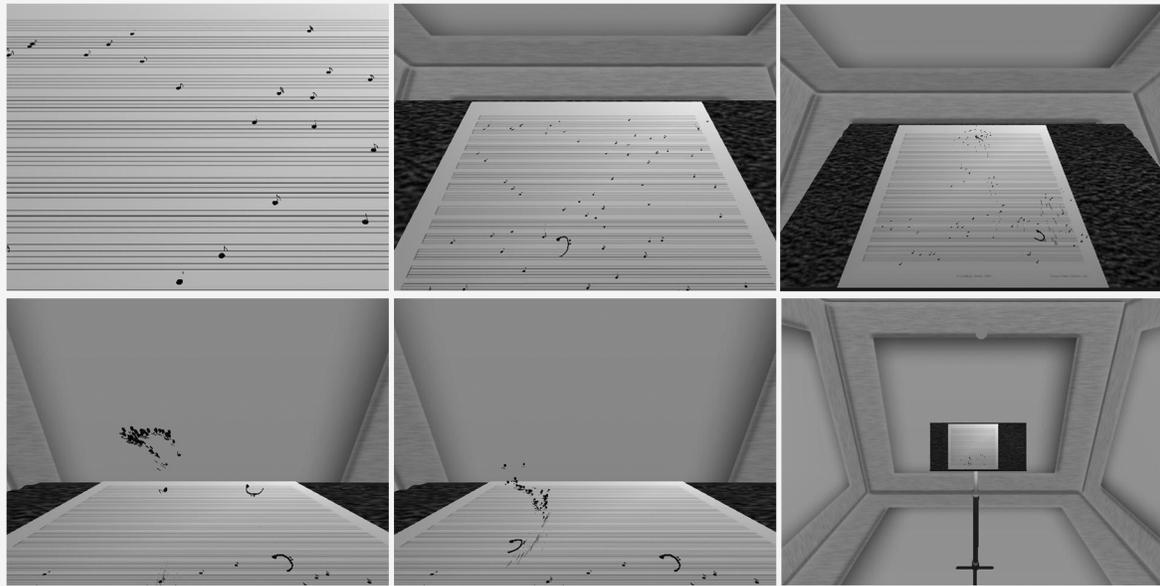


# Music Box: Emergent Behavior

Lindsay Grace, Miami University, 800 High Street, Oxford, Ohio, Email: LGrace@MUohio.edu



## Overview

*Music Box* is an artistic implementation of emergent behavior to create music. *Music Box* employs a flocking algorithm (Reynolds, 1999) to display animated notes that rise from a written score and move to create a flock-lead musical arrangement. The result is emergent sound; a musical composition directed by the visual representation of flocking. The experience is a pseudo-synesthetic application of visual rules to the creation of music.

The philosophical goal of this creative exploration is to experiment with freeing the musical score from the prevalent model of composer, performer and listener. Instead the experience is more democratic. Here, the composer suggests, the performer follows a few loose rules, and the listener plays with the composition. As a performance, it attempts to conflate listener and composer, in much the same way author and player are combined in sandbox game narratives. This is accomplished through the development of artificial intelligence software that applies the visual rules of flocking behaviors to the algorithmic arrangement of musical tones.

## Treatment

The piece begins when musical notations ascend from two dimensions to three. In pursuit of an analogical representation of contemporary compositional rules, the notes follow their clefs in a predator-prey relationship. The notes resound as they race around the clefs, seeking them out, but never actually catching them. The dance ends when the prey descends back to their two-dimensional world and the predators follow.

Each musical element from the score has its own tone. Changes in pitch and volume occur as it moves through the scene. There are but two timbres, the heavy tone of a bass clef and

the plucky lightness of pursuing notes. The sound is scalar, emphasizing pursuit. The aesthetic is a black and white binary, visually demonstrating the dichotomous prey and predator.

### **Technology and Installation**

*Music Box* was created using the Blitz3D game environment. The distinct algorithm for generating music combines 6 vector calculations for each element of the simulation. This vector sum dictates movement within the virtual space. The vector sum is then applied to a single initial frequency and coupled with a velocity relevant pitch (Grace, 2010).

This work is designed to be a small, intimate experience akin to a late night gaming session. As such, it has been exhibited as a small screen (15"-21") interactive installation, an interactive black box room installation with projection, or as a looping video on a 10" inch video display. The interactive versions of the Music Box experience are controlled by a computer game controller.

### **References**

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