ASE Initial Design

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1. Class Responsibilities & Diagram

1. **Boid**
   Creates boids using information about the initial position and size and assigns the starting velocity and acceleration for each boid. It defines the maximum speed of movement and maximum applicable force which will vary according to the size of each boid. It will also include an object of class Behavior which would be used in the run method to call flock method of Behavior. Also, initially all the boids will start off with no color. The run method will sequentially call allotBrush method of brushStroke, flock method of Behavior and its own update method to update boid position, velocity, acceleration and color.

2. **Behavior**
   A class to record all the possible behaviors of the boids: separation, align, cohesion, view, swarm, seek, path following, flow field following. Its flock method is responsible for setting up calls to different boid behaviors and assigning weights or priority order to each. It will take boid list and a choice parameter as input. Choice to choose an action to perform: flow field, path following or rest all.

3. **Flock**
   This class sets up the initial list of boids. The main will send the first call to runflock method of Flock which in turn calls run method of Boid and triggers the action. Apart from carrying the list of boids it also provides the facility to add new boids to the list via addBoid.

4. **Target**
   Target class is responsible for creating and setting locations from where boids will pick colors. It will have size and target boundary which will be constant for all the targets. The target boundary is to set a limit which when a boid crosses is applied target's color. The targets' color will be set during target creation. The setTColor method allows us to change target's color and changePosition to shift existing targets if required.

5. **colorPalette**
   The class will contain a list of all the targets and the creation of any new target will follow via its addTarget method. Boid class will use this changeColor function of this class to set target's color to the boids when they are within target's boundary.

6. **brushStroke**
   The main purpose of this class is to allot brushes to the boids based on their sizes and apply the boid color on plane as they move. The run method of the Boid class will call allotBrush which will in turn call applyBColor to perform this task. To start with we will have four brushes. To create new brushes the constructor will be called with input of size and a spread value; the spread value to set the tolerance limit of color spread. It has a vector list to record and manage new and existing brushes.

7. **flowFileds**
   This class will be responsible for setting up three types of flow fields: Perlin Noise, Flow to center and random. Based on the value of “choice” passed via flock of Behavior it will set up one of the flow fields. The lookup function will then be called to enable the boids to see the vector in a particular cell and direct their movement accordingly.

8. **Path**
   Path is considered as connection of points. The class will have a vector of points, width of the path, addPoints to extend the path. Similar to flowFields its work will depend on the value of “choice”. If called, the followPath of Behavior will use this class to set up the desired path.