Bird Data Visualization/Sonification - Final Project
Yifeng Yvonne Yuan

In this project, I created an interactive bird sighting visualization and sonification tool using real-time data from the eBird API. The program allows users to type in the name of a bird species, and all matching sightings from the past month are displayed on a map of the United States. Each sighting is marked at its accurate geographic location, and users can also hear the bird's chirping when available.

The inspiration behind this project came from two places: my fascination with bird sounds, and the API integration I learned in class. My original prototype was a text-based art piece modeled after a flipping-board-like display. However, I found the abstraction of pure text to lack semantic meaning. I wanted something more specific, which then led me to birds and their data.

The visual design is minimalistic, with a clean white background, an outline of the continental U.S, animated flocks of birds flying around, and an interactive search interface with corresponding birds displayed. Here is a breakdown of all the components:

1. Flock of Birds

The core algorithm powering the flock behavior is Craig Reynolds' Boids Algorithm, which models separation, alignment, and cohesion. Each behavior outputs a PVector that contributes to the bird's acceleration. I added an additional feature: birds appear larger near the center of the screen and smaller near the edges, creating a depth effect.

2. The US Map

To draw the US map, an svg file is first loaded. Then, all the edge paths of the map are looped through, and the lerp( ) function is used to interpolate points between each pair of vertices, creating evenly spaced dots along the map's outline.

3. The Bird Display
All bird sighting data is pulled live from the eBird API. Here is an example of the API data:

```
"speciesCode": "mallar3",
"comName": "Mallard",
"sciName": "Anas platyrhynchos",
"locId": "L7214385",
"locName": "Beaver Pond, Pine Hill Rd.",
"obsDt": "2025-03-23 13:59",
"lat": 41.3330775,
"lng": -74.318579,
"obsValid": true,
"obsReviewed": false,
"locationPrivate": false,
"subId": "S220306339"
```

Through latLngToGrid( ), the location of bird on the screen is calculated. Once the mouse is hovered over (less than 12 pixels), the bird species and location will be displayed.

To listen to the bird's sound, user can click the bird icon. Processing would send the bird's name to MAX Msp through OSC.

All the bird sound files are managed through a "local API", where I made a designated folder of downloaded audio clips. As long as the clicked-on bird name matches a filename in the folder, its sound is triggered and played. This logic is managed in MAX Msp.

There is also an optional ambient audio layer, which the user can toggle on or off to accompany the visual environment.